INTERNATIONAL CIVIL AVIATION ORGANIZATION

FINAL

REPORT OF THE TWENTY-NINTH MEETING OF THE REGIONAL AIRSPACE SAFETY MONITORING ADVISORY GROUP (RASMAG/29)

BANGKOK, THAILAND, 19 – 22 AUGUST 2024

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

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

CONTENTS

APPENDIXES TO THE REPORT

…………………………

INTRODUCTION

Meetings

1.1 The Twenty-Ninth Meeting of the Regional Airspace Safety Monitoring Advisory Group (RASMAG/29) was held from 19 to 22 August 2024, at the ICAO Asia and Pacific Regional Office in Bangkok, Thailand.

Attendance

2.1 The meeting was attended by 60 participants from 17 States, one Special Administrative Region of China, and four International Organisations including Australia, Brunei Darussalam, Cambodia, China, Hong Kong China, Indonesia, Japan, Malaysia, Mongolia, New Zealand, Pakistan, Philippines, Republic of Korea, Singapore, Sri Lanka, Thailand, United States of America, Viet Nam, IATA, IFALPA, IFATCA and ICAO.

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

Officers and Secretariat

3.1 Ms. Saifon Obromsook, Director of Safety Management Department, AEROTHAI, chaired the meeting.

3.2 Mr. Ying Weng Kit, ATM Officer and Mr. Hiroyuki Takata, Regional Officer, ATM, ICAO Asia and Pacific Office, were Secretaries of the RASMAG/29 meeting. They were assisted by Mr. Anony Chui, AIM/ATM Officer, and Dr. 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. Tao Ma, Regional Director of ICAO Asia and Pacific Office, Mr. Ying Weng Kit 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 33 Working Papers (WPs), eight Information Papers (IPs) and four Flimsies were presented to the meeting.

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

5.4 **DISCLAIMER**: The presentation of material in this report does not imply the expression of any opinion whatsoever on the part of ICAO, APANPIRG or the RASMAG of APANPIRG concerning the legal status of any country, territory, city or area of its authorities, or concerning the delimitation of its frontiers or boundaries.

Conclusions, 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 related to matters that are not just of a purely technical or operational nature, which need to be considered by APANPIRG;

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

c) **Draft Decisions** related 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 related 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, Conclusions, Draft Decisions and Decisions

7.1 <u>List of Draft Conclusions</u>

Nil

7.2 List of Conclusions

<table>
<tr><td colspan="3">Conclusion RASMAG/29-1: Revised Colour Key Codes for Asia/Pacific PBCS Reporting Templates</td></tr>
<tr><td colspan="2">What: That, the following PBCS reporting templates and example were revised to correctly reflect the criteria colour key code for yellow acceptable performance.

1. Data Link Performance Report Template – ANSP to FIT (Appendix C to the Report);
2. EXAMPLE - Data Link Performance Report Template – ANSP to FIT (Appendix D to the Report); and
3. Aggregated Regional Data Link Performance Report Template - FIT to RASMAG (Appendix E to the Report).

The above files to be uploaded on the ICAO Asia/Pacific Regional Office eDocuments webpage.</td><td>Expected impact:
☐ Political / Global
☐ Inter-regional
☐ Economic
☐ Environmental
☒ Ops/Technical</td></tr>
<tr><td>Why: To reflect the correct colour key code in the Asia/pacific PBCS reporting templates to be consistent with other FIT.</td><td colspan="2">Follow-up: ☒Required from States</td></tr>
<tr><td>When: 22-Aug-24</td><td colspan="2">Status: Adopted by Subgroup</td></tr>
<tr><td colspan="3">Who: ☒Sub groups ☒APAC States ☒ICAO APAC RO ☐ICAO HQ ☐Other: Aircraft operators</td></tr>
</table>

<table>
<tr><td colspan="3">Conclusion RASMAG/29-2: Revised Guidance Material for the Continued Safety Monitoring of the Asia-Pacific RVSM Airspace</td></tr>
<tr><td colspan="2">What: That,

the revised Guidance Material for the Continued Safety Monitoring of the Asia-Pacific RVSM Airspace, containing the Hot Spot Management process, WP/03 - Attachment 3, be uploaded to the Asia/Pacific Regional Office eDocuments webpage to replace the existing version.</td><td>Expected impact:
☐ Political / Global
☐ Inter-regional
☐ Economic
☐ Environmental
☒ Ops/Technical</td></tr>
<tr><td>Why: To update Hot Spot Management Process into the Guidance Material for the Continued Safety Monitoring of the Asia-Pacific RVSM Airspace after adoption by RASMAG/29.</td><td colspan="2">Follow-up: ☒Required from States</td></tr>
<tr><td>When: 22-Aug-24</td><td colspan="2">Status: Adopted by Subgroup</td></tr>
<tr><td colspan="3">Who: ☒Sub groups ☒APAC States ☒ICAO APAC RO ☐ICAO HQ ☐Other: Aircraft operators</td></tr>
</table>

<table>
<tr><td colspan="3">Conclusion RASMAG/29-3: Revised Guidance Material for End-to-End Safety and Performance Monitoring of ATS Data Link Systems in the APAC Region and Additional PBCS Guidance Material NAT Doc 011</td></tr>
<tr><td colspan="2">What: That,

1. the revised Guidance Material for End-to-End Safety and Performance Monitoring of ATS Data Link Systems in the APAC Region at Appendix F to the Report be uploaded to the Asia/Pacific Regional Office eDocuments webpage to replace the existing version; and

2. the EUR NAT Doc 011 – PBCS Monitoring and Reporting Guidance, 1st Ed.- Amdt. 2, at WP/17 Attachment C be uploaded on the ICAO Asia/Pacific Regional Office eDocuments webpage.</td><td>Expected impact:
☐ Political / Global
☐ Inter-regional
☐ Economic
☐ Environmental
☒ Ops/Technical</td></tr>
<tr><td>Why: To conduct review of the Guidance Material for End-to-End Safety and Performance Monitoring of ATS Data Link Systems in the APAC Region to update information, references and remove duplicated information and to provide additional guidance for PBCS monitoring</td><td colspan="2">Follow-up: ☒Required from States</td></tr>
<tr><td>When: 22-Aug-24</td><td colspan="2">Status: Adopted by Subgroup</td></tr>
<tr><td colspan="3">Who: ☒Sub groups ☒APAC States ☒ICAO APAC RO ☐ICAO HQ ☐Other: Aircraft operators</td></tr>
</table>

7.3 List of Draft Decisions

Nil.

7.4 List of Decisions

Nil

REPORT ON AGENDA ITEMS – RASMAG/29

Agenda Item 1: Adoption of Agenda

1.1 The provisional agenda (WP/1) was adopted by the meeting. The meeting noted IP/01 (List of Working and Information Papers).

Agenda Item 2: Review Outcomes of Related Meetings

FIT-Asia Meeting Outcomes (WP/2)

2.1 The Fourteenth Meeting of the FANS Interoperability Team-Asia (FIT-Asia/14) was held in Bangkok, Thailand from 16 to 19 July 2024.

2.2 FIT-Asia/14 had been provided with updated information on the status of Asia/Pacific engagement in data link problem reporting through the FANS-CRA website, and performance analysis reporting to a recognised FIT. **Figure 1** illustrated the number of PRs submitted by the FIT-Asia States per calendar year.

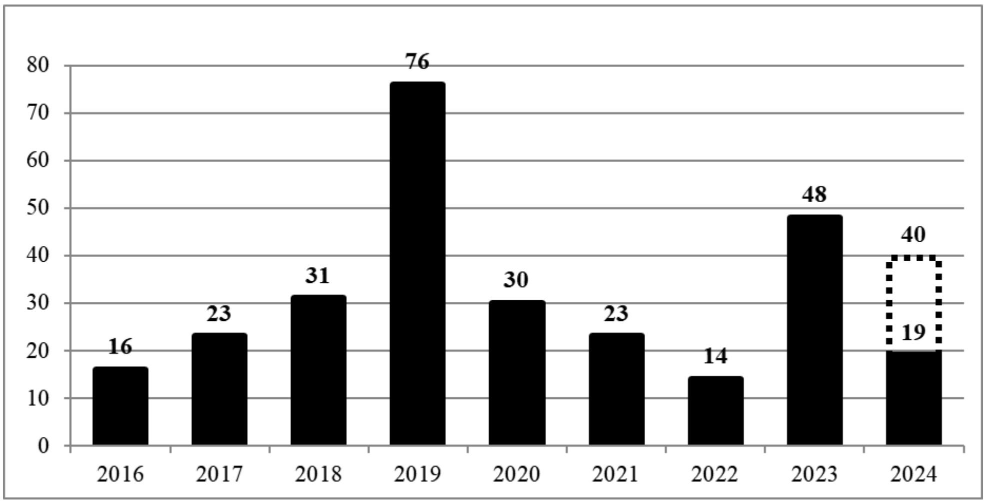

Figure 1: FIT-Asia PR Submissions per Year

Competent Airspace Safety Monitoring Organisations List

2.3 The FIT-Asia meeting was reminded that APANPIRG/34 agreed the following Conclusion proposed by RASMAG/28.

Conclusion APANPIRG/34/8: Formal Service Arrangements with CRA

That, States are urged to ensure that formal service arrangements are made with an APANPIRG-recognised, competent Central Reporting Agency for the submission and analysis of data link problem reports.

2.4 The United States informed the meeting that the FAA contract for IPACG, ISPACG, and NAT would be expanded to include FIT-Asia States without formal service arrangements with a CRA, excluding SEASMA States.

2.5 The Secretariat stated that they would reach out to each state to assess the suitability of the United States' proposed arrangement.

Asia/Pacific Region Combined PBCS Monitoring Report

2.6 Japan prepared and provided the aggregated data link performance monitoring report for the Asia/Pacific Region. The FIT-Asia meeting noted that Indonesia and Malaysia had volunteered for task to compile the data jointly for two years from 2025. States/Administrations were invited to double-check the data before submission each year to avoid format errors and consistency issues.

2.7 **Table 1** showed the combined data for RSP across all media types in 2023. The 95 percent standard was achieved in all FIRs. None of the FIRs met the 99.9 percent standard, but all FIRs except Chennai achieved a clearance rate of 99.0 percent.

Table 1: RCP Aggregated Data (All Media Types) in 2023

ACTUAL SURVEILLANCE PERFORMANCE - FIR AGGREGATE (ALL MEDIA TYPES)						
Region	Asia-Pacific Region					
Performance Criteria	RSP180					
Time Period	2023 January-June			2023 July-December		
Colour Key: Meets Criteria; 99.0%-99.84%; Under Criteria	Message Counts	Criteria		Message Counts	Criteria	
		95%	99.90%		95%	99.90%
FIR		% < = 90sec	% <= 180sec		% < = 90sec	% <= 180sec
PAZA	1510971	98.85%	99.65%	1774333	98.33%	99.48%
RJJJ	2371615	98.41%	99.62%	3057643	98.43%	99.58%
KZAK	5103764	98.85%	99.73%	5040555	98.68%	99.58%
NFFF	271083	99.11%	99.61%	197629	98.99%	99.53%
NTTT	95276	99.58%	99.80%	103928	99.56%	99.82%
NZZO	414330	98.97%	99.70%	471687	98.81%	99.64%
YBBB	1116402	99.52%	99.83%	1286584	99.50%	99.82%
YMMM	846180	99.05%	99.55%	913946	99.50%	99.81%
RPHI	431079	98.39%	99.31%	563565	98.37%	99.35%
VCCF	255585	98.79%	99.59%	321497	98.59%	99.73%
VABF				522944	97.49%	99.15%
VOMF	226298	97.16%	98.72%	287769	99.11%	99.14%
VECF	470003	98.21%	99.23%	417838	98.36%	99.25%
VVTS	227123	98.85%	99.75%	254460	98.92%	99.75%
WAAF	169637	98.94%	99.43%	158334	99.14%	99.58%
WSJC	694972	98.99%	99.80%	813004	99.07%	99.84%
ZLLL	323166	98.60%	99.70%	463475	98.50%	99.60%
ZWWW	193406	98.60%	99.70%	252168	98.50%	99.60%
WMFC	503742	98.85%	99.68%	487506	99.01%	99.73%

2.8 The 95 percent ACP criteria were met in all FIRs except for the second half of 2023 in Ho Chi Minh FIR. Although Urumqi FIR achieved all criteria in the whole of 2023, the numbers of message counts were below one hundred (**Table 2**).

Table 2: RCP Aggregated Data (All Media Types) in 2023

ACTUAL COMMUNICATION PERFORMANCE - FIR AGGREGATE (ALL MEDIA TYPES)										
Region	Asia-Pacific Region									
Performance Criteria	RCP240									
Time Period	2023 January-June					2023 July-December				
Colour Key: Meets Criteria; 99.0%-99.84%; Under Criteria	Message Counts	ACP Criteria		ACTP Criteria		Message Counts	ACP Criteria		ACTP Criteria	
		95%	99.90%	95%	99.90%		95%	99.90%	95%	99.90%
FIR		% < = 180sec	% <= 210sec	% < = 120sec	% <= 150sec		% < = 180sec	% <= 210sec	% < = 120sec	% <= 150sec
PAZA	96168	99.24%	99.51%	99.35%	99.55%	108973	99.22%	99.47%	99.32%	99.52%
RJJJ	51322	99.70%	99.83%	99.74%	99.81%	64259	99.67%	99.80%	99.72%	99.80%
KZAK	319665	99.32%	99.57%	99.52%	99.68%	362176	99.31%	99.54%	99.49%	99.65%
NFFF	10739	99.43%	99.66%	99.65%	99.73%	6856	99.64%	99.75%	99.72%	99.78%
NTTT	9370	99.55%	99.59%	99.80%	99.83%	9848	99.63%	99.70%	99.77%	99.80%
NZZO	78677	99.07%	99.36%	99.53%	99.71%	84773	99.13%	99.40%	99.49%	99.65%
YBBB	31567	99.53%	99.67%	99.54%	99.70%	36095	99.45%	99.67%	99.45%	99.60%
YMMM	38482	99.44%	99.60%	99.45%	99.62%	39375	99.69%	99.81%	99.71%	99.80%
RPHI	16263	98.01%	98.26%	98.74%	98.91%	34167	98.04%	98.30%	98.60%	98.77%
VCCF	17768	99.19%	99.50%	99.88%	99.94%	26493	99.49%	99.64%	99.88%	99.91%
VABF						84996	98.66%	99.16%	99.38%	99.68%
VOMF	92927	99.72%	99.81%	99.79%	99.85%	103692	99.74%	99.83%	99.83%	99.88%
VECF	22343	98.63%	98.98%	99.01%	99.15%	27550	99.15%	99.36%	99.42%	99.60%
VVTS	70225	95.19%	95.78%	99.41%	99.60%	76131	94.76%	95.37%	99.60%	99.74%
WAAF	27512	99.19%	99.73%	99.36%	99.80%	30676	99.28%	99.44%	99.65%	99.72%
WSJC	45547	98.94%	99.19%	99.05%	99.32%	57158	99.21%	99.44%	99.31%	99.53%
ZLLL	1178	97.96%	98.13%	99.06%	99.32%	1475	98.03%	98.16%	99.05%	99.45%
ZWWW	13	100.00%	100.00%	100.00%	100.00%	19	100.00%	100.00%	100.00%	100.00%
WMFC	83576	98.98%	99.18%	99.31%	99.52%	91156	99.04%	99.28%	99.37%	99.56%

2.9 **Table 3** provided a detailed breakdown of the combinations of airlines and aircraft types that did not meet PORT compliance, with message counts exceeding one thousand in the first or second half of 2023.

Table 3: Combinations of Aircraft Operators and Types Confirmed Non-Compliance of PORT

Performance Criteria		RCP240											
Period		2023 January-June						2023 July-December					
Colour Key: Meets Criteria; 99.0%-99.84%; Under Criteria		Message Counts	ACP Criteria		ACTP Criteria		PORT	Message Counts	ACP Criteria		ACTP Criteria		PORT
			95%	99.90%	95%	99.90%	95%		95%	99.90%	95%	99.90%	95%
			% < = 180sec	% <= 210sec	% < = 120sec	% <= 150sec	% <= 60sec		% < = 180sec	% <= 210sec	% < = 120sec	% <= 150sec	% <= 60sec
FIR	Aircraft Operator / Type	By Aircraft Operator / Type (only message counts >100 recorded)											
PAZA	CPA/B748	2594	96.34%	97.88%	95.99%	97.19%	95.07%	2926	98.02%	99.32%	98.80%	99.08%	94.74%
KZAK	UAL/B738	4801	97.58%	98.46%	98.33%	99.29%	94.42%	6815	97.42%	98.33%	98.33%	99.22%	94.42%
KZAK	MIL/C17	3100	98.55%	98.71%	99.74%	99.81%	94.48%	3841	98.13%	98.41%	99.66%	99.82%	94.32%
KZAK	MIL/K35R	1574	98.28%	98.73%	99.49%	99.49%	92.76%	1517	98.75%	99.14%	99.80%	99.80%	91.30%
KZAK	VOZ/B38M							1091	96.70%	97.98%	98.35%	98.53%	94.50%
RPHI	CAL/A359	980	95.56%	96.08%	95.05%	95.82%	94.56%	1344	94.72%	95.24%	94.70%	95.16%	93.38%
RPHI	CSN/B789	1009	97.57%	97.68%	96.45%	96.86%	95.98%	2282	95.97%	96.33%	95.57%	96.01%	93.73%
RPHI	SIA/A359	1247	96.44%	96.74%	97.34%	97.79%	93.10%	2354	95.16%	95.77%	95.13%	95.80%	92.82%
RPHI	SIA/B78X	645	96.51%	96.74%	95.87%	96.35%	94.57%	1402	95.86%	96.14%	95.76%	96.14%	93.44%
VCCF	ETD_B77W	774	99.90%	99.90%	100.00%	100.00%	99.95%	1012	99.54%	99.54%	99.80%	99.80%	93.17%
VCCF	GIA_B77W	892	99.77%	99.91%	100.00%	100.00%	99.92%	1826	99.81%	99.93%	100.00%	100.00%	90.06%
VCCF	LNI_A333	1493	99.89%	99.94%	100.00%	100.00%	99.95%	1593	100.00%	100.00%	100.00%	100.00%	90.06%
VCCF	MAS_B738	552	99.33%	99.49%	99.67%	100.00%	99.62%	1477	99.41%	99.41%	99.85%	99.85%	94.63%
VCCF	QTR_A388	626	97.81%	97.81%	98.74%	99.66%	94.78%	1041	99.69%	100.00%	100.00%	100.00%	93.40%
VCCF	SVA_B77W	914	99.69%	99.79%	100.00%	100.00%	99.85%	2281	95.61%	99.10%	97.82%	99.24%	94.17%
VABF	ALK/A333							1287	98.95%	99.32%	99.71%	100.00%	94.02%
VABF	ETD/A320							1006	95.56%	96.92%	98.93%	99.24%	88.87%
VABF	ETD/A321							1481	94.73%	96.60%	98.67%	98.91%	87.58%
VABF	QTR/A333							1393	98.38%	98.99%	99.85%	99.95%	93.54%
VABF	SVA/A333							1640	97.41%	98.35%	99.88%	99.91%	86.46%
VVTS	CAL	1762	95.52%	96.00%	99.82%	99.96%	92.19%	1086	95.27%	95.95%	99.55%	99.85%	91.48%
VVTS	CES	355	92.92%	93.75%	98.92%	99.06%	90.14%	1009	95.14%	95.76%	99.43%	99.50%	92.41%
VVTS	CPA	2018	92.63%	93.26%	99.86%	99.89%	88.73%	2720	94.19%	94.67%	99.92%	99.97%	89.85%
VVTS	EVA	1931	96.79%	97.16%	99.74%	99.85%	94.41%	1361	96.03%	96.39%	99.87%	100.00%	92.65%
VVTS	KAL	3649	94.71%	95.47%	99.47%	99.70%	91.26%	2748	92.83%	93.51%	99.54%	99.76%	88.83%
VVTS	MAS	1647	95.90%	96.77%	99.40%	99.50%	93.14%	2285	95.65%	96.39%	99.26%	99.40%	93.26%
VVTS	SCO	2739	96.89%	97.20%	99.89%	99.98%	94.93%	3616	95.60%	96.02%	99.92%	99.95%	93.86%
VVTS	SIA	1225	93.55%	94.60%	98.86%	99.53%	90.86%	1699	93.47%	95.00%	98.68%	99.35%	90.64%
VVTS	XAX	966	95.31%	95.65%	99.72%	99.83%	92.34%	1706	94.57%	95.01%	99.56%	99.78%	91.44%
WAAF	CPA/B77W	395	98.88%	99.23%	100.00%	100.00%	91.14%	1088	98.53%	99.51%	100.00%	100.00%	94.12%
WMFC	MAS/B738	2127	96.10%	97.46%	97.13%	98.92%	91.07%	2617	94.31%	96.22%	95.91%	98.24%	89.49%
WMFC	SIA/B38M	1345	97.11%	97.81%	98.14%	98.71%	93.83%	1527	96.23%	97.31%	98.15%	98.85%	92.53%
WMFC	SVA/B78X	885	98.66%	98.98%	99.47%	100.00%	95.25%	1022	97.85%	99.07%	99.66%	100.00%	94.72%
WMFC	THY/B77W	2809	98.50%	99.06%	98.97%	99.42%	95.09%	1562	98.44%	99.24%	98.58%	99.17%	92.38%

Asia/Pacific PBCS Reporting Templates

2.10 It was noted from Asia/Pacific Region Combined PBCS Monitoring Report that the colour codes used by FIT-Asia were slightly different to other FIT's therefore a correction proposed to the templates to resolve this error.

2.11 The current colour key was incorrect and a revised yellow acceptable performance showing as between 99.0% and 99.89% was proposed **(Figure 2).**

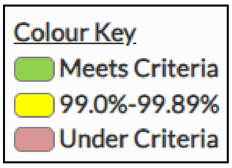

Figure 2: Revised Colour Key Code for Yellow Acceptable Performance

2.12 FIT-Asia meeting agreed to revised colour key codes in the following files on the ICAO APAC eDocument webpage shown below and the following draft conclusion.

Draft Conclusion FIT-Asia/14-2: Revised colour key codes for Asia/Pacific PBCS reporting templates

That, the following PBCS reporting templates and example were revised to correctly reflect the criteria colour key code for yellow acceptable performance and be uploaded to the Asia/Pacific Regional Office to replace the existing ones.

1. *Data Link Performance Report Template – ANSP to FIT (**Appendix C**);*
2. *EXAMPLE - Data Link Performance Report Template – ANSP to FIT (**Appendix D**); and*
3. *Aggregated Regional Data Link Performance Report Template - FIT to RASMAG (**Appendix E**)*

Air Navigation Deficiencies Relating to Data Link Performance Monitoring and Analysis

2.13 India provided the PBCS Performance Monitoring Analysis and Reporting for Mumbai FIR for five months last year (i.e., August – December 2023) with ICAO APAC. However, India did not respond to the survey on the Status of Current and Planned Implementation of Performance-Based Horizontal Separation Minima in 2024. This lack of response, along with the absence of a WP on the Data Link Performance Report to FIT-Asia/14, has left FIT-Asia/14 without sufficient data/evidence to discuss the deficiency.

2.14 The meeting agreed that India's deficiency remained current.

India: Performance monitoring and analysis not reported for Mumbai FIRs.

2.15 The meeting was also informed that Maldives had not provided PRs to CRA or reported performance monitoring and analysis to FIT. However, Maldives had disabled the ADS-C function from the ATM system due to an application issue, and the use of CPDLC/HF beyond VHF coverage.

2.16 It was agreed that since Maldives did not attend the FIT-Asia/14, ICAO Secretariat would further investigate the matter for follow-up discussion at the upcoming RASMAG/29 meeting in August 2024 to determine if the deficiency would be appropriate. This matter would be discussed under Agenda Item 6 at RASMAG/29.

Maldives: Problem reports not provided to CRA. Performance monitoring and analysis not reported to FIT.

2.17 These recommendations were included in the Deficiencies List provided for RASMAG/29 discussion and agreement in WP/31.

Future Direction of FIT-Asia

2.18 The Secretariat provided information on the history and progress of FIT-Asia. The number of Working Papers (WP) and Information Papers (IP) provided by States/Administrations, International Organisations, CRA, and RMAs at the previous FIT-Asia meetings were mainly WPs provided by States/Administrations for Data Link Performance Reports, and a few papers addressed technical matters at the FIT-Asia meetings by the champion States in the region.

2.19 The following were proposed

a) The FIT-Asia meeting agreed to conduct a workshop/seminar in conjunction with the FIT-Asia meeting, at least in 2025, including the subjects such as safety risk assessment for PBCS implementation, PBCS Charter, etc.

b) China, Japan, New Zealand, USA, Boeing, and Inmarsat expressed their support for the future seminar/workshop. Additionally, New Zealand expressed their willingness to support the PBCS implementation individually if a State required it, particularly in PBCS data analysis. Subsequently, States were encouraged to reach out to New Zealand.

2.20 In response to a query regarding the action by the meeting, it was clarified that some States provided only data collection and there was a lack of analysis and rectifications for PBCS non-compliance. Therefore, States were encouraged to fully analyse PBCS performance that fails to meet RCP/RSP specifications, take the rectification action, and report them to FIT

2.21 In addition, states were encouraged to also submit the annual PBCS implementation survey to provide the APAC region with a better understanding of the status of PBCS implementation.

2.22 RASMAG meeting agreed to the following conclusion:

Conclusion RASMAG/29-1: Revised colour key codes for Asia/Pacific PBCS reporting templates

That, the following PBCS reporting templates and example were revised to correctly reflect the criteria colour key code for yellow acceptable performance and be uploaded to the Asia/Pacific Regional Office to replace the existing ones.

1. Data Link Performance Report Template – ANSP to FIT (**Appendix C to the Report**);

2. EXAMPLE - Data Link Performance Report Template – ANSP to FIT (**Appendix D to the Report**); and

3. Aggregated Regional Data Link Performance Report Template - FIT to RASMAG (**Appendix E to the Report**).

The above files to be uploaded on the ICAO Asia/Pacific Regional Office eDocuments webpage.

<u>Outcomes of RASMAG/MAWG and RMACG Meetings (WP/03)</u>

2.23 Eleventh Meeting of the Regional Airspace Safety Monitoring Advisory Group Monitoring Agencies Working Group (RASMAG/MAWG/11) Meeting was held from 29 January to 1 February 2024 in Bangkok, Thailand. The Nineteenth RMA Coordination Group Meeting (RMACG/19) was held at the headquarters of the International Civil Aviation Organization (ICAO) in Montreal, Canada from 11 to 14 June 2024 in hybrid format.

2.24 Some salient points discussed during MAWG/11 and RMACG/19:

a) RVSM Minimum Monitoring Requirements (MMR);

b) PBCS Format for Approval File;

c) Procedure of Submitting LHD Report from Operator;

d) Management Process of Hot Spots for RASMAG; and

e) RASMAG Safety Bulletin

RVSM Minimum Monitoring Requirements (MMR)

2.25 The RVSM Minimum Monitoring Requirements (MMR) Version 2024 was reviewed and adopted by the RMACG meeting (**RASMAG/29 WP/3 Attachment 1**). There were various changes due to new entrants to Civilian and Military MMR, changes to existing monitoring groups in the Civilian MMR and also changes to the category in the Civilian MMR.

Process of Hot Spots for RASMAG

2.26 The MAWG agreed that the process as detailed in **Attachment 2 (Attachment to WP/06 from RASMAG/MAWG/11**) was ready and would be presented to the RASMAG/29 meeting for endorsement and its application by APAC RMAs and EMAs. The MAWG meeting agreed with JASMA's proposal to allow the splitting of a hot spot into smaller areas depending on the FIR interfaces, the contributing factors, implementation of mitigation measures, etc. The meeting decided to split Hot Spot B and Hot Spot D into smaller areas at the interface level.

2.27 It was highlighted to the meeting that the naming of the hot spot may not reflect the actual situation, and the changes could be discussed in WP/16 - Asia Pacific Consolidated Safety Report.

2.28 RASMAG agreed to adopt the application of the Hot Spot Management Process and agreed to the changes to Guidance Material for the Continued Safety Monitoring of the Asia-Pacific RVSM Airspace version 3 and to be uploaded to the APAC ICAO Asia/Pacific Regional Office eDocuments webpage to replace the previous version. The meeting agreed to the following conclusion:

Conclusion RASMAG/29-2: Revised Guidance Material for the Continued Safety Monitoring of the Asia-Pacific RVSM Airspace

That,

the revised Guidance Material for the Continued Safety Monitoring of the Asia-Pacific RVSM Airspace, containing the Hot Spot Management process, **WP/03 - Attachment 3**, be uploaded to the Asia/Pacific Regional Office eDocuments webpage to replace the existing version

RASMAG Safety Bulletin

2.29 JASMA proposed Team Resource Management (TRM) as the next topic and also volunteered to lead the next RASMAG safety bulletin.

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

RVSM Risk Assessment in the Brisbane, Honiara, Melbourne, Nauru and Port Moresby, FIRs – 1 January to 31 December 2023 (WP/05)

3.1 The Australian Airspace Monitoring Agency (AAMA) provided an airspace safety review of RVSM airspace risk within the Brisbane, Honiara, Melbourne, Nauru and Port Moresby FIRs for the period 1 January to 31 December 2023.

3.2 **Table 4** detailed the results for the technical, operational and total risk, each of which met the TLS.

3.3 **Table 4**: RVSM Risk Estimates for the period 1 January to 31 December 2023. The number of estimated annual flying hours was 1,182,067 based on the December 2023 TSD.

Source of risk	Risk estimate	TLS	Comparison with TLS
Technical risk	0.101×10^{-9}	2.5×10^{-9}	Below technical TLS
Operational risk	1.41×10^{-9}	-	-
Total risk	$\mathbf{1.51 \times 10^{-9}}$	$\mathbf{5.0 \times 10^{-9}}$	**Below total TLS**

3.4 The reporting safety culture metric be measured by the reporting rate of occurrence per flight hour, with occurrences grouped by attribution is shown in **Table 5**. Reports were consistently made by both pilots and ATC.

Table 5: Safety culture metric for Australia, Nauru, Papua New Guinea, and Solomon Islands by LHD attribution for the period 1 January to 31 December 2023.

Attribution	Number of reports	Flight hours	Number of reports per flight hour ($\times 10^{-5}$)
Pilot/Aircrew (A, B, C)	33	1 182 067	2.79
ATC (D, E, F)	28	1 182 067	2.37
Other	4	1 182 067	0.338
Total	**65**	1 182 067	**5.50**

3.5 **Figure 3** identified the geographic location of LHD occurrences for the period 1 January to 31 December 2023. The occurrences at each location were represented by a coloured circle, with the radius proportional to the total risk at that location. The map was intended to provide a means to identify and visualise risk hot spots related to RVSM operations.

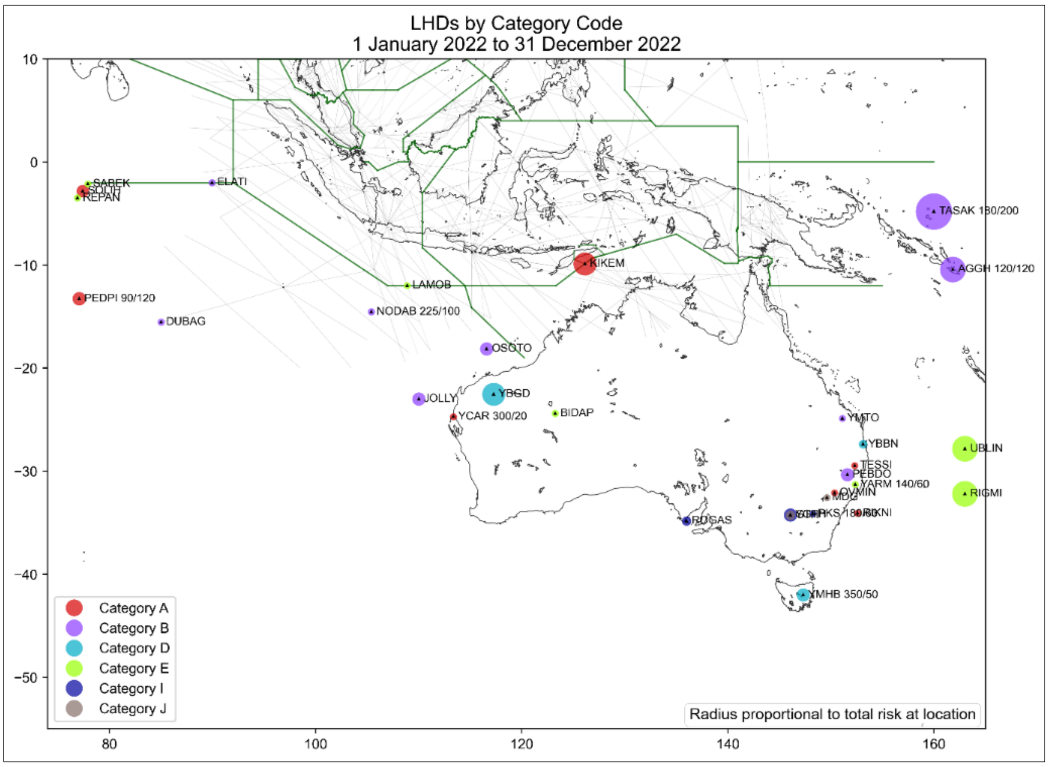

Figure 3: Geolocation of LHDs for Brisbane, Honiara, Melbourne, Nauru, and Port Moresby FIRs for the period 1 January to 31 December 2023.

3.6 The total risk (**1.51 x 10^{-9}**) was comparable to the risks reported for the last two annual reporting periods (1.50 x 10^{-9} reported at RASMAG/27 and 1.73 x 10^{-9} reported at RASMAG/28).

3.7 The two riskiest LHDs were of interest, having occurred on two-way routes and having lasted more than 10 minutes in duration.

3.8 An October 2023 LHD assessed as Category E (ATC coordination error as a result of human factor issues) involved one FIR coordinating an aircraft at the wrong flight level (FL310 instead of the actual FL330) and was reported as 14 minutes in duration. This occurrence constituted almost half of the weighted occupational risk for the 12-month period.

3.9 A June 2023 LHD assessed as Category D (ATS system loop error) lasted 10 minutes in duration and involved an ATC failing to issue a climb instruction through the relevant automated system to an aircraft.

3.10 In the period 1 January to 31 December 2023, the number of LHDs with Aircrew/Pilot attribution, 33, was comparable to the number of LHDs with ATC attribution, at 28. Category C was the most common category, wherein most involved flight crews who reported maintaining expired or non-existent block clearances.

RVSM Risk Assessment in the Jakarta and Ujung Pandang Flight Information Regions (WP/06)

3.11 AAMA provided an airspace safety review of RVSM airspace risk in the Jakarta and Ujung Pandang Flight Information Regions (FIRs) for the period 1 January to 31 December 2023.

3.12 The results for the technical, operational, and total risk for the RVSM implementation in Jakarta and Ujung Pandang FIRs were detailed in **Table 6**.

Table 6: RVSM Risk Estimates for the period 1 January to 31 December 2023. The number of estimated annual flying hours was 762,410 based on the December 2023 TSD.

Source of risk	**Risk estimate 2023**	**Risk estimate 2022**	**TLS**	**Comparison with TLS**
Technical risk	0.12 x 10^{-9}	0.133 x 10^{-9}	2.5 x 10^{-9}	Below technical TLS
Operational risk	5.23 x 10^{-9}	3.10 x 10^{-9}	-	-
Total risk	**5.35 x 10^{-9}**	3.24 x 10^{-9}	**5.0 x 10^{-9}**	**Above total TLS**

3.13 The total risk in 2023 (**5.35 x 10^{-9}**) had increased from the value reported for the period 1 January – 31 December 2022 at (RASMAG/28) (then 3.24 x 10^{-9}). This appeared to be due to an improvement in reporting culture and a value marginally above the TLS was not of major concern and would be monitored closely in future analysis.

3.14 Almost 60% of the operational risk was presented by 36 Category E LHDs (ATC coordination error as a result of human factor issues). All involved aircraft flying on 2-way routes, and they reported an average of 2.9 flight levels crossed and 1.2 minutes in duration.

3.15 In the period 1 January—31 December 2023, the number of LHDs with Aircrew/Pilot attribution, 13, was almost 10% of the number of LHDs with ATC attribution, at 111. **Figure 4** showed the geolocation of LHDs.

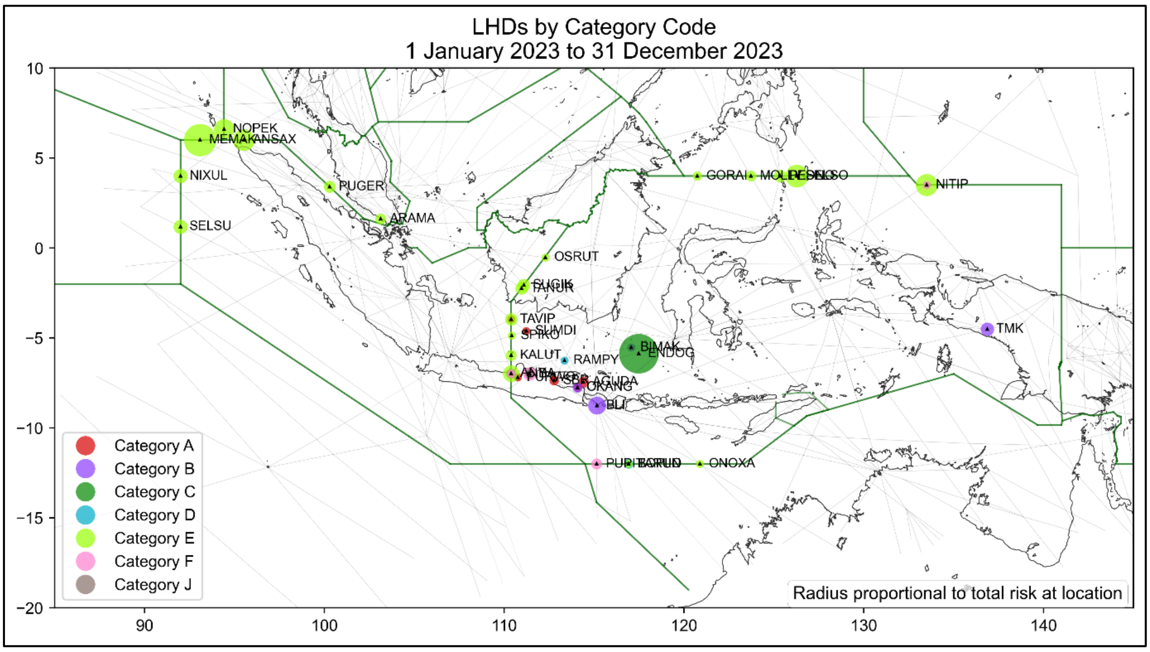

Figure 4: Geolocation of LHDs for the Indonesian FIR for the period 1 January to 31 December 2023.

Assessment of Safety Reporting Culture

3.16 An assessment of safety reporting culture for Indonesia is shown in **Table 7**.

Table 7: Safety culture metric for Indonesia by LHD attribution for the period 1 January to 31 December 2023.

Attribution	Number of reports	Flight hours	Number of reports per flight hour (x 10^{-5})
Pilot/Aircrew (A, B, C)	13	762 410	1.71
ATC (D, E, F)	111	762 410	14.60
Other	1	762 410	0.13
Total	**125**	**762 410**	**16.40**

3.17 Of the 103 Category E LHDs, 63 reports corresponded to errors made by neighbouring ATCs, and 40 report correspond to errors made by Jakarta or Ujung Pandang ATCs.

3.18 In response to queries from WP/05 and WP/06, AMAA provided additional information in **Flimsy/04 - Additional Information on LHDs from AAMA** concerning a large graphical spot in Indonesian airspace and the CAT A and CAT B LHDs. AAMA planned to include such analysis in future meetings.

3.19 IFALPA requested for details of LHD occurrence involving pilots and it was proposed to discuss this issue at the next MAWG meeting to determine a process of identification/de-identification reports for sharing amongst stakeholders.

2023 Analyses for the Incheon FIR AKARA Corridor Interface with Shanghai/Fukuoka/Taibei FIRs (WP/04)

3.20 PARMO provided an update on the analysis of the Incheon FIR AKARA corridor airspace interface with Shanghai/Fukuoka/Taibei FIRs using TSD and LHD reports from calendar years 2015 – 2023. The China RMA, JASMA, MAAR and PARMO provide the relevant LHD reports to the PARMO for inclusion in the analysis.

Reported LHDs for AKARA Corridor Airspace

3.21 There were 74 reported LHDs in 2023 for the AKARA airspace. A reduction in the number of reported LHDs compared noted in calendar year 2022. All report LHDs were involved ATC coordination, and all reported occurrences were mitigated with available surveillance, direct speech circuit or other means. There was no contribution towards the vertical operational risk estimate from the reported LHDs in 2023. China RMA, JASMA and PARMO shared the reported occurrence details for this report.

Vertical Risk Estimate

3.22 The twelve-month rolling vertical collision risk estimates for AKARA airspace for 2017 through 2023 was shown in **Figure 5**. The 2023 vertical technical risk estimate of 0.57×10^{-9} fapfh met the TLS for vertical technical risk, the technical risk TLS was 2.5×10^{-9} fapfh. The overall vertical risk estimate of **0.57×10^{-9}** fapfh met the overall vertical TLS of 5×10^{-9} fapfh.

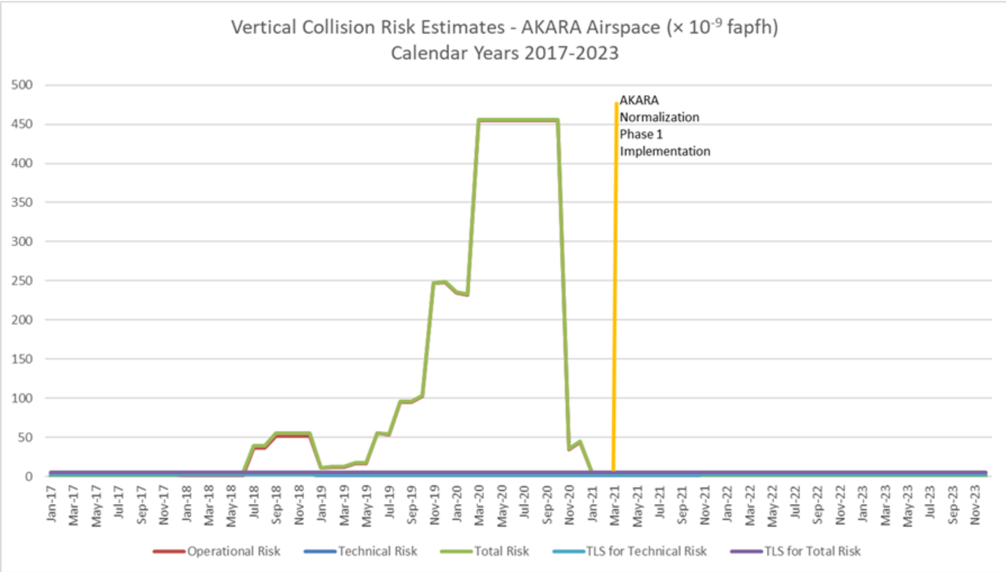

Figure 5: Twelve-month Rolling Vertical Collision Risk Estimates

Hot Spot Identification Process

3.23 The Hot Spot Identification process was applied to Hot Spot B. This process was developed at the Ninth Meeting of the RASMAG Monitoring Agencies Working Group (RASMAG/MAWG/9). The RASMAG/MAWG/11 meeting agreed to split Hot Spot B into smaller areas at the interface level. The Hot Spot B was divided into three smaller areas as follows (**Figure 6**):

a) B1 for Incheon (Transfer-of-control Point between Incheon ACC and Shanghai ACC);

b) B2 for Incheon (Intersection points of A593, Y590, Y711 and Y722;

c) B3 for Fukuoka and Incheon

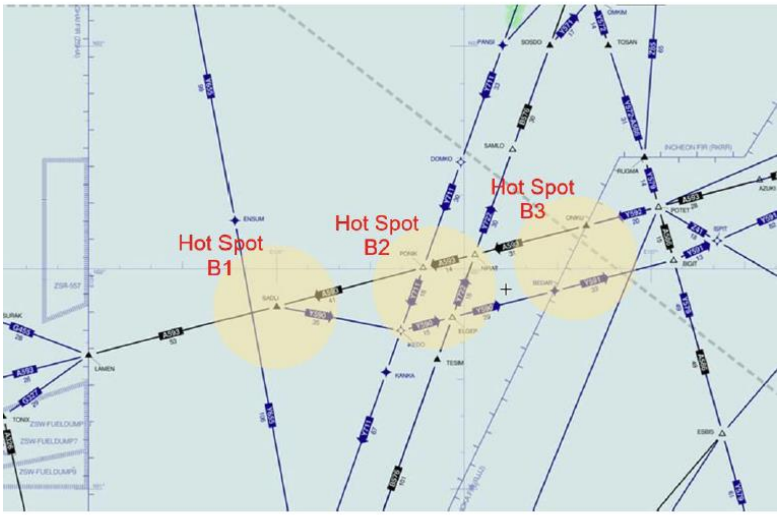

Figure 6: Subdivisions for Hot Spot B

3.24 The number of clusters for Hot Spot B reduced from 2 to 1 in calendar year 2021. This change was associated with the Phase 1 of the AKARA Corridor Improvement Plan implemented in March 2021. The change in the number of observed clusters contributed to the reason for the subdivision of Hot Spot B area. For RASMAG to remove an LHD hot spot, proof of mitigation measures should be presented, and the implementation results should reflect the effectiveness of risk controls in terms of reduction in the number of occurrences and operational risk of the hot spot. The observed results from these mitigation measures have been reported zero occurrences since March 2021 when the mitigations at B2 and B3 areas were introduced.

3.25 For Hot Spot B1, the process to relay the reported occurrences began with the reporting ATC-unit sending the report to the designated RMA. That RMA emailed the other RMA with the received reported occurrences, and finally the RMA sent the reports to the adjacent ATC-unit. Due to the lag time built into the report relay process, data retention for the adjacent ATC-unit often had expired before the occurrence can be investigated. Without the identification of underlying causes, corrective action was not possible. The meeting was asked to consider ideas to provide the occurrence reports to the adjacent ATC-unit within a time that allowed for the determination of underlying causal factors.

3.26 The meeting was appraised on the two options available for data sharing:

a) MAAR's online LHD reporting platform

b) ICAO secure portal

3.27 Another suggestion offered by the Chair was the consideration of enhancement to the current email exchange protocol among the China, China RMA, Republic of Korea and PARMO to assist with the timeliness of data sharing. Specifically, Republic of Korea proposed the exchange LHD information by email once it occurs (or weekly, 2 times a month, etc.) to facilitate analysis of LHD occurrence.

<u>Measures to reduce LHD occurrence between Shanghai and Incheon ACCs (WP/29)</u>

3.28 Republic of Korea presented the analysis of the current status of LHD occurrences after the implementation of Phase 1 of the A593 normalisation and proposed various measures to improve safety and reduce LHD in this area.

3.29 After the Phase 1 implementation, Incheon ACC has been providing air traffic services to the 125°E of the corridor area where Fukuoka ACC had been responsible for the provision of air traffic services. In addition, Incheon ACC established the Y590 route parallel to the A593, and signed the Letter of Agreement (LOA) and established direct communication lines with Shanghai ACC. LHDs have occurred continuously in this area since Incheon Area Control Center (ACC) began to provide air traffic control service in March 2021.

3.30 To reduce LHDs, the Republic of Korea suggested the following mitigation:

a) to implement ATS Inter-facility Data Communication (AIDC) between Incheon ACC and Shanghai ACC;

b) add more ATS routes through the implementation of the second phase of A593 normalization;

c) reduce separation minima between Incheon and Shanghai ACC; and

d) share safety (oversight) information of the delegated airspace (SADLI-LAMEN) between the two States.

3.31 In response to a query, ICAO clarified that the AKARA Corridor Technical Working Group (TWG) was first organised by ICAO HQ with the relevant stakeholders in 2019 and the implementation of Phase 1 was completed in 2021 with the transition to phase 2 to follow swiftly. As of this meeting, the TWG secretariat has not received information from any of the TWG stakeholders for further discussion.

3.32 China RMA stated that ROK's proposal d) was beyond the interaction between RMAs and States. Shanghai ACC submitted LHDs to China RMA and confirm the information in time for investigation. The meeting was also informed that China has been making efforts to improve the safety and efficiency in the area, the issue of AKARA airspace was complicated and includes more operational issues than LHD, and there were many ways to mitigate the issue in the area such as releasing more flight levels to Shanghai ACC. China also informed the meeting that the Stakeholders were discussing a "package of resolution" including but not limited to AIDC. However, Republic of Korea opined that a consolidated "package of resolution" approach might delay the mitigations for LHD occurrences.

3.33 The meeting was encouraged to hear of the annual Bilateral meeting (resumed in 2022 after the pandemic) between China and Republic of Korea was planned in September 2024 to discuss various operational issues. Consequently, Republic of Korea has planned to table the above topics for LHD mitigation discussion during the Bilateral meeting.

China RMA Vertical Safety Report (WP/07)

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

3.35 The 2023 RVSM risk estimates for the Chinese FIRs (**Table 8**) indicated that the TLS had been met, at **0.75×10^{-9}** fapfh.

Table 8: Risk Estimates for the RVSM airspace of Chinese FIRs

The RVSM Airspace of Chinese FIRs – estimated annual flying hours = 2,346,975.6 hours ***(note: estimated hours based on Dec 2023 traffic sample data)***			
Source of Risk	**Risk Estimation**	**TLS**	**Remarks**
RASMAG 28 Total Risk	*0.19×10^{-9}*	*5.0×10^{-9}*	*Below TLS*
Technical Risk	0.11×10^{-9}	2.5×10^{-9}	Below Technical TLS
Operational Risk	0.64×10^{-9}	-	-
Total Risk	**0.75×10^{-9}**	5.0×10^{-9}	**Below TLS**

3.36 According to the result of cluster identification, there was no Hot Spot in Chinese airspace. The total risk of 2023 was **0.75×10^{-9}**, which is below TLS, and there was also no high risk event occurred in this year.

3.37 It was explained to the meeting that the high number of CAT I LHDs was due to the requirement for pilots to report all deviations including Turbulence and weather-related events to ATC.

3.38 **Figure 7** provides the geographic location of risk bearing LHD reports within Airspace of Chinese FIRs during the assessment period.

Figure 7: Airspace of the nine Chinese FIRs – Risk Bearing LHD

3.39 **Table 9** provided the Pyongyang FIR RVSM technical, operational, and total risk estimates. According to the email response from ATMB of DPR Korea, there was no LHD event and zero flying hour in Pyongyang FIR due to world public health crisis in 2023, so the operational risk, the technical risk and the total risk remain 0.

Table 9: RVSM Risk Estimates for Pyongyang FIR

The RVSM Airspace of Chinese FIRs – estimated annual flying hours = 0 hours ***(note: estimated hours based on Dec 2023 traffic sample data)***			
Source of Risk	**Risk Estimation**	**TLS**	**Remarks**
RASMAG 28 Total Risk	*0*	*5.0 x 10^{-9}*	*Below TLS*
Technical Risk	0	2.5 x 10^{-9}	Below Technical TLS
Operational Risk	0	-	-
Total Risk	**0**	5.0 x 10^{-9}	**Below TLS**

<u>JASMA Vertical Safety Report (WP/08)</u>

3.40 JASMA provided an executive summary of the airspace safety oversight assessment of the RVSM implementation in the Fukuoka Flight Information Region (FIR). A detailed report was also provided in **RASMAG/29 WP/08 Attachment**.

3.41 The total risk for the reporting period from 1 January to 31 December 2023 was **2.36 x 10^{-9}** fapfh, which met the TLS and was improved from the risk reported to RASMAG/27 (9.52 x 10^{-9} fapfh) in **Table 10** and **Figure 8** presented the collision risk estimate trends for the period.

Table 10: Japanese Airspace RVSM Risk Estimates

Japanese Airspace – estimated annual flying hours = 1,688,572 hours ***(note: estimated hours based on Dec 2023 traffic sample data)***			
Source of Risk	**Risk Estimation**	**TLS**	**Remarks**
RASMAG 28 Total Risk	*4.92 x 10^{-9}*	*5.0 x 10^{-9}*	*Below TLS*
Technical Risk	0.27 x 10^{-9}	2.5 x 10^{-9}	Below Technical TLS
Operational Risk	2.09 x 10^{-9}	-	-
Total Risk	**2.36 x 10^{-9}**	5.0 x 10^{-9}	**Below TLS**

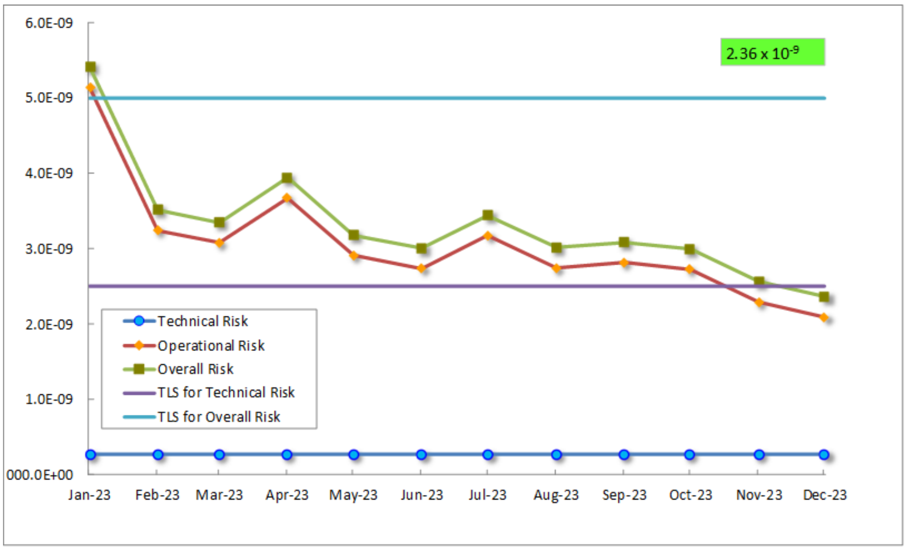

Figure 8: Japanese Airspace RVSM Risk Estimate Trends

3.42 **Figure 9** provided the geographic location of LHD reports occurred within Fukuoka FIR during the assessment period. The filled blue square symbols represent LHD location in the RVSM stratum of Fukuoka FIR. The circles represent LHD duration of 50 seconds or more.

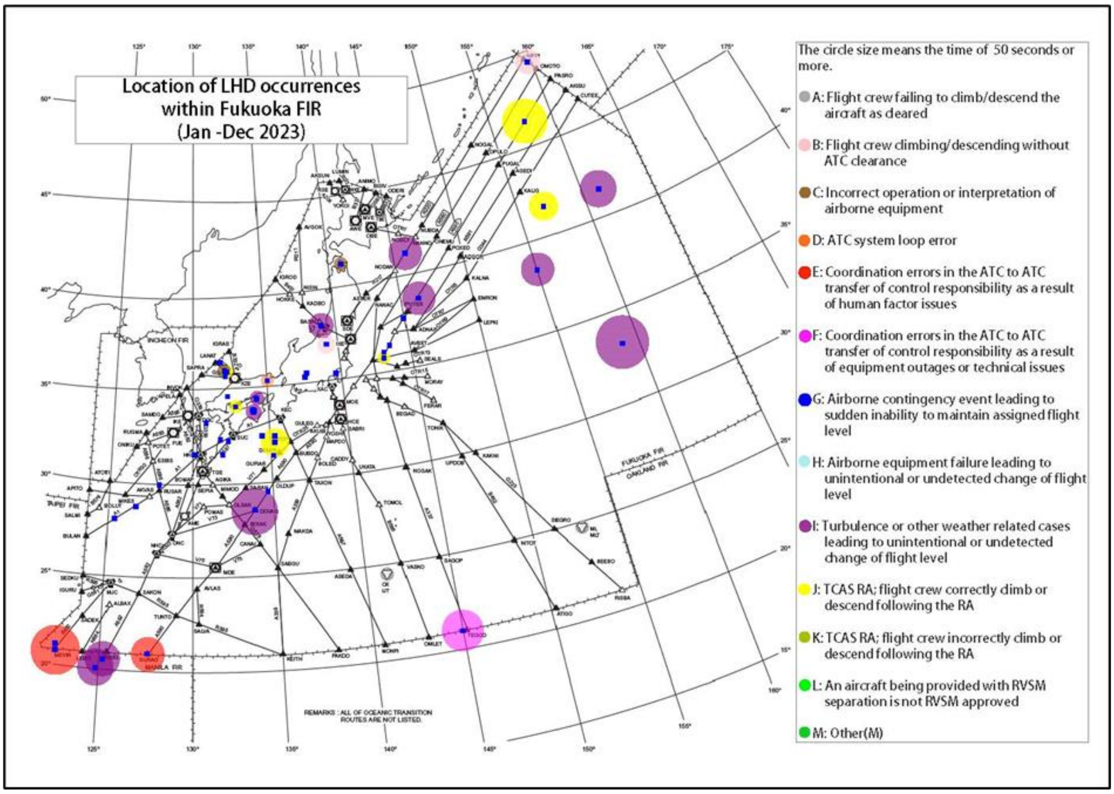

Figure 9: Geographical Location of LHDs within Fukuoka FIR

3.43 The paper illustrated the analysis of trends and changes LHDs and highlighted the significant increase of Category J LHDs which might correspond with the increase of traffic volume in Fukuoka FIR. However, further analysis would be needed because some cases occurred due to traffic that seemed to fly under the Visual Flight Rules (VFR) in the RVSM altitude stratum. Additionally, in a few cases, relevant traffic was not observed by ATS surveillance and pilots' visual contact.

3.44 Follow up from the Tenth Meeting of the RASMAG Monitoring Agencies Working Group (RASMAG/MAWG/10), JASMA considered the percentage value of traffic volume recovery since 2019 and a re-examination of current LHD Hot Spots. **Figure 10** showed the trend of traffic volume in Fukuoka FIR from 2008 to 2023

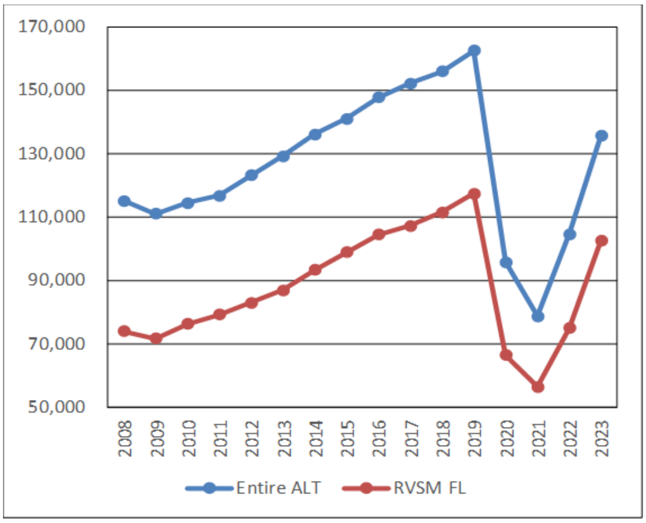

Figure 10: Traffic volume in Fukuoka FIR from 2008 to 2023

3.45 The traffic volume of Fukuoka FIR in 2023 was approximately 83% of it in 2019, which was a peak traffic volume before the COVID-19 pandemic. The traffic volume of Fukuoka FIR showed a solid recovery trend and estimated that the traffic volumes of the RVSM altitude stratum in 2024 would surpass 2019.

Hot Spot B3 (FIR Boundary between Fukuoka and Incheon FIRs in AKARA ¬ FUKUE corridor airspace)

3.46 In 2023, there was no LHD reported at a part of Hot Spot B where the area located at the east edge of the AKARA - FUKUE corridor airspace and the FIR boundary between Fukuoka and Incheon FIRs.

3.47 At the RASMAG/MAWG/11 meeting held from January to February 2024, JASMA proposed to split Hot Spots at each FIR boundary by contributing factors, mitigation measures and future risks to manage and monitor Hot Spots more precisely.

3.48 The subdivision of Hot Spot B was discussed and agreed at the meeting. The area, along and around the FIR interface between Fukuoka and Incheon FIRs was redefined as Hot Spot B3. Hot Spot B3 would be proposed for removal from the Hot Spot list since there has been no LHD report in the area for over two years.

Hot Spot D1 (FIR Boundary between Fukuoka and Manila FIRs)

3.49 **Figure 11** presented the number of LHD occurrences at the FIR boundary between Fukuoka FIR and Manila FIR, part of Hot Spot D, from 2018 to 2023. Hot Spot D was also splitted into D1 to D9, and the FIR boundary between Fukuoka and Manila FIRs was renamed D1.

3.50 A total of five category E LHDs occurred at Hot Spot D1 in 2023. Three of these LHDs occurred on transfer from the Manila ACC to Fukuoka ACC or the Fukuoka Air Traffic Management Center (ATMC), and the rest of the two LHDs occurred on transfer from Fukuoka ATMC or Fukuoka ACC to Manila ACC.

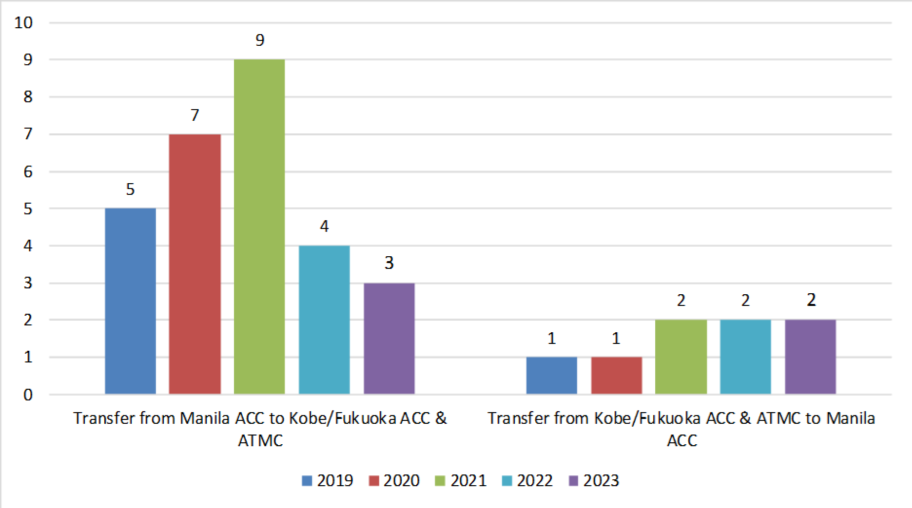

Figure 11: Number of LHDs at Hot spot D between Fukuoka and Manila FIR

3.51 To mitigate transfer error due to human factors at Hot Spot D1, bilateral meetings between Fukuoka and Manila ACC were regularly held since December 2022. The details and efforts of the bilateral meetings were provided in **RASMAG/29 IP/07**.

JASMA Horizontal Safety Report (WP09)

3.52 JASMA provided the horizontal risk assessment results of the Fukuoka Flight Information Region (FIR) conducted by the Japan Airspace Safety Monitoring Agency (JASMA). A detailed report was also provided in **RASMAG/29 WP/09 Attachment**. In this paper, the risk estimation results of the following three horizontal separation standards were reported.

a) 50 NM lateral separation

b) 10 minutes Time-based longitudinal separation (without Mach number technique)

c) 30 NM Distance-based longitudinal separation (PBCS and RNP4)

3.53 **Table 11** provided the North Pacific Ocean airspace horizontal risk estimates during the period January 2023 to December 2023.

Table 11: North Pacific Ocean Airspace Horizontal Risk Estimates

North Pacific Ocean Airspace – estimated annual flying hours = 119,382 hours (note: estimated hours based on Dec 2023 traffic sample data)			
Risk	**Risk Estimation**	**TLS**	**Remarks**
RASMAG 28 50 NM Lateral Risk	*0.456×10^{-9}*	*5.0×10^{-9}*	*Below TLS*
RASMAG 28 10 MIN Based-Longitudinal Risk	*1.75×10^{-9}*	*5.0×10^{-9}*	*Below TLS*
RASMAG 28 30 NM Distance-based Longitudinal Risk	*0.008×10^{-9}*	*5.0×10^{-9}*	*Below TLS*
50 NM Lateral Risk	**1.16×10^{-9}**	5.0×10^{-9}	**Below TLS**
10 MIN Time-based Longitudinal Risk	**10.01×10^{-9}**	5.0×10^{-9}	**Above TLS**
30 NM Distance-based Longitudinal Risk	**0.003×10^{-9}**	5.0×10^{-9}	**Below TLS**

3.54 There was a total of 18 Large Lateral Deviations (LLDs) and Large Longitudinal Errors (LLEs) reported to JASMA in 2023. The top contributor belonged to Category H (Turbulence or weather-related causes leading to a deviation in the horizontal dimension – eleven occurrences).

3.55 To enhance airspace capacity in the Pacific Ocean airspace, 23 NM lateral separation minima based on PBCS and RNP4 has been implemented in the airspace of Fukuoka FIR entirely since 15 June 2023 as an operational trial.

3.56 Current RNAV10 (RNP10) routes and the Pacific Organized Track System (PACOTS) in the airspace were established by using 50 NM lateral distance. A new RNP4 route named M523, requiring PBCS and RNP4 equipage, had been established in the North Pacific Ocean airspace since 25 January 2024, and the RNP4 route was separated at least 23 NM from other neighbouring ATS routes.

3.57 JASMA was developing and updating the procedures and software to calculate "23 NM Lateral Risk", and the Risk estimate would be provided to the Thirtieth Meeting of the Regional Airspace Safety Monitoring Advisory Group (RASMAG/30) next year.

3.58 In response to a query, JASMA would analyse the calculation for the 10 min time-based longitudinal risk again and the meeting noted that it was not typically included in the horizontal risk assessment.

MAAR Safety Report (WP/10)

3.59 MAAR presented the results of airspace safety oversight for RVSM operations in South Asia/Indian Ocean Airspace (SA/IO), Southeast Asia (SEA) Airspace, and Mongolian Airspace during 2023.

South Asia Indian Ocean Airspace

3.60 The 2023 RVSM risk estimate for SA/IO airspace indicated that the TLS had met at **4.05 x 10^{-9}** fapfh (**Table 12**).

Table 12: Trends of Risk Estimates for SA/IO RVSM Airspace

SA/IO Airspace – estimated annual flying hours = 2,642,401 hours ***(note: estimated hours based on Dec 2023 traffic sample data)***			
Source of Risk	**Risk Estimation**	**TLS**	**Remarks**
RASMAG 28 Total Risk	*1.75 x 10^{-9}*	*5.0 x 10^{-9}*	*Below TLS*
Technical Risk	0.65 x 10^{-9}	2.5 x 10^{-9}	Below Technical TLS
Operational Risk	3.40 x 10^{-9}	-	-
Total Risk	**4.05 x 10^{-9}**	5.0 x 10^{-9}	**Below TLS**

3.61 248 of the 254 reported LHDs in SEA airspace were classified as Category E in 2023. **Table 13** showed the number of LHD and operational risk of each cluster as well as the results of checking against the criteria in SA/IO Airspace.

Table 13: Results of identifying hot spots in SA/IO Airspace

2023 Clusters (SA/IO)	Mumbai-Muscat (Hot Spot G)	Mogadishu-Mumbai (Hot Spot F)	Chennai/Kolkata-Yangon (Hot Spot A1)	Chennai-Kuala Lumpur (Hot Spot A2)	Chennai-Colombo	Jakarta-Colombo	Karachi-Muscat
Number of LHDs	138	10	26	13	14	8	10
Check Criteria: Number >= 31.75	Positive	Negative	Negative	Negative	Negative	Negative	Negative
Operational Risk (x 10^{-9} fapfh)	2.79	0.00	0.06	0.22	0.03	0.10	0.01
Check Criteria: Risk >= 0.43 x 10^{-9} fapfh	Positive	Negative	Negative	Negative	Negative	Negative	Negative
Check Criteria: Operation Risk >= 5.00 x 10^{-9} fapfh	Negative	Negative	Negative	Negative	Negative	Negative	Negative

3.62 At the Mumbai-Muscat FIR boundary (a part of Hot Spot G), the number of LHDs, the number of non-zero-duration LHDs, and the operational risk significantly increased. There were 138 LHDs reported at this boundary in 2023 which was 54% of the total number of LHDs in SA/IO Airspace, representing a noticeable climb from to 44 in 2021 and 43 in 2020. The operational risk of 2.79 x 10^{-9} fapfh at the boundary accounted for 82% of the operational risk in SA/IO Airspace.

3.63 At the Mumbai-Sanaa (another part of Hot Spot G) and Mogadishu-Mumbai (Hot Spot F) FIR boundaries, the number of LHDs remained similar to the number recorded in 2022 while the number of non-zero-duration LHDs and the operational risk decreased to 0 in 2023.

3.64 At the Kolkata-Yangon and Chennai-Yangon FIR boundaries (Hot Spot A1), the number of LHDs decreased from 40 in 2022 to 26 in 2023. At these two boundaries, there was only one non-zero-duration LHDs, contributed to 0.06 x 10^{-9} fapfh.

3.65 At Chennai-Kuala Lumpur FIR boundary (Hot Spot A2), the number of LHDs decreased from 22 in 2022 to 13 in 2023. However, the non-zero-duration LHDs significantly increased from 0 in 2022 to 5 in 2023. This led to an increase in operational risk, reaching 0.23 x 10^{-9} fapfh.

3.66 In the analysis of hot spots, the following were proposed:

a) Hot Spot G should remain on the hot spot list and continue to be monitored until further safety improvement initiatives or prevention measures, such as AIDC, are completed and demonstrate their effectiveness.

b) Hot Spot F and A1 should remain on the hot spot list and be monitored until further safety improvement initiatives (specifically AIDC) are implemented even though the number of LHDs and the associated risks are currently below the hot spot criteria.

c) Hot Spot A2 (the boundary between Chennai FIR and Kuala Lumpur FIR) which was proposed as a potential non-hot spot in the RASMAG/28 meeting held in August 2023, continued to not satisfy any criteria in 2023. Hence, Hot Spot A2 was proposed for removal from the hot spot list.

Southeast Asia Airspace

3.67 The 2023 RVSM risk estimate for Southeast Asia (SEA) airspace indicated that the TLS for total risk had been met at **2.91x 10^{-9}** fapfh, as shown in **Table 14.**

Table 14: SEA Airspace RVSM Risk Estimates

SEA Airspace – estimated annual flying hours = 2,969,413 hours ***(note: estimated hours based on Dec 2023 traffic sample data)***			
Source of Risk	**Risk Estimation**	**TLS**	**Remarks**
RASMAG 28 Total Risk	*1.83 x 10^{-9}*	*5.0 x 10^{-9}*	*Below TLS*
Technical Risk	1.07 x 10^{-9}	2.5 x 10^{-9}	Below Technical TLS
Operational Risk	1.84 x 10^{-9}	-	-
Total Risk	**2.91 x 10^{-9}**	5.0 x 10^{-9}	**Below TLS**

3.68 85 of the 95 reported LHDs in SEA airspace were classified as Category E.

3.69 **Table 15** shows the number of LHDs and operational risk of each cluster as well as the results of checking against the criteria in SEA Airspace.

Table 15: The results of identifying hot spots in SEA Airspace

2023 Clusters (SEA)	**Bangkok/Ho Chi Minh/ Kuala Lumpur-Singapore (Hot Spot O)**	**Jakarta-Singapore (Hot Spot J)**	**Manila-Taibei (Hot Spot D)**	**Manila-Ujung Pandang (Hot Spot D)**
Number of LHDs	5	27	12	15
Check Criteria: Number >= 19.00	Negative	Positive	Negative	Negative
Operational Risk (x 10^{-9} fapfh)	0.51	0.33	0.06	0.41
Check Criteria: Operational Risk >= 0.37 x 10^{-9} fapfh	Positive	Negative	Negative	Positive
Check Criteria: Operational Risk >= 5.00 x 10^{-9} fapfh	Negative	Negative	Negative	Negative

3.70 According to the result in **Table 15**, the following three (3) clusters satisfy the hot spot criteria:

a) Bangkok/Ho Chi Minh/Kuala Lumpur-Singapore FIR boundaries (Hot Spot O);
b) Jakarta-Singapore FIR boundary (Hot Spot J); and
c) Manila-Ujung Pandang FIR boundary (Hot Spot D).

3.71 LHD Hot Spot O (Bangkok/Ho Chi Minh/Kuala Lumpur-Singapore) was identified as LHD hot spot in 2023. The number of LHDs and the operational risk in 2023 slightly decreased from 2022. However, the operational risk in this area was 28 % of the total operational risk in SEA Airspace. The risk was contributed by 3 non-zero-duration LHDs, which were the negative transfer from Kuala Lumpur to Singapore at TIDAR waypoint.

3.72 LHD Hot Spot J (Singapore-Jakarta) was identified as LHD hot spot in 2018. The number of LHDs at Singapore-Jakarta FIR boundary increased from 14 in 2022 to 27 in 2023, accounted for 28% of the total LHDs in SEA airspace. The operational risk also increased from 0.18 x 10^{-9} fapfh in 2022 to 0.33 x 10^{-9} fapfh in 2023. The increase was about doubled for the number of LHDs and operational risk.

3.73 On the other hand, the Manila-Taibei FIR boundary was identified as a cluster and was listed as part of Hot Spot D, but it did not meet any hot spot criteria in 2023.

3.74 LHD Hot Spot D (Manila FIR boundaries) was identified as LHD hot spot in 2015. The number of LHDs increased to 46 in 2023, highest over the last three years. The 46 LHDs at Hot Spot D accounted for 48% of the total LHDs in SEA airspace. In addition, the operational risk increased from 0.27×10^{-9} fapfh in 2022 to 0.96×10^{-9} fapfh in 2023. The operational risk at Hot Spot D accounted for 52% of total operational risk in SEA Airspace.

3.75 In 2023, the highest number of LHDs and the highest total operational risk occurred at Manila-Ujung Pandang FIR boundary with 15 LHDs and 0.41×10^{-9} fapfh of the operational risk. Out of 15 LHDs, 10 LHDs were in Category E and 5 LHDs were in Category F. All Category F LHDs were caused by the error from AIDC, leading to the operational risk of 0.17×10^{-9} fapfh.

3.76 According to the decision made by the RASMAG MAWG/11, a hot spot could be subdivided into smaller interfaces between FIR boundaries or ATS sectors, if applicable. Therefore, Hot Spot D was subdivided into nine (9) interfaces as shown in **Figure 12**.

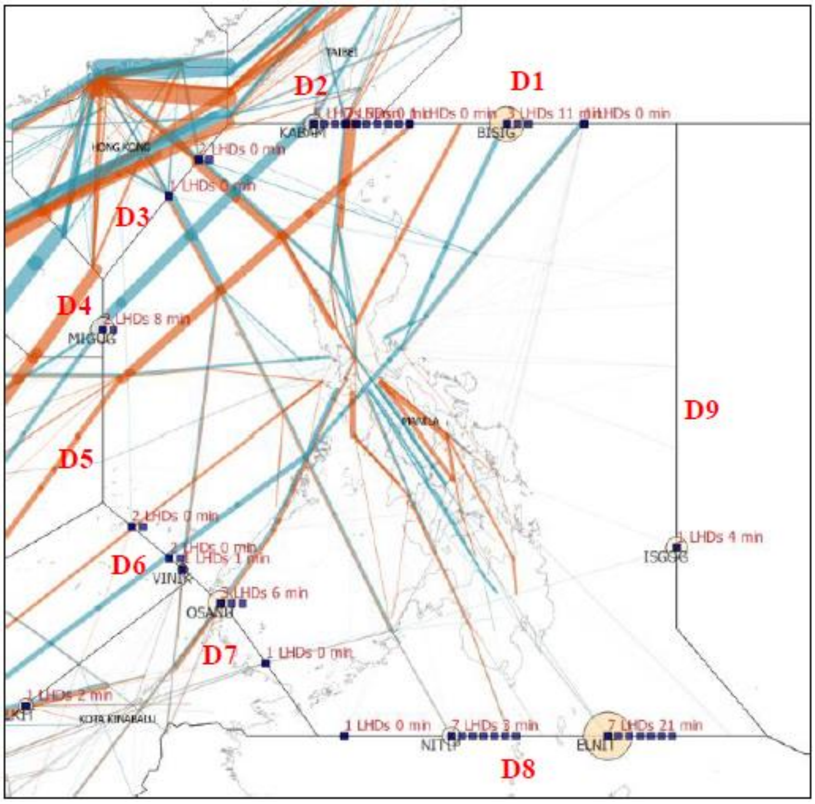

Figure 12: The Subdivision of Hot Spot D

3.77 Based on the hot spot identification process, analysed statistics, and existing AIDC implementation, the status of each subdivision of Hot Spot in SEA was proposed as follows:

a) D1 (Fukuoka and Manila FIR boundary) should remain on the Hot Spot list because the number of LHDs and operational risk met the 2022 criteria in JASMA's analysis even though it did not meet any criteria in MAAR's analysis. The AIDC implementation between Manila ACC and Kobe/Fukuoka ACC has not operated yet.

b) D2 (Manila and Taibei FIR boundary), D3 (Hong Kong and Manila FIR boundary), D4 (Manila and Sanya FIR boundary), D6 (Manila and Singapore FIR boundary) and D9 (Manila and Oakland FIR boundary) were proposed for removal from the Hot Spot list because they had not met the hot spot criteria since 2020, and AIDC implementation had been completed.

c) D5 (Ho Chi Minh and Manila FIR boundary) should remain on the Hot Spot list because AIDC implementation remained incomplete, even though it has not met the hot spot criteria since 2022.

d) D7 (Kota Kinabalu and Manila FIR boundary) should remain on the Hot Spot list because AIDC implementation remained incomplete, even though it has not met the hot spot criteria since 2021.

e) D8 (Manila and Ujung Pandang FIR boundary) should remain on the Hot Spot list because it met the hot spot criteria in 2023.

f) Singapore-Jakarta boundary (LHD Hot Spot J) should remain on the hot spot list.

g) Bangkok/Ho Chi Minh/Kuala Lumpur-Singapore FIR Boundary (Hot Spot O) should remain in the Hot Spot list.

Mongolian Airspace

3.78 In 2023, no LHD was reported within or at the boundary of the Mongolian Airspace. Hence, the analysis of operational errors cannot be conducted. As a result, the total risk was estimated as **0.58×10^{-9}** fapfh.

APANPIRG Deficiencies

3.79 To facilitate the process of RVSM safety oversight, States were required to annually submit a December TSD (APANPIRG Conclusion 16/4) and ANSPs were responsible for submitting LHD data to their Regional Monitoring Agencies (RMAs) on a monthly basis.

3.80 MAAR had not received any data from Afghanistan since the political issue in August 2021. Except Afghanistan, MAAR received the TSD and LHD data from all other States in 2023. The States that submitted the data also provided good cooperation and promptly revised any error when requested.

3.81 As a result, MAAR proposed to maintain Afghanistan on the APANPIRG List of ATM and Airspace Safety Deficiencies under *Non-Provision of Safety-related Data*.

Reporting Culture

3.82 Over the past several years, MAAR observed continuous improvement among the States and ANSPs under its jurisdiction. Almost all States would submit their LHD reports to MAAR through the Online LHD Submission System regularly and cooperated in addressing LHD-related matters. MAAR noted significant improvement from Sri Lanka, with a rapid increase in the number of LHD reports and LHD-related responses via email in 2023.

BOBASMA Horizontal Safety Monitoring Report (WP/11)

3.83 On behalf of the Bay of Bengal Airspace Safety Monitoring Agency (BOBASMA), the secretariat presented the horizontal safety assessment for the Bay of Bengal/Arabian Sea Indian Ocean airspace during the period January to December 2023. The 50NM lateral and longitudinal risks remained below the Target Level of Safety (TLS) shown in **Table 16**.

Table 16: Bay of Bengal Arabian Sea Indian Ocean Airspace Horizontal Risk Estimates

Bay of Bengal Arabian Sea Indian Ocean Airspace Estimated annual flying hours = 57,7231 Hours *(Note: Estimated Hours based on Dec 2023 Traffic Sample Data)*			
Source of Risk	**Risk Estimation**	**TLS**	**Remarks**
RASMAG 28 Lateral Risk	1.38017×10^{-9}	5.0×10^{-9}	Below TLS
RASMAG28 50NM Longitudinal Risk	0.484744×10^{-9}	5.0×10^{-9}	Below TLS
Lateral Risk	$\mathbf{1.57342 \times 10^{-9}}$	$\mathbf{5.0 \times 10^{-9}}$	**Below TLS**
50NM Longitudinal Risk	$\mathbf{4.58856 \times 10^{-9}}$	$\mathbf{5.0 \times 10^{-9}}$	**Below TLS**

3.84 It was noted that due to the COVID-19 pandemic and associated restrictions, the number of flights drastically reduced all over the world in 2020, and this trend largely continued in 2021. In 2023, flight levels have recovered to, and perhaps exceeded, pre-pandemic levels for the first time.

3.85 The meeting highlighted that the assumed speed distribution ($\hat{\beta}_v$ = 0.10987) used in the risk assessment was overly conservative, this equated to a scale parameter of 9.1 knots relating to the Laplace distribution of unexpected changes in speed. When compared to an updated analysis by ICAO Separation Airspace Safety Panel (SASP), indicating that 5.5 knots would be more appropriate and for closely spaced pairs of aircraft this can be reduced more to 2.5 to 4 knots. Thus the actual risk might be lower than 4.59×10^{-9}.

SEASMA Safety Report (WP/12)

3.86 The Southeast Asia Safety Monitoring Agency (SEASMA) provided a horizontal safety assessment report for operations on ATS routes N892, L625, N884 and M767 over the South China Sea. The assessment met the TLS values for lateral and longitudinal separation standards applicable for RNP 10 and RNP 4 operations. The assessment period covered from 1 January to 31 December 2023.

3.87 ATS routes M767 and N884 supported a hybrid mode of RNP 4 and RNP 10 operations. The lateral and longitudinal collision risk estimate trends for RNP 4 operation presented in this paper contained the risk assessment of these two ATS routes.

3.88 **Table 17** provides the horizontal risk estimates for the airspace over the South China Sea

Table 17: Horizontal Risk Estimates

Airspace over the South China Sea – estimated annual flying hours = 52,044 hours (note: estimated hours based on December 2023 traffic sample data)			
Risk	**Risk Estimation**	**TLS**	**Remarks**
RASMAG 28 Lateral Risk (RNP 10)	0.096×10^{-9}	5.0×10^{-9}	*Meets TLS*
RASMAG 28 Longitudinal Risk (RNP 10)	0.375×10^{-9}	5.0×10^{-9}	*Meets TLS*
RASMAG 28 Lateral Risk (RNP 4)	0.738×10^{-9}	5.0×10^{-9}	*Meets TLS*
RASMAG 28 Longitudinal Risk (RNP 4)	0.786×10^{-9}	5.0×10^{-9}	*Meets TLS*
RASMAG 29 Lateral Risk (RNP 10)	$\mathbf{0.569 \times 10^{-9}}$	5.0×10^{-9}	**Meets TLS**
RASMAG 29 Longitudinal Risk (RNP 10)	$\mathbf{0.384 \times 10^{-9}}$	5.0×10^{-9}	**Meets TLS**
RASMAG 29 Lateral Risk (RNP 4)	$\mathbf{0.123 \times 10^{-9}}$	5.0×10^{-9}	**Meets TLS**
RASMAG 29 Longitudinal Risk (RNP 4)	$\mathbf{0.786 \times 10^{-9}}$	5.0×10^{-9}	**Meets TLS**

3.89 The number of LLDs increased from one in CY2022 to five in CY2023, while LLEs increased from zero in CY2022 to one in CY2023. All LLDs reported in CY2023 were categorised as Category 'A' LLDs, where the flight crew deviated in the horizontal dimension without receiving ATC clearance. The LLE reported in CY2023 was a Category 'B' LLE, attributed to an incorrect estimate provided by the flight crew.

Summary Report of Identified Airspace Risk and Mitigations (IP/02)

3.90 Singapore presented the analysis and mitigations to reduce Large Height Deviation (LHD) and Gross Navigation Error (GNE) occurrences in Singapore FIR its associated mitigations for the period of 1 January to 31 December 2023. The number of reported LHD occurrences within the Singapore FIR noted a moderate decrease and this could be due to a combination of man, machine, and method mitigation strategies

PARMO Vertical Safety Monitoring Report (WP/13)

3.91 PARMO provided a vertical safety assessment for 2023 for the Pacific RVSM airspace and a portion of Northeast Asia RVSM airspace.

Pacific Airspace

3.92 The 2023 RVSM risk estimate for Pacific airspace indicated that the TLS had not been met at **18.6×10^{-9}** (**Table 18**).

Table 18: Pacific Airspace RVSM Risk Estimates

Pacific Airspace – estimated annual flying hours = 1,773,499 hours ***(note: estimated hours based on Dec 2023 traffic sample data)***			
Source of Risk	**Risk Estimation**	**TLS**	**Remarks**
RASMAG 28 Total Risk	*32.6×10^{-9}*	*5.0×10^{-9}*	*Above TLS*
Technical Risk	0.17×10^{-9}	2.5×10^{-9}	Below Technical TLS
Operational Risk	18.4×10^{-9}	-	-
Total Risk	**18.6×10^{-9}**	5.0×10^{-9}	**Above TLS**

3.93 The highest contributor towards the vertical risk estimate continued to be errors in ATC coordination between Oakland Center and Honolulu Control Facility. These reports were part of the Hot Spot N area and were covered in a separate paper WP/15 to this meeting.

3.94 The reduction of RVSM risk estimate was computed by taking advantage of the specific location of each LHD and applying specific occupancy parameters instead of an average value, PARMO was able to produce a more accurate risk estimate.

Northeast Asia Airspace

3.95 **Table 19** summarises North East Asia airspace RVSM technical, operational, and total risks.

Table 19: North East Asia Airspace RVSM Risk Estimates

North East Asia Airspace – estimated annual flying hours = 166,499 hours ***(note: estimated hours based on Dec 2023 traffic sample data)***			
Source of Risk	**Risk Estimation**	**TLS**	**Remarks**
RASMAG 28 Total Risk	*0.04×10^{-9}*	*5.0×10^{-9}*	*Below TLS*
Technical Risk	0.17×10^{-9}	2.5×10^{-9}	Below Technical TLS
Operational Risk	0.00×10^{-9}	-	-
Total Risk	**0.17×10^{-9}**	5.0×10^{-9}	**Below TLS**

3.96 There were 74 reported occurrences, consisting of 36 reported occurrences affected the Incheon FIR, the remaining 38 reported occurrences affected the adjacent FIR. All reported LHDs occurred at the SADLI fix location. The reported LHDs for this area contributed towards the observed trend in the airspace which part of Hot Spot B1 and was covered in WP/04 to this meeting.

PARMO Horizontal Safety Monitoring Report (WP/14)

3.97 PARMO submitted the 2023 horizontal safety monitoring report for the Anchorage, Auckland, Nadi, Oakland, and Tahiti FIRs. The lateral, longitudinal risks were all estimated to meet the TLS (**Table 20)**. Of the 120 reported LLDs and LLEs, 106 (90%) were Category E.

Table 20: Pacific Airspace Horizontal Risk Estimates

Pacific Airspace – estimated annual flying hours = 1,773,499 hours ***(note: estimated hours based on Dec 2023 traffic sample data)***			
Risk	**Risk Estimation**	**TLS**	**Remarks**
RASMAG 28 Lateral Risk	*2.09×10^{-9}*	*5.0×10^{-9}*	*Below TLS*
RASMAG 28 Longitudinal Risk	*0.003×10^{-9}*	*5.0×10^{-9}*	*Below TLS*
Lateral Risk	**0.173×10^{-9}**	5.0×10^{-9}	**Below TLS**
Longitudinal Risk	**0.040×10^{-9}**	5.0×10^{-9}	**Below TLS**

3.98 In calendar year 2023, there were fewer reported occurrences with incorrect application of the weather deviation procedure compared to 2022.

3.99 The increasing trend of coordination occurrences between Honolulu Control Facility (HCF) and Oakland ARTCC was observed to continue in calendar year 2023. These occurrences affected multiple traffic flows within Pacific airspace due to the centric geographic location of the HCF. However, the metrics for the Central East Pacific (CEP) traffic flow were the most significant due to the high traffic density. The related analysis was provided in a WP/15 as part of the Hot Spot N analysis.

3.100 The concept of appropriate Lateral Infringement Distance (LID) was introduced and PARMO explained that there was no requirement to change the monitoring lateral criteria for LLD.

3.101 The meeting noted the absence of LHD, LLE and LLD reports submission from Tahiti for 2023 and the first half of 2024 and proposed to include French Polynesia to the ATM deficiency list recorded for the non-provision of Safety Data. ICAO would conduct the verification check with French Polynesia to seek their response prior to the recommendation of inclusion into the Deficiency list during APANPIRG/35 meeting in November for consideration.

2023 Central East Pacific Traffic Flow Assessment (WP/15)

3.102 PARMO presented the 2023 vertical risk assessment for the CEP traffic flow in Pacific airspace. This area was designated as Hot Spot N at RASMAG/24. The CEP traffic flow contained air traffic between mainland North America and Hawaii.

3.103 In calendar year 2023, there were 37 reported LHDs that occurred within the CEP traffic flow. This was a slight decrease over the 44 reported LHDs in calendar year 2022. The LHD category with the highest duration is category E, errors in ATC-to-ATC transfers. There were two category A, one category B, and 32 category E reported LHDs. **Figure 13** provides the reported LHD by cause code, duration and flight levels crossed incorrectly for the CEP and **Figure 14** shows the locations of the reported LHDs within the CEP in 2023.

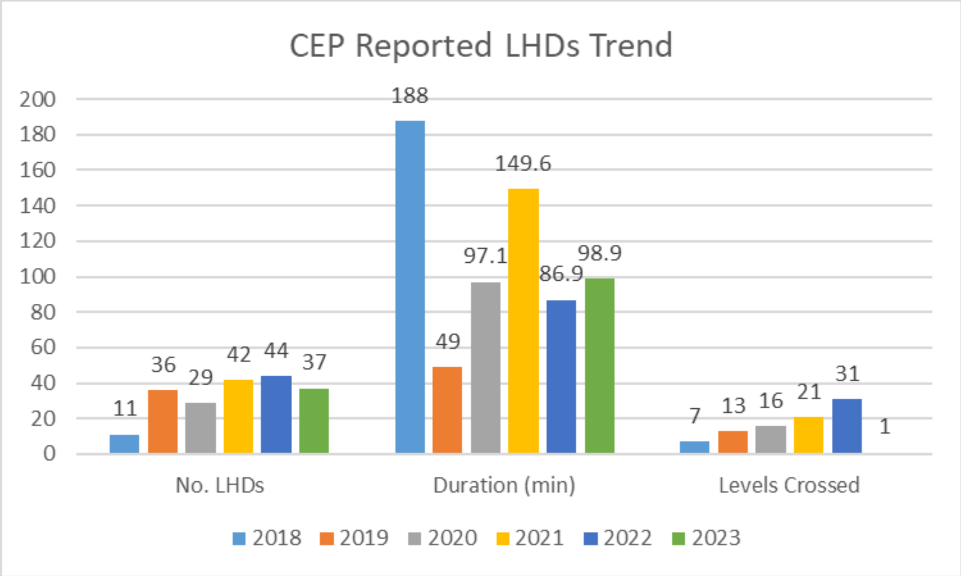

Figure 13: Reported LHDs Comparison Summary

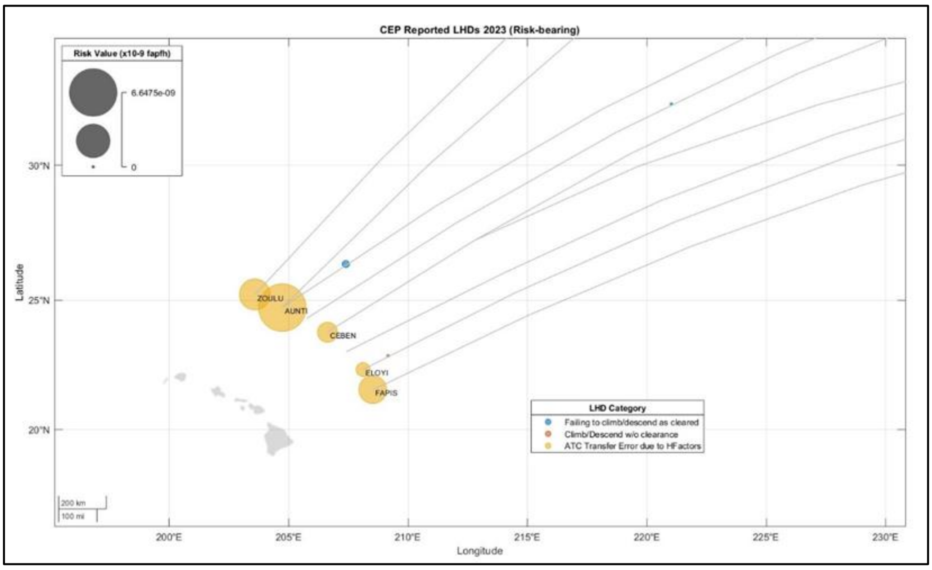

Figure 14: Reported LHDs within the CEP Traffic Flow – 2023

3.104 Various mitigations were explained prior to implementing the En Route Automation Modernization (ERAM) system at the HCF is planned for implementation by the end of 2025. The ongoing efforts that might see a reduction in the number of Category E LHDs reported during the third quarter of calendar year 2024.

3.105 The overall vertical risk for the CEP in 2023 is **12.0 × 10^{-9}** fapfh, a value that exceeded the TLS. This value represented a decrease from that reported in 2022. **Figure 15** showed the five-year (rolling 12-month) trend for the CEP vertical collision risk estimates.

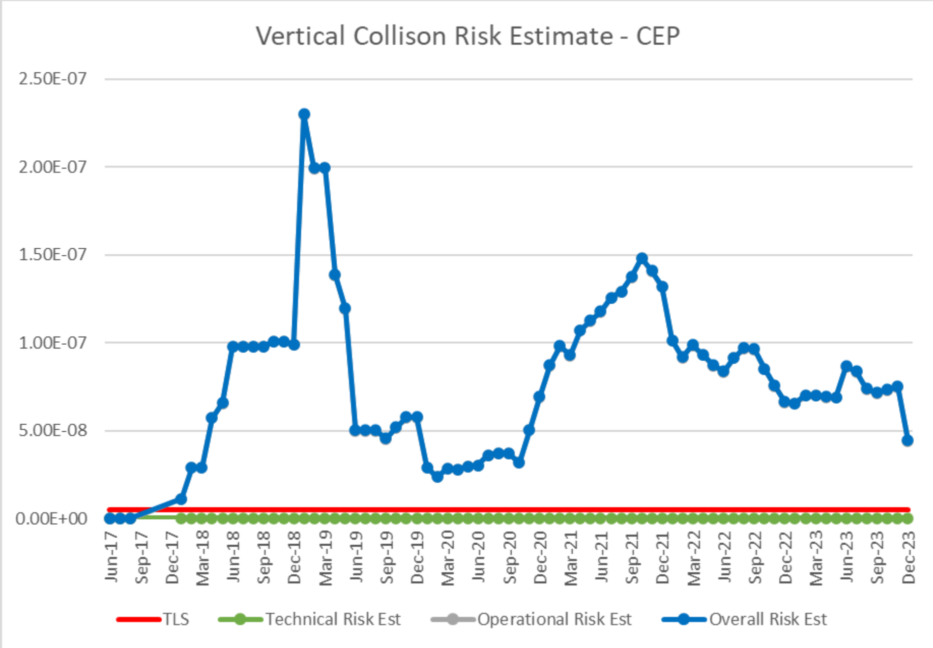

Figure 15: CEP vertical collision risk estimates by calendar year (rolling 12-month)

JASMA Hot Spot Identification (Flimsy/3)

3.106 JASMA had used the proposed Hot Spot identification process and presented the result of JASMA's analysis regarding current and former Hot Spots relating to the Fukuoka FIR. It revealed that Hot Spot B3 did not satisfy the hot spot criteria and will be removed but D1 should be retain as hot spot.

Asia/Pacific Consolidated Safety Report (WP/16)

3.107 MAAR presented the Asia/Pacific Consolidated Safety Report, on behalf of the Asia/Pacific RMAs and EMAs (**Appendix G to this report**).

3.108 The report was divided into the Pacific (PAC) area, and Asia area (**Figure 16**).

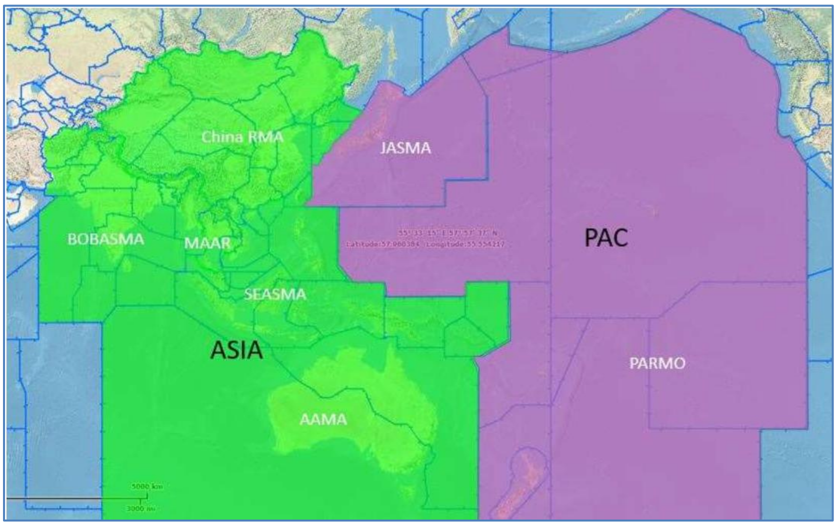

Figure 16: Asia and Pacific Safety Reporting Areas

Pacific Area Vertical Collision Risk

3.109 The estimated vertical collision risk for 2023 for the PAC area did not meet TLS. (**Table 21**).

Table 21: Pacific Area Vertical Collision Risk 2023

Pacific Area – annual flying hours = 3,462,071			
Source of Risk	**Risk Estimation**	**TLS**	**Remarks**
Vertical Technical Risk	0.22×10^{-9}	2.5×10^{-9}	Below Technical TLS
Vertical Operational Risk	10.55×10^{-9}	-	-
2023 Vertical Overall Risk	**10.77×10^{-9}**	5.0×10^{-9}	**Above TLS**

3.110 The PAC vertical collision risk estimates had been above TLS and trending upwards each year from 2016 to 2019. In 2023, there was a slight decrease when compared to the previous year. **(Table 22**)

Table 22: Pacific Area Vertical Collision Risk Estimates 2016 – 2023

Year	**Vertical Overall Risk Estimate (x 10^{-9} fapfh)**	**Remark**
2023	10.77	Above TLS
2022	19.62	Above TLS
2021	19.74	Above TLS
2020	16.71	Above TLS
2019	30.21	Above TLS
2018	19.40	Above TLS
2017	7.30	Above TLS
2016	5.01	Above TLS

3.111 There was a total of 134 LHDs in the Pacific area in 2023 (increased from 118 in 2022), with total duration 362 minutes and 36 levels crossed. 33 of the occurrences were Category A, B or C (25%), 64 were Category D, E or F (48%), zero were Category G or H, 20 in Category I (15%), 16 were Category J or K (12%), and one were Category L or M (1%).

Pacific Area Horizontal Collision Risk

3.112 The estimated horizontal collision risk for 2023 for the PAC area met TLS in all longitudinal and lateral risk categories. (**Table 23**)

Table 23: Pacific Area Horizontal Collision Risk 2023

Pacific Area – annual flying hours = 1,892,881 hours			
2023 PAC Area	**Risk Estimation**	**Airspace**	**Remarks**
Total Lateral Risk	**0.09×10^{-9}**	Pacific	Below TLS
Total Longitudinal Risk	**0.17×10^{-9}**	Pacific	Below TLS
2022 PAC Area	**Risk Estimation**	**Airspace**	**Remarks**
Lateral Risk	2.09×10^{-9}	Pacific	Below TLS
50NM Lateral Risk	0.456×10^{-9}	Japan	Below TLS
30NM Longitudinal Risk	0.0008×10^{-9}	Japan	Below TLS
10MIN Longitudinal Risk	1.754×10^{-9}	Japan	Below TLS

3.113 There was a total of 141 LLDs and LLEs in the Pacific area in 2023 (decreased from 146 in 2022), with a total duration of 1774 minutes and total horizontal deviation of 812NM. 16 occurrences were Category A, B or C (11%), 112 of the occurrences were Category D, E or F (79%), one was Category G (1%), 11 were Category H (8%) and one in Category I or J (1%).

Asia Vertical Collision Risk

3.114 The estimated vertical collision risk for 2023 for the Asia area met TLS (**Table 24 and Table 2**5. The overall risk continued to decline since 2017 due to various safety improvement initiatives and was below the TLS. There was a total of 824 LHDs reported in the Asia area in 2023 (increased compared to 518 in 2022), with total duration 414.45 minutes and 237 levels crossed.

Table 24: Asia Area Vertical Collision Risk 2023

Asia Area – annual flying hours = 10,153,474 hours (38% increase from 2022)			
Source of Risk	**Risk Estimation**	**TLS**	**Remarks**
Vertical Technical Risk	0.56×10^{-9}	2.5×10^{-9}	Below Technical TLS
Vertical Operational Risk	2.84×10^{-9}	-	-
2023 Vertical Overall Risk	$\mathbf{3.40 \times 10^{-9}}$	5.0×10^{-9}	**Below TLS**

Table 25: Asia Area Vertical Collision Risk Estimates 2016 –2023

Year	**Vertical Overall Risk Estimate (x 10^{-9} fapfh)**	**Remark**
2023	3.40	Below TLS
2022	1.53	Below TLS
2021	4.03	Below TLS
2020	7.42	Above TLS
2019	12.88	Above TLS
2018	15.50	Above TLS
2017	27.30	Above TLS
2016	12.53	Above TLS

Asia Area Horizontal Collision Risk

3.115 The estimated horizontal collision risk for 2023 for the Asia area met TLS in all longitudinal and lateral risk categories (**Table 26**). There were ten LLDs and LLEs reported in the Asia area in 2023, with the total horizontal deviation of 136 NM.

Table 26: Asia Area Horizontal Collision Risk 2023

Asia Area – annual flying hours = 503,528 hours (51% increase from 2021)			
2023 Asia Area	**Risk Estimation**	**Airspace**	**Remarks**
Total Lateral Risk	$\mathbf{1.517 \times 10^{-9}}$	ASIA	Below TLS
Total Longitudinal Risk	$\mathbf{4.444 \times 10^{-9}}$	ASIA	Below TLS
2022 Asia Area	**Risk Estimation**	**Airspace**	**Remarks**
30NM Lateral Risk	0.068×10^{-9}	SEA	Below TLS
50NM Longitudinal Risk	0.096×10^{-9}	SEA	Below TLS
30NM Lateral Risk	0.786×10^{-9}	SEA	Below TLS
50NM Longitudinal Risk	0.475×10^{-9}	SEA and SA/IO	Below TLS

Reporting Rate of LHDs, LLDs and LLEs

3.116 **Table 27** shows the number of LHD, LLD and LLE reports for 2017 to 2023, and the number of reports per flying hours. Total estimated flying hours had been increasing since 2020, 7,234,881 hours in 2020, 7,604,927 in 2021 to 10,240,138 hours in 2022 and 13,615,545 in 2023.

3.117 The reporting rate for SEA, China, SA/IO and Indonesia improved in 2023. The reporting rate for SW Pacific dropped because of the huge increase in the estimated flying hours. No aircraft flying in the RVSM airspace of DPRK due to public health crisis in 2023. As a result, there were no flying hours and no reported LHDs, LLDs, or LLEs for DPRK.

Table 27: Total LHD, LLD and LLE Reports, and Reports per Flying Hours, 2017 - 2023

Airspace	# Reports							1 Report : Flying Hrs						
	2017	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**
DPRK	0	0	0	0	0	0	0	-	-	-	-	-	-	-
Mongolia	4	1	2	0	1	0	0	1: 37,771	1: 158,891	1: 82,138	-	1: 121,621	-	-
SEA	474	205	152	42	70	62	95	1: 6,548	1: 17,757	1: 22,275	1: 25,106	1: 15,456	1: 32,620	1:29,400
SA/IO	935	681	439	152	135	143	254	1: 3,166	1: 3,783	1: 7,955	1: 7,907	1: 11,167	1: 21,018	1:10,242
Japan	71	76	77	66	80	75	67	1: 21,510	1: 20,632	1: 20,762	1: 14,737	1: 13,528	1: 18,751	1:23,452
China	134	110	79	85	105	72	223	1: 18,248	1: 22,229	1: 31,119	1: 26,867	1: 15,477	1: 18,003	1:10,525
Pacific	42	43	173	134	176	179	193	1: 54,191	1: 45,064	1: 10,139	1: 6,404	1: 6,638	1: 8,280	1:8,736
Indonesia	34	23	37	18	41	54	125	1: 10,842	1: 53,603	1: 33,321	1: 17,346	1: 7,402	1: 8,060	1:6,099
SW Pacific	51	53	101	46	47	81	65	1: 17,572	1: 17,817	1: 9,335	1: 6,954	1: 11,975	1: 5,352	1:18,186
ROK and AKARA	5	12	34	5	24	108	75	1: 117,090	1: 28,365	1: 18,959	1: 25,965	1: 6,285	1: 1,056	1:2,220
Total	**1,750**	**1,204**	**1,094**	**548**	**679**	**774**	**1,122**	**1: 8,180**	**1: 12,332**	**1: 14,330**	**1: 11,712**	**1: 11,200**	**1:13,230**	**1:12,135**

Hot Spots

3.118 The meeting discussed and agreed to the following changes to the Asia Pacific Consolidated report and the revision would be updated into the APAC consolidated Safety Report accordingly (**Appendix G to the report**)

a) Amendment to the naming of the hot spot B1 for clarity

b) Update of the mitigation information of Hot Spot B1 to reflect prevailing circumstances

   i) China proposed to omit the original text "such as AIDC" as it might be ambiguous and mislead the reader into thinking that the mitigations had already been confirmed by the relevant stakeholders of AKARA, instead the proponents of AIDC should be stated clearly.

   ii) Republic of Korea reminded the meeting that AIDC implementation was part of the AKARA normalisation Phase 2 and was stated in WP/04 as one of the mitigation.

   iii) To provide additional context on the subject of AIDC, ICAO elaborated that the APAC consolidated Safety report during RASMAG 28 and RASMAG27, which was agreed and published to APANPIRG, stated AIDC as one of the recommended mitigations in the AKARA hotspot.

   iv) In addition, the implementation of AIDC was supported by various APANPIRG conclusions over the years.

      (i) Conclusion 18/3 – Prevalence of LHDs from ATC Unit-to-ATC Unit b) highlights the APANPIRG recommendation that States work towards the implementation of compatible AIDC capabilities based on the Asia/Pacific AIDC ICD between ATC units as soon as possible.

      (ii) Conclusion 19/19 – Implementation of AIDC in Asia and Pacific Regions

      (iii) Conclusion 24/27 – Prioritization of AIDC Implementation to Address

LHDs

(iv) Conclusion 24/17 – AIDC Implementation

(v) Conclusion 25/38 – Harmonization for AIDC Implementation

c) Added an explanatory note for the PAC vertical risk to provide non-RASMAG readers a better understand in the situation and follow-up actions.

d) The updated mitigation measures for hot spot M were presented to the meeting for consideration and together with decreasing number of LHDs, enabled RASMAG to agree to the removal as a Hot spot. They included:

   i) Re-sectorisation in Colombo oceanic airspace since 2020

   ii) Awareness and training on topic of non-RVSM approved Indian military aircraft were also provided to ATCOs in both Colombo and Melbourne OCCs

3.119 **Table 28** summarised current LHD Hot Spots, the FIRs involved, the year of identification, and status remarks.

3.120 The Chair asked the relevant States to kindly provide an analysis/update in relation to Hot Spot J (Jakarta/Kota Kinabalu/Singapore) for the meeting of RASMAG/30 in 2025 or to the responsible RMAs before the meeting.

Table 28: LHD Hot Spots in the Asia/Pacific Region

Hot Spot	Involved FIRs	Identified	Remarks
A1	Chennai/Dhaka/Kolkata/ Yangon	2015	Cat. E LHDs and risk reducing.
A2	Chennai/Kuala Lumpur	2015	Cat. E LHDs reducing. Risk slightly increasing. Removed from the Hot Spot list in 2024 (RASMAG/29).
B1	Incheon (Transfer-of-control point between Incheon ACC and Shanghai ACC)	2015	Cat. E LHDs and risk reducing.
B2	Incheon (Intersection points of A593, Y590, Y711 and Y722)	2015	Removed from the Hot Spot list in 2024 (RASMAG/29).
B3	Fukuoka/Incheon	2015	Removed from the Hot Spot list in 2024 (RASMAG/29).
D1	Fukuoka/Manila	2015	Cat. E LHDs reducing. Risk slightly increasing
D2	Manila/Taibei	2015	Removed from the Hot Spot list in 2024 (RASMAG/29).
D3	Hong Kong/Manila	2015	Removed from the Hot Spot list in 2024 (RASMAG/29).
D4	Manila/Sanya	2015	Removed from the Hot Spot list in 2024 (RASMAG/29).
D5	Ho Chi Minh/Manila	2015	Cat. E LHDs reducing. Risk slightly increasing
D6	Manila/Singapore	2015	Removed from the Hot Spot list in 2024 (RASMAG/29).

Hot Spot	Involved FIRs	Identified	Remarks
D7	Kota Kinabalu-Manila	2015	Cat. E LHDs and risk slightly increasing
D8	Manila-Ujung Pandang	2015	Cat. E & F LHDs and risk increasing
D9	Manila/Oakland	2015	Removed from the Hot Spot list in 2024 (RASMAG/29).
F	Mogadishu/Mumbai	2015	Cat. E LHDs slightly increasing. Risk reducing.
G	Mumbai/Muscat/Sanaa	2015	Cat. E LHDs and risk increasing.
J	Jakarta/Kota Kinabalu/Singapore	2018	Cat. E LHDs and risk increasing.
M	Colombo/Melbourne	2019	Removed from the Hot Spot list in 2024 (RASMAG/29).
N	Hawaii CEP/Oakland USA	2019	Cat. E LHDs and Risk reducing.
O	Bangkok/Ho Chi Minh/Kuala Lumpur/Singapore	2023	Cat. E LHDs and Risk reducing.

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

Review of Guidance Material for End-To-End Safety and Performance Monitoring of ATS Data Link Systems in the APAC region (WP/17)

4.1 ICAO Secretariat, China, New Zealand and USA were tasked with RASAMG Task item RASMAG28/1 - *Review and develop Draft of new version of Guidance Material for End-to-End Safety and Performance Monitoring of ATS Data Link Systems in the APAC Region in cooperation with CNS subject matter experts*. *Include region-specific matters from Appendix B to the GOLD Manual (to be removed from the manual in 2020).*

4.2 A working paper was submitted to FIT-Asia/14 held on 16 – 19 July 2024 and FIT-Asia/14 agreed to the ***Draft Conclusion FIT-Asia/14-1: Revised Guidance Material for End-to-End Safety and Performance Monitoring of ATS Data Link Systems in the APAC Region and Additional PBCS Guidance Material NAT Doc 011.***

4.3 In addition, Boeing CRA submitted supplementary amendments after the meeting. Therefore, the updated Guidance Material for End-to-End Safety and Performance Monitoring of ATS Data Link Systems in the APAC Region included all changes were shown in **RASMAG/29 WP17 Attachment A.** A summary of the proposed amendments, including reasons for each proposed amendment, was provided in **WP17 Attachment B** and the EUR NAT Doc 011 could be found in **WP17 Attachment C**.

4.4 The meeting agreed to the proposed changes, and to adopt the following Conclusion:

Conclusion RASMAG/29-3: Revised Guidance Material for End-to-End Safety and Performance Monitoring of ATS Data Link Systems in the APAC Region and Additional PBCS Guidance Material NAT Doc 011

That,

1. the revised Guidance Material for End-to-End Safety and Performance Monitoring of ATS Data Link Systems in the APAC Region at **Appendix F to the report** be uploaded to the Asia/Pacific Regional Office eDocuments webpage to replace the existing version; and
2. the EUR NAT Doc 011 – PBCS Monitoring and Reporting Guidance, 1st Ed.- Amdt. 2, at **WP/17 Attachment C** be uploaded on the ICAO Asia/Pacific Regional Office eDocuments webpage.

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

Bilateral Meeting between Fukuoka and Manila ACC (IP/07)

5.1 Japan highlighted the collaborative work between Fukuoka & Manila ACC to prevent transfer errors at the Flight Information Region (FIR) interface between Fukuoka FIR and Manila FIR.

5.2 Through bilateral meetings between Fukuoka and Manila ACCs, the two parties agreed to change the timing of sending transfer information, originally 30 minutes, to 20 minutes prior to the estimated time of the FIR boundary from Manila ACC to Fukuoka ACC. After a trial period, the full operation was implemented on 13 June 2024 and there was no altitude revision error from Manila ACC to this date.

Cooperation between Manila ACC and Fukuoka ACC to remove Hotspot D (Flimsy/02)

5.3 In the collaborative efforts of Manila ACC and Fukuoka ACC in preventing transfer errors at the common boundary between Fukuoka FIR and Manila FIR. After various meetings between Manila ACC and Fukuoka ACC, a reduced transfer timing procedure was trialled and adopted and incorporated in the new LOA between Fukuoka ACC and Manila ACC which took effect on June 12, 2024. This has resulted in significantly reduction of coordination error compared to the previous years based on Manila ACC data.

5.4 The meeting was appraised that AIDC implementation remained a consideration by Japan and Philippines, but no timeline was confirmed.

China RMA Assessment of Non-RVSM-Approved Aircraft (WP/18)

5.5 China RMA presented the comparison of Non-RVSM approved aircraft checked using flight plan data against the combined global RVSM approval database, including Chinese PBCS approved aircraft database. In addition, the approval validation process for RVSM and PBCS adopted by China RMA was introduced.

5.6 20 suspected non-approved aircraft had been detected from China, China (Hong Kong), China (Taiwan), Indonesia, Japan, Philippines and Republic of Korea.

5.7 Indonesia confirmed that the two Indonesian aircraft mentioned in the paper had valid RVSM approval and corresponding F2 forms had been sent to AAMA and PARMO also confirmed that all the Republic of Korea aircraft in the list were RVSM approved.

JASMA Assessment of Non-RVSM-Approved Aircraft (WP/19)

5.8 JASMA presented a list of operator-aircraft type operating within the RVSM airspace of Fukuoka FIR with no registration of RVSM in the approval databases as of July 2024. 111 aircraft with no registration in the RMA's approval database had been detected (current and past checks included) from Australia, Bermuda (UK), Canada, Cayman Islands (UK), China, China (Hong Kong), China (Taiwan), Ethiopia, France, India, Japan, Malaysia, Malta, Mexico, Philippines, Republic of Korea, San Marino, United States and Vietnam. The detailed list was attached to **RASMAG/29 WP/19**.

5.9 RMAs were encouraged to notify their counterparts in other areas as soon as possible when the detection of suspected Non-RVSM aircraft had occurred. This would facilitate timely investigation and would also present the latest and most accurate Non-RVSM-Approved status at the time of the paper submission to RASMAG.

5.10 MAAR, PARMO and Republic of Korea provided updates regarding the RVSM approval of aircraft registered under the States of their respective responsibility.

MAAR Assessment of Non-RVSM Approved Aircraft (WP/20)

5.11 MAAR presented the results of the annual audit of aircraft filing 'W' to operate in the RVSM airspace but has no valid RVSM approvals in RMAs' database (a.k.a. rogue aircraft). The audit identified a total of 27 aircraft, a result similar to the previous year's count of 24 aircraft. The detected aircraft were distributed across all regions, with less than half of them being under the APAC RMA's responsibility. This year, no long-term repeated rogue aircraft appeared on the list

APANPIRG List of Deficiencies

5.12 MAAR noticed an improvement in the State's coordination for verifying the RVSM approval status of long-term repeated rogue aircraft. India and Indonesia, previously reported as States with numerous repeated rogue aircraft, did not appear in this year's result.

5.13 It was discovered that some States had changed their Point of Contact (POC) for RVSM approval matters. However, the new POC was not aware of the procedure for submitting the F2 Form for new RVSM approval aircraft and the F3 Form for RVSM de-registration aircraft. Consequently, the database could not be updated with the latest RVSM approval. MAAR emphasised that all States should ensure that new POCs continuously update MAAR of any changes to RVSM approval records

5.14 States were strongly advised to the new POCs continually update MAAR of any changes to RVSM approval records.

5.15 The meeting was updated with information regarding the RVSM approval of the aircraft registered to Indonesia and United States.

5.16 As Bangladesh and Nepal failed to submit the 2023 annual RVSM approval snapshot, MAAR recommended RASMAG to propose to APANPIRG to inform these two States that failure to submit the annual RVSM approval snapshot this year would result in an inclusion in the APANPIRG List of Deficiencies in the ATM and Airspace Safety fields next year.

PARMO RVSM Traffic Compliance Monitoring (WP/21)

5.17 PARMO presented an assessment of non-State-approved operators using the RVSM airspace in the Pacific and a portion of North East Asia overseen by PARMO, the RVSM Approval records up to June 2024 and various TSDs provided were used for the assessment.

5.18 All civil aircraft operations observed in each of the TSD submitted to PARMO were compiled into one master traffic sample, consisting of **5,612** airframes and **75,242** operations.

5.19 As shown in **Table 29**, out of the **12** aircraft which were identified for further analysis in the master traffic sample: **Five** registrations were found to be approved, ferried, cancelled or exported, while four were found to be misfiles or typographical errors in flight plan data, leaving **three** aircraft from Cayman Island (UK), Mexico and United States remaining as non-approved.

Table 29: Categorization of aircraft with suspected non-approved operations

RMA	December 2023 Traffic Samples	Approved/Exported/ Cancelled	Typos/ Misfile	Unapproved
AAMA	Australia	1	2	
CARSAM MA	United Kingdom (Cayman Islands)			1
JASMA	Japan	1		
NAARMO	Mexico			1
	United States	1	2	1
PARMO	Republic of Korea	2		
	Total	**5**	**4**	**3**

5.20 PARMO's experience indicated that the primary reason for failure to match operations and approvals was a delay in State notification of the RVSM approval status of some operators to the appropriate RMA. Thus, the importance of timely notification by States of operator approval status to RMAs was emphasised.

5.21 PARMO notified the pertinent RMAs and responsible States regarding the airframes detailed in this paper and incorporated the feedback received.

JASMA Assessment of Non-PBCS Approved Aircraft (WP/22)

5.22 JASMA presented the trend of the numbers and percentages for the PBCS-filed flights and PBCS-approved flights flying in the Pacific Ocean airspace of Fukuoka FIR as of June 2024. The list of operator-aircraft combinations identified as non-PBCS-approved flight in June 2024 was also provided.

5.23 Since lateral separation minima for PBCS/RNP4 aircraft had been reduced from 30 NM to 23 NM in Fukuoka FIR, aircraft without PBCS authorization/approval or the requirement of PBCS performance should be identified to ensure airspace safety.

5.24 JASMA would be conducting on a trial basis to confirm the PBCS approval status of identified and listed aircraft as non-PBCS flights flying in the airspace implementing 23 NM lateral separation minima based on PBCS to the designated RMAs, as well as the RVSM flight plan checks.

5.25 **Figure 17** represented the number of all flights in the Pacific Ocean airspace of Fukuoka FIR, the percentage of flights with "P2" and "RSP180" in their flight plans (PBCS-filed flights), and the percentage of the flights which were confirmed as PBCS approved aircraft in the approval databases (PBCS-approved flights) for January 2023 to June 2024.

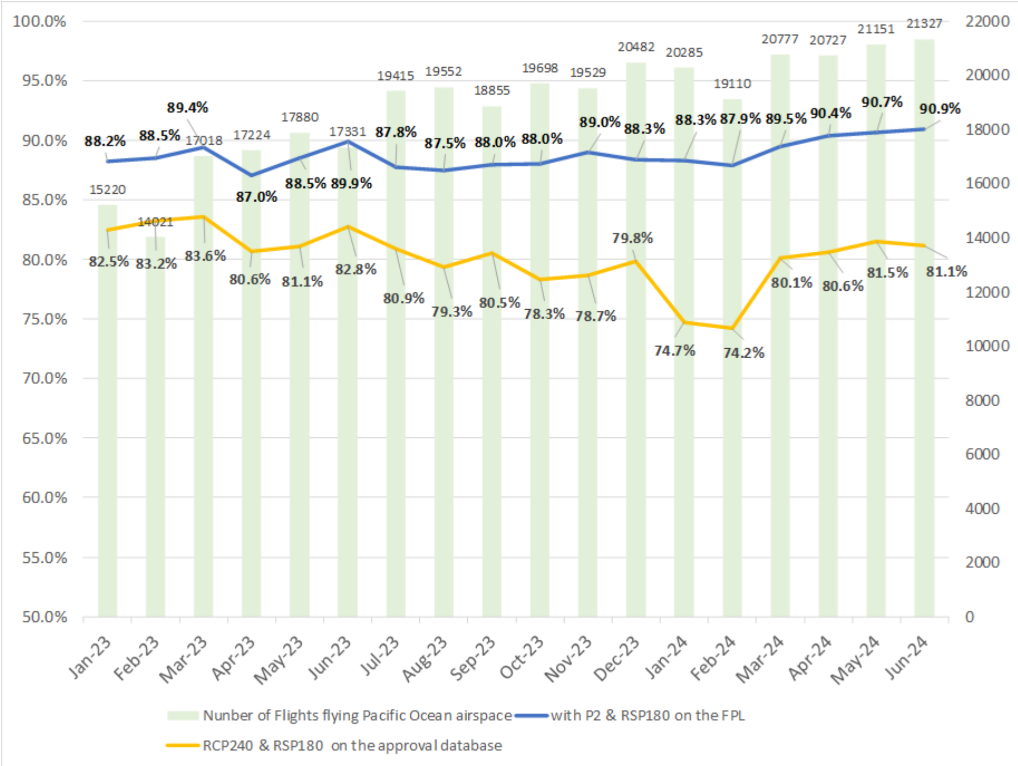

Figure 17: Percentage of PBCS-filed flights and PBCS-approved flights

5.26 There were approximately 80 flights per day and 2,400 flights per month flying in the Pacific Ocean airspace of Fukuoka FIR in June 2024 that filled "P2" and "RSP180" in their flight plans but were not confirmed their PBCS approval/authorization in the approval database.

Survey results for Asia Pacific States PBCS Approval Process (WP/23)

5.27 ICAO presented survey summary aimed to improve understanding by RASMAG and FIT-Asia of the PBCS approval process from APAC member states. However, there were no provisions for applying a specific approval to PBCS operations at this time, PBCS manual Doc 9869 refers.

5.28 There were 13 responses to the survey, seven administrations claimed to have aircraft operators with PBCS approvals and of which six administration conducted direct Approvals.

5.29 Two administrations did not issue specific operational approvals for PBCS. One example showed that for aircraft to be eligible for PBCS separation, they must achieve RCP 240 and RSP 180 requirements and register on the FANS central Reporting Agency Website. Another State required that any pilot in command intending to file a PBCS indicator in their flight plan were to meet a set of regulatory requirements.

5.30 Therefore, for EMAs conducting the PBCS approval checks, aircraft from Australia and French Polynesia could be deemed to have the PBCS approvals and in addition, Australia had plans to update the PBCS database with PBCS approvals in the future.

5.31 The meeting was updated that the UK did not issue specific PBCS approvals for their aircraft.

China RMA LTHM Burden Estimate Update (WP/24)

5.32 China detailed monitoring burden for the aircraft registered and operated under China RMA to meet the long-term height monitoring requirement. The data were based on the RVSM approval database by the end of June 2024. Detailed information was provided in **RASMAG/29 WP/24 Appendix A**.

5.33 The total number of RVSM-approved aircraft was 4,520, with a resultant monitoring burden of 888 and a total of 45 aircraft remaining to be monitored, required by minimum monitoring requirements (MMR).

5.34 For China, there were 4,516 approved aircraft, with a resultant monitoring burden of 884 and 45 aircraft remaining to be monitored.

5.35 For the Democratic People's Republic of Korea (DPRK), there was one operator with four aircraft that require monitoring. In the last four years, due to the COVID-19 epidemic, the flight duration of Air Koryo was limited and was monitored against the MMR of 1,000 flight hours requirements. China RMA has been coordinating with DPRK for technical training and aircraft monitoring. It would be expected to be done by the end of 2024 or early 2025.

5.36 In response to a query, it was confirmed that China RMA conducted the height monitoring for DPRK instead of training DPRK officials to perform that task.

JASMA LTHM Burden Estimate Update (WP/25)

5.37 JASMA presented the current monitoring burden for aircraft registered and operated by Japan to meet Annex 6 LTHM requirements, as of 30 June 2024. Detailed information was provided in **RASMAG/29 WP/25 Attachment**.

5.38 There was a total of 829 airframes approved for the Reduced Vertical Separation Minima (RVSM) on the RVSM approvals database maintained by the JASMA. Applying the Minimum Monitoring Requirements (MMR) to the total of RVSM approved aircraft results in a total monitoring burden to be achieved of 152 airframes. Taking into account aircraft which was approved RVSM for the first time or were conducting height monitoring within the past two years, the outstanding burden was 9 airframes (1.1%).

5.39 The remaining aircraft were operated by small aircraft operators or State. JASMA proclaimed that the flight hours of these operators’ aircraft might not have reached 1,000 hours within the recent two years.

NAARMO Long Term Height Monitoring Burden (IP/3)

5.40 The total of number of unique airframes identified as having a full RVSM approval from a state of registry under NAARMO responsibility as of 17 June 2024 was 23,306, with a resultant monitoring burden of 14,935 and a total of 461 aircraft not successfully monitored within the past two years (or 1,000 flight hours, whichever interval was longer).

5.41 NAARMO used ADS-B as the primary source of RVSM monitoring data, as a result, operators who routinely fly in ADS-B airspace have nearly 100% of their aircraft monitored. Since, the implementation of ADS-B Monitoring in the United States, the number of aircraft remaining unmonitored for the past two years had been greatly reduced.

PARMO RVSM Long Term Height Monitoring Burden (WP/26)

5.42 An assessment of the monitoring burden associated with the LTHM requirements for airframes for which PARMO responsible for was provided to the meeting. PARMO approvals and global monitoring records as of 17 June 2024 were used to assess the monitoring burden.

5.43 The total number of unique airframes identified as having a full RVSM approval from a state of registry under PARMO responsibility as of 17 June 2024 was 583, with a resultant monitoring burden of 124 and a total of 3 aircraft not successfully monitored within the past two years (or 1,000 flight hours, whichever interval was longer).

5.44 A detailed list of the monitoring burden per State under PARMO responsibility was provided in **RASMAG/29 WP/26 Appendix A**.

New Zealand Efforts to fulfil Annex 6 Requirements for Long Term Height Monitoring (WP/27)

5.45 New Zealand presented their efforts to meet the ICAO Annex 6 LTHM requirements. While a few solutions were identified, ADS-B data was decided as the solution to address the current monitoring burden deficiency attributed to New Zealand. PARMO and New Zealand held discussions about the data provided and established a plan for routine check on the monitoring burden requirement to enable RVSM height monitoring analysis when needed. There were ongoing activities to tighten the process for approval and monitoring of RVSM height monitoring requirement such as reminders sent to operators who currently hold RVSM approvals, of their obligation to fulfil Annex 6 LTHM requirements.

APAC Consolidated LTHM Compliance Status (WP/28)

5.46 MAAR presented the overview of LTHM compliance status in the APAC Region, including assessments of five APAC RMAs – AAMA, China RMA, JASMA, MAAR and PARMO. The assessment, based on RVSM approval data as of 30 June 2024, yielded a remaining monitoring burden in the APAC Region of 307 aircraft, which was a 39% decrease compared to the previous year.

APANPIRG List of Deficiencies Consideration

5.47 Based on the criteria for State Responsibility to comply with the Annex 6 Height-Keeping Monitoring Requirement Annex 6 Part I Section 7.2.9 (12th Ed.) and Part II Section 2.5.2.10 (11th Ed.) for Non-compliance with LTHM requirement (remaining monitoring burden 30% or more), the following recommendations were proposed to add, remove and retain their APANPIRG deficiency status in **Table 30.**

Table 30: List of States that could be subject to add, remove, and retain their APANPIRG deficiency status based on RVSM approval data as of 30th June 2024

State	**2022**	**2023**	**RASMAG recommendation**
Pakistan (MAAR)	**45%**	**27%**	**Remove**
Mongolia (MAAR)	**43%**	**18%**	**Remove**
Papua New Guinea (AAMA)	**69%**	**15%**	**Remove**
Solomon Islands (AAMA)	**50%**	**0%**	**Remove**
New Zealand (PARMO)	**36%**	**11%**	**Remove**
India (MAAR)	**24%**	**48%**	**Add**
Philippines (MAAR)	**26%**	**40%**	**Add**

State	2022	2023	RASMAG recommendation
Nepal (MAAR)	45%	45%	Retain
Afghanistan (MAAR)	0%	50%	Retain

5.48 The paper also outlined some recommendations for states and operators such as:

a) APAC States are encouraged to inform their RMAs about any changes (such as transferred or de-registered aircraft) in a timely manner, as this will affect the number of aircraft required to be height-monitored.

b) APAC States are encouraged to provide their RMA with a list of aircraft meeting the 1,000 flight hour criteria. This will enable the RMA to subtract these aircraft from the remaining monitoring burden calculation, thereby decreasing the overall percentage.

c) APAC States should encourage aircraft operators to retrofit ADS-B-Out capability where feasible, as it would provide a more efficient and more cost-effective solution for height monitoring in the long run.

d) The operators that have ADS-B-Out equipped aircraft but still have not fulfilled their monitoring requirements should consult the respective RMAs for other feasible arrangements.

e) APAC States are encouraged to actively engage in sharing their ADS-B data with their designated RMA as another means to alleviate the monitoring burden.

5.49 MAAR requested that APAC RMAs subtract airframe data meeting the 1,000 flight hour criteria before submitting the burden data to MAAR for the APAC consolidated LTHM Compliance Status.

<u>China RMA AHMS Upgrade (IP/04)</u>

5.50 China RMA had been using AHMS for aircraft height keeping performance (HKP) monitoring since 2014 and upgraded AHMS in 2022. This paper presented the reasons for upgrading AHMS, main optimisations or changes made, and ASE comparison between the ordinary and improved ASE calculation methods.

<u>JASMA Project of Updating about HMU (IP/08)</u>

5.51 JASMA utilised the Height Monitoring Unit (HMU) as an essential device for measuring the altitude of the aircraft in RVSM airspace and monitoring altitude error. Since the current devices have been in operation for more than 10 years, JCAB has planned to start new HMU operation in 2026 (Fiscal Year). As the AHMS would be equipped to new devices, Japan would consider expanding of monitoring services.

<u>China RMA Introduction of Field Research (IP/05)</u>

5.52 The field research conducted by China RMA covered eight topics and 33 questions, and also learnt about the ATC automatic system alert types. The system would alarm the controller over 60 meter vertical separation was reached, effectively reducing the LHD events and their generated risks. China RMA will present a paper detailing the application of automated system alarms at the next meeting.

5.53 The field trip improved the understanding of LHD event analysis capability in the ATCs and supported the amendments of the regulation from CAAC or ATMB.

JASMA LLD Standard for 12 NM Lateral Separation (IP/06)

5.54 JASMA shared information regarding the implementation process, including the safety assessment of offset climb/descent procedure and the 12 NM lateral separation minimum using ATS data link services applicable while one aircraft climbs/descends through the level of another aircraft in the Pacific Ocean airspace of the Fukuoka FIR.

5.55 The trial operation period was scheduled to last approximately one year, and the transition from trial operation to official operation was expected to occur in the first quarter of 2024. However, if enough sample data could not be obtained during the trial operation period, the transition might be delayed in order to conduct a safety assessment after implementation.

Procedure of submitting LHD report from operator (Flimsy/01)

5.56 JASMA illustrated the procedures and some examples when aircraft operators submit a LHD Report to the Japan Airspace Safety Monitoring Agency (JASMA) directly. This paper supplemented the working paper "Outcomes of RASMAG-MAWG and RMACG Meetings" at this meeting.

Competent Airspace Safety Monitoring Organizations List (WP/30)

5.57 The meeting updated the *RASMAG List of Competent Airspace Safety Monitoring Organizations* (**Appendix H to the Report**).

Agenda Item 6: Air Navigation Services Deficiencies

ANS Deficiencies List (WP/31)

6.1 The meeting reviewed the APANPIRG ATM and Airspace Safety Deficiency List and agreed to make the following recommendation to APANPIRG/35, as recorded in **Appendix I to this Report.** The meeting was informed that the deadline for submission of information on reduction of the remaining monitoring burden must reach MAAR by 25 Oct 2024 in order to be processed in time for APANPIRG/35.

6.2 ICAO has sent an email to French Polynesia on 21 Aug 2024 and requested for LHD, LLE & LLD data for 2023 to be submitted to ICAO and PARMO by 18 Nov 2024 to facilitate the withdrawal of the deficiency for APANPIRG's review.

a) To be retained in the Deficiencies list

i) Safety Reporting Deficiencies

(i) **Afghanistan** (Failure to submit Kabul FIR Large Height Deviation (LHD) data).

ii) Long Term Height Monitoring Requirement Deficiencies

(i) **Afghanistan** (Remaining monitoring burden of 50%, RASMAG/29).

(ii) **Nepal** (Remaining monitoring burden of 45%, RASMAG/29).

iii) ATS Datalink Deficiencies

(i) **India**: Post implementation monitoring not implemented (insufficient data/evidence).

b) Removal of Deficiency:

i) Long Term Height Monitoring Requirement Deficiencies

(i) **Mongolia** (Remaining monitoring burden of 18%, RASMAG/29).

(ii) **New Zealand** (Remaining monitoring burden of 11%, RASMAG/29).

(iii) **Pakistan** (Remaining monitoring burden of 27%, RASMAG/29).

(iv) **Papua New Guinea** (Remaining monitoring burden of 15%, RASMAG/29).

(v) **Solomon Islands** (Remaining monitoring burden of 0%, RASMAG/29).

ii) ATS Datalink Deficiencies

(i) **Maldives:** It was confirmed that Maldives had disabled the ADS-C function from the ATM system due to an application issue, and CPDLC/HF is used beyond VHF coverage

c) Add new Deficiency

i) Safety Reporting Deficiencies

(i) **French Polynesia** (Failure to submit Tahiti FIR Large Height Deviation (LHD) data).

ii) Long Term Height Monitoring Requirement Deficiencies

(i) **India** (Remaining monitoring burden of 48%, RASMAG/29).

(ii) **Philippines** (Remaining monitoring burden of 40%, RASMAG/29).

Agenda Item 7: Any Other Business

ATM Points of Contact (WP/32)

7.1 Meeting participants were requested to review and updated the ATM Points of Contact (**RASMAG/29 WP/32 Attachment A**) as appropriate.

Agenda Item 8: Review and Update RASMAG Task List

RASMAG Terms of Reference and Task List (WP/33)

8.1 The meeting reviewed the RASMAG Terms of Reference and there were no changes. The meeting also reviewed and updated the RASMAG Task List (**Appendix J to this Report**).

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

9.1 The RASMAG/30 meeting would be planned in July 2025 in Bangkok, Thailand. Any Administration wishing to host the RASMAG/30 meeting should contact the ICAO APAC Regional Office.

Closing of the Meeting

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

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LIST OF PARTICIPANTS

		STATE/NAME	TITLE/ORGANIZATION
1.		**AUSTRALIA (2)**	
	1.	Dr. Steve Barry	Risk Intelligence Lead Airservices Australia **AUSTRALIA**
	2.	Mr. Shea Houlihan	Risk Intelligence Specialist Airservices Australia **AUSTRALIA**
2.		**BRUNEI DARUSSALAM (2)**	
	3.	Mr. Muhd Masyhadi	Air Traffic Control Officer II Department of Civil Aviation Brunei **BRUNEI DARUSSALAM**
	4.	Mr. Hj Azrol Saruji	Chief Aerotelecommunications Officer/ Brunei ATELS Department of Civil Aviation Brunei **BRUNEI DARUSSALAM**
3.		**CAMBODIA (1)**	
	5.	Mr. Lorn Thyrith	Director of Quality and Safety & Security Department Cambodia Air Traffic Services **CAMBODIA**

		STATE/NAME	TITLE/ORGANIZATION
4.		**CHINA (1)**	
	6.	Mr. Chen Yongyue	Engineer China RMA **CHINA**
5.		**HONG KONG, CHINA (2)**	
	7.	Mr. Isaac Wong	Senior Air Traffic Management Standards Officer Civil Aviation Department, Hong Kong China **HONG KONG, CHINA**
	8.	Mr. Wentz LAU	Safety & Quality Officer (En-route) Civil Aviation Department, Hong Kong China **HONG KONG, CHINA**
6.		**INDONESIA (3)**	
	9.	Ms. Annisa Dwi Kurniati	Inspector of Air Navigation Directorate General of Civil Aviation **INDONESIA**
	10.	Mr. Achmad Budi Fathoni	Air Navigation Inspector (CNS) Directorate General of Civil Aviation **INDONESIA**
	11.	Mr. Henry Wiranto	Air Navigation Inspector Directorate General of Civil Aviation **INDONESIA**

		STATE/NAME	TITLE/ORGANIZATION
7.		**JAPAN (4)**	
	12.	Mr. Yasutaka Hashimoto	Senior Air Traffic Controller Fukuoka Area Control Center Japan Civil Aviation Bureau **JAPAN**
	13.	Mr. Eijiro Sunouchi	Special Assistance to the Director Japan Civil Aviation Bureau **JAPAN**
	14.	Mr. Kenichi Furukawa	Director Department of Research and Study Service Air Traffic Control Association Japan **JAPAN**
	15.	Mr. Koji Kato	Director Research & Planning Service Air Traffic Control Association Japan **JAPAN**
8.		**MALAYSIA (3)**	
	16.	Mrs. Farhana Binti Mohamad Khairrudin	Principal Assistant Director Air Navigation Services Safety Division Civil Aviation Authority of Malaysia **MALAYSIA**

		STATE/NAME	TITLE/ORGANIZATION
	17.	Mrs. Nik Afiqah Binti Abdullah	Senior Assistant Director Air Navigation Services Operations Division Civil Aviation Authority of Malaysia **MALAYSIA**
	18.	Mr. Hafizuddin bin Mohamed	Assistant Director Air Navigation Services and Aerodrome Division Civil Aviation Authority of Malaysia **MALAYSIA**
9.		**MONGOLIA (1)**	
	19.	Mr. Puntsag Ganbaatar	Head of Air Navigation Services Oversight Division Civil Aviation Authority of Mongolia (CAAM) **MONGOLIA**
10.		**NEW ZEALAND (1)**	
	20.	Mr. Edmund Heng	Technical Specialist Aeronautical Services Civil Aviation Authority of New Zealand **NEW ZEALAND**
11.		**PAKISTAN (2)**	
	21.	Mr. Asad Moosa	Sr. Joint Director ATS Pakistan Civil Aviation Authority - Ops. Directorate **PAKISTAN**

		STATE/NAME	TITLE/ORGANIZATION
	22.	Mr. Muhammad Rafiq	Senior Joint Director (ATM/SAR) Pakistan Civil Aviation Authority – DAAR **PAKISTAN**
12.		**PHILIPPINES (1)**	
	23.	Ms. Anna Liza D. Chiefe	Air Traffic Management Officer III, Manila ACC Air Traffic Service Civil Aviation Authority of the Philippines **PHILIPPINES**
13.		**REPUBLIC OF KOREA (3)**	
	24.	Mr. Hu-Ho Ha	Deputy Director of Air Traffic Division Korea Office of Civil Aviation (KOCA), Ministry of Land, Infrastructure and Transport (MOLIT) **REPUBLIC OF KOREA**
	25.	Ms. JuYoung Lim	Assistant Director of Air Traffic Division Korea Office of Civil Aviation (KOCA), Ministry of Land, Infrastructure and Transport (MOLIT) **REPUBLIC OF KOREA**
	26.	Ms. Kim Hayeong	Airspace Management Manager Air Traffic Management Office Ministry of Land, Infrastructure and Transport (MOLIT) **REPUBLIC OF KOREA**

		STATE/NAME	TITLE/ORGANIZATION
14.		**SINGAPORE (3)**	
	27.	Mr. Wen Pei Goh	ATC Manager Civil Aviation Authority of Singapore (CAAS) **SINGAPORE**
	28.	Mr. Lam Seng Lim	Safety Manager Civil Aviation Authority of Singapore (CAAS) **SINGAPORE**
	29.	Mr. Naresh Kumar Dhalamal Tarani	Head (Safety Partnership) Civil Aviation Authority of Singapore (CAAS) **SINGAPORE**
15.		**SRI LANKA (2)**	
	30.	Ms. Thilini Dinushika Herath	Senior Civil Aviation Inspector - ATMSP Civil Aviation Authority of Sri Lanka **SRI LANKA**
	31.	Ms. Priyasha Ransrini Hettiarachchi	Manager - Air Traffic Control / Unit Safety Officer - Area Control Centre Airport and Aviation Services (Sri Lanka) Ltd. **SRI LANKA**

		STATE/NAME	TITLE/ORGANIZATION
16.		**THAILAND (12)**	
	32.	Mr. Buntoeng Megchai	Manager of Air Navigation Operations Management Department The Civil Aviation Authority of Thailand **THAILAND**
	33.	Mr. Apiwat Torpradit	Flight Operations Standards Department Senior Officer The Civil Aviation Authority of Thailand **THAILAND**
	34.	Mr. Suphichet Phatcharaphisutsin	Flight Operations Inspection Officer The Civil Aviation Authority of Thailand **THAILAND**
	35.	Ms. Saifon Obromsook	Director, Safety Management Department Aeronautical Radio of Thailand Limited **THAILAND**
	36.	Ms. Rinthida Jorntes	Safety Management System Assistant Manager Aeronautical Radio of Thailand Ltd. **THAILAND**
	37.	Ms. Chantima Sritiapetch	Senior System Engineer (Safety Management System) Aeronautical Radio of Thailand Ltd. **THAILAND**

		STATE/NAME	TITLE/ORGANIZATION
	38.	Mr. Dolsarit Somseang	Executive Systems Engineer (Safety Management System) Aeronautical Radio of Thailand Ltd. **THAILAND**
	39.	Mr. Ponkrit Sawedsud	System Engineer (Safety Management System) Aeronautical Radio of Thailand Ltd. **THAILAND**
	40.	Mr. Raksit Soontornmalai	Senior Safety Management System Officer Aeronautical Radio of Thailand Ltd. **THAILAND**
	41.	Captain Polkrit Thanusil	Team Lead, Investigation and Flight Data Analysis (OB-A) Thai Airways International Public Company Limited **THAILAND**
	42.	Mrs. Kaew Dhapagupta	Senior Aircraft Engineer Aviation Safety Group, Quality Assurance Department Technical Department Thai Airways International Public Company Limited **THAILAND**

		STATE/NAME	TITLE/ORGANIZATION
	43.	Capt. Thammarat Thammalikhit	Administrative Assistant Safety Management System Department Corporate Safety and Quality Assurance Department Thai Airways International Public Company Limited **THAILAND**
17.		**UNITED STATES (5)**	
	44.	Mr. Shayne Campbell	Senior Air Traffic Representative, Asia Pacific Federal Aviation Administration Air Traffic Organization, System Operations **SINGAPORE**
	45.	Mr. Micah Lyman	Foreign Affairs Specialist Federal Aviation Administration Air Traffic Safety Oversight **UNITED STATES**
	46.	Ms. Christine Falk	Operations Research Analyst Federal Aviation Administration Separations Standards Analysis **UNITED STATES**
	47.	Mr. José Pérez	Computer Specialist Separation Standards Analysis Branch Federal Aviation Administration **UNITED STATES**

		STATE/NAME	TITLE/ORGANIZATION
	48.	Ms. Tracy Sivley	Program Analyst Federal Aviation Administration **UNITED STATES**
18.	**VIET NAM (5)**		
	49.	Mr. Nguyen The Hung	Director of Air Navigation Dept Civil Aviation Authority of Viet Nam **VIET NAM**
	50.	Ms. Tran Thi Ngoc Anh	Officer Civil Aviation Authority of Viet Nam **VIET NAM**
	51.	Mr. Nguyen Manh Thang	Deputy Director - Safety & Quality Department Vietnam Air Traffic Management Corporation **VIET NAM**
	52.	Mr. Dang Ha Khuong	Manager of safety, quality and security Division, Southern Region Air Traffic Services Company Vietnam Air Traffic Management Corporation **VIET NAM**
	53.	Ms. Phan Thi Van Anh	Officer - ATS Department Vietnam Air Traffic Management Corporation **VIET NAM**

		STATE/NAME	TITLE/ORGANIZATION
19.		**IATA (1)**	
	54.	Mr. Blair Cowles	Regional Director, OSS – Safety & Operations, Asia-Pacific International Air Transport Association (IATA) **SINGAPORE**
20.		**IFALPA (1)**	
	55.	Captain Amornvaj Mansumitchai	IFALPA President IFALPA **THAILAND**
21.		**IFATCA (1)**	
	56.	Ms. Yenchun Cheryl Chen	EVP IFATCA – Asia and Pacific **CANADA**
22.		**ICAO (4)**	
	57.	Mr. Hiroyuki Takata	Regional Officer, Air Traffic Management ICAO Asia and Pacific Regional Office **THAILAND**
	58.	Mr. Weng Kit Ying	Air Traffic Management Officer ICAO Asia and Pacific Regional Office **THAILAND**

		STATE/NAME	TITLE/ORGANIZATION
	59.	Mr. Tak Chuen Chui	AIM/ATM Officer ICAO Asia and Pacific Regional Office **THAILAND**
	60.	Dr. Prakayphet Chalayonnawin	Programme Analysis Associate, Air Traffic Management ICAO Asia and Pacific Regional Office **THAILAND**

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LIST OF PAPERS

LIST OF WORKING PAPERS

NUMBER	AGENDA	TITLE	PRESENTED BY
WP/01	1	Provisional Agenda	Secretariat
WP/02	2	FIT-Asia Meeting Outcomes	Secretariat
WP/03	2	Outcomes of RASMAG-MAWG and RMACG Meetings	MAAR
WP/04	3	2023 Analyses for the Incheon FIR AKARA Corridor Interface with Shanghai, Fukuoka and Taipei FIRs	PARMO
WP/05	3	RVSM Risk Assessment in the Brisbane, Honiara, Melbourne, Nauru and Port Moresby Flight Information Regions 1 January 2023 to 31 December 2023	AAMA
WP/06	3	RVSM Risk Assessment in Jakarta and Ujung Pandang Flight Information Region 1 January 2023 to 31 December 2023	AAMA
WP/07	3	China RMA Vertical Safety Report	China RMA
WP/08	3	JASMA Vertical Safety Report	JASMA
WP/09	3	JASMA Horizontal Safety Report	JASMA
WP/10	3	MAAR Vertical Safety Report	MAAR
WP/11	3	BOBASMA Horizontal Safety Monitoring Report	BOBASMA
WP/12	3	SEASMA Horizontal Safety Report	SEASMA
WP/13	3	PARMO Vertical Safety Monitoring Report 2023	PARMO
WP/14	3	PARMO Horizontal Safety Monitoring Report 2023	PARMO
WP/15	3	2023 Central East Pacific Traffic Flow Assessment	PARMO
WP/16	3	Asia/Pacific Consolidated Safety Report	MAAR
WP/17	4	Review of Guidance Material for End-To-End Safety and Performance Monitoring of Air Traffic Service (ATS) Data Link Systems in the Asia/Pacific Region	Secretariat
WP/18	5	China RMA Assessment of PBCS and Non-RVSM Approved Aircraft	China RMA
WP/19	5	JASMA Assessment of Non-RVSM Approved Aircraft	JASMA
WP/20	5	MAAR Assessment of Non-RVSM Approved Aircraft	MAAR
WP/21	5	PARMO RVSM Traffic Compliance Monitoring	PARMO
WP/22	5	JASMA Assessment of Non-PBCS Approved Aircraft	JASMA
WP/23	5	Survey results for Asia Pacific States PBCS Approval Process	Secretariat
WP/24	5	China RMA LTHM Burden Estimate Update	China RMA
WP/25	5	JASMA LTHM Burden Estimate Update	JASMA
WP/26	5	PARMO RVSM Long Term Height Monitoring Burden	PARMO

NUMBER	AGENDA	TITLE	PRESENTED BY
WP/27	5	New Zealand Efforts to fulfil Annex 6 Requirements for Long Term Height Monitoring	New Zealand
WP/28	5	APAC Consolidated LTHM Compliance Status	MAAR
WP/29	5	Measures to reduce LHD occurrence between Shanghai and Incheon ACCs	Republic of Korea
WP/30	5	Competent Airspace Safety Monitoring Organizations List	Secretariat
WP/31	6	ATM and Airspace Deficiencies List	Secretariat
WP/32	7	Airspace Safety Points of Contact	Secretariat
WP/33	8	RASMAG Terms of Reference and Task List	Secretariat

LIST OF INFORMATION PAPERS

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IP/3	5	NAARMO RVSM Long Term Height Monitoring Burden	NAARMO
IP/4	5	China RMA ADS-B Height Monitoring System (AHMS) Upgrade	China RMA
IP/5	5	China RMA Introduction of Field Research	China RMA
IP/6	5	JASMA Safety Assessment of the 12NM Lateral Separation Minima using ATS Data Link Services in Fukuoka FIR Oceanic Airspace	JASMA
IP/7	5	Bilateral Meeting between Fukuoka and Manila ACC	JASMA
IP/8	5	Project of updated about Height Monitoring System in Fukuoka FIR	JASMA

LIST OF FLIMSIES

NUMBER	AGENDA	TITLE	PRESENTED BY
Flimsy/1	5	Procedure of Submitting LHD Report from Operator	JASMA
Flimsy/2	5	Cooperation Between Manila ACC and Fukuoka ACC to Remove Hotspot D	Philippines
Flimsy/3	5	JASMA Hop Spot Identification	JASMA
Flimsy/4	3	Additional Information on LHDs from the AAMA 1 January 2023 to 31 December 2023	AAMA

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FIR		[FIR Name}					
Criteria		RSP180					
Period		Jan-June YYYY			July-December YYYY		
Colour Key Meets Criteria 99.0%-99.89% Under Criteria		**Message Counts**	**95%** **% < = 90sec**	**99.90%** **% <= 180sec**	**Message Counts**	**95%** **% < = 90sec**	**99.90%** **% <= 180sec**
By Media Type							
SATCOM							
VHF							
HF							
ALL							
By Remote Ground Station (RGS) Ground Earth Station (GES)							
Designator	**Type**	(only RGS/GES with message counts >100 recorded)					

FIR	{FIR Name}					
Criteria	RSP180					
Period	Jan-June YYYY			July-December YYYY		
Colour Key Meets Criteria 99.0%-99.89% Under Criteria	Message Counts	95% % <= 90sec	99.90% % <= 180sec	Message Counts	95% % <= 90sec	99.90% % <= 180sec
By Aircraft Operator / Type **(only message counts >100 recorded)**						

FIR		{FIR Name}									
Criteria		RCP240									
Period		Jan - Jun YYYY					Jul - Dec YYYY				
Colour Key Meets Criteria 99.0%-99.89% Under Criteria		Message Counts	95% benchmark		99.9% Benchmark		Message Counts	95% benchmark		99.9% Benchmark	
			ACP % < = 180sec	ACTP % <= 120sec	ACP % < = 210sec	ACTP % <= 150sec		ACP % < =180sec	ACTP % <= 120sec	ACP % < = 210sec	ACTP % <= 150sec
By Media Type											
SATCOM											
VHF											
HF											
ALL											
By Remote Ground Station (RGS) Ground Earth Station (GES)											
Designator	**Type**	(RGS/GES with message counts >100)									

FIR	[FIR Name}											
Criteria	RCP240											
Period	Jan - Jun YYYY						Jul - Dec YYYY					
Colour Key Meets Criteria 99.0%-99.89% Under Criteria	Message Counts	95% benchmark		99.9% Benchmark		95%	Message Counts	95% benchmark		99.9% Benchmark		95%
		ACP % < = 180sec	ACTP % <= 120sec	ACP % < = 210sec	ACTP % <= 150sec	PORT %<60secs		ACP % < =180sec	ACTP % <= 120sec	ACP % < = 210sec	ACTP % <= 150sec	PORT %<60secs
By Aircraft Operator / Type (only message counts >100 recorded)												

EXAMPLE PERFORMANCE REPORT DATA CPDLC

ANSP REPORTS TO FIT MEDIA TYPE/RGS & GES

FIR		NZZO					
Criteria		RSP180					
Period		Jan-June 2023			July-December 2023		
Colour Key: Meets Criteria; 99.0%-99.89%; Under Criteria		Message Counts	95% % <= 90sec	99.90% % <= 180sec	Message Counts	95% % <= 90sec	99.90% % <= 180sec
By Media Type							
SATCOM		337695	98.81	99.66	382399	98.61	99.59
VHF		76376	99.75	99.92	89058	99.7	99.87
HF		259	74.13	84.16	230	69.56	85.65
ALL		414330	98.97	99.7	471687	98.81	99.64
By Remote Ground Station (RGS) Ground Earth Station (GES)							
Designator	**Type**	(only RGS/GES with message counts >100 recorded)					
AKL	VDL	6434	99.75	99.9	7720	99.79	99.88
AKL1	VDL	856	100	100	878	99.88	99.88
AKL2	VDL	6425	99.09	99.89	7099	98.81	99.5
AKL7	VDL	4168	99.97	99.97	5652	99.96	99.98
AKL8	VDL	21360	99.92	99.96	20269	99.96	99.99
AKLV	VDL	1419	99.71	99.85	1441	100	100
AME1	SAT	13297	99.7	99.92	16016	99.25	99.68
AME2	SAT	2659	99.81	99.92	4050	99.5	99.75
AME7	SAT				470	99.57	99.78
AME8	SAT				288	100	100
APK1	SAT	151812	99.19	99.82	175089	98.92	99.74
APK2	SAT	8732	99.54	99.89	7052	99.37	99.87
APK7	SAT				1600	98.5	98.81
APK8	SAT				889	98.98	99.43
APW1	VDL	4432	99.66	99.72	5198	99.9	99.98
CHC	VDL	356	100	100	436	100	100
CHC1	VDL	252	97.22	99.2	259	96.91	99.61
CHC2	VDL	282	97.51	100	243	95.47	98.76
CHC7	VDL	1913	99.94	100	1777	99.88	100
CHC8	VDL	1535	99.93	100	1419	99.92	100
CHCV	VDL	383	100	100	619	99.83	99.83
H05	HF	208	77.4	86.05	186	74.19	89.78
HLZ	VDL	1097	99.72	99.9	728	100	100
HLZ1	VDL	269	99.62	100	299	98.99	99.33
IG1	SAT	2287	96.76	98.51	1687	97.09	98.93
IGW1	SAT	77675	97.38	99.23	83026	96.95	99.12
IOR5	SAT				197	97.46	100
IVC1	VDL	754	97.21	99.6	956	98.22	100

EXAMPLE PERFORMANCE REPORT DATA CPDLC

ANSP REPORTS TO FIT Aircraft Operator & Type

FIR	NZZO					
Criteria	RSP180					
Period	Jan-June 2023			July-December 2023		
Colour Key: Meets Criteria; 99.0%-99.89%; Under Criteria	Message Counts	95% % <= 90sec	99.90% % <= 180sec	Message Counts	95% % <= 90sec	99.90% % <= 180sec
By Aircraft Operator / Type (only message counts >100 recorded)						
AAL/B77W	4234	98.91%	99.34%	9511	98.92%	99.32%
AAL/B788				108	100.00%	100.00%
AAL/B789	8290	99.92%	100.00%	4762	99.87%	99.98%
ACA/B77L	273	98.53%	100.00%	468	97.86%	98.50%
ACA/B789	3732	99.01%	99.65%	2015	98.91%	99.80%
ACI/A20N	2173	98.44%	99.54%	2312	98.36%	99.35%
ACI/A339	1467	99.25%	99.93%	1563	100.00%	100.00%
ANZ/A20N	36588	97.70%	99.62%	36744	97.52%	99.73%
ANZ/A21N	40944	98.22%	99.44%	46025	97.44%	99.14%
ANZ/B77W	35456	99.28%	99.71%	52449	98.88%	99.59%
ANZ/B789	73626	99.34%	99.94%	70165	99.12%	99.94%
ASY/A332	163	100.00%	100.00%	228	99.56%	100.00%
ASY/C17	109	100.00%	100.00%	237	96.20%	97.89%
ASY/C30J	101	100.00%	100.00%	147	98.64%	100.00%
ASY/FA7X	242	97.93%	98.35%	174	98.85%	100.00%
AWC/A21N				140	97.86%	100.00%
CAL/A359	2668	99.06%	99.85%	2951	99.36%	100.00%
CAL/B77L	155	98.71%	100.00%			
CCA/A332				171	100.00%	100.00%
CCA/B789	678	98.53%	99.26%	2891	98.93%	99.34%
CES/A332	1996	100.00%	100.00%	1222	99.92%	100.00%
CES/B77W	928	99.25%	99.46%	3560	98.96%	99.47%
CES/B789	101	100.00%	100.00%	1967	99.90%	99.90%
CHH/A333	238	100.00%	100.00%			
CKS/B744	346	98.55%	100.00%			
CKS/B77L	5143	98.41%	99.38%	1240	98.23%	99.03%
CPA/A359				202	100.00%	100.00%
CPA/A35K	1780	99.89%	100.00%	2062	99.37%	99.95%
CSN/A359	405	100.00%	100.00%	331	100.00%	100.00%
CSN/B789	3266	99.91%	99.97%	5617	99.54%	99.93%
DAL/A359	8060	99.50%	99.94%	12381	99.56%	99.92%
DOD/K35R	131	86.26%	90.84%			
FDX/B77L	1134	98.85%	99.74%	1123	97.77%	99.02%
FJI/A332	5705	98.02%	99.67%	4167	96.33%	98.78%

EXAMPLE PERFORMANCE REPORT DATA CPDLC

ANSP REPORTS TO FIT MEDIA TYPE/RGS & GES

FIR		NZZO									
Criteria		RCP240									
Period		Jan - Jun 2023					Jul - Dec 2023				
Colour Key: Meets Criteria (green); 99.0%-99.89% (yellow); Under Criteria (red)		Message Counts	95% benchmark		99.9% Benchmark		Message Counts	95% benchmark		99.9% Benchmark	
			ACP % < = 180sec	ACTP % <= 120sec	ACP % < = 210sec	ACTP % <= 150sec		ACP % < =180sec	ACTP % <= 120sec	ACP % < = 210sec	ACTP % <= 150sec
By Media Type											
SATCOM		68738	99.03%	99.53%	99.35%	99.70%	74291	99.08%	99.48%	99.36%	99.63%
VHF		9827	99.64%	99.83%	99.71%	99.91%	10372	99.69%	99.73%	99.82%	99.91%
HF		112	75.00%	76.78%	77.67%	82.14%	110	83.63%	87.27%	90.00%	91.81%
ALL		78677	99.07%	99.53%	99.36%	99.71%	84773	99.13%	99.49%	99.40%	99.65%
By Remote Ground Station (RGS) Ground Earth Station (GES)											
Designator	**Type**	(RGS/GES with message counts > 100)									
AKL	VDL	973	99.28%	99.58%	99.28%	99.58%	1109	99.63%	99.90%	99.81%	100.00%
AKL2	VDL	1285	99.84%	99.84%	99.84%	99.92%	1049	100.00%	100.00%	100.00%	100.00%
AKL7	VDL	316	100.00%	99.36%	100.00%	100.00%	394	99.23%	99.23%	99.49%	99.49%
AKL8	VDL	2105	99.61%	99.71%	99.80%	99.95%	1812	99.61%	99.11%	99.83%	99.77%
AKLV	VDL	168	100.00%	100.00%	100.00%	100.00%	161	99.37%	100.00%	100.00%	100.00%
AME1	SAT	1813	99.39%	99.72%	99.39%	99.88%	2071	99.61%	99.71%	99.71%	99.85%
AME2	SAT	372	98.65%	99.73%	98.92%	99.73%	494	98.98%	98.98%	99.39%	99.39%
APK1	SAT	30442	99.37%	99.63%	99.62%	99.78%	32789	99.33%	99.55%	99.60%	99.70%
APK2	SAT	1853	99.62%	99.89%	99.78%	99.89%	1344	99.25%	99.55%	99.47%	99.77%
APK7	SAT						260	99.23%	100.00%	99.61%	100.00%
APK8	SAT						134	99.25%	100.00%	99.25%	100.00%
APW1	VDL	831	100.00%	100.00%	100.00%	100.00%	950	100.00%	100.00%	100.00%	100.00%
CHC7	VDL	150	100.00%	100.00%	100.00%	100.00%	140	100.00%	98.57%	100.00%	100.00%
CHC8	VDL	102	100.00%	100.00%	100.00%	100.00%					
HLZ	VDL	123	100.00%	100.00%	100.00%	100.00%	100	100.00%	100.00%	100.00%	100.00%
IG1	SAT	426	92.25%	95.53%	94.36%	98.12%	298	96.64%	97.65%	97.31%	98.99%
IGW1	SAT	18403	98.20%	99.26%	98.75%	99.54%	19242	98.29%	99.12%	98.71%	99.33%
IVC1	VDL	126	100.00%	100.00%	100.00%	100.00%	198	100.00%	100.00%	100.00%	100.00%
RAR1	VDL	378	99.20%	99.73%	99.20%	99.73%	707	99.85%	100.00%	99.85%	100.00%
SUV1	VDL	146	97.94%	100.00%	98.63%	100.00%					
TBU1	VDL	2627	99.58%	99.96%	99.61%	99.96%	2149	99.67%	99.95%	99.76%	100.00%
XSN7	VDL						428	99.53%	99.06%	100.00%	99.53%
XXA	SAT	11664	99.47%	99.70%	99.66%	99.76%	13424	99.36%	99.70%	99.57%	99.77%
XXH	SAT	697	98.42%	99.13%	98.99%	99.28%	1239	99.59%	99.83%	99.75%	99.83%
XXP	SAT	2614	99.46%	99.77%	99.65%	99.77%	2809	99.67%	99.85%	99.71%	99.85%
XXU	SAT						204	99.50%	100.00%	99.50%	100.00%
XXW	SAT	407	99.26%	99.75%	99.26%	99.75%	375	99.73%	100.00%	99.73%	100.00%

EXAMPLE PERFORMANCE REPORT DATA CPDLC

ANSP REPORTS TO FIT Aircraft Operator & Type

FIR	NZZO											
Criteria	RCP240											
Period	Jan - Jun 2023						Jul - Dec 2023					
Colour Key: Meets Criteria; 99.0%-99.89%; Under Criteria	Message Counts	95% benchmark		99.9% Benchmark		95%	Message Counts	95% benchmark		99.9% Benchmark		95%
		ACP %<=180sec	ACTP %<=120sec	ACP %<=210sec	ACTP %<=150sec	PORT %<60secs		ACP %<=180sec	ACTP %<=120sec	ACP %<=210sec	ACTP %<=150sec	PORT %<60secs
By Aircraft Operator / Type (only message counts >100 recorded)												
AAL/B77W	816	99.26%	99.87%	99.26%	99.87%	98.28%	1588	99.31	99.49%	99.62	99.62%	98.55%
AAL/B789	1430	99.93%	100.00%	100.00%	100.00%	99.44%	703	99.86	100.00%	99.86	100.00%	99.00%
ACA/B789	577	99.48%	99.13%	99.83%	99.13%	99.30%	319	99.69%	98.43%	100.00%	99.05%	98.43%
ACI/A20N	360	99.72%	100.00%	99.72%	100.00%	98.61%	362	100.00%	99.72%	100.00%	100.00%	99.17%
ACI/A339	185	100.00%	100.00%	100.00%	100.00%	98.91%	189	100.00%	100.00%	100.00%	100.00%	98.41%
ANZ/A20N	8016	98.75%	99.65%	99.13%	99.83%	96.83%	8081	98.87%	99.50%	99.26%	99.82%	97.06%
ANZ/A21N	8844	98.64%	99.43%	99.04%	99.77%	96.85%	9538	98.67%	99.30%	98.99%	99.41%	97.27%
ANZ/B77W	6677	99.36%	99.65%	99.52%	99.79%	97.94%	8635	99.07%	99.50%	99.43%	99.55%	97.85%
ANZ/B789	13329	99.55%	99.55%	99.81%	99.80%	98.87%	12180	99.55%	99.37%	99.81%	99.77%	99.12%
CAL/A359	559	99.28%	99.28%	99.28%	99.28%	97.49%	586	99.32%	99.31%	99.32%	99.48%	99.14%
CCA/B789	150	98.67%	100.00%	99.33%	100.00%	96.00%	612	99.84%	100.00%	99.84%	100.00%	99.83%
CES/A332	426	99.30%	99.53%	99.53%	99.76%	97.18%	244	99.18%	99.59%	99.59%	100.00%	97.95%
CES/B77W	209	99.04%	99.04%	99.04%	99.04%	99.04%	782	99.62%	99.74%	99.74%	99.74%	99.61%
CHH/A333	-	-	-	-	-	-	353	100.00%	100.00%	100.00%	100.00%	97.00%
CKS/B77L	826	99.15%	99.03%	99.64%	99.27%	98.18%	200	100.00%	100.00%	100.00%	100.00%	99.15%
CPA/A35K	404	100.00%	100.00%	100.00%	100.00%	98.01%	458	99.56%	99.34%	100.00%	99.78%	98.25%
CSN/B789	721	98.75%	99.16%	98.75%	99.30%	98.75%	1204	99.58%	99.83%	99.75%	99.83%	99.08%
DAL/A359	1475	99.25%	99.59%	99.66%	99.66%	97.08%	2065	99.27%	99.80%	99.47%	99.80%	96.99%
FDX/B77L	180	98.89%	100.00%	99.44%	100.00%	97.77%	165	97.58%	98.78%	98.18%	99.39%	96.36%
FJI/A332	1134	98.85%	99.20%	99.29%	99.47%	97.88%	739	97.56%	98.10%	98.24%	99.05%	94.04%
FJI/A333	297	99.66%	100.00%	100.00%	100.00%	96.96%	334	99.10%	98.80%	99.70%	99.40%	96.70%
FJI/A359	760	99.74%	99.86%	99.87%	99.86%	98.68%	1241	99.76%	100.00%	99.76%	100.00%	98.63%
FJI/B38M	3176	97.13%	98.58%	98.08%	98.77%	95.27%	3043	96.68%	98.12%	97.31%	98.22%	95.72%
GTI/B744	131	100.00%	100.00%	100.00%	100.00%	98.47%	166	98.80%	99.39%	99.40%	100.00%	98.79%
HAL/A21N	-	-	-	-	-	-	208	99.52%	100.00%	99.52%	100.00%	97.59%
HAL/A332	1320	99.62%	99.92%	99.70%	99.92%	97.50%	1340	99.78%	100.00%	99.93%	100.00%	98.05%
JST/A21N	-	-	-	-	-	-	622	99.20%	100.00%	99.52%	100.00%	96.46%
JST/A332	234	98.72%	100.00%	98.72%	100.00%	96.17%	180	100.00%	100.00%	100.00%	100.00%	98.33%
KAL/A332	110	100.00%	100.00%	100.00%	100.00%	97.27%	428	99.53%	100.00%	99.53%	100.00%	93.22%
KAL/B772	271	99.26%	100.00%	99.26%	100.00%	96.67%	-	-	-	-	-	-
KAL/B77W	263	99.24%	99.23%	99.62%	99.23%	96.95%	306	100.00%	100.00%	100.00%	100.00%	98.69%
KIW/B752	113	100.00%	100.00%	100.00%	100.00%	98.23%	174	98.28%	99.42%	99.42%	100.00%	97.70%
KIW/C130	116	99.14%	100.00%	99.14%	100.00%	95.68%	204	98.53%	99.50%	99.01%	99.50%	97.54%

REQUIRED SURVEILLANCE PERFORMANCE						
Region	{FIT Name}					
Performance Criteria	RSP180					
Time Period	YYYY January-June			YYYY July-December		
Colour Key Meets Criteria 99.0%-99.89% Under Criteria	**No. Messages**	**Criteria**		**No. Messages**	**Criteria**	
		95% **% < = 90sec**	**99.90%** **% <= 180sec**		**95%** **% < = 90sec**	**99.90%** **% <= 180sec**
Aggregate All RGS						
{FIR name}						

REQUIRED COMMUNICATIONS PERFORMANCE										
Region	ISPACG									
Performance Criteria	RCP240									
Time Period	YYYY January-June					YYYY July - December				
Colour Key Meets Criteria 99.0%-99.89% Under Criteria	No. Messages	ACP Criteria		ACTP Criteria		No. Messages	ACP Criteria		ACTP Criteria	
		95% % <= 180sec	99.90% % <= 210sec	95% % <= 120sec	99.90% % <= 150sec		95% % <= 180sec	99.90% % <= 210sec	95% % < = 120sec	99.90% % <=150sec
Aggregate All RGS										
{FIR name}										

Criteria			RSP180					
Period			Jan-June YYYY			July-December YYYY		
Colour Key Meets Criteria 99.0%-99.89% Under Criteria			Message Counts	95% % < = 90sec	99.90% % <= 180sec	Message Counts	95% % < = 90sec	99.90% % <= 180sec
FIR	By Media Type							
By Remote Ground Station (RGS) Ground Earth Station (GES)								
FIR	Designator	Type	(only RGS/GES with message counts >100 recorded)					

Criteria		RSP180					
Period		Jan-June YYYY			July-December YYYY		
Colour Key Meets Criteria 99.0%-99.89% Under Criteria		Message Counts	95% % <= 90sec	99.90% % <= 180sec	Message Counts	95% % <= 90sec	99.90% % <= 180sec
FIR	By Aircraft Operator / Type (only message counts >100 recorded)						

Criteria			RCP240									
Period			Jan - Jun YYYY					Jul - Dec YYYY				
Colour Key Meets Criteria 99.0%-99.89% Under Criteria			Message Counts	95% benchmark		99.9% Benchmark		Message Counts	95% benchmark		99.9% Benchmark	
				ACP % < = 180sec	ACTP % <= 120sec	ACP % < = 210sec	ACTP % <= 150sec		ACP % < =180sec	ACTP % <= 120sec	ACP % < = 210sec	ACTP % <= 150sec
FIR	By Media Type											
By Remote Ground Station (RGS) Ground Earth Station (GES)												
FIR	Designator	Type	(RGS/GES with message counts >100)									

Criteria		RCP240											
Period		Jan - Jun YYYY						Jul - Dec YYY					
Colour Key Meets Criteria 99.0%-99.89% Under Criteria		Message Counts	95% benchmark		99.9% Benchmark		95%	Message Counts	95% benchmark		99.9% Benchmark		95%
			ACP % < = 180sec	ACTP % <= 120sec	ACP % < = 210sec	ACTP % <= 150sec	PORT %<60secs		ACP % < =180sec	ACTP % <= 120sec	ACP % < = 210sec	ACTP % <= 150sec	PORT %<60secs
FIR	By Aircraft Operator / Type (only message counts >100 recorded)												

INTERNATIONAL CIVIL AVIATION ORGANIZATION

ASIA AND PACIFIC OFFICE

GUIDANCE MATERIAL FOR

END-TO-END SAFETY AND PERFORMANCE MONITORING OF

AIR TRAFFIC SERVICE (ATS) DATA LINK SYSTEMS

IN THE ASIA/PACIFIC REGION

Version ~~4~~5.0 – ~~February 2011~~
XXX 2024

Issued by the ICAO Asia and Pacific Office, Bangkok

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1. Background

1.1. The Asia Pacific Airspace Safety Monitoring (APASM) Task Force established by the Asia Pacific Air Navigation Planning Implementation Regional Group (APANPIRG) during 2001 noted that requirements for monitoring aircraft height-keeping performance and the safety of reduced vertical separation minimum (RVSM) operations had been more comprehensively developed than for other Air Traffic Management (ATM) services, such as reduced horizontal separation based on required navigation performance (RNP) and the monitoring of ATS data link systems.

1.2. For example, to assist RVSM operations a handbook with detailed guidance on the requirements for establishing and operating Regional Monitoring Agencies (RMA) was developed by the ICAO Separation and Airspace Safety Panel (SASP). There was no comparable document under development by ICAO for ATS data link applications and so the APASM Task Force developed draft guidance material covering safety and performance monitoring for ATS data link applications.

1.3. The experience gained by the Informal Pacific ATC Coordinating Group (IPACG) and the Informal South Pacific ATS Coordinating Group (ISPACG) FANS Interoperability Teams (FITs) and the supporting Central Reporting Agencies (CRAs) to monitor automatic dependent surveillance - contract (ADS-C) and controller pilot data link communication (CPDLC) performance for both aircraft and ground systems was used as a resource from which to develop monitoring guidance material.

1.4. From 2004, the APASM Task Force was succeeded by the Regional Airspace Safety Monitoring Advisory Group (RASMAG) of APANPIRG, which decided to adopt and extend the APASM material to become the standard guidance material for end-to-end safety and performance monitoring of ATS data link systems in the Asia/Pacific region. Following significant development of the material, APANPIRG/16 (2005) adopted the Guidance Material for the End-to-End Monitoring of ATS Data Link Systems in the Asia/Pacific Region under the terms of Conclusion 16/20.

1.5. Within the remainder of the Asia/Pacific Region, the Bay of Bengal and South East Asia ATS Coordination Groups are following the lead of IPACG and ISPACG and have created FANS-1/A implementation teams and data link CRAs to accomplish this activity. These implementation teams also perform the interoperability activities which will continue after the implementation of CPDLC and ADS-C is complete. This guidance material focuses on interoperability issues, both prior to and following implementation of a data link system.

1.6. During 2008, agreement was reached between Asia/Pacific and North Atlantic data link interoperability/implementation groups that the global harmonization of data link monitoring activities was desirable. Accordingly, the APANPIRG, NAT SPG and ICAO Secretariat would coordinate to the extent possible in order to develop proposals to implement required monitoring infrastructure and arrangements that would be global and cost effective.

1.7. The regional Performance-Based Communications and Surveillance (PBCS) monitoring program requires continuous performance monitoring of data link operations utilizing separation standards where Required Communications Performance (RCP) or Required Surveillance Performance (RSP) specifications are required under the provisions of ICAO Annex 11 Air Traffic Services and Doc 4444 Procedures for Air Navigation Services – Air Traffic Management (PANS-ATM). In accordance with the supporting guidance provided in ICAO Doc 9869 PBCS Manual, the Air Navigation Service Provider (ANSP) should perform an analysis of actual communication performance (ACP) and actual surveillance performance (ASP) at an interval suitable to verify system performance, and to enable continuous performance improvement. The established lines of communication between airspace safety monitoring organisations and their respective States are the most effective and efficient means for transmission of problem or non-compliance reports between the ANSP detecting/reporting the problem or non-compliance and the State of Operator/Registry of the aircraft concerned.

2 Requirements for Safety and Performance Monitoring

2.1. Annex 11, at paragraph ~~2.27.5~~ 2.29, states:

> "Any significant safety-related change to the ATC system, including the implementation of a reduced separation minimum or a new procedure, shall only be effected after a safety assessment has demonstrated that an acceptable level of safety will be met and users have been consulted. When appropriate, the responsible authority shall ensure that adequate provision is made for post- implementation monitoring to verify that the defined level of safety continues to be met."

2.2. The Manual of Air Traffic Services Data Link Applications (Doc 9694) describes ATS data link applications as including ~~DLIS~~ DLIC, ADS, CPDLC, DFIS, AIDC and ADS-B. ATS data link applications, such as ADS-C, CPDLC and ATS interfacility data communication (AIDC), are increasingly being used in support reduced horizontal separation minima. It is therefore necessary to apply the safety monitoring requirements of Annex 11 to these data link services.

> ***Note:*** *For the purposes of this guidance material, 'data link systems' (or applications) generally refer to CPDLC, ADS-C and/or AIDC.*

2.3. Data link applications comprise both a technical and an operational element. The guidelines in this document - which apply only to the technical element - propose a structure and methodology for monitoring the technical end-to-end safety performance of air-ground and ground-air data link services. The operational aspects of data link monitoring – such as reviewing the correct use of CPDLC message elements - are carried out by the appropriate safety monitoring agency.

2.4. Ground-ground data link systems supporting applications such as AIDC are essentially simpler and more direct than air-ground systems and monitoring can be achieved directly between the concerned ATSUs. However, it should be noted that States have a responsibility to ensure that monitoring of ground-ground data link systems is carried out in support of the implementation of reduced separation minima. Monitoring of ground-ground AIDC performance is outlined in **Appendix A**.

2.5. The requirement for on-going monitoring after implementation of a data link system is based on several factors, including:

a) degradation of performance with time,

b) increasing traffic levels, and

c) changes to equipment and/or procedures which may occur from time to time.

2.6. On-going monitoring also permits the detection of errors that may have been introduced by a third party (e.g. a communications service provider).

2.7. The use of ADS-B to support separation and the introduction of the Aeronautical Telecommunication Network (ATN) will bring significant changes to operational systems that will also require the establishment of monitoring programmes.

2.xx ICAO Doc. 9869 Performance-based Communication and Surveillance Manual offers the reader guidance on the establishment of a PBCS monitoring program, with detailed guidance in Appendix D for compilation and handling of the data to support monitoring. Significant revisions are being coordinated to provide clarification in Appendix D for Edition 3. Additional guidance can be found in NAT Doc 011, 1st Ed. Amdt. 2, located on the ICAO website - ICAO APAC eDocuments>>ATM>> Safety monitoring.

2.xx The NAT Doc011 focused on the reporting and filtering of under-performing airframes as well as guidance for State Oversight Authorities. The guidance is divided into three phases and reliant on the positive participation of the aircraft operators in accordance with the PBCS Global Charter:

Phase 1 - ATSP: This phase covers initial monitoring and reporting by the Air Traffic Service Provider (ATSP) at a local level. The ATSP is responsible for the collection, analysis and, if possible, classification of under-performance data as well as the transmission of that data, in the agreed format, to the Regional Monitoring Agency (RMA). (Refer to NAT Doc 011 Chapter 2).

Phase 2 - RMA: This phase captures the administration of the regional monitoring requirements and the mechanism to achieve global reporting. The RMA is responsible for the collection and collation of the data reported by ATSPs for transmission to, either the States within their region of responsibility, or to other RMAs for transmission to States within their own regions of responsibility. (Refer to NAT Doc 011 Chapter 3).

Phase 3 - State Oversight Authority: This phase covers the State Oversight Authority's role in the management of reports of under-performance. The State Oversight Authority is responsible for the oversight of all aircraft operators registered in their respective states and ensuring that the performance of their airframes meets the required standards. (Refer to NAT Doc 011 Chapter 4).

PBCS Non-Compliance Reporting

2.8. The En-route Monitoring Agency (EMA) or Regional Monitoring Agency (RMA) with responsibility for the airspace associated with the ANSP reporting a non-compliance would notify the EMA/RMA that has responsibility for the State of Operator/Registry associated with the aircraft/fleet observed with non-compliant data link performance. The EMA/RMA receiving the notification would then provide the report to the State of Operator/Registry of the aircraft/fleet observed with non-compliant data link performance. It is possible that all EMAs/RMAs may have a role associated with Step 3 of Figure 1 to assist in initial contact due to the familiarity of State POC with RMAs.

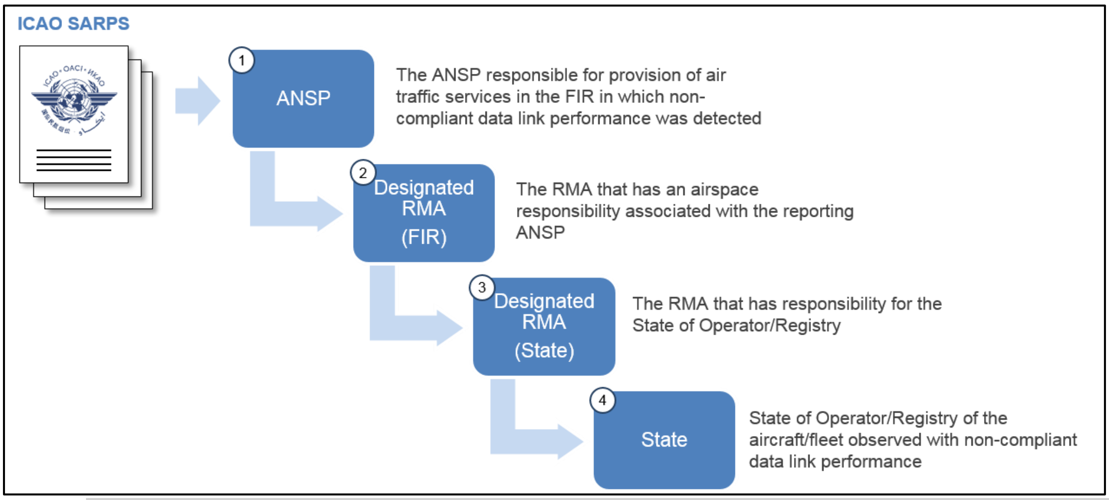


Figure 1: Communication flow for reports of non-compliance with PBCS performance requirements (Source: *RASMAG24 WP/19 - RMA Contribution to the PBCS Monitoring Program and Documentation Development, Bangkok, Thailand, 09-12 July 2019*)

2.XX The process of PBCS non-compliance reporting was adopted by APANPIRG/34 and the various actions by the stakeholders are detailed below. The PBCS non-compliance report submission (including Nil Occurrence reports) and handling processes by various stakeholders is shown in **Figure 2**. The guidance noted by APANPIRG/34 in *Conclusion RASMAG/28-4 Removal of EMA handbook Appendix A and Guidance for PBCS Non-Compliance Reporting* refers.

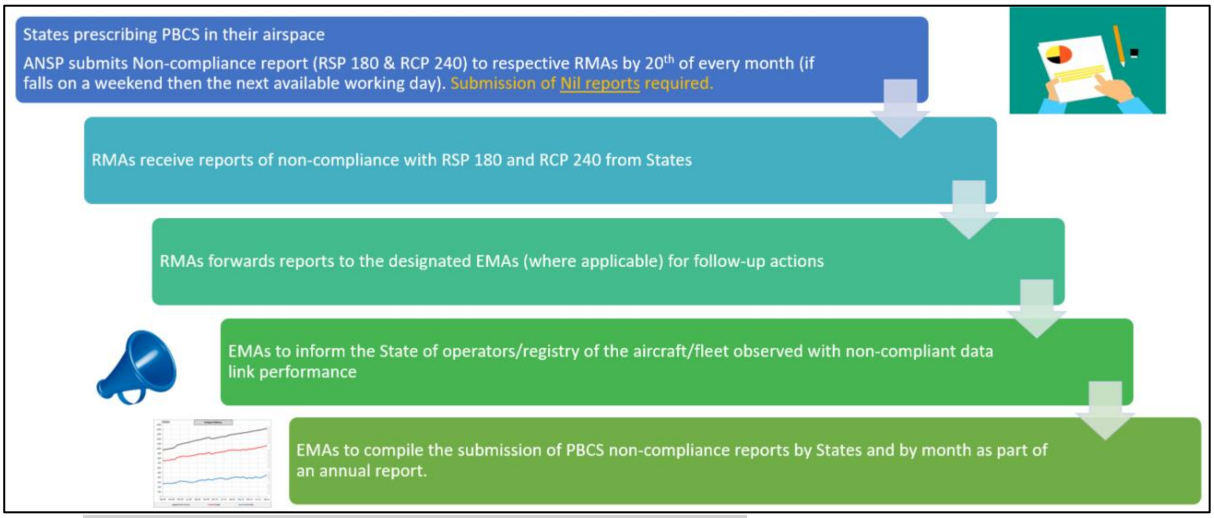


Figure 2 - PBCS non-compliance submission flow chart

EMA/RMA actions

2.XX En-route Monitoring Agency (EMA) handbook

item: k) to coordinate/establish appropriate contacts for PBCS via RMA POCS for PBCS non-compliance, compile PBCS non-compliance reports received from States each month and, where necessary, propose APANPIRG ATM Deficiencies, for lack of reporting; and

ANSP action items

2.XX PBCS Action List for ANSPs found in ICAO APAC e Documents

Paragraph 1.15 –Submit PBCS non-compliance report to designated EMA/RMA by 20th of every month (if falls on a weekend then the next available working day), e.g. Submission of PBCS non-compliance report Jan~~-Mar~~ by 20th Feb ~~Apr~~.

Paragraph 1.16 –Submission of Nil report is required.

3. Purpose of Guidance Material

3.1 The purpose of this guidance material is to:

a) Provide a set of working principles common to all Asia/Pacific States Implementing ATS data link systems;

b) Provide detailed guidance on the requirements for establishing and operating a FANS-1/A implementation/interoperability team (FIT);

c) Provide detailed guidance on the requirements for establishing and operating a Central Reporting Agency (CRA);

d) Promote a standardized approach for implementation and monitoring within the Asia/Pacific Region; and

e) Promote interchange of information among different Regions to support common operational monitoring procedures.

4. Establishment and Operation of an Implementation/Interoperability Team and CRA

4.1 Recognising the safety oversight responsibilities necessary to support the implementation and continued safe use of ATS data link systems, the following standards apply to any organization intending to fill the role of an implementation/interoperability team:

a) The organisation must receive authority to act as an implementation/ interoperability team as the result of a decision by a State, a group of States or a regional planning group, or by regional agreement.

b) States should appoint a CRA that has the required tools and personnel with the technical skills and experience to carry out the CRA functions.

c) States should ensure that the CRA is adequately funded to carry out its required functions.

d) States are urged to ensure that formal service arrangements are made with an APANPIRG-recognized, competent Central Reporting Agency for the submission and analysis of data link problem reports. *APANPIRG Conclusion 34/8 - Formal Service Arrangements with CRA* refers.

5. Interoperability Teams

5.1 ATS data link functionality exists in several different domains (e.g. aircraft, satellite, ground network, air traffic service units and human factors) and these elements must be successfully integrated across all domains. Airborne and ground equipment from many different vendors, as well as the sub-systems of several different communication networks, must inter-operate successfully to provide the required end-to-end system performance. In addition, standardised procedures must be coordinated among many different airlines and States to provide the desired operational performance. Technical and operational elements must then combine to allow the various applications to demonstrate mature and stable performance. It is only when this has been achieved that benefits can start being realized.

5.2 A team approach to interoperability is essential to the success of any ATS data link implementation, an important lesson learned by ISPACG, whose members were the first to implement CNS/ATM applications using FANS-1/A systems. Stakeholders had worked closely together during the initial development and subsequent certification of FANS-1/A. However, even though a problem-reporting system was in place when FANS-1/A operations commenced, many problems went unresolved. Consequently, it was not possible in the short term to adopt the new operational procedures that would provide the expected benefits of higher traffic capacity and more economic routes.

5.3 An interoperability team (the ‘FIT’) was formed and tasked to address both technical and operational issues and to assist in ensuring that benefits would result. Because daily attention and occasional significant research would be required, ISPACG realized that a traditional industry team approach would not be effective. To address these concerns, the FIT created a dedicated sub-team, the CRA, to perform the daily monitoring, coordination, testing and investigation of the problem reports submitted by the team. This approach aligns with that taken for RVSM implementations where specialist supporting groups provide height keeping monitoring services.

5.4 Although the monitoring process described above was developed for FANS-1/A based CPDLC and ADS-C applications, it applies equally to AIDC and to ATN-based ATS applications. The latter was validated during the Preliminary EUROCONTROL Test of Air/ground data Link (PETAL) implementation of ATN-based ATS data link services in Maastricht ACC.

Role of the Interoperability Team

5.5 The FANS Interoperability Team (FIT) shall be responsible for overseeing system configuration and the end-to-end monitoring process of datalink systems to ensure they are implemented and continue to meet performance, safety, and interoperability requirements within the Asian Region. ~~The role of the interoperability team is to address technical and operational problems affecting the transit of data link aircraft through international airspace. To do this, the interoperability team must oversee the end-to-end monitoring process to ensure the data link system meets, and continues to meet, its performance, safety and interoperability requirements and that~~

~~operations and procedures are working as specified.~~

5.6 The specific tasks of an interoperability team are to: [specific tasks of an interoperability team updated from FIT-Asia/13 – WP18]

Implementation

a) support the implementation and operational benefits of CPDLC and ADS-C;

Reporting and problem resolution processes

b) establish a problem reporting system;
c) review problem reports, identify trends and determine appropriate resolution;
d) develop interim operational procedures to mitigate the effects of problems until resolution;
e) monitor the progress of problem resolution;
f) prepare summaries of problems encountered and their operational implications;

System performance and monitoring processes

g) establish a performance monitoring system;
h) assess system performance based on information from the CRA, and reported by States;
i) coordinate system testing and trials;
j) identify accountability for each element of the end-to-end system;
k) develop, document and implement a quality assurance plan that will provide a stable system;
l) ensure that such configurations are maintained by all stakeholders;

New procedures

m) coordinate testing in support of implementation of enhanced operational procedures

Reporting

n) oversee the reporting of safety-related issues to the appropriate State or regulatory authorities for action;
o) provide reports to relevant ATM coordinating groups;
p) coordinate the collation and analysis of aggregated regional data link performance data; and
q) report to RASMAG.

~~5.7 Initiate and oversee problem reporting and problem resolution processes;~~

~~b) Establish a CRA to undertake performance monitoring on its behalf;~~

~~c) Initiate and oversee end-to-end system performance monitoring processes;~~

~~d) Oversee the implementation of new procedures;~~

~~e) Report to the appropriate State regulatory authorities and to the appropriate ATS coordinating group; and~~

f) Provide reports to the RASMAG.

The section on CRAs below shows that a CRA requires considerable technical resources and skills. It is likely to be more efficient to employ one of the existing CRAs than to set up a new CRA; this would also improve the standardisation of methods and results across the Region.

5.7 A Model Terms of reference for an interoperability team are shown at **Appendix B.**

Interoperability Team Members

5.8 The principal members of an interoperability team are the major stakeholders of the sub-systems that must interoperate to achieve the desired system performance and end-to-end operation. In the case of ATS data link systems, the major stakeholders are aircraft operators, air navigation services providers (ANSPs) and communication services providers (CSPs). Other stakeholders such as international organizations, and airframe and avionics manufacturers also play an important role and should be invited by the major stakeholders to contribute their expertise.

6. Central Reporting Agencies

6.1 Work must be conducted on a daily basis for an interoperability team to achieve its important goals of problem resolution, system performance assurance, and planning and testing of operations that will enable benefits. A dedicated sub-team, the CRA, is required to do the daily monitoring, coordination, testing and problem research tasks for the interoperability team. **Appendix C** shows a table of CRA tasks and the associated resource requirements.

6.2 A CRA should be established in order to determine the safety performance of the ADS-C and CPDLC data link systems before the implementation of reduced separation minima in a particular area, and it should remain active throughout the early stages of implementation. However, as the performance of the systems stabilises to a satisfactory level, it should be possible to reduce the number of CRAs in the region by combining responsibility for different areas.

6.3 The functions of a CRA are:

a) To develop and administer problem report processes;

b) To maintain a database of problem reports;

c) To receive and process monthly end-to-end system performance reports from air navigation service providers investigate and organise submitted problem reports;

d) To coordinate and test the implementation of new procedures resulting from ATS data link systems for a given region;

e) To administer and monitor an informal end-to-end configuration process;

f) To manage data confidentiality agreements as required;

g) To identify trends; and

h) To provide regular reports to the interoperability team.

CRA Resource Requirements

6.4 To be effective, the CRA must have dedicated staff and adequate tools. Staffing requirements will depend on the complexity of the region being monitored. There are several factors that affect regional complexity from an ATS monitoring standpoint such as dimensions of the airspace, variety in operating procedures, number of airlines, number of airborne equipment variants, number of ANSPs, number of ground equipment variants and number of CSPs.

6.5 The CRA must be able to simulate an ATS ground station operational capability to the extent of exercising all combinations and ranges of CPDLC uplinks and ADS-C reports. The CRA must also have access to airborne equipment: a test bench is adequate, though engineering simulators that can be connected to either the ARINC or SITA communication network can offer additional capability for problem solving. In support of the data link audit analysis task, the CRA must have software that can decode CSP audit data and produce usable reports. Without these tools it is virtually impossible for a CRA to ~~resolve problems or monitor system performance~~ investigate submitted problem reports.

6.6 Coordination is an important component of the CRA's function. In the pursuit of problem resolution, action item resolution, monitoring and testing, many issues arise that require coordination among the various stakeholders. The CRA has a primary responsibility to provide this coordination function as delegated by the implementation/interoperability team. Coordination between CRAs is also important, particularly to expand the information database on problems and trends; there may be a need for CRA coordination within the region and with CRAs in other regions. An incident may appear to be an isolated case, but the collation of similar reports by a number of CRAs might indicate an area that needs more detailed examination.

7. Working Principles for Central Reporting Agencies

7.1 The working principles in this guidance material result from the combined experience of the North Atlantic Technology and Interoperability Group (NAT TIG), ISPACG FIT, IPACG FIT, and the ATN implementation in Maastricht ACC.

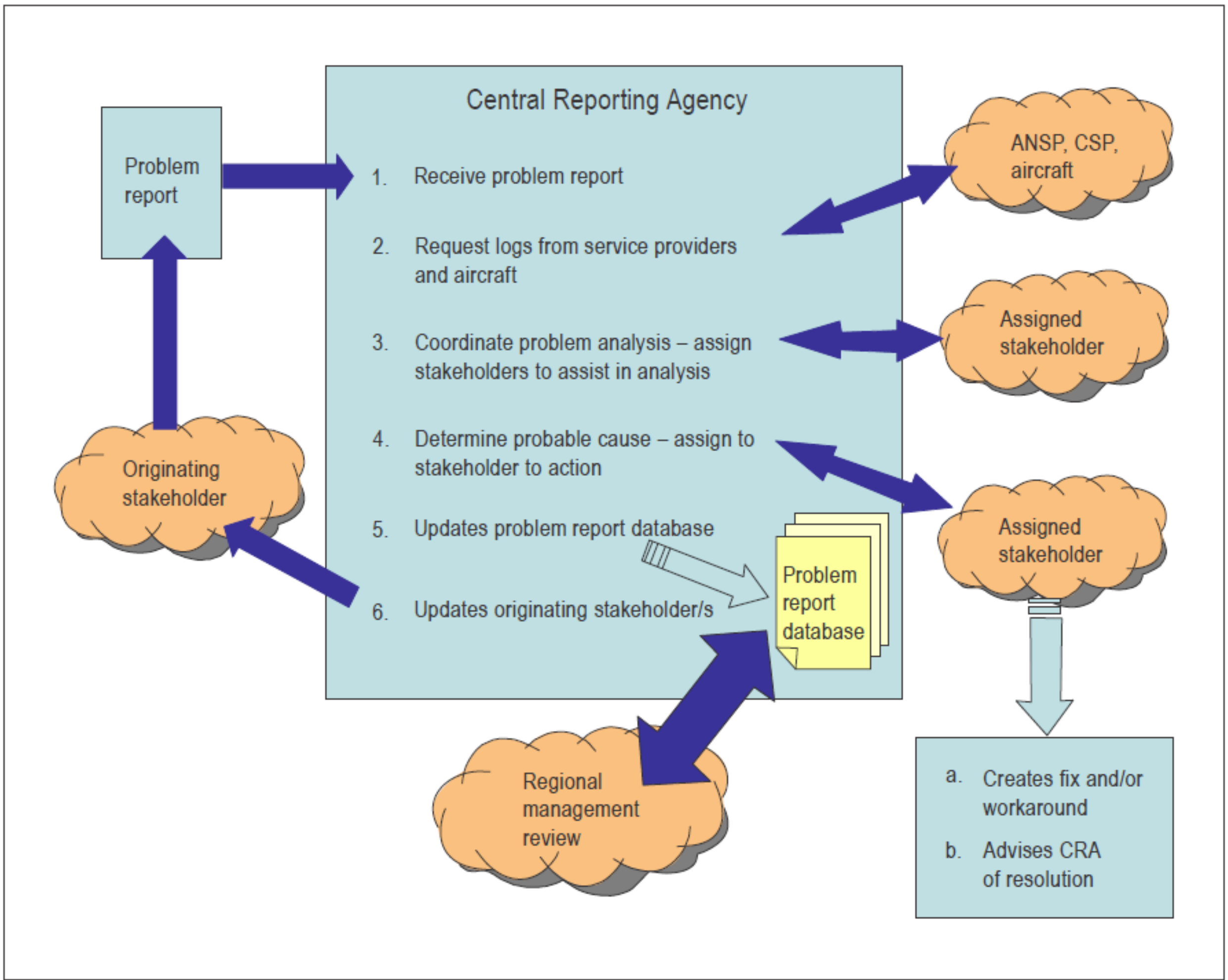
Confidentiality Agreements

7.2 Confidentiality of information is an established principle for problem reporting, and so reports must be de-identified before being made accessible to other agencies. However, it is necessary for the CRA to retain the identity of the original reports so that problem resolution and follow-up action can be taken.

7.3 The CRA must initiate and maintain confidentiality agreements with each entity providing problem reports.

Problem Identification and Resolution

7.4 The problem identification and resolution process, as it applies to an individual problem, consists of a data collection phase, followed by problem analysis and coordination with affected parties to secure a resolution, and recommendation of interim procedures to mitigate the problem in some instances. This is shown in the diagram below (Doc 9869 - PBCS manual 2nd Ed.).



7.5 The problem identification task begins with receipt of a report from a stakeholder, usually an operator, ANSP or CSP. If the person reporting the problem has used the problem reporting form provided in the appropriate regional manual, then data collection can begin. If not, additional data may have to be requested from the reporter.

7.6 The data collection phase consists of obtaining message logs from the appropriate parties, which will depend on which service providers were being used and the operator service contracts in place at the time. Today, this usually means obtaining logs for the appropriate period from the CSPs involved. In the future, with ATN development, additional providers will become involved and airborne recordings as per EUROCAE ED-112 should become available. Usually, a log for a few hours before and after the event that was reported will suffice but, once the analysis has begun, it is sometimes necessary to request additional data, perhaps for several days prior to the event if the problem appears to be an on-going one.

7.7 Additionally, some airplane-specific recordings may be available that may assist in the data analysis task. These are not always requested initially as doing so would be an unacceptable imposition on the operators but may occur when the nature of the problem has been clarified enough to indicate the line of investigation that needs to be pursued. These additional records include:

- Aircraft maintenance system logs, and
- Built-In Test Equipment data dumps for some airplane systems, and
- SATCOM activity logs.

7.8 Logs and printouts from the flight crew and recordings/logs from the ATSUs involved in the problem may also be necessary. It is important that the organization collecting data for the analysis task requests all this data in a timely manner, as much of it is subject to limited retention.

7.9 Once the data has been collected, the analysis can begin. For this, it is necessary to be able to decode all the messages involved, and a tool that can decode every ATS data link message type used in the region is essential. These messages include:

- AFN (ARINC 622), ADS-C and CPDLC (RTCA DO-258A/EUROCAE ED-100A) in a region operating FANS-1/A;
- Context Management, ADS-C and CPDLC applications (ICAO Doc 9705 and RTCA DO-280/ED-110) in a region using ATN; and
- FIS or ARINC 623 messages used in the region.

7.10 The analysis of the decoded messages requires a thorough understanding of the complete message traffic, including:

- Media management messages;
- Relationship of ground-ground and air-ground traffic; and
- Message envelope schemes used by the particular data link technology (ACARS, ATN, etc).

7.11 The analyst must also have a good understanding of how the aircraft systems operate and interact to provide the ATS data link functions, as many reported problems are airplane system problems.

7.12 This information will enable the analyst to determine a probable cause by working back from the area where the problem was noticed to where it began. In some cases, this may entail manual decoding of parts of messages based on the appropriate standard to identify particular encoding errors. It may also require laboratory testing using the airborne equipment (and sometimes the ground networks) to reliably assign the problem to a particular cause.

7.13 Once the problem has been identified, the task of coordination with affected parties begins. The stakeholder who is assigned responsibility for fixing the problem must be contacted and a corrective action plan agreed.

7.14 This information (the problem description, the results of the analysis and the plan for corrective action) is then entered into a database covering data link problems, both in a complete form to allow continued analysis and monitoring of the corrective action and in a de-identified form for the information of other stakeholders. These de-identified summaries are reported at the appropriate regional management forum.

Mitigating Procedures

7.15 The CRA's responsibility does not end with determining the cause of the problem and identifying a fix. Procedural methods to mitigate the problem may have to be developed because a considerable period may elapse while a solution is being developed and implemented, particularly if software updates are to be applied to all aircraft in a fleet. The CRA should identify the need for such procedures and develop recommendations for implementation by the service providers and operators involved.

Routine Data Link Performance Reporting

7.16 An important part of data link safety performance is the measurement of the end-to-end performance. This should be carried out prior to implementation of new separation minima, but should continue regularly to provide assurance that the safety requirements continue to be met. Routine ~~D~~data link performance assessment by ANSPs, usually carried out monthly, is based on regular measurement of the continuity and availability ~~round-trip time, availability, integrity, reliability and continuity, and ANSPs should provide the CRA with regular measurements of these~~ parameters.

7.xx For the purpose of standardising the presentation of performance data and to provide guidance in the steps for analysis and reporting of PBCS performance Reporting templates and guidance such as Data link performance analysis reporting, and PBCS action list for ANSPs were developed by FIT/Asia 8 and agreed by RASMAG/28 , *Conclusion RASMAG/23-2: PBCS Action List for ANSPs and Conclusion RASMAG/23-3: Data Link Performance Analysis Reporting Templates* refers located on the ICAO website. ICAO APAC eDocuments>>ATM>> Datalink.

7.17 ~~The CRA will use the information supplied by ANSPs to produce a performance assessment against the established data link requirements for the region~~. The implementation of Required Communication Performance (RCP) and Required Surveillance Performance (RSP) in a region will assist the regulatory oversight ~~CRA~~ by providing a statement of the performance requirements for operational communication in support of specific ATS functions. These requirements are set according to the separation minima being applied, and so may differ within different areas according to usage. The Regional FANS1/A Interoperability Teams (FIT) will use the information supplied by their ANSPs to produce the Regional Combined PBCS Monitoring Report against the established data link requirements for their region.

7.18 The Regional Combined PBCS Monitoring Report ~~The CRA performance assessment~~ should be made available to the RVSM RMA and horizontal plane En-route Monitoring Agency (EMA) for their calculation of system performance against the minimum values defined in the ~~Oceanic SPR Standard (RTCA DO-306/EUROCAE ED-122 Safety and Performance Standard for Air Traffic Data link Services in Oceanic and Remote Airspace)~~ in PBCS Manual (ICAO Doc 9869 Second Edition). The PBCS system performance criteria and Post-implementation monitoring and corrective actions are ~~included~~ referenced in **Appendix C ~~D~~**.

7.19 ~~ADS-C round-trip times are normally measured as the time between sending a contract request and receiving the associated Acknowledgement (ACK) or Message Assurance (MAS) message. CPDLC round-trip times are normally determined from the ATSU end-system time stamps for transmission of the uplink message and reception of the associated MAS.~~

~~7.20 ADS-C and CPDLC downlink one-way times are defined by the difference between the aircraft time stamp and the ASTU end-system reception time stamp.~~

~~7.21 ADS-C and CPDLC success rates are only available for uplink messages. The success rate is expressed as the percentage of messages that receive a successful ACK or MAS within a specified time.~~

~~7.22 CPDLC Actual Communications Performance (ACP) used for monitoring the RCP TRN (transaction) is the difference between the time stamp on the CPDLC uplink from the ATSU requiring a WILCO/UNABLE response to reception of the associated downlink from the aircraft.~~

~~***Note 1.*** *TRN is the overall transaction time, and denotes that part of the operational communication used to define start and end points for monitoring; it does not include uplink message composition or reviewing of the downlink message response by the Controller.*~~

~~***Note 2.*** *When monitoring RCP only those transactions requiring a WILCO/UNABLE response are assessed in order to provide the best modelling of the performance of a CPDLC message used for intervention in a reduced separation scenario.*~~

~~7.23 CPDLC Actual Communications Technical Performance (ACTP) used for monitoring RCTP is the sum of the following two time intervals:~~

1. ~~The difference between the time stamp on the CPDLC uplink and the ATSU end-system reception time stamp of the corresponding MAS divided by two; and~~
2. ~~The associated CPDLC downlink transit time (calculated by determining the difference between the aircraft time stamp and the ATSU end-system reception time stamp).~~

~~7.24 CPDLC Crew Performance (sometimes referred to as Pilot Operational Response Time - PORT) is the difference between ACP and ACTP for the same transaction.~~

~~7.25 Communication transaction time - The maximum time for the completion of the operational communication transaction after which the initiator should revert to an alternative procedure.~~

~~7.26 Position report delivery time – The maximum time for the delivery of a position report from the aircraft to the ATSU.~~

~~7.27 Monitored operational performance (TRN) - The portion of the operational communication transaction (used for intervention) that does not include message composition or recognition of the operational response.~~

~~7.28 Required Communication Technical Performance (RCTP) – The technical portion of the operational communication transaction (used for intervention) that does not include message composition, operational response, and recognition of the operational response times.~~

~~7.29 Continuity - The probability that an operational communication transaction or position report delivery can be completed within the communication transaction time.~~

- ~~The proportion of intervention messages and responses that can be delivered within the specified TRN for Intervention.~~

- ~~The proportion of intervention messages and responses that can be delivered within the specified RCTP for Intervention.~~

7.30 AIDC round trip times may be obtained from the difference between message transmission and reception of the associated application response (Logical Acknowledgement Message (LAM), or Logical Rejection Message (LRM)). The success rate is expressed as the percentage of messages that are delivered to the destination ATSU.

7.31 The integrity of AIDC messaging is not normally monitored, although an analysis of operational data over a long period could reveal undetected errors and their effects. It may also reveal interoperability issues between ground systems in adjoining ATSUs.

Time Standards

7.32 It is critical to the successful measurement and analysis of the data link performance that all elements of the system use a common time system and that the system time is maintained within the required tolerance. In accordance with Annexes 2 and 11, all times used in data link communications must be accurate to within 1 second of UTC.

7.33 ~~It is important to note that, at the time of publishing this guidance material, GPS time is more than 10 seconds ahead of UTC; where GPS time is used as the source, the system time must be corrected to UTC.~~

~~Configuration Monitoring~~

~~7.34 A variety of technical systems are involved in the data link process and changes, particularly to software and/or software parameters, are not infrequent. Any system change may have an impact on the overall performance of the data link, and it is therefore important that the CRA is kept informed of each change of configuration to each system. With this information it is often possible to identify changes that result it improvements or deteriorations in data link performance or that may be associated with particular problems.~~

~~7.35 All ANSPs, CSPs, aircraft operators and avionics suppliers should therefore report all system configuration changes to the CRA. The CRA will then maintain a database of configuration changes for each system or sub-system. It is not necessary for the CRA to know the details of changes, but where a change is expected to affect performance, information on the likely effect should be provided.~~

New Procedures and Improved Performance Requirements

7.36 The CRA may recommend new end-to-end data link system performance requirements, either to accommodate new operational procedures or to take account of recognised problems.

7.37 The CRA may recommend the testing and implementation of new procedures.

APPENDIX A METHODOLOGY FOR MONITORING AIDC

1 Introduction

1.1 AIDC plays an important role in ATC coordination and may become a significant element of ATC in the support of reduced separation minima. The performance of AIDC operations should therefore be monitored as part of the required monitoring process prior to the implementation of reduced separation minima.

1.2 AIDC operates essentially over fixed networks and generally has only two or three involved parties, generally comprising the ATSUs at either end of the network and the network provider. It is therefore generally unnecessary to develop a FIT-type approach to safety monitoring; instead such monitoring and problem identification and resolution can be carried out directly by the concerned parties.

1.3 Because fixed networks are used for AIDC, continuous performance monitoring after the implementation of reduced separation minima is not generally necessary, though annual performance and availability checks are recommended. Monitoring should also take place after any changes to the network or the end-user equipment. This will be particularly important during the implementation of the ATN.

2 AIDC Technical Performance

2.1 Two major criteria for monitoring AIDC technical performance are the achievement of acceptable delivery times and the reliability of message delivery. Delivery times can best be measured in terms of the end-to-end round trip time. Reliability is measured as the AIDC message delivery success rate.

3 End-to-End Round-Trip Time

3.1 The end-to-end round trip message time may be measured as the time difference between the transmission of an AIDC message and the reception of the corresponding Logical Acknowledgement Message (LAM) or Logical Rejection Message (LRM). If the originating AIDC system receives neither a LAM nor an LRM from the receiving system within a specified time limit (a variable system parameter, typically between 1 and 3 minutes), it will declare a time-out, and the time-out parameter must be used as the round-trip time.

3.2 All AIDC message requiring a LAM response may be used; measuring results from a variety of message types should give a more representative overall result.

3.3 Because of variations in circuits used for AIDC, separate measurements should be made and reported for each ATSU with which AIDC messages are exchanged.

3.4 A large number of measurements of round-trip times should be averaged for performance reporting.

Note: *If it is not practical to measure end-to-end times, one-way trip times may be measured by comparing the time stamps of the outgoing AIDC message and the received LAM or LRM. The reverse path may be measured from the time stamps of the received AIDC message and the corresponding LAM or LRM.*

4 Message Delivery Success Rate

4.1 The Message Delivery Success Rate is expressed as the percentage of messages successfully delivered to the destination ATSU.

4.2 Unsuccessful delivery is indicated by a time-out due to non-reception of either a LAM or LRM within a specified time.

Note: *For the purpose of this measurement, even if an AIDC message is responded to with an LRM, it is considered to have been "successfully delivered".*

4.3 The time-out indicates non-delivery of the message (and initiates various actions within the AIDC system).

$$\text{Message Delivery Success Rate} = 1 - \frac{TO}{TOT}$$

Where:

TO = number of Time Outs

TOT = total number of messages

4.4 A large number of measurements of delivery success rates should be averaged for performance reporting. Non-typical extensive transit times should also be investigated.

5 Results

5.1 An ANSP should share the results of AIDC performance monitoring with relevant ANSPs. This will enable problems to be identified and remedial actions agreed upon.

6 Caution

6.1 It is known that there are incompatibilities between some ATS end-systems leading to a situation in which a satisfactorily received message may not be able to be properly processed. In at least one case, the receiving system has been programmed to send neither LAM nor LRM in response to such messages.

6.2 This will result in a distortion of the average round-trip time and success rate for the originating end-system.

6.3 It is recommended that ANSPs ensure that all involved parties are aware of such situations so that affected messages may be excluded from the performance measurement data.

APPENDIX B MODEL TERMS OF REFERENCE FOR AN INTEROPERABILITY TEAM

Reporting and problem resolution processes

- To establish a problem reporting system;
- To review de-identified problem reports and determine appropriate resolution;
- To identify trends;
- To develop interim operational procedures to mitigate the effects of problems until such time as they are resolved;
- To monitor the progress of problem resolution; and
- To prepare summaries of problems encountered and their operational implications.

System performance and monitoring processes

- To determine and validate system performance requirements;
- To establish a performance monitoring system;
- To assess system performance based on information from the CRA;
- To authorise and coordinate system testing;
- To identify accountability for each element of the end-to-end system;
- To develop, document and implement a quality assurance plan that will provide a path to a more stable system; and
- To identify configurations of the end-to-end system that provide acceptable data link performance, and to ensure that such configurations are maintained by all stakeholders.

New procedures

- To coordinate testing in support of implementation of enhanced operational procedures

Reporting

- To report safety-related issues to the appropriate State or regulatory authorities for action;
- To provide reports to each meeting of the implementation team or ATS coordinating group, as appropriate; and
- To provide reports to RASMAG.

APPENDIX ~~C~~ B CRA TASKS AND RESOURCE REQUIREMENTS

CRA Task	Resource Requirement
Manage data confidentiality agreements as required.	Legal services Technical expertise
Develop and administer problem report process: • de-identify all reports, • enter de-identified reports into a database, • keep the identified reports for processing, • request audit data from communication service providers, • assign responsibility for problem resolution where possible, • analyse the data, and • identify trends.	Problem reporting data base, ATS audit decode capability and Airborne test bench as a minimum, simulator highly recommended as well as ATS simulation capability (CPDLC and ADS-C)
Coordinate and test the implementation of new procedures	Airborne test bench as a minimum, simulator capability highly recommended ATS simulation capability (CPDLC and ADS-C) ATS audit decode and report capability. Technical expertise Operational expertise
Administer and monitor an informal end-to-end configuration process.	Technical expertise
Report to the interoperability team.	Technical expertise

APPENDIX D C SYSTEM PERFORMANCE CRITERIA

In 2008, the ANC approved a work programme to reconvene the OPLINKP, and tasked the panel to update the *Manual on Required Communication Performance (RCP)* (Doc 9869) by taking into account significant advances by ICAO Member States and regions, in the areas of qualification and monitoring, commercial service contracts/agreements and operational approvals, thereby also avoiding the imposition of regional or State-specific criteria on aircraft operators and aircraft/avionics manufacturers.

In 2010, OPLINKP reconvened and agreed to develop an amendment to Doc 9869, renaming it to the *Performance-based Communication and Surveillance (PBCS) Manual*, and expanding its scope by incorporating parts of the GOLD and SVGM, and other material that was developed by the regions since 2007. The Global Operational Datalink Document (GOLD), which is published as Regional Guidance Material, contains the detailed safety and performance requirements for data link services that need to be met and verified. These requirements are derived from *RTCA DO-306/EUROCAE ED-122 Safety and Performance Standard for Air Traffic Data link Services in Oceanic and Remote Airspace* (Oceanic SPR Standard). This does not prevent ATS service providers from negotiating more constraining contractual requirements with their communication service providers if necessary.
The RCP and RSP specifications are described within the performance-based communication and surveillance (PBCS) framework, thereby providing the means to prescribe the appropriate RCP and RSP specifications and initially qualify different subsystems, as well as manage operational (end-to-end) system performance in continued operations.

Refer to The tables below summarise the requirements in Appendices B and C of the GOLD ICAO DOC 9869 Appendix B contains a “merged” version of the RCP specifications taken from the regional guidance material (GOLD and SVGM), Appendix B in each document. These specifications are considered a requirement when they are prescribed or guidance if applied only to PBCS monitoring programmes. Appendix C contains a “merged” version of the RSP specifications taken from the regional guidance material (GOLD and SVGM), Appendix C in each document. These specifications are considered a requirement when they are prescribed or guidance if applied only to PBCS monitoring programmes. Appendix D contains the guidance on post-implementation monitoring at ANSP, regional and inter-regional levels, taken from GOLD. Appendix E contains the guidance on post-implementation monitoring at ANSP, regional and interregional levels, taken from the SVGM.

D.1 Required Communication Performance Specifications

The rationale for the criteria provided in these specifications can be found in ICAO Annex 11, ICAO Doc 4444, ICAO Doc 9689 and RTCA DO-306/ED-122.

RCP specification	
Term	**Description**
RCP expiration time (ET)	The maximum time for the completion of the operational communication transaction after which the initiator is required to revert to an alternative procedure.
RCP nominal time (TT 95%)	The maximum nominal time within which 95% of operational communication transactions is required to be completed.
RCP continuity (C)	The required probability that an operational communication transaction can be completed within the communication transaction time, either ET or TT 95%, given that the service was available at the start of the transaction.
RCP availability (A)	The required probability that an operational communication transaction can be initiated when needed.

~~RCP integrity (I)~~	~~The required probability that an operational communication transaction is completed with no undetected errors.~~ ~~*Note Whilst RCP integrity is defined in terms of the "goodness" of the communication capability, it is specified in terms of the likelihood of occurrence of malfunction on a per flight hour basis, e.g. 10^{-5}, consistent with RNAV/RNP specifications.*~~

~~/D transaction time~~	
~~Term~~	**~~Description~~**
~~Monitored operational performance (TRN)~~	~~The portion of the transaction time (used for intervention) that does not include the times for message composition or recognition of the operational response.~~
~~Required communication technical performance (RCTP)~~	~~The portion of the (intervention) transaction time that does not include the human times for message composition, operational response, and recognition of the operational response.~~
~~Responder performance criteria~~	~~The operational portion of the transaction time to prepare the operational response, and includes the recognition of the instruction, and message composition, e.g. flight crew/HMI for intervention transactions.~~
~~$RCTP_{ATSU}$~~	~~The summed critical transit times for an ATC intervention message and a response message, allocated to the ATSU system.~~

RCP specification	
Term	**Description**
$RCTP_{CSP}$	The summed critical transit times for an ATC intervention message and a response message, allocated to the CSP system.
$RCTP_{AIR}$	The summed critical transit times for an ATC intervention message and a response message, allocated to the aircraft system.

D.1.1 RCP 240

RCP communication transaction time and continuity criteria		
Specification: RCP 240/D	**Application: CPDLC**	
Transaction Time Parameter	**ET (sec)** **C = 99.9%**	**TT (sec)** **C = 95%**
Transaction Time Value	240	210
RCP Time Allocations		
Initiator	30	30
TRN	210	180
TRN Time Allocations		
Responder	60	60
RCTP	150	120
RCTP Time Allocation		
$RCTP_{ATSU}$	15	10
$RCTP_{CSP}$	120	100
$RCTP_{AIR}$	15	10

RCP availability criteria		
Specification: RCP 240/D	**Application: CPDLC**	
Availability parameter	**Efficiency**	**Safety**
Service availability (A_{CSP})	0.9999	0.999
Unplanned outage duration limit (min)	10	10
Maximum number of unplanned outages	4	48
Maximum accumulated unplanned outage time (min/yr)	52	520
Unplanned outage notification delay (min)	5	5
Note 1 — DO 306/ED 122 specifies an availability value based on safety assessment of the operational effects of the loss of the service. The more stringent (efficiency) value is based on an additional need to maintain orderly and efficient operations. *Note 2 — DO 306/ED 122 specifies a requirement to indicate loss of the service. Unplanned outage notification delay is an additional time value associated with the requirement to indicate the loss to the ATS provider.*		

RCP integrity criteria	
Specification: RCP 240/D	**Application: CPDLC**
Integrity (I)	Malfunction = 10^{-5} per flight hour

D.1.2 RCP 400

RCP communication transaction time and continuity criteria		
Specification: RCP 400/D	**Application: CPDLC**	
Transaction Time Parameter	**ET (sec)** **C = 99.9%**	**TT (sec)** **C = 95%**
Transaction Time Value	400	350
RCP Time Allocations		
Initiator	30	30
TRN	370	320
TRN Time Allocations		
Responder	60	60
RCTP	310	260
RCTP Time Allocation		
$RCTP_{ATSU}$	15	10
$RCTP_{CSP}$	280	240
$RCTP_{AIR}$	15	10

RCP availability and integrity criteria	
Specification: RCP 400/D	**Application: CPDLC**
Availability (A) 0.999	**Integrity (I)** Malfunction= 10^{-5} per flight hour

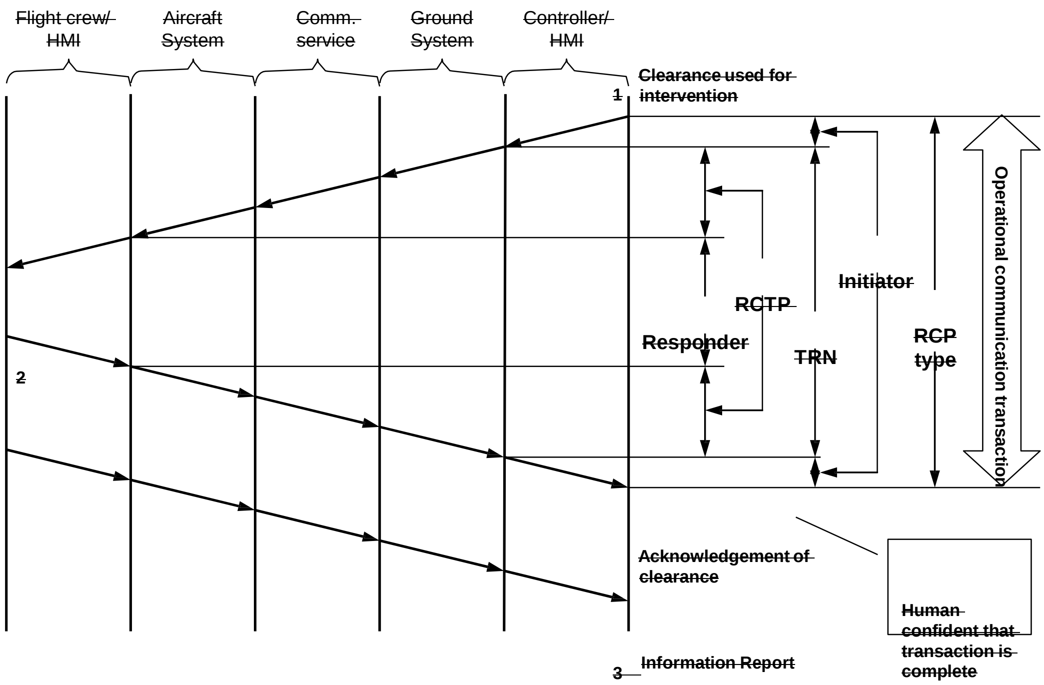


***Figure 1:** RCP allocations for intervention capability (DO-306/ED-122, Figure 5-3)*

D.2 Surveillance Performance Specifications

The rationale for the criteria provided in these specifications can be found in ICAO Annex 11, ICAO Doc 4444, ICAO Doc 9689, and RTCA DO-306/ED-122.

Surveillance performance specification and related terms	
Term	**Description**
Surveillance overdue delivery time (OT)	The maximum time for the successful delivery of surveillance data after which the initiator is required to revert to an alternative procedure.
Surveillance nominal delivery time (DT 95%)	The maximum nominal time within which 95% of surveillance data is required to be successfully delivered.
Surveillance continuity (C)	The required probability that surveillance data can be delivered within the surveillance delivery time parameter, either OT or DT 95%, given that the service was available at the start of delivery.
Surveillance availability (A)	The required probability that surveillance data can be provided when needed.
Surveillance integrity (I)	The required probability that the surveillance data is delivered with no undetected error. *Note Surveillance integrity includes such factors as the accuracy of time, correlating the time at aircraft position, reporting interval, data latency, extrapolation and/or estimation of the data.*
Surveillance data transit time criteria	
Term	**Description**
$RSTP_{ATSU}$	The overdue (OD) or nominal (DT) transit time for surveillance data from the CSP interface to the ATSU's flight data processing system.
$RSTP_{AIR}$	The overdue (OD) or nominal (DT) transit time for surveillance data from the aircraft's avionics to the antenna.
$RSTP_{CSP}$	The overdue (OD) or nominal (DT) transit time for surveillance data allocated to the CSP.

D.2.1 Surveillance performance type 180 specification

Surveillance data transit time and continuity criteria		
Specification: Type 180/D	**Application: ADS-C, FMC WPR**	
Data Latency Parameter	**OT (sec)** **C = 99.9%**	**DT 95%(sec)** **C = 95%**
Delivery Time Value	180	90
RSTP Time Allocation		
$RSTP_{ATSU}$	5	3
$RSTP_{CSP}$	170	84
$RSTP_{AIR}$	5	3
Surveillance availability and integrity criteria		
Availability (A)	**Integrity (I)**	
0.999 0.9999 (efficiency) *Note. The surveillance availability criteria for type 180/D are the same as the for RCP 240/D. See D.1.1 above.*	**Navigation FOM**	*The navigation figure of merit (FOM) is specified based on the navigation criteria associated with this spec. For example, if RNP 4 is prescribed, then for ADS-C surveillance service, the FOM level would need to be 4 or higher.*
	Time at position accuracy	+/- 1 sec (UTC)
	Data integrity	Malfunction = 10^{-5} per flight hour

D.2.2 Surveillance performance type 400 specification

Surveillance data transit time and continuity criteria		
Specification: Type 180/D	**Application: ADS-C, FMC WPR**	
Data Latency Parameter	**OT (sec)** **C = 99.9%**	**DT 95%(sec)** **C = 95%**
Delivery Time Value	400	300
RSTP Time Allocation		
$RSTP_{ATSU}$	30	15
$RSTP_{CSP}$	340	270
$RSTP_{AIR}$	30	15
Surveillance availability and integrity criteria		
Availability (A)	**Integrity (I)**	
0.999	**Navigation FOM**	*The navigation figure of merit (FOM) is specified based on the navigation criteria associated with this spec. For example, if RNP 10 is prescribed, then for ADS-C surveillance service, the FOM level would need to be 3 or higher.*
	Time at position accuracy	+/- 1 sec (UTC)
	Data integrity	Malfunction = 10^{-5} per flight hour

2023 Asia Pacific
Consolidated Safety Report

RASMAG/29
19 - 22 August 2024

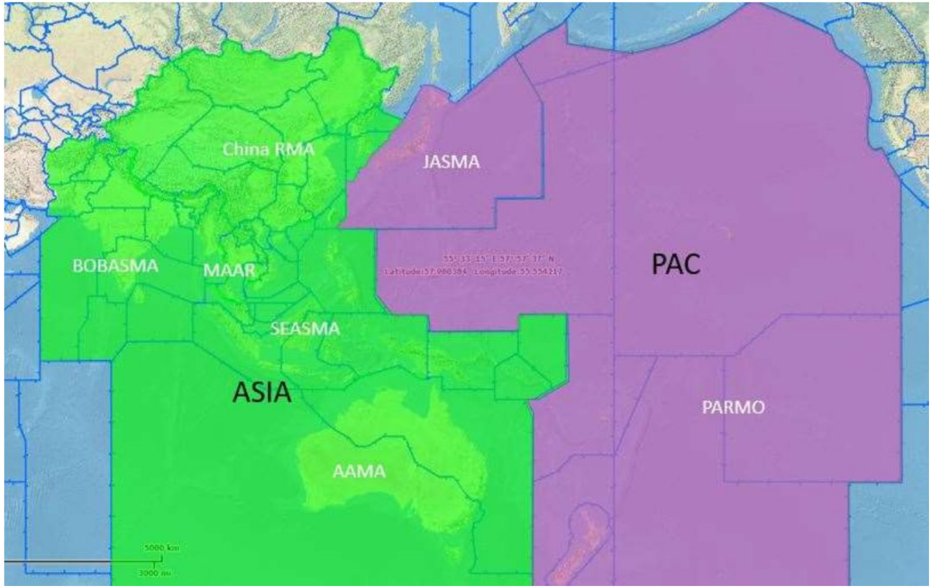
Outline

- Background
- PAC Area
  - Vertical Collision Risk Estimates and Summary of LHDs
  - Horizontal Collision Risk Estimates and Summary of LLDs and LLEs
  - Geolocations of LHDs/LLDs/LLEs
  - Hot Spots
- Asia Area
  - Vertical Collision Risk Estimates and Summary of LHDs
  - Horizontal Collision Risk Estimates and Summary of LLDs and LLEs
  - Geolocations of LHDs/LLDs/LLEs
  - Hot Spots
- Reporting Rate of LHDs/LLDs/LLEs
- Conclusion

Background

Background

In MAWG/5, APAC monitoring agencies agreed to consolidate key elements from their safety risk analysis into one report to give an overall picture of airspace safety risk in Asia Pacific.



The report is divided into:

- **Pacific (PAC) Area**
- **Asia Area**

For each area, there will be a summary of:

- vertical collision risk estimates, LHD summary, and their hot spots (if any);
- horizontal collision risk estimates, LLD & LLE summary, and their hot spots (if any); and
- reporting rates in 3 groups: Category A + B + C (related to the pilot/aircrew), D + E + F (related to ATC), and G + H + I + J + K + L + M (Other).

Pacific Area (PAC)

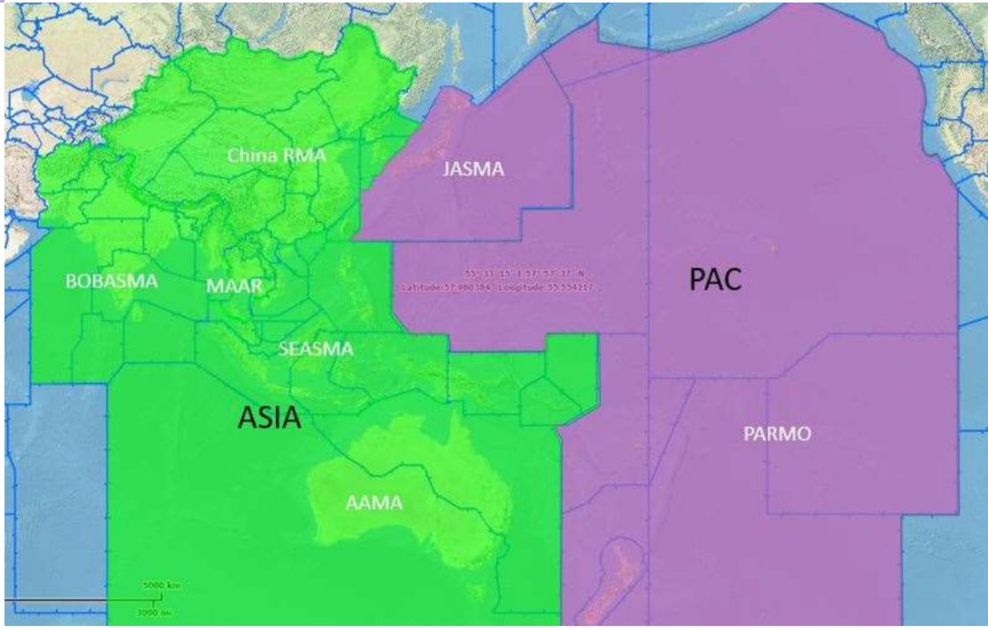
Traffic between North America and Asia, or North America and South Pacific States

FIRs : Anchorage, Auckland, Fukuoka, Nadi, Oakland, and Tahiti

Monitoring Agencies :

RMAs (Verical): JASMA, PARMO

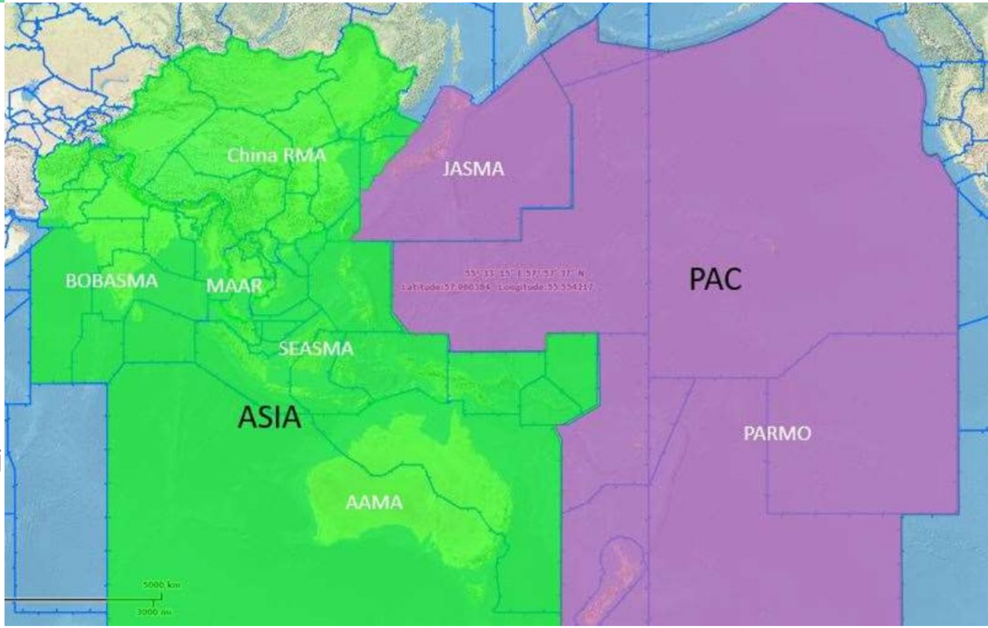
EMAs (Horizontal): JASMA, PARMO



Asia Area (Asia)

Traffic flows between between Asia and Middle East, Europe and South Pacific States.

FIRs : Bangkok, Beijing, Brisbane, Chennai,Colombo, Dhaka, Delhi, Guangzhou, Hanoi, Ho Chi Minh, Hong Kong, Honiara, Incheon, Jakarta, Karachi, Kathmandu, Kolkata, Kota Kinabalu, Kuala Lumpur, Kunming, Lahore, Lanzhou, Male, Manila, Melbourne, Mumbai, Nauru, Phnom Penh, Port Moresby, Pyongyang, Sanya, Shanghai Shenyang, Singapore, Taibei, Ujung Pandang, Ulaanbaatar, Urumqi, Vientiane, Wuhan, and Yangon



Monitoring Agencies :

RMAs (Vertical): AAMA, China RMA, MAAR, PARMO
EMAs (Horizontal): AAMA, BOBASMA, PARMO, SEASMA

PAC Area

PAC : Vertical Collision Risk

PAC : Vertical Collision Risk Estimates

Number of annual flying hours: 3,462,071 hours/year

2023 PAC Area	Vertical Risk Estimate	Remark
Vertical Technical Risk	0.22×10^{-9} FAPFH	Below Technical TLS
Vertical Operational Risk	10.55×10^{-9} FAPFH	
Vertical Overall Risk	10.77×10^{-9} FAPFH	Above TLS

PAC : Vertical Collision Risk Estimates

2016 - 2023

Year	Vertical Overall Risk Estimate	Remark
2023	10.77×10^{-9} FAPFH	Above TLS
2022	19.62×10^{-9} FAPFH	Above TLS
2021	19.74×10^{-9} FAPFH	Above TLS
2020	16.71×10^{-9} FAPFH	Above TLS
2019	30.21×10^{-9} FAPFH	Above TLS
2018	19.40×10^{-9} FAPFH	Above TLS
2017	7.30×10^{-9} FAPFH	Above TLS
2016	5.01×10^{-9} FAPFH	Above TLS

PAC : Summary of LHDs

Attributions	Category Code	Description	Number of Occurrences	Duration (minutes)	Number of Levels Crossed
Aircrew/ Pilot	A	Flight crew failing to climb/descend the aircraft as cleared	**16**	**4.98**	**9**
	B	Flight crew climbing/descending without ATC Clearance	**14**	**14.22**	**13**
	C	Incorrect operation or interpretation of airborne equipment	**3**	**2.13**	**2**
ATC	D	ATC system loop error	**6**	**2.50**	**3**
	E	Coordination errors in the ATC-to-ATC transfer of control responsibility as a result of human factors issues	**57**	**224.18**	**6**
	F	Coordination errors in the ATC-to-ATC transfer of control responsibility as a result of equipment outage or technical issues	**1**	**7.00**	**0**
Aircraft/ Avionics/ Contingencies	G	Aircraft contingency event leading to sudden inability to maintain assigned flight level	**0**	**0.00**	**0**
	H	Airborne equipment failure leading to unintentional or undetected change of flight level	**0**	**0.00**	**0**

PAC : Summary of LHDs

Attributions	Category Code	Description	Number of Occurrences	Duration (minutes)	Number of Levels Crossed
Weather/ Turbulence	I	Turbulence or other weather related causes leading to unintentional or undetected change of flight level	20	59.93	1
TCAS	J	TCAS resolution advisory, flight crew correctly climb or descend following the resolution advisory	16	21.63	2
	K	TCAS resolution advisory, flight crew incorrectly climb or descend following the resolution advisory	0	0.00	0
Other	L	An aircraft being provided with RVSM separation is not RVSM approved	0	0.00	0
	M	Other	1	25.00	0
		Total	134	361.58	36

PAC : Horizontal Collision Risk

PAC : Horizontal Collision Risk Estimates

Number of annual flying hours: 1,892,881 hours/year

2023 PAC Area	Horizontal Risk Estimate	Airspace	Remark
Total Lateral Risk	0.09×10^{-9} FAPFH	Pacific	Below TLS
Total Longitudinal Risk	0.17×10^{-9} FAPFH	Pacific	Below TLS
2022 PAC Area	**Horizontal Risk Estimate**	**Airspace**	**Remark**
Lateral Risk	2.09×10^{-9} FAPFH	Pacific	Below TLS
50NM Lateral Risk	0.456×10^{-9} FAPFH	Japan	Below TLS
30NM Longitudinal Risk	0.008×10^{-9} FAPFH	Japan	Below TLS
10MIN Longitudinal Risk	1.754×10^{-9} FAPFH	Japan	Below TLS

Notes:

- The 2023 Horizontal collision risk estimates are combined into a single value using a weighted average.

PAC : Summary of LLDs and LLEs

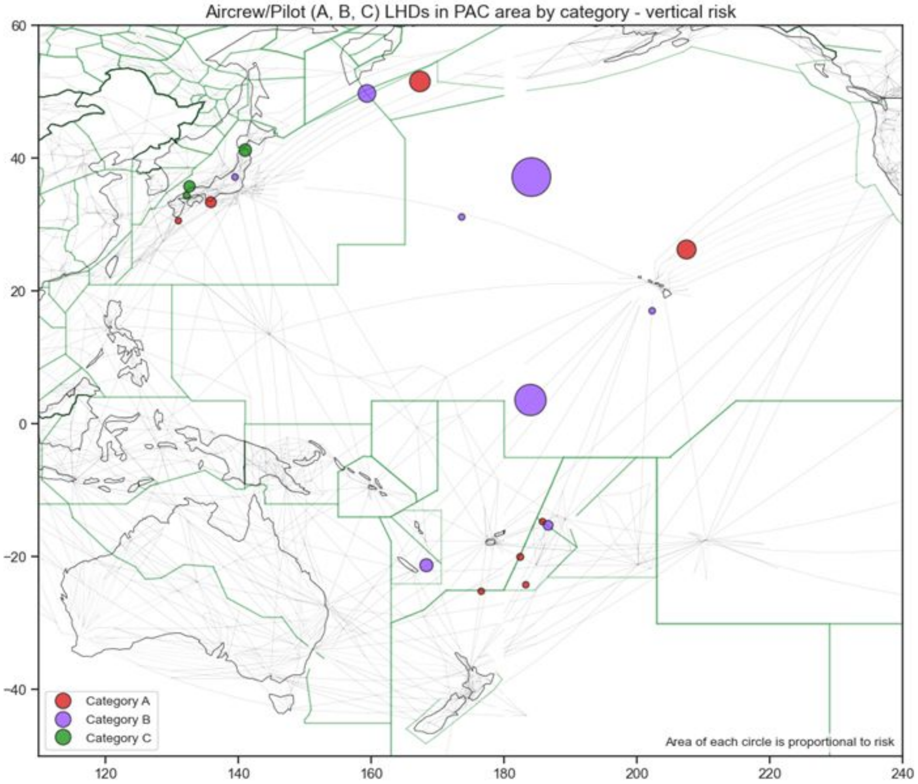
Attributions	Category Code	Description	Number of Occurrences	Duration (minutes)	Number of Tracks/Routes Crossed	Horizontal Deviation (NM)
Aircrew/ Pilot	A	Flight crew deviate without ATC Clearance	10	10.00	3	100
	B	Incorrect estimate or route provided due to incorrect operation or interpretation of airborne equipment	3	1.00	1	15
	C	Flight crew waypoint insertion error, due to correct entry of incorrect position or incorrect entry of correct position	3	15.00	0	75
ATC	D	ATC system loop error	2	5.00	1	61
	E	Coordination errors in the ATC-to-ATC transfer of control responsibility as a result of human factors issues	109	1614.00	0	158
	F	Coordination errors in the ATC-to-ATC transfer of control responsibility as a result of equipment outage or technical issues	1	11.00	0	0

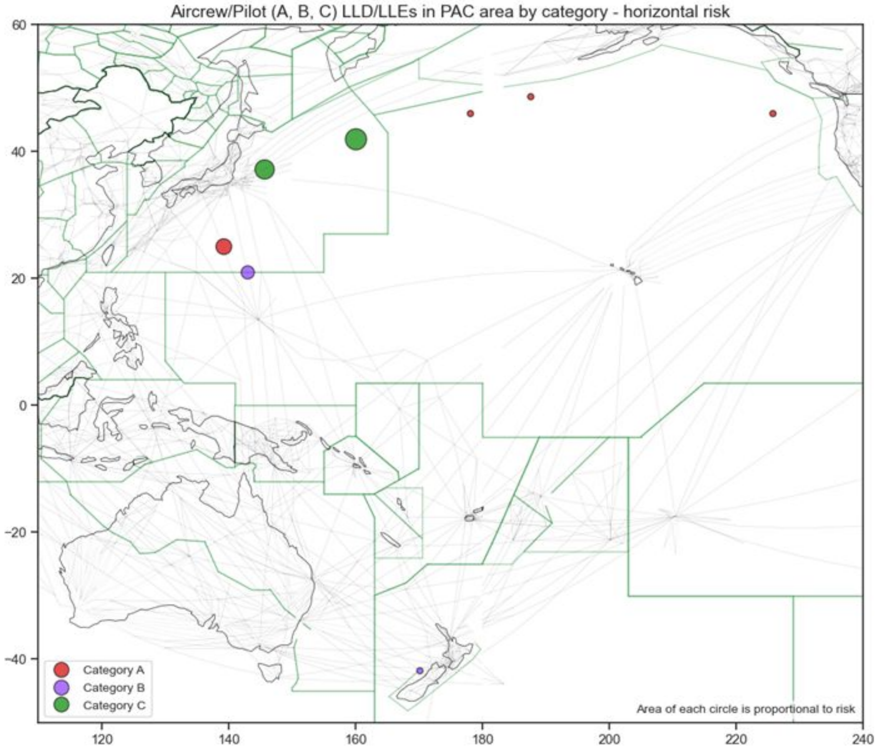
PAC : Summary of LLDs and LLEs

Attributions	Category Code	Description	Number of Occurrences	Duration (minutes)	Number of Tracks/Routes Crossed	Horizontal Deviation (NM)
Aircraft/ Avionics/ Contingencies	G	Navigation errors due to airborne equipment failure	1	20.00	0	128
Weather/ Turbulence	H	Turbulence or other weather related causes leading to a deviation in the horizontal dimension	11	98.00	0	255
Other	I	An aircraft was provided with reduced horizontal separation minima but did not meet the RNP/RSP/RCP specification;	0	0.00	0	0
	J	Other	1	0.00	1	20
		Total	141	1774.00	6	812

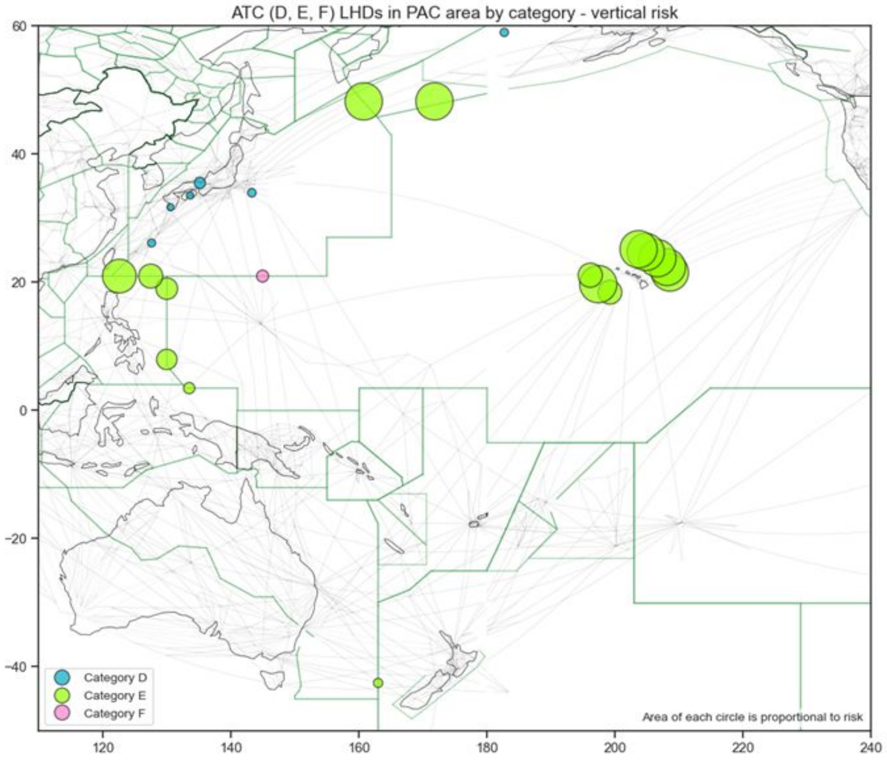
PAC : Geolocation of LHDs/LLDs/LLEs

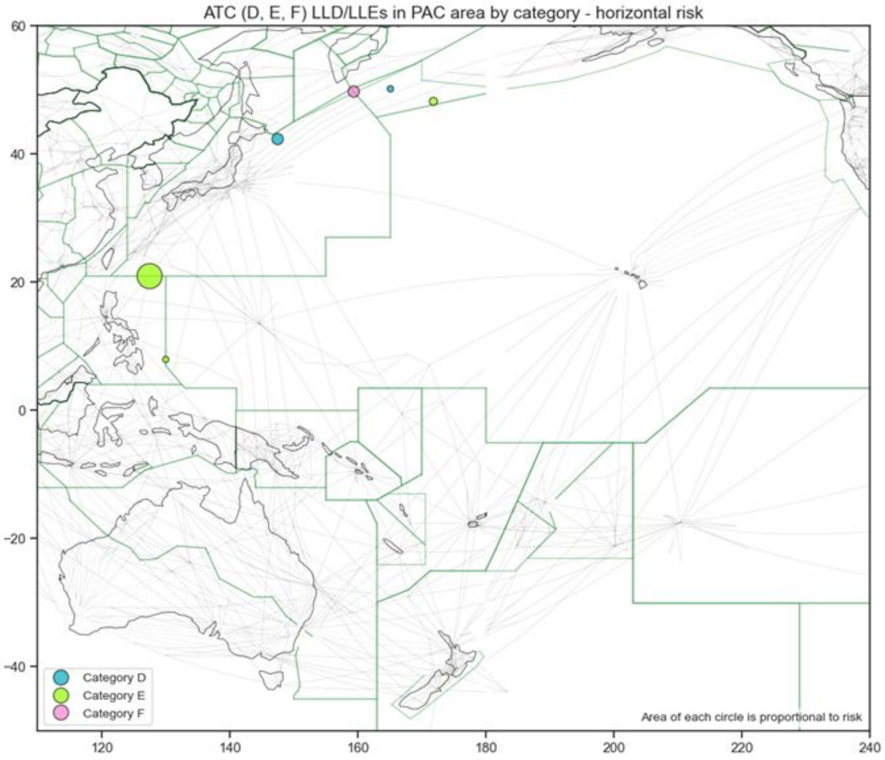
PAC : Aircrew/Pilot (A, B, C)



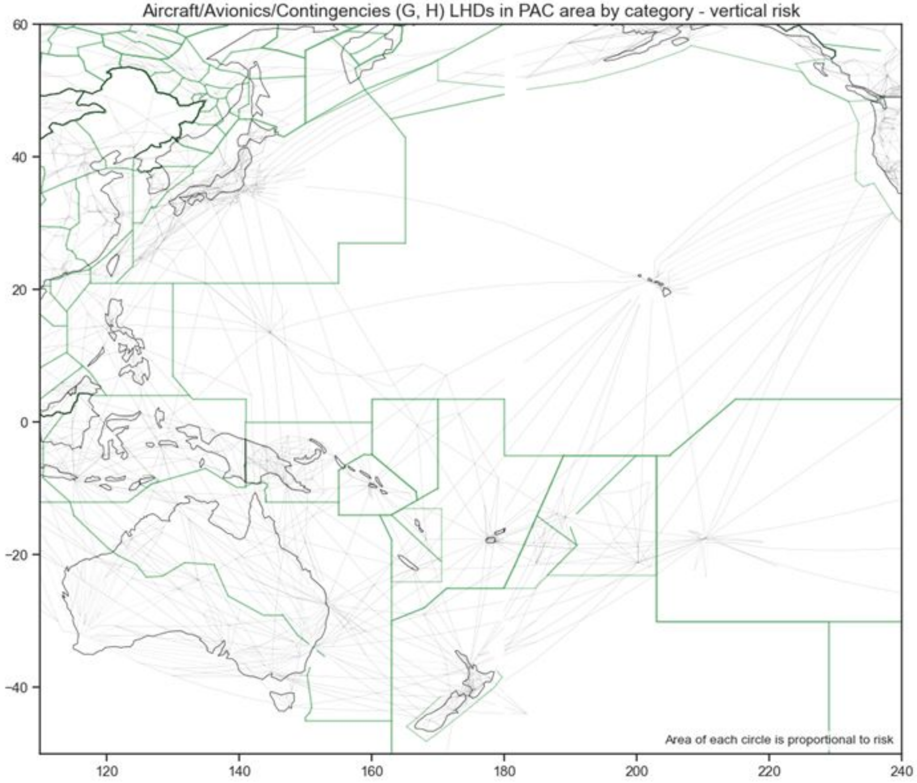


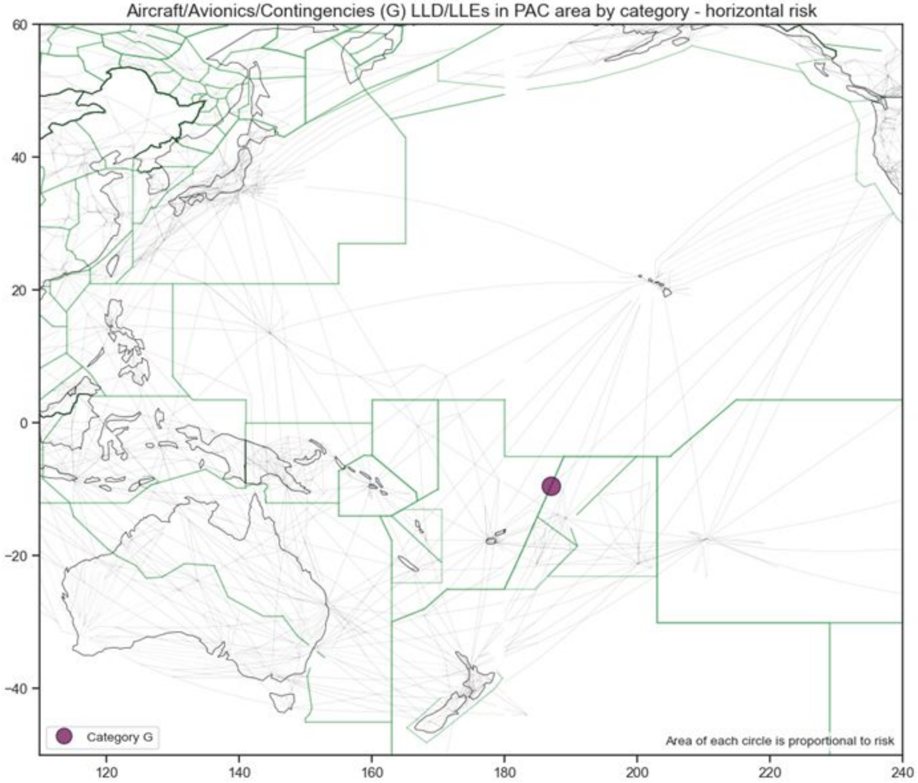
PAC : ATC (D, E, F)


ATC (D, E, F) LHDs in PAC area by category - vertical risk
60
40
20
0
-20
-40
120
140
160
180
200
220
240
Category D
Category E
Category F
Area of each circle is proportional to risk


ATC (D, E, F) LLD/LLEs in PAC area by category - horizontal risk
60
40
20
0
-20
-40
120
140
160
180
200
220
240
Category D
Category E
Category F
Area of each circle is proportional to risk

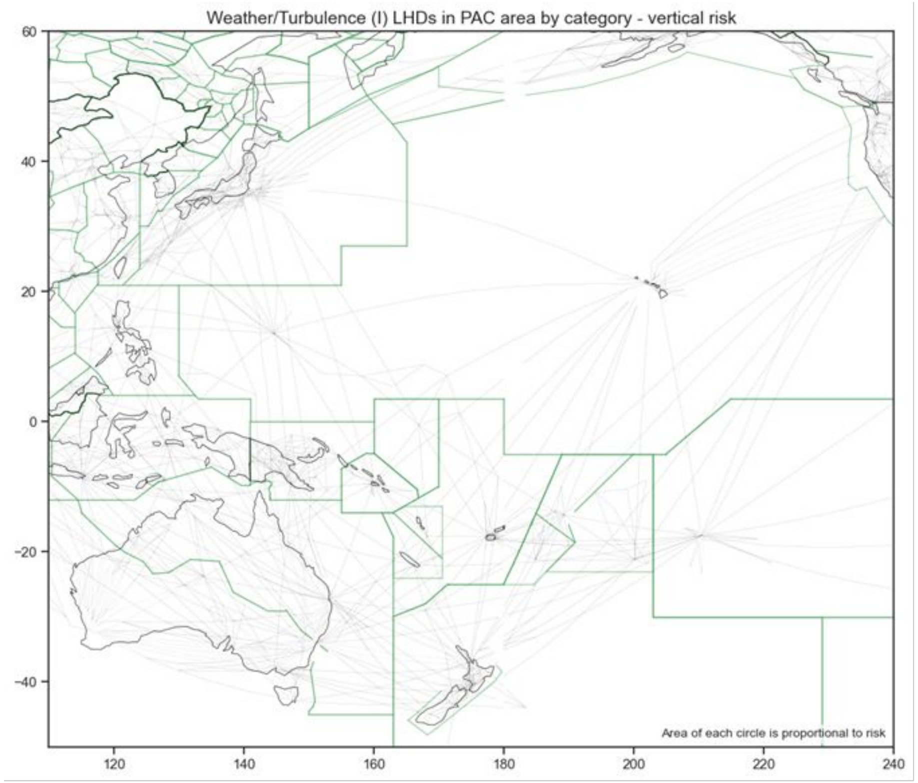
PAC : Aircraft Avionics/Contingencies (LHD:G,H, LLD/LLE:H)



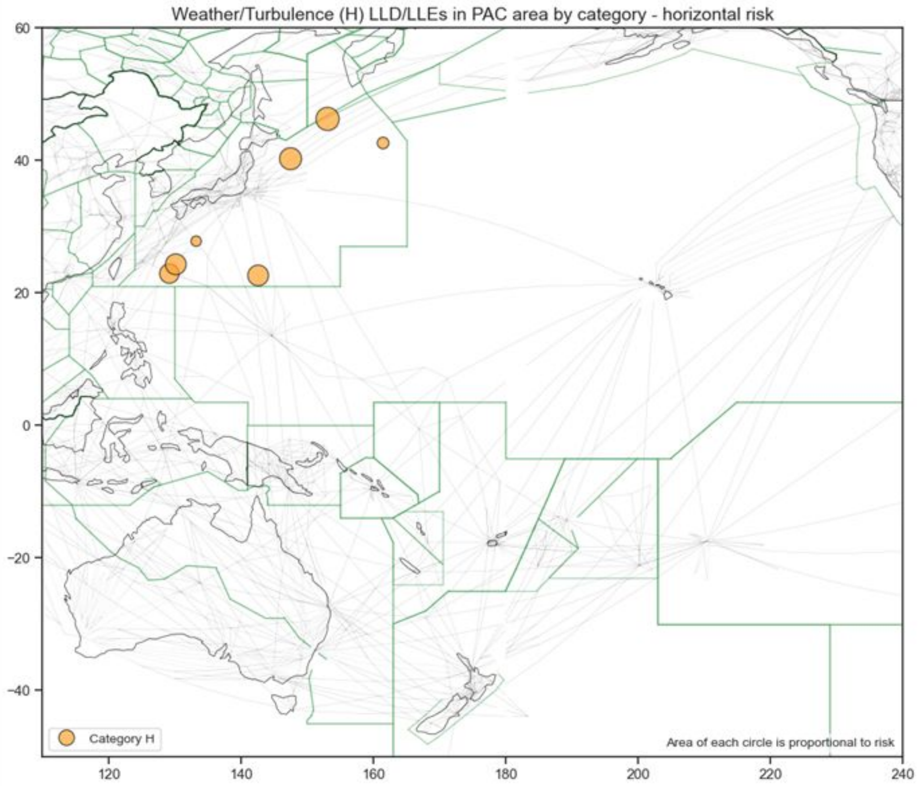


Note: No non-zero Category G and H LHD in 2023

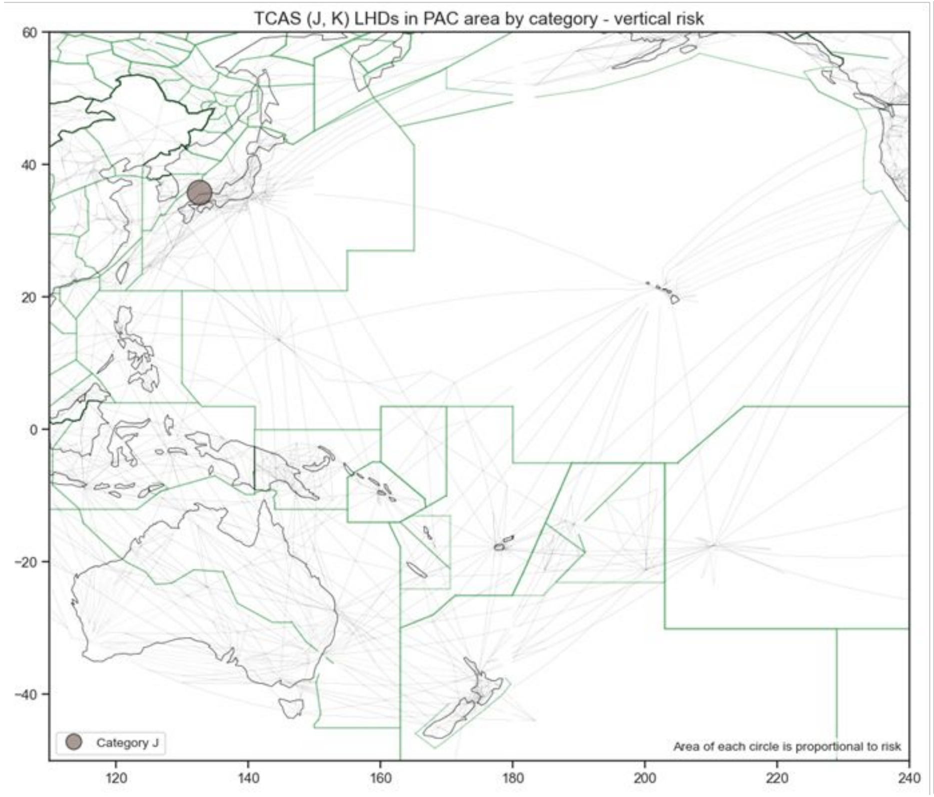
PAC : Weather/Turbulence (LHD:I, LLD/LLE:H)

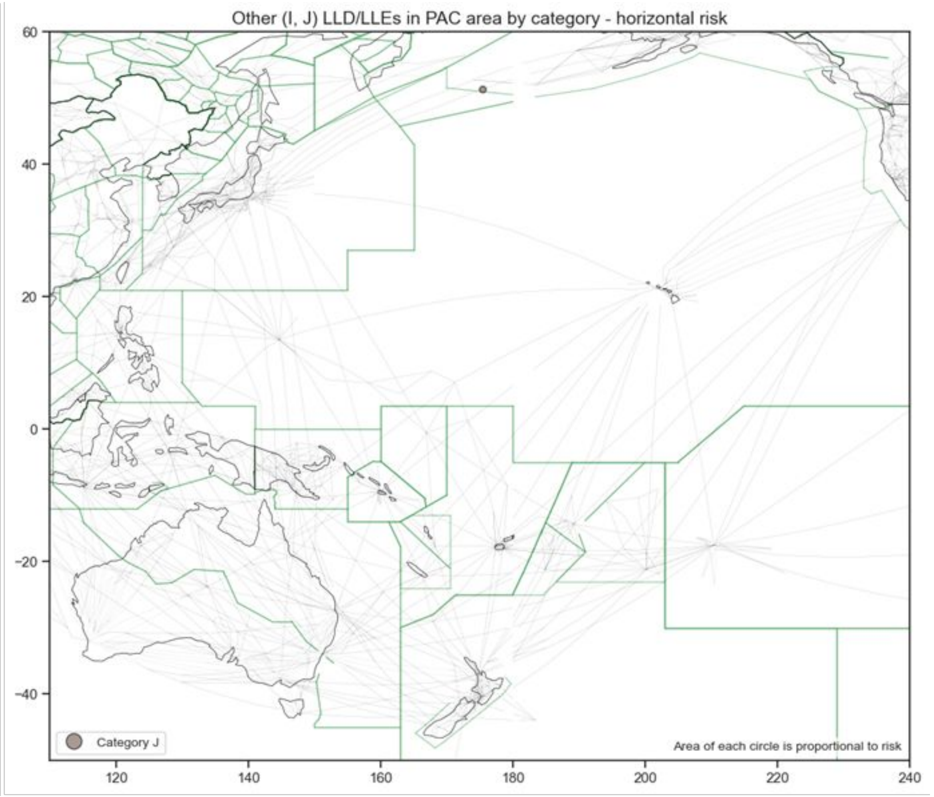


Note: No non-zero Category I LHD in 2023



PAC : TCAS (LHD:J, K)





Note: No non-zero Category K LHD in 2023

Note: No non-zero Category I LLD/LLE in 2023

PAC : Hot Spots

PAC : LHD Hot Spot N (Hawaii CEP/Oakland USA)

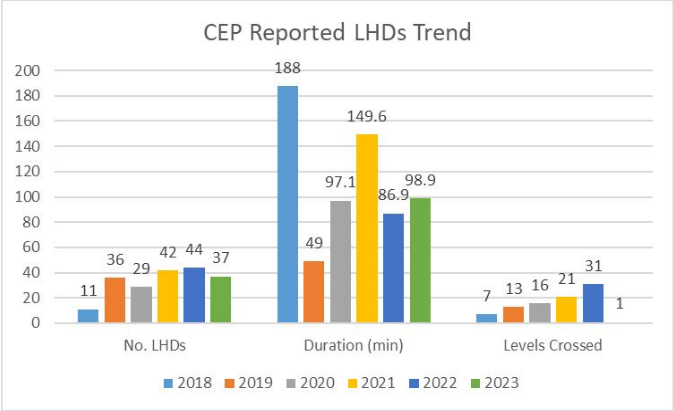
Nature of Occurrences : Coordination errors as a result of human factors issues (Category E)

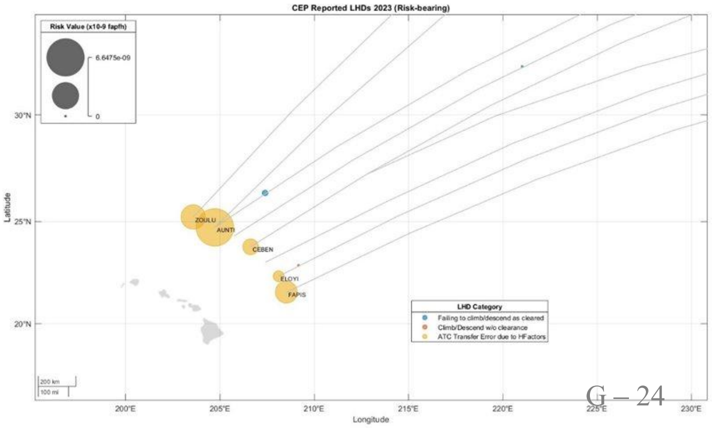
Contributing Factors : The reported LHDs occur within the high traffic volume in the Central East Pacific (CEP). These occurrences affect the CEP traffic and the user-preferred routes that cross the CEP airways.

Trend : Modifications were made to the vertical risk calculations to account for the one-way routes in the traffic flow. These adjustments have resulted in a lower vertical collision risk estimate, but still exceeds the TLS.

Mitigations : North America and Hawaii CEP have developed mitigation procedures. The long term mitigation is a new ATC system scheduled to be implemented at the Honolulu Control Facility in 2025.

Result from the hot spot identification process : This boundary continues to satisfy the hot spot criteria. Therefore, **Hot Spot N remains on the hot spot list**.





Asia Region

Asia : Vertical Collision Risk

ASIA : Vertical Collision Risk Estimates

Number of annual flying hours: 10,153,474 hours/year

2023 ASIA Area	Vertical Risk Estimate	Remark
Vertical Technical Risk	0.56×10^{-9} FAPFH	Below Technical TLS
Vertical Operational Risk	2.84×10^{-9} FAPFH	
Vertical Overall Risk	3.40×10^{-9} FAPFH	Below TLS

ASIA : Vertical Collision Risk Estimates

2016 - 2023

Year	Vertical Overall Risk Estimate	Remark
2023	3.40 x 10^{-9} FAPFH	Below TLS
2022	1.53 x 10^{-9} FAPFH	Below TLS
2021	4.03 x 10^{-9} FAPFH	Below TLS
2020	7.42 x 10^{-9} FAPFH	Above TLS
2019	12.88 x 10^{-9} FAPFH	Above TLS
2018	15.50 x 10^{-9} FAPFH	Above TLS
2017	27.30 x 10^{-9} FAPFH	Above TLS
2016	12.53 x 10^{-9} FAPFH	Above TLS

Asia : Summary of LHDs

Attributions	Category Code	Description	Number of Occurrences	Duration (minutes)	Number of Levels Crossed
Aircrew/ Pilot	A	Flight crew failing to climb/descend the aircraft as cleared	25	15.00	19
	B	Flight crew climbing/descending without ATC Clearance	12	12.75	12
	C	Incorrect operation or interpretation of airborne equipment	19	26.00	1
ATC	D	ATC system loop error	25	26.00	6
	E	Coordination errors in the ATC-to-ATC transfer of control responsibility as a result of human factors issues	519	304	106
	F	Coordination errors in the ATC-to-ATC transfer of control responsibility as a result of equipment outage or technical issues	21	21.00	0.00
Aircraft/ Avionics/ Contingencies	G	Aircraft contingency event leading to sudden inability to maintain assigned flight level	1	1.00	1
	H	Airborne equipment failure leading to unintentional or undetected change of flight level	6	0.00	6

Asia : Summary of LHDs

Attributions	Category Code	Description	Number of Occurrences	Duration (minutes)	Number of Levels Crossed
Weather/ Turbulence	I	Turbulence or other weather related causes leading to unintentional or undetected change of flight level	82	0.20	62
TCAS	J	TCAS resolution advisory, flight crew correctly climb or descend following the resolution advisory	19	1.50	19
	K	TCAS resolution advisory, flight crew incorrectly climb or descend following the resolution advisory	0	0.00	0
Other	L	An aircraft being provided with RVSM separation is not RVSM approved	0	0.00	0
	M	Other	95	7.00	5
		Total	824	414.45	237

Asia : Horizontal Collision Risk

Asia : Horizontal Collision Risk Estimates

Number of annual flying hours: 503,528 hours/year

2023 Asia Area	Horizontal Risk Estimate	Airspace	Remark
Total Lateral Risk	1.517 x 10^{-9} FAPFH	ASIA	Below TLS
Total Longitudinal Risk	4.444 x 10^{-9} FAPFH	ASIA	Below TLS
2022 Asia Area	**Horizontal Risk Estimate**	**Airspace**	**Remark**
30NM Lateral Risk	0.068 x 10^{-9} FAPFH	SEA	Below TLS
50NM Lateral Risk	0.096 x 10^{-9} FAPFH	SEA	
30NM Longitudinal Risk	0.786 x 10^{-9} FAPFH	SEA	Below TLS
50NM Longitudinal Risk	0.475 x 10^{-9} FAPFH	SEA and SA/IO	Below TLS

Notes:

- The 2023 Horizontal collision risk estimates are combined into a single value using a weighted average.

Asia : Summary of LLDs and LLEs

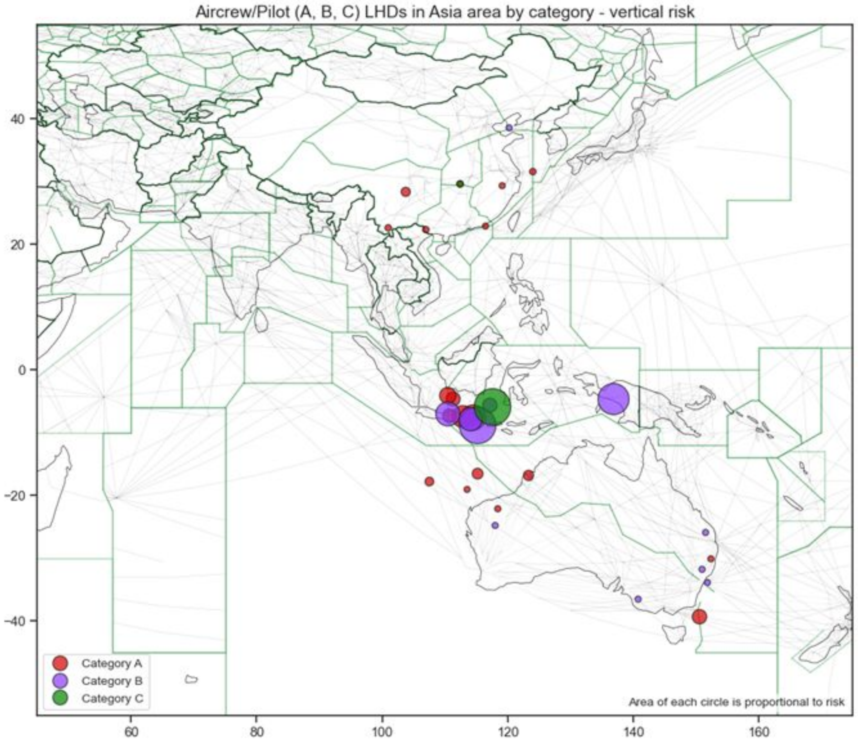
Attributions	Category Code	Description	Number of Occurrences	Duration (minutes)	Number of Tracks/Routes Crossed	Horizontal Deviation (NM)
Aircrew/ Pilot	A	Flight crew deviate without ATC Clearance	5	0.00	0.00	104.00
	B	Incorrect estimate or route provided due to incorrect operation or interpretation of airborne equipment	1	0.00	0.00	32.00
	C	Flight crew waypoint insertion error, due to correct entry of incorrect position or incorrect entry of correct position	0	0.00	0.00	0.00
ATC	D	ATC system loop error	0	0.00	0.00	0.00
	E	Coordination errors in the ATC-to-ATC transfer of control responsibility as a result of human factors issues	4	0.00	1.00	0.00
	F	Coordination errors in the ATC-to-ATC transfer of control responsibility as a result of equipment outage or technical issues	0	0.00	0.00	0.00

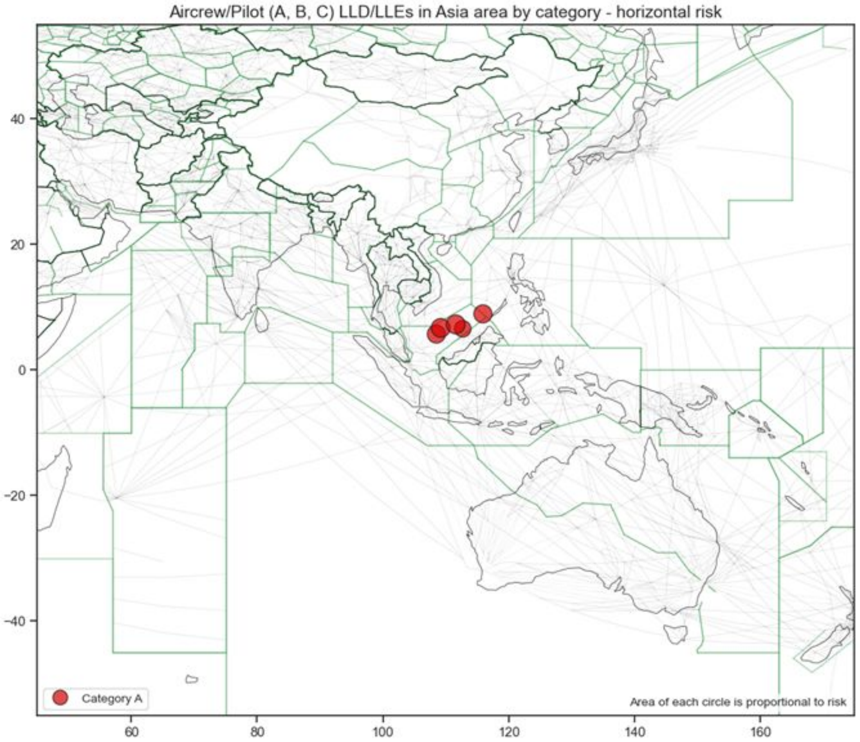
Asia : Summary of LLDs and LLEs

Attributions	Category Code	Description	Number of Occurrence s	Duration (minutes)	Number of Tracks/Routes Crossed	Horizontal Deviation (NM)
Aircraft/ Avionics/ Contingencies	G	Navigation errors due to airborne equipment failure	0	0.00	0.00	0.00
Weather/ Turbulence	H	Turbulence or other weather related causes leading to a deviation in the horizontal dimension	0	0.00	0.00	0.00
Other	I	An aircraft was provided with reduced horizontal separation minima but did not meet the RNP/RSP/RCP specification;	0	0.00	0.00	0.00
	J	Other	0	0.00	0.00	0.00
		Total	10	0.00	1.00	136.00

Asia : Geolocation of LHDs/LLDs/LLEs

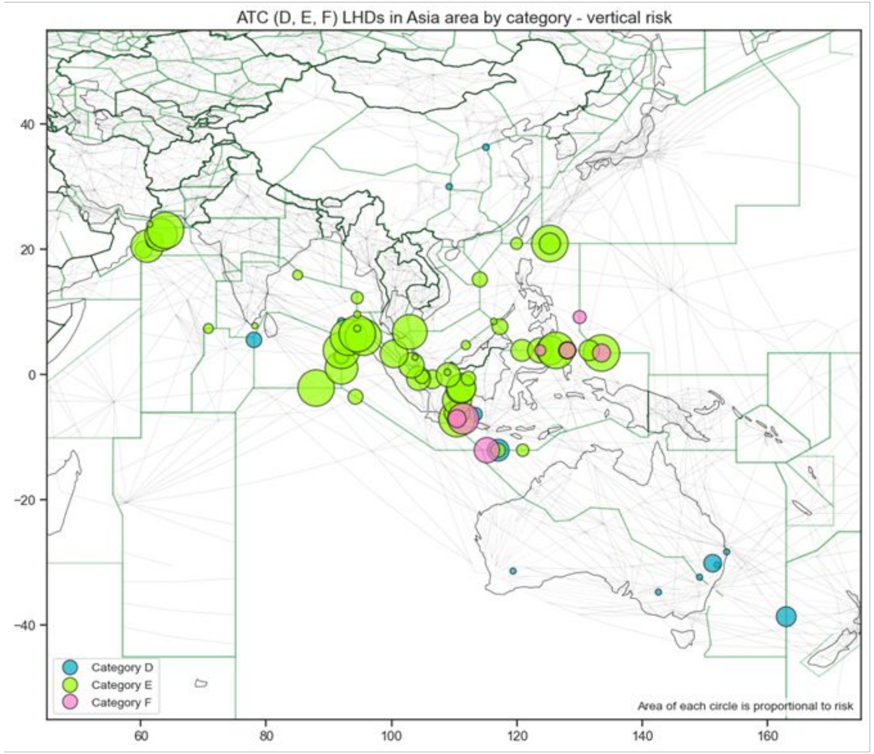
Asia : Aircrew/Pilot (A, B, C)

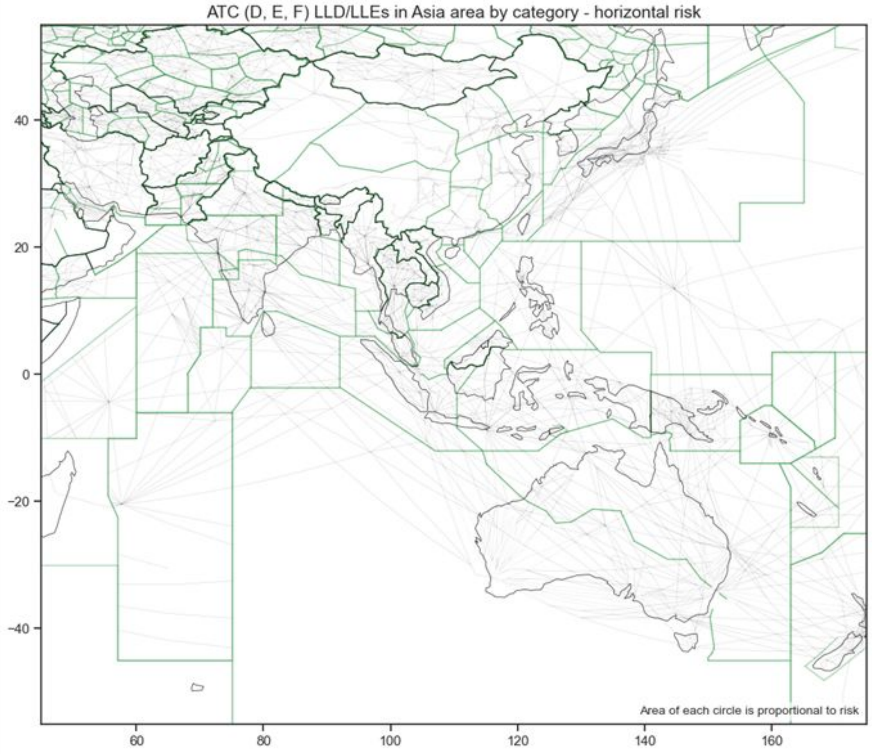




Note: No non-zero Category B and C LLD/LLE in 2023

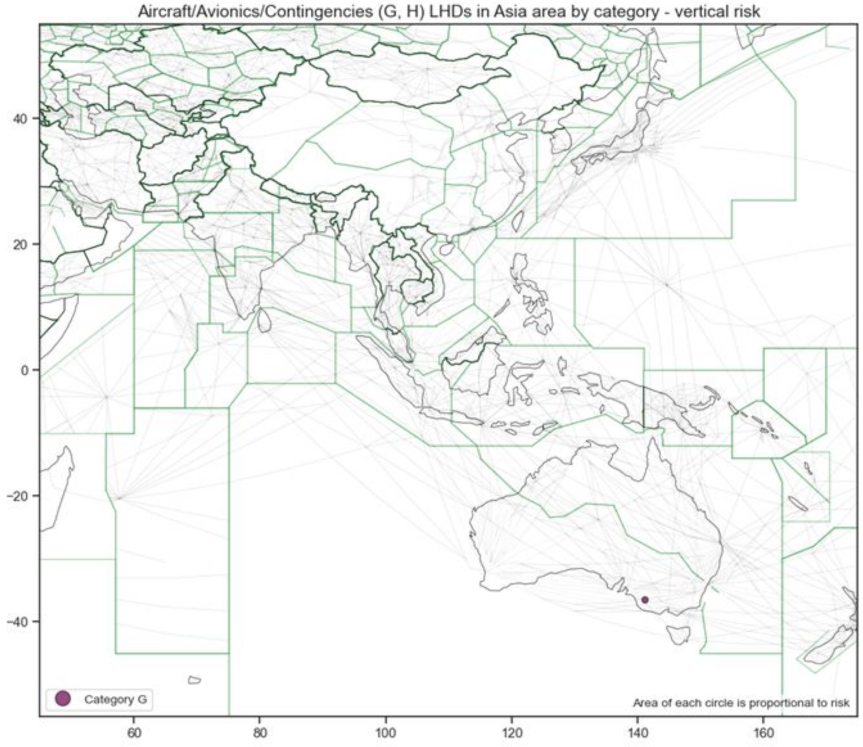
Asia : ATC (D, E, F)



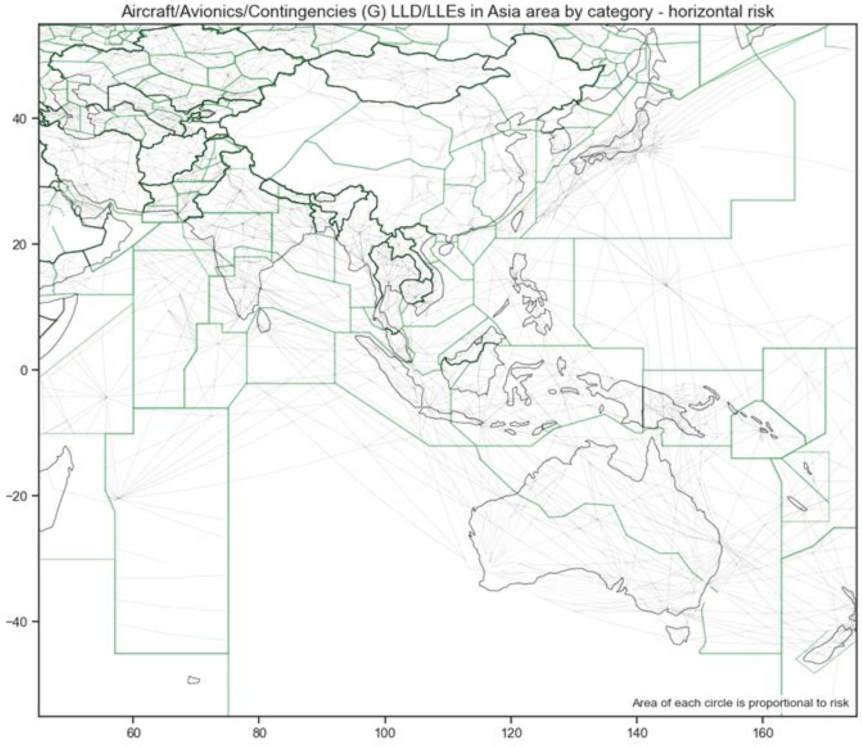


Note: No non-zero Category D, E and F LLD/LLE in 2023

Asia : Aircraft Avionics/Contingencies (LHD:G,H, LLD/LLE:H)

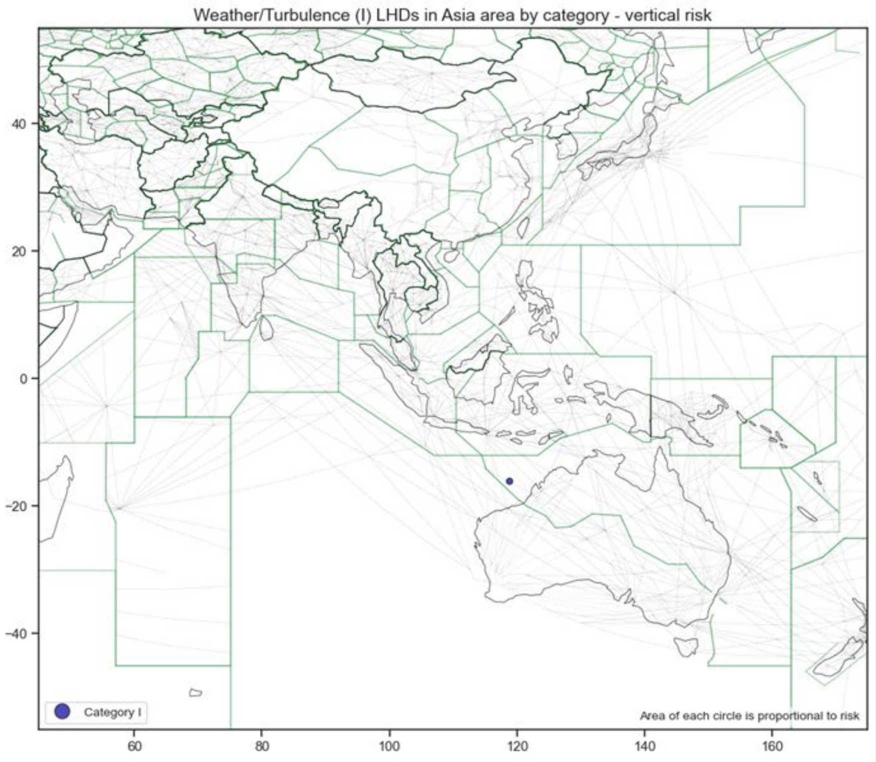


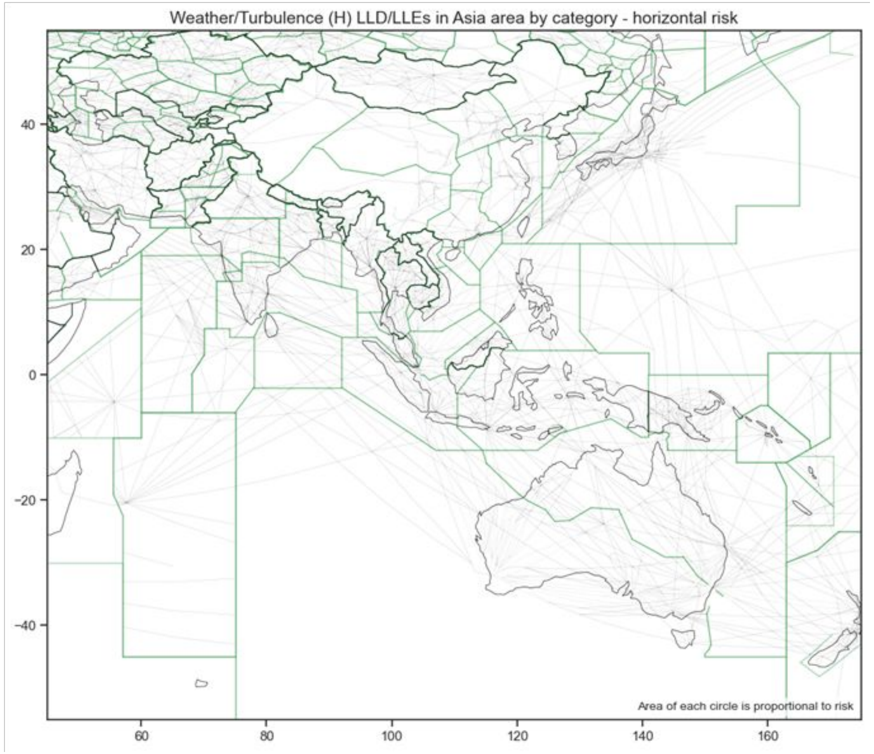
Note: No non-zero Category H LHD in 2023



Note: No non-zero Category G LLD/LLE in 2023

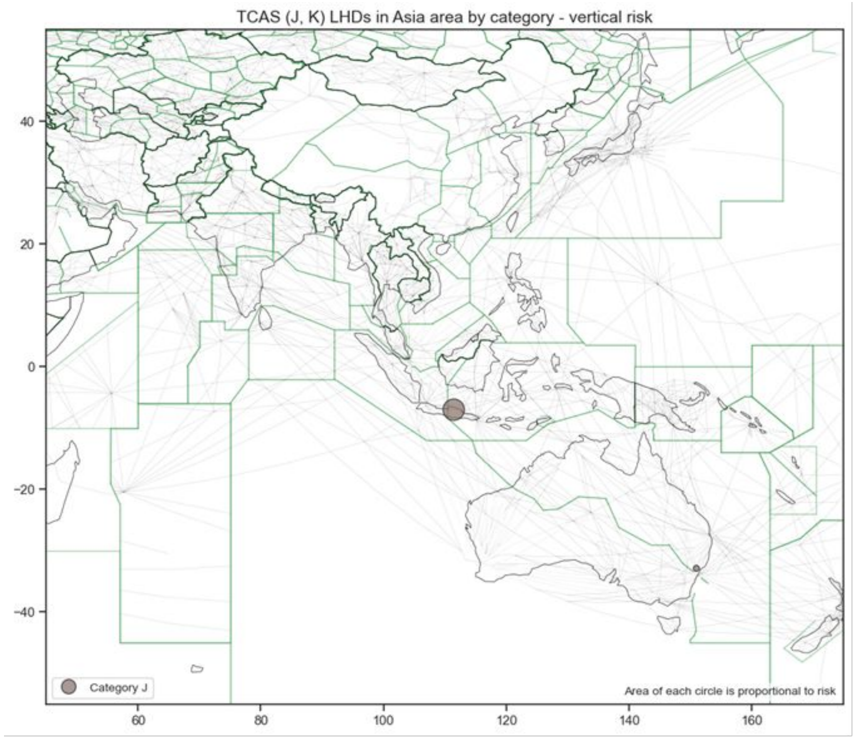
Asia : Weather/Turbulence (LHD:I, LLD/LLE:H)



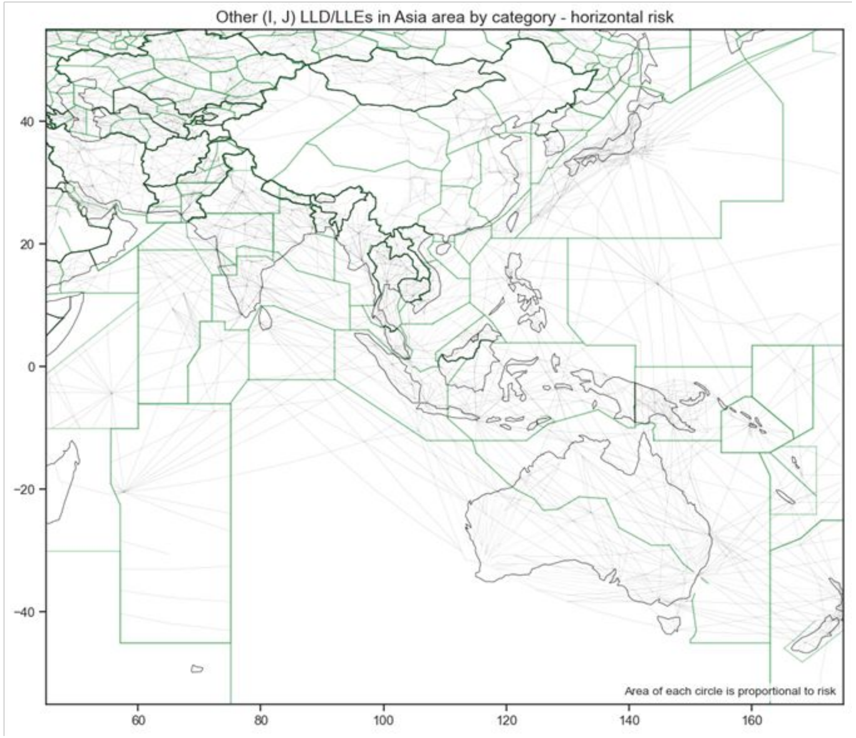


Note: No non-zero Category H LLD/LLE in 2023

Asia : TCAS (LHD:J, K)



Note: No non-zero Category K LHD in 2023



Note: No non-zero Category I and J LLD/LLE in 2023

Asia : Hot Spots

Asia : LHD Hot Spot A1 (Chennai/Dhaka/Kolkata/Yangon)

Nature of Occurrences : Coordination errors as a result of human factors issues (Category E)

Contributing Factors : Some gaps in communication and surveillance coverage.

Trend : The number of LHDs slightly decreased in 2023. There was one non-zero-duration LHD, contributing to the operational risk of 0.06 x 10^{-9} FAPFH.

Mitigations :
- The surveillance was enhanced by Space-Based ADS-B of Indian FIRs and ADS-B data sharing among Kolkata ACC, Chennai ACC and Yangon ACC.
- The AIDC is initiated between Kolkata ACC/Chennai ACC and Yangon ACC, but has not been successfully operated yet.

Result from the hot spot identification process :
- Hot Spot A1 does not meet the hot spot criteria.
- However, **Hot Spot A1 remains on the hot spot list** and should be monitored until further safety improvement initiatives are implemented.

Boundary	The Number of LHDs		
	2021	2022	2023
Kolkata-Yangon	1	17	11
Chennai-Yangon	8	23	15

Boundary	Operational Risk (FAPFH)		
	2021	2022	2023
Kolkata-Yangon	0	0	0.00
Chennai-Yangon	0	0.02×10^{-9}	0.06×10^{-9}

Asia : LHD Hot Spot A2 (Chennai/Kuala Lumpur)

Nature of Occurrences : Coordination errors as a result of human factors issues (Category E)

Contributing Factors : Some gaps in communication and surveillance coverage.

Trend : The number of LHDs decreased in 2023, but the operational risk increased from 0 to 0.23×10^{-9} FAPFH.

Mitigations :
- The surveillance was enhanced by Space-Based ADS-B of Indian FIRs.
- The AIDC operation was successfully implemented between Chennai ACC and Kuala Lumpur ACC since January 2021

Result from the identifying hot spots process :
- Hot Spot A2 does not satisfy any hot spot criteria for two consecutive years.
- **Hot Spot A2 is removed from the hot spot list,** because the safety improvement initiatives such as Spaced-Based ADS-B and the AIDC have been successfully operated.

Boundary	The Number of LHDs		
	2021	2022	2023
Chennai-KL	21	22	13
Boundary	**Operational Risk (FAPFH)**		
	2021	**2022**	**2023**
Chennai-KL	0.05×10^{-9}	0	0.23×10^{-9}

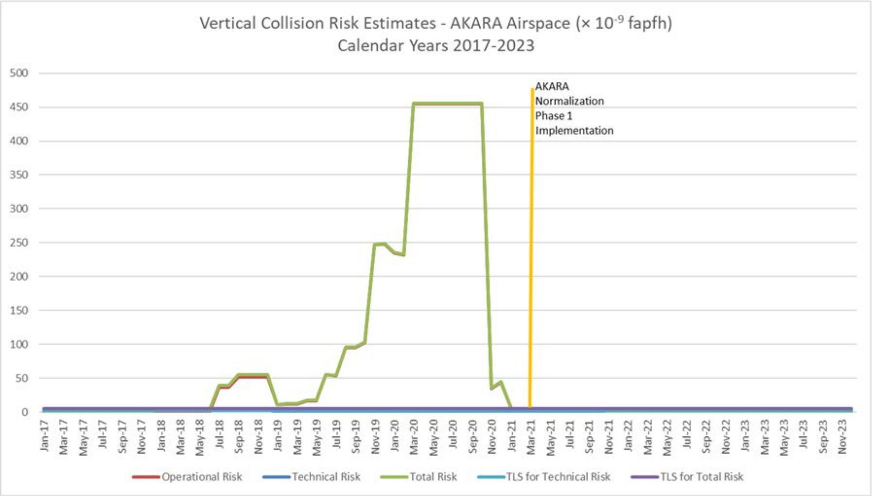
Asia : LHD Hot Spot B (AKARA Airspace)

Nature of Occurrences : Coordination errors as a result of human factors issues (Category E)

Contributing Factors : The Flight Level Allocation Scheme (FLAS) limits available flight levels due to high traffic volume in the area. Existing LOA for provision of ATS.

Trend :
- Continued trend in the number of LHDs at Incheon-Shanghai TOC point.
- No reported LHD at Fukuoka-Incheon FIR boundary and within the Incheon FIR from 2021 to 2023. As a result, the vertical operational risk estimate was zero.

Mitigations :
- Significant route structure change was implemented in March 2021. The Phase I implementation included a parallel airway (Y590/Y591) to A593.
- Mitigations provided by the available surveillance and direct speech circuit.



Asia : LHD Hot Spot B (AKARA Airspace)

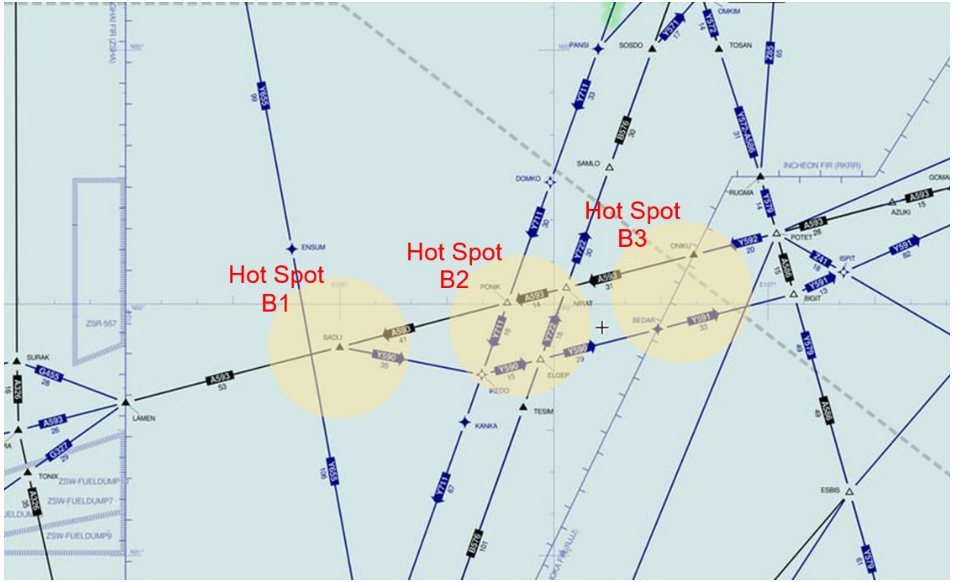
Subdivision of Hot Spot B :
During RASMAG MAWG/11, APAC monitoring agencies agreed to subdivide Hot Spot B into :

- B1 - Incheon (Transfer-of-Control Point between Incheon ACC and Shanghai ACC)
- B2 - Incheon (Intersection points of A593, Y590, Y711, and Y722)
- B3 - Fukuoka/Incheon

Result from the identifying hot spots process :
In 2022 and 2023, only B1 met the criteria in terms of the number of LHDs.

B1 remains on the Hot Spot list, because it still meets the hot spot criteria and should be monitored until further safety improvement initiatives are implemented (such as AIDC and route structure reorganization as suggested by PARMO and ROK).

B2 and B3 are removed from the Hot Spot list, because no LHD has been reported at those areas for more than two years and the reorganization of route structure in Phase I was completed.



Asia : LHD Hot Spot D (Manila and adjacent FIRs)

Nature of Occurrences :
- Coordination errors as a result of human factors issues(Category E)
- Several coordination errors as a result of equipment outage or technical issues (Category F) emerging from AIDC failures.

Contributing Factors :
- Communication and surveillance coverage gaps along the boundaries of Manila FIR
- Verbal exchange of transfer information
- Sectors configuration of Manila ACC
- New ATM system and new infrastructure implementation such as AIDC

Trend : In 2023, the total number of LHDs and the operational risk increased.

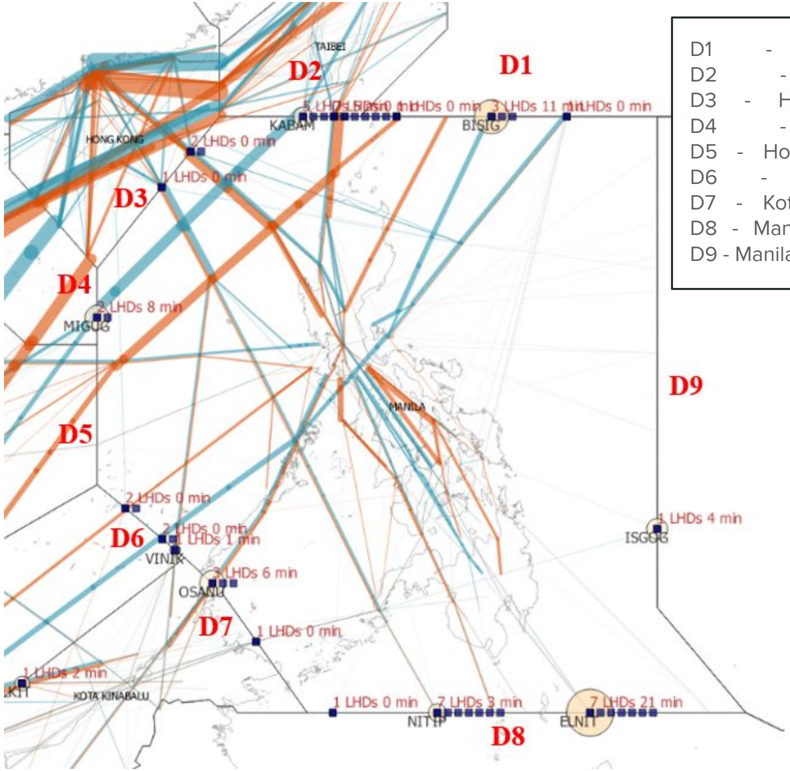
Mitigations :
- Several safety improvement activities such as the new ATM system, ACC sector re-sectorization, enhanced surveillance, and ADS-C/CPDLC have been implemented.

- Manila ACC and Fukuoka ACC have bilateral meetings regularly and agreed to implement a mitigation measure that would contribute to a reduction of transfer error due to human factors.

Boundary	Number of LHDs			Operational Risk (x 10^{-9} FAPFH)		
	2021	2022	2023	2021	2022	2023
Fukuoka/Manila	11	4	4	0.45	0.03	0.19
Ho Chi Minh/Manila	7	3	2	0.77	0.05	0.10
Hong Kong/Manila	2	1	3	0.00	0.00	0.00
Kota Kinabalu/Manila	2	3	5	0.00	0.04	0.13
Manila/Sanya	0	0	0	0.00	0.00	0.00
Manila/Singapore	2	2	4	0.00	0.04	0.00
Manila/Taibei	4	3	12	0.07	0.00	0.06
Manila/Ujung Pandang	7	2	15	0.36	0.11	0.41
Manila/Oakland	2	0	1	0.00	0.00	0.07
Total	**37**	**18**	**46**	**1.65**	**0.27**	**0.96**

Note: The number of LHDs and the operational risk in this table are based solely on the LHDs collected in MAAR's analysis.

Asia : LHD Hot Spot D (Manila and adjacent FIRs)



D1 - Fukuoka/Manila
D2 - Manila/Taibei
D3 - Hong Kong/Manila
D4 - Manila/Sanya
D5 - Ho Chi Minh/Manila
D6 - Manila/Singapore
D7 - Kota Kinabalu/Manila
D8 - Manila/Ujung Pandang
D9 - Manila/Oakland

Subdivision of Hot Spot D :
During RASMAG MAWG/11, APAC monitoring agencies agreed to subdivide Hot Spot D to 9 interfaces (D1 to D9).

Result from the identifying hot spots process :
D1 met the criteria in terms of the operational risk in 2023 (JASMA).
D8 met the criteria in terms of the operational risk in 2023.

The remaining subdivisions did not meet any of the hot spot criteria in the last two years. However, AIDC was successfully implemented at D2, D3, D4, D6, and D9.

Thus, D2, D3, D4, D6, and D9 are removed from the Hot Spot list.

D1, D5, D7, and D8 remain on the Hot Spot list and should be monitored until further safety improvement initiatives such as AIDC are implemented.

Asia : LHD Hot Spot F (Mogadishu/Mumbai)

Nature of Occurrences : Coordination errors as a result of human factors issues (Category E)

Contributing Factors : The Mogadishu-Mumbai FIR boundary (Waypoint: ORLID, Route: G450) is in the oceanic airspace with poor communication and surveillance coverage.

Trend : The number of LHDs slightly increased in 2023. The operational risk conversely decreased to 0 FAPFH.

Mitigations :
- The Space-Based ADS-B enhances surveillance capability of Indian FIRs.
- AIDC implementation between Mumbai and Mogadishu ACC remains in the testing phase.

Boundary	The Number of LHDs		
	2021	2022	2023
Mogadishu-Mumbai	5	9	10

Boundary	The Operational Risk (FAPFH)		
	2021	2022	2023
Mogadishu-Mumbai	0.12×10^{-9}	0.02×10^{-9}	0.00×10^{-9}

Result from the identifying hot spots process :
- Even though this area does not satisfy any hot spot criteria, **Hot Spot F remains on the hot spot list** until further safety improvement initiatives or prevention measures such as AIDC are completed and demonstrate their effectiveness.

Asia : LHD Hot Spot G (Mumbai/Muscat/Sanaa)

Nature of Occurrences : Coordination errors as a result of human factors issues (Category E)

Contributing Factors : Mumbai-Muscat and Mumbai-Sanaa FIR boundaries are oceanic airspace with poor communication and surveillance coverage.

Trend : At Mumbai-Muscat, the number of LHDs and the operational risk significantly increased in 2023. Conversely, at Mumbai-Sanaa, the number of LHDs remained low over the past three years, with the operational risk being zero in both 2022 and 2023.

Mitigations :
- The Space-Based ADS-B enhances surveillance capability of Indian FIRs.
- AIDC implementation between Mumbai ACC and Muscat ACC remains in the testing phase.

Result from the identifying hot spots process :
- Hot Spot G, particularly at Mumbai-Muscat FIR boundary, met the criteria in terms of both the number of LHDs and the operational risk in 2023.
- **Hot Spot G remains on the hot spot list** until further safety improvement initiatives or prevention measures such as AIDC are completed and demonstrate their effectiveness.

Boundary	The Number of LHDs		
	2021	2022	2023
Mumbai-Muscat	44	43	138
Mumbai-Sanaa	4	2	3

Boundary	The Operational Risk (FAPFH)		
	2021	2022	2023
Mumbai-Muscat	1.35×10^{-9}	0.79×10^{-9}	2.79×10^{-9}
Mumbai-Sanaa	0.07×10^{-9}	0.00×10^{-9}	0.00×10^{-9}

Asia : LHD Hot Spot J (Jakarta/Kota Kinabalu/Singapore)

Nature of Occurrences :
Coordination errors as a result of human factors issues (Category E)

Contributing Factors : To be analysed

Trend : The number of LHDs and operational risk significantly increased in 2023. However, the operational risk remained below the TLS.

Mitigations : AAMA is working with SEASMA to share and confirm the information about LHDs on the Jakarta–Singapore FIR boundary. AirNav Indonesia is working towards implementation of AIDC, which could mitigate coordination errors due to human factors issues.

Result from the identifying hot spots process :
This boundary satisfied the hot spot criteria in terms of the number of LHDs from 2021 to 2023. Therefore, **Hot Spot J remains on the hot spot list**.

Boundary	The Number of LHDs		
	2021	2022	2023
Jakarta – Singapore	16	14	27

Boundary	The Operational Risk (FAPFH)		
	2021	2022	2023
Jakarta – Singapore	0.23×10^{-9}	0.18×10^{-9}	0.33×10^{-9}

Asia : LHD Hot Spot M (Colombo/Melbourne)

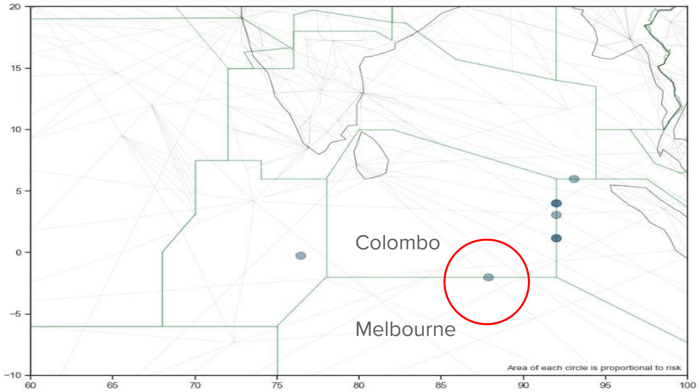
Nature of Occurrences : Category A, B, and E LHDs.

Contributing Factors : A large number were pilot errors involving the Indian Navy.

Trend : Since 2019, the number of LHDs at Hot Spot M has been decreasing, so RASMAG/26 proposed to re-classify as a non-Hot Spot. However, AAMA and MAAR still do not have a suitable contact for the Indian Navy.

Mitigations : In 2020, the re-sectorisation was implemented at Colombo oceanic airspace. The awareness and training on this issue were also provided to ATCOs in both Colombo and Melbourne OCCs.

For this reason, **Hot Spot M is removed from the Hot Spot list.**



Asia : LHD Hot Spot O
(Bangkok/Ho Chi Minh/Kuala Lumpur/Singapore)

Nature of Occurrences : Coordination errors as a result of human factors issues (Category E).

Contributing Factors : The route structure and ATC procedures of handling crossing traffic over this area can be complex due to the different Transfer of Control and Communication Points and the involvement of multiple ATS units.

Trend : The operational risk and the number of LHDs slightly decreased in 2023. However, the proportion of operational risk, at 28%, remains high compared to the total operational risk in SEA airspace.

Result from the identifying hot spots process : This area satisfied the hot spot criteria in terms of the operational risk in 2022 and 2023. Therefore, **Hot Spot O remains on the hot spot list**.

Boundary	The Number of LHDs		
	2021	2022	2023
Hot Spot O	5	7	5

Boundary	The Operational Risk (FAPFH)		
	2021	2022	2023
Hot Spot O	0.14×10^{-9}	0.58×10^{-9}	0.51×10^{-9}

Reporting Rate
of LHDs/LLDs/LLEs

2023 Reporting Rate of LHDs/LLDs/LLEs

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	-	0	-	0	-	0	-	0	-
Mongolia	83,708	0	-	0	-	0	-	0	-
SEA	2,969,413	6	1: 494,902	92	1: 32,276	3	1: 98,804	101	1: 29,400
Japan	1,688,572	12	1: 140,714	16	1: 105,536	44	1: 38,377	72	1: 23,452
SW Pacific	1,182,067	33	1: 35,820	28	1: 42,217	4	1: 295,517	65	1: 18,186
China	2,346,976	9	1: 260,775	19	1: 123,525	195	1: 12,036	223	1: 10,525
SA/IO	2,642,401	1	1: 2,642,41	256	1: 10,322	1	1: 2,642,401	258	1: 10,242
Pacific	1,773,499	37	1: 47,932	160	1: 11,084	6	1: 295,583	203	1: 8,736
Indonesia	762,410	13	1: 58,647	111	1: 6,869	1	1: 762,410	125	1: 6,099
ROK and AKARA	166,500	0	-	75	1: 2,220	0	-	75	1: 2,220
Total	13,615,545	111	1: 122,663	757	1: 17,986	254	1: 53,605	1,122	1: 12,135

Notes:

- No aircraft flying in the RVSM airspace of DPRK due to public health crisis in 2023. As a result, there were no flying hours and no reported LHDs, LLDs, or LLEs for DPRK.

Reporting Rate of LHDs/LLDs/LLEs

Airspace	# Reports							1 Report : Flying Hrs						
	2017	2018	2019	2020	2021	2022	2023	2017	2018	2019	2020	2021	2022	2023
DPRK	0	0	0	0	0	0	0	-	-	-	-	-	-	-
Mongolia	4	1	2	0	1	0	0	1: 37,771	1: 158,891	1: 82,138	-	1: 121,621	-	-
SEA	474	205	152	42	70	62	95	1: 6,548	1: 17,757	1: 22,275	1: 25,106	1: 15,456	1:32,620	1:29,400
Japan	71	76	77	66	80	75	67	1: 21,510	1: 20,632	1: 20,762	1: 14,737	1: 13,528	1:18,751	1:23,452
SW Pacific	51	53	101	46	47	81	65	1: 17,572	1: 17,817	1: 9,335	1: 6,954	1: 11,975	1:5,352	1:18,186
China	134	110	79	85	105	72	223	1: 18,248	1: 22,229	1: 31,119	1: 26,867	1: 15,477	1:18,003	1:10,525
SA/IO	935	681	439	152	135	143	254	1: 3,166	1: 3,783	1: 7,955	1: 7,907	1: 11,167	1:21,018	1:10,242
Pacific	42	43	173	134	176	179	193	1: 54,191	1: 45,064	1: 10,139	1: 6,404	1: 6,638	1:8,280	1:8,736
Indonesia	34	23	37	18	41	54	125	1: 10,842	1: 53,603	1: 33,321	1: 17,346	1: 7,402	1:8,060	1:6,099
ROK and AKARA	5	12	34	5	24	108	75	1: 117,090	1: 28,365	1: 18,959	1: 25,965	1: 6,285	1:1,056	1:2,220
Total	**1,750**	**1,204**	**1,094**	**548**	**679**	**774**	**1,122**	**1: 8,180**	**1: 12,332**	**1: 14,330**	**1: 13,202**	**1: 11,200**	**1:13,230**	**1:12,135**

The reporting rate for SEA, China, SA/IO and Indonesia improved in 2023.
The reporting rate for SW Pacific dropped because of the huge increase in the estimated flying hours.

Notes:

- The flying hours for Indonesian airspace in 2021 was calculated based on the 2020 TSD.
- The flying hours for SW Pacific and Indonesian airspace in 2022 were calculated based on the 2021 TSD.

Conclusion

RVSM TLS Compliance - Vertical

- **The 2023 PAC vertical overall risk is 10.77 x 10^{-9} FAPFH, above the TLS,** mostly driven by Hot Spot N (Hawaii CEP/Oakland USA). To address this hot spot, the responsible units have already implemented mitigation procedures while planning for an ATM system upgrade to begin in 2025 to resolve the issue.
- **The 2023 ASIA vertical overall risk is 3.40 x 10^{-9} FAPFH, below the TLS.**

RVSM TLS Compliance - Horizontal

- **All horizontal risk estimates in 2023 are below the TLS.**

RASMAG's Hot Spot List

Hot Spot	Involved FIRs	Identified	Remarks
A1	Chennai/Dhaka/Kolkata/Yangon	2015	Cat. E LHDs and risk reducing.
A2	Chennai/Kuala Lumpur	2015	Cat. E LHDs reducing. Risk slightly increasing. Removed from the Hot Spot list in 2024 (RASMAG/29).
B1	Incheon (Transfer-of-Control Point between Incheon ACC and Shanghai ACC)	2015	Cat. E LHDs and risk reducing.
B2	Incheon (Intersection points of A593, Y590, Y711, and Y722)	2015	Removed from the Hot Spot list in 2024 (RASMAG/29).
B3	Fukuoka/Incheon	2015	Removed from the Hot Spot list in 2024 (RASMAG/29).
D1	Fukuoka/Manila	2015	Cat. E LHDs reducing. Risk slightly increasing.
D2	Manila/Taibei	2015	Removed from the Hot Spot list in 2024 (RASMAG/29).
D3	Hong Kong/Manila	2015	Removed from the Hot Spot list in 2024 (RASMAG/29).
D4	Manila/Sanya	2015	Removed from the Hot Spot list in 2024 (RASMAG/29).
D5	Ho Chi Minh/Manila	2015	Cat. E LHDs reducing. Risk slightly increasing.
D6	Manila/Singapore	2015	Removed from the Hot Spot list in 2024 (RASMAG/29).

RASMAG's Hot Spot List

Hot Spot	Involved FIRs	Identified	Remarks
D7	Kota Kinabalu/Manila	2015	Cat. E LHDs and risk slightly increasing.
D8	Manila/Ujung Pandang	2015	Cat. E & F LHDs and risk increasing.
D9	Manila/Oakland	2015	Removed from the Hot Spot list in 2024 (RASMAG/29).
F	Mogadishu/Mumbai	2015	Cat. E LHDs slightly increasing. Risk reducing.
G	Mumbai/Muscat/Sanaa	2015	Cat. E LHDs and risk increasing.
J	Jakarta/Kota Kinabalu/Singapore	2018	Cat. E LHDs and risk increasing.
M	Colombo/Melbourne	2019	Removed from the Hot Spot list in 2024 (RASMAG/29).
N	Hawaii CEP/Oakland USA	2019	Cat. E LHDs and Risk reducing.
O	Bangkok/Ho Chi Minh/Kuala Lumpur/ Singapore	2023	Cat. E LHDs and Risk reducing.

Reporting Rate of LHDs/LLDs/LLEs

- The estimated flying hours significantly increased from

  7,604,927 hours in 2021 and
  10,240,138 hours in 2022 to
  13,615,545 hours in 2023.

- The overall reporting rate of LHDs/LLDs/LLEs slightly improved from

  1 report per 13,230 hours in 2022 to
  1 report per 12,135 hours in 2023.

- The reporting rate for SEA, China, SA/IO and Indonesia improved in 2023.
- The reporting rate for SW Pacific dropped because of the huge increase in the estimated flying hours.
- The reporting rate for DPRK could not be calculated because there were no flying hours and no reported LHDs, LLDs, or LLEs due to a public health crisis (no aircraft flying in DPRK's RVSM airspace in 2023.)
- The reporting rate for Mongolia could not be calculated because no LHDs, LLDs, or LLEs were reported. Mongolia submitted NIL reports for all months in 2023.

Thank You

APANPIRG Asia/Pacific Airspace Safety Monitoring

RASMAG LIST OF COMPETENT AIRSPACE SAFETY MONITORING ORGANISATIONS

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

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

DISCLAIMER: The presentation of material in this report does not imply the expression of any opinion whatsoever on the part of ICAO, APANPIRG or the ATM Sub-Group of APANPIRG concerning the legal status of any country, territory, city or area of its authorities, or concerning the delimitation of its frontiers or boundaries.

(Last updated 21 August 2024)

Organisation ***(including contact officer)***	**State**	**Competency**	**Status**	**Airspace assessed (FIRs)**
Australian Airspace Monitoring Agency (AAMA) - Airservices https://www.airservicesaustralia.com/about-us/our-services/aama/	Australia	RMA	Current	Brisbane, Honiara, Jakarta, Melbourne, Nauru, Port Moresby and Ujung Pandang (including Timor-Leste) FIRs

Organisation *(including contact officer)*	State	Competency	Status	Airspace assessed (FIRs)
~~Dr. Amelia Gontar, Risk Intelligence Specialist~~ ~~Safety and Risk~~ ~~Airservices Australia~~ ~~Email: amelia.gontar@airservicesaustralia.com; or~~ ~~aama@airservicesaustralia.com;~~ Dr. Steven Barry, Risk Intelligence Lead steve.barry@AirservicesAustralia.com Dr Shea Houlihan, Risk Intelligence Specialist, Shea.Houlihan@AirservicesAustralia.com Risk Intelligence Airservices Australia Email: aama@airservicesaustralia.com;		EMA	Current	Brisbane, Melbourne, Honiara, Nauru, and Port Moresby FIRs
China RMA - **Air Traffic Management Bureau, (ATMB) of Civil Aviation Administration of China (CAAC)** http://www.chinarma.cn Mr. Yongyue Chen (Monsoon), Coordinator of China RMA, ADCC, ATMB of CAAC Email: rmachina@rmachina.cn;	China	RMA & EMA	Current	RMA for: Beijing, Guangzhou, Kunming, Lanzhou, Pyongyang, Sanya, Shanghai, Shenyang, Urumqi, and Wuhan FIRs. EMA for: Lanzhou and Urumqi FIRs
India Bay of Bengal Arabian Sea Indian Ocean Safety Monitoring Agency (BOBASMA)	India	EMA	Current	Chennai, Colombo, Delhi, Dhaka, Kabul, Karachi,

Organisation *(including contact officer)*	State	Competency	Status	Airspace assessed (FIRs)
http://www.aai.aero/public_notices/aaisite_test/bobasma_index.jsp Mr. A. P. Udayanarayanan Joint General Manager (ATM) Phone No:+ 91 44 22561253 Fax No: +91 44 22561740 Email: bobasmachennai@gmail.com; bobasma@aai.aero;				Kolkata, Lahore, Male, Mumbai, Yangon,
Japan Airspace Safety Monitoring Agency (JASMA) - Japan Civil Aviation Bureau (JCAB) https://www.jasma.jp Mr. Eijiro SUNOUCHI, Special Assistant to the Director, Flight Procedures and Airspace Program Office, Japan Civil Aviation Bureau, Email : sunouchi-e24qz@mlit.go.jp; hqt-JASMA@gxb.mlit.go.jp; jasma-hq@jasma.jp;	Japan	RMA and EMA	Current	Fukuoka FIR
Central Reporting Agency Japan (CRA Japan) Mr. Hajime AOTO, Special Assistant to the Director, Air Navigation Services Planning Division, Civil Aviation Bureau, MLIT Email: aoto-h074i@mlit.go.jp;		CRA	Current	Fukuoka FIR
Monitoring Agency for the Asia Region (MAAR) **Aeronautical Radio of Thailand LTD** (AEROTHAI) http://www.aerothai.co.th/maar Miss Saifon Obromsook	Thailand	RMA	Current	Bangkok, Kolkata, Chennai, Colombo, Delhi, Dhaka, Hanoi, Ho Chi Minh, Hong Kong, Kabul, Karachi, Kathmandu, Kota Kinabalu, Kuala Lumpur, Lahore, Male,

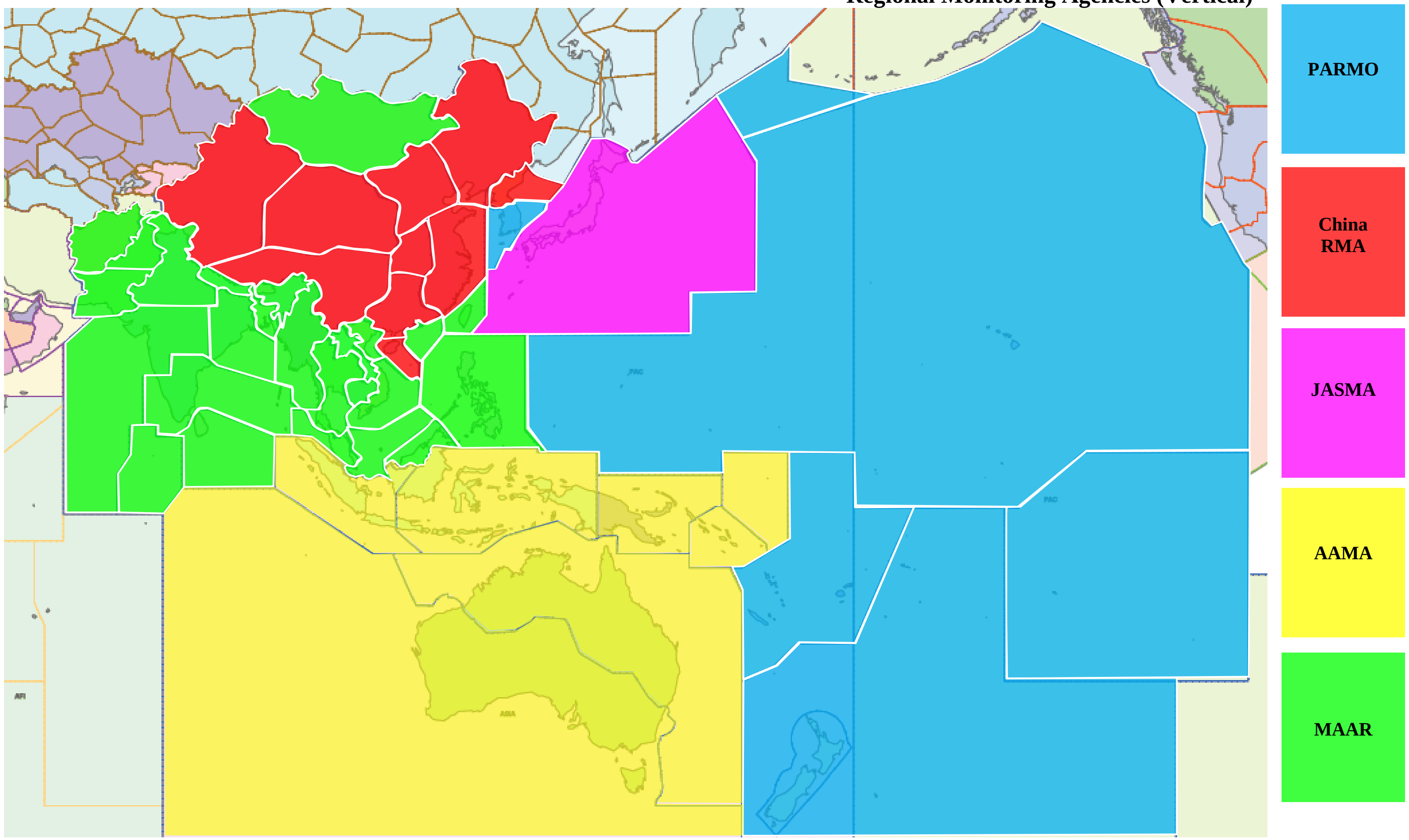
Organisation ***(including contact officer)***	**State**	**Competency**	**Status**	**Airspace assessed (FIRs)**
Director, Safety Management Department & MAAR AEROTHAI Email: maar@aerothai.co.th;				Manila, Mumbai, Phnom Penh, Singapore, Taibei, Ulaan Bataar, Vientiane, Yangon FIRs
Pacific Approvals Registry and Monitoring Organization (PARMO) – Federal Aviation Administration (US FAA) http://www.faa.gov/air_traffic/separation_standards/parmo/ Christine Falk Federal Aviation Administration Separation Standards Analysis Branch Safety Analysis Subject Matter Expert Email: parmo@faa.gov;	USA	RMA and EMA	Current	RMA for Anchorage Oceanic, Auckland Oceanic, Incheon, Nadi, Oakland Oceanic, Tahiti FIRs EMA for Anchorage Oceanic, Auckland Oceanic, Nadi, Oakland Oceanic, Tahiti FIRs
South East Asia Safety Monitoring Agency (SEASMA) - Civil Aviation Authority of Singapore (CAAS) Mr. Goh Wen Pei, Air Traffic Control Manager (ANS Safety & Security), Air Navigation Services Group, Email: goh_wen_pei@caas.gov.sg; https://www.caas.gov.sg/operations-safety/airspace/south-east-asia-safety-monitoring-agency	Singapore	EMA and CRA	Current	EMA for Hong Kong, Ho Chi Minh, Kota Kinabalu, Kuala Lumpur, Manila, Jakarta, Sanya, Singapore and Ujung Pandang FIRs CRA for Singapore, Viet Nam and Philippines
FIT-ASIA ICAO Asia and Pacific Regional Office Email: apac@icao.int; htakata@icao.int;	FIT-Asia States	FIT	Current	FIRs in the Asian Region not covered by IPACG/FIT and ISPACG/FIT

Organisation ***(including contact officer)***	**State**	**Competency**	**Status**	**Airspace assessed (FIRs)**
Mr. Hong Yang Chair, FIT-Asia Email: hongyang@adcc.com.cn; Mr. Michael Matyas Boeing Engineering Email: michael.matyas@boeing.com; Mr Rami Ayari Boeing Engineering Email: rami.ayari@boeing.com	Boeing USA	CRA	Current	FIRs in the Asian Region not covered by IPACG/FIT, ISPACG/FIT, JASMA or SEASMA
IPACG/FIT Mr. Hajime AOTO IPACG/FIT Co-Chair (JCAB) Email : aoto-h074i@mlit.go.jp; Mr. John Roman FAA IPACG/FIT Co-Chair (FAA) Email: john.roman@faa.gov; Mr. Michael Matyas, Boeing Engineering IPACG CRA Email: michael.matyas@boeing.com;	Japan and USA Boeing USA	FIT CRA	Current	North & Central Pacific (Oceanic airspace within Fukuoka FIR, and Anchorage & Oakland FIRs) Oakland Oceanic, Anchorage Continental, and Anchorage Oceanic FIRs.

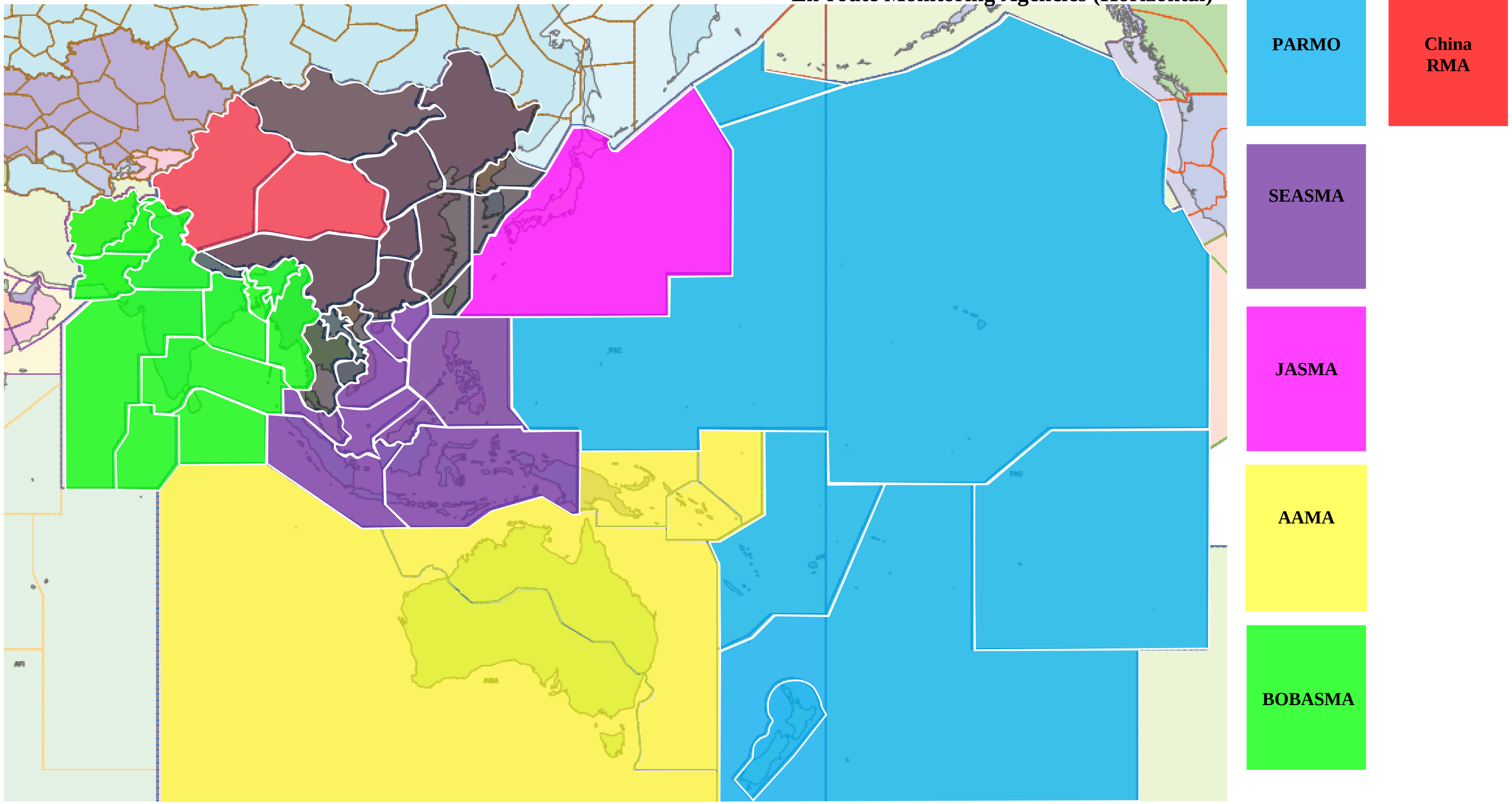
Organisation ***(including contact officer)***	**State**	**Competency**	**Status**	**Airspace assessed (FIRs)**
Mr Noah Inahara Boeing Engineering IPACG CRA Email: noah.inahara@boeing.com;				
ISPACG/FIT Mr. Todd Kendall Airways New Zealand ISPACG Co-Chair Email: Todd.Kendall@airways.co.nz; Mr. Ahmad Usmani FAA ISPACG Co-Chair Email: ahmad.usmani@faa.gov; Ms. Lisa Bee, Inmarsat Aviation ISPACG/FIT Chair Email: Lisa.Bee@inmarsat.com; Mr. Michael Matyas, Boeing Engineering ISPACG CRA Email: michael.matyas@boeing.com; Mr Christopher Jirucha Boeing Engineering ISPACG CRA	ISPACG States Inmarsat Boeing USA	FIT&CRA FIT CRA	Current	South Pacific FIRs and members of the Informal South Pacific ATS Coordination Group (ISPACG)

Organisation ***(including contact officer)***	**State**	**Competency**	**Status**	**Airspace assessed (FIRs)**
Email: christopher.j.jirucha@boeing.com;				

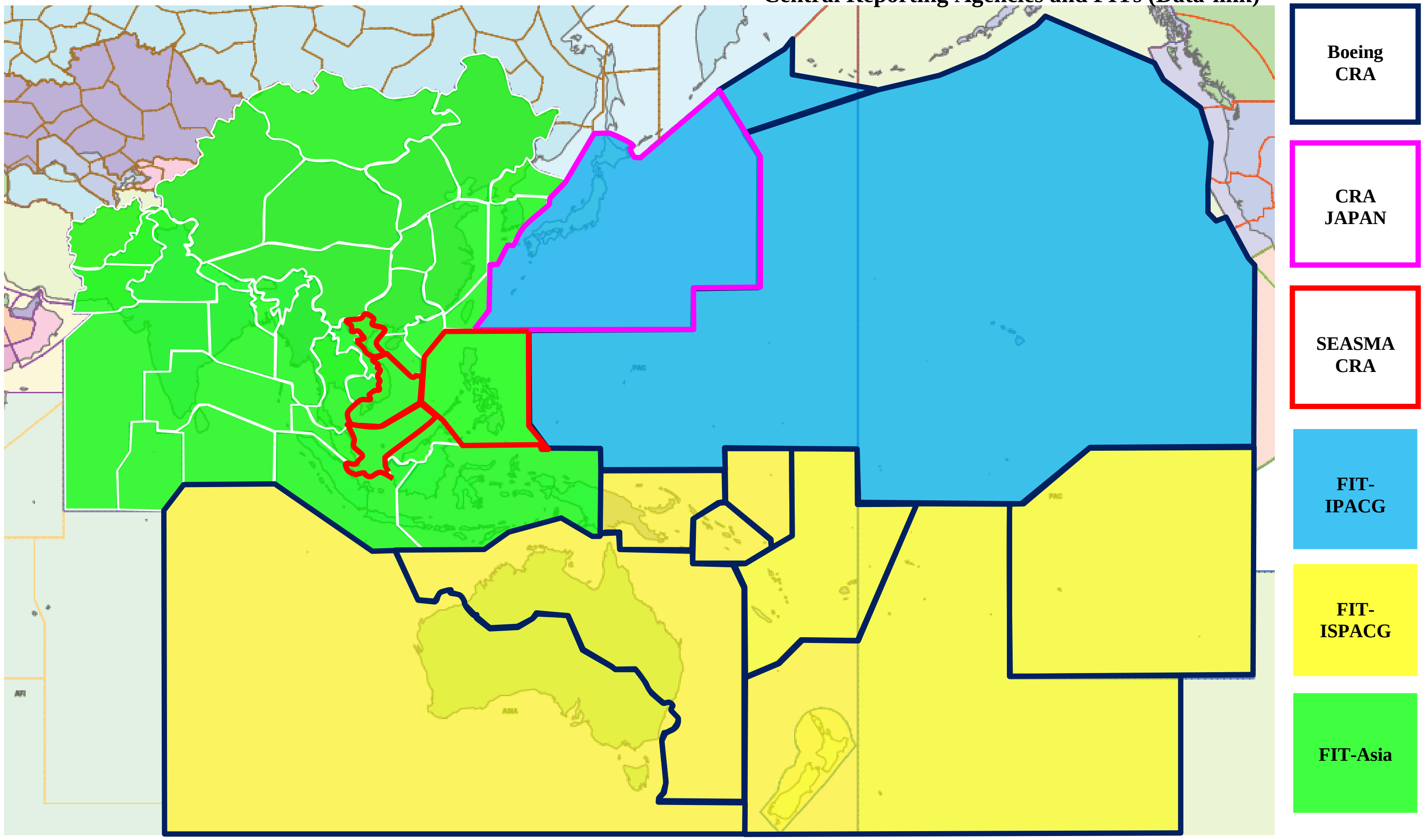
Regional Monitoring Agencies (Vertical)



En-route Monitoring Agencies (Horizontal)



Central Reporting Agencies and FITs (Data-link)



ATM and Airspace Safety Deficiencies List (Updated 21 August 2024)

	Deficiencies			**Corrective Action**		
States/facilities	**Description**	**Date first reported**	**Remarks**	**Executing body**	**Target date**	**Priority ****
	Non Provision of Safety-related Data Requirement of Paragraph 3.3.5.1 of Annex 11 (provision of data for monitoring the height-keeping performance of aircraft) and APANPIRG Conclusion 16/6 – Non Provision of safety related data by States					
Afghanistan	Non-provision of safety related data	12/07/2019	Failure to submit Kabul LHD data for January-December 2018 and 2020. Afghanistan had submitted data for the period January to July 2021, but no further LHD reports were received after August 2021.	Afghanistan	~~RASMAG/27~~ TBD	U
French Polynesia	Non-provision of safety related data	RASMAG/ 29	Failure to submit Tahiti LHD data for January-December 2023	French Polynesia	RASMAG/30	U
	State Responsibility to comply with the Annex 6 Height-Keeping Monitoring Requirement Annex 6 Part I Section 7.2.9 (10th Ed.) and Part II Section 2.5.2.10 (9th Ed.)					
Afghanistan	Non-compliance with LTHM requirement (remaining monitoring burden more than 30%)	RASMAG/ 23	Remaining monitoring burden of 50% (RASMAG/29) MAAR informed ICAO that all known airframes in Afghanistan have complied with the monitoring requirement (November 2022). Deficiency retained due to the unknown status of the Afghanistan aeronautical authority responsible for	Afghanistan	~~RASMAG24~~ TBD	A

	Deficiencies			Corrective Action		
States/facilities	**Description**	**Date first reported**	**Remarks**	**Executing body**	**Target date**	**Priority ****
			ensuring monitoring is conducted.			
~~Mongolia~~	~~Non-compliance with LTHM requirement (remaining monitoring burden more than 30%)~~	~~RASMAG/ 28~~	~~Remaining monitoring burden of 43% (RASMAG/28)~~	~~Mongolia~~	~~TBD~~	~~A~~
Nepal	Non-compliance with LTHM requirement (remaining monitoring burden more than 30%)	RASMAG/ 28	Remaining monitoring burden of 45% (RASMAG/29)	Nepal	TBD	A
~~New Zealand~~	~~Non-compliance with LTHM requirement (remaining monitoring burden more than 30%)~~	~~RASMAG/ 28~~	~~Remaining monitoring burden of 36% (RASMAG/28)~~	~~New Zealand~~	~~TBD~~	~~A~~
~~Pakistan~~	~~Non-compliance with LTHM requirement (remaining monitoring burden more than 30%)~~	~~RASMAG/ 22~~	~~Remaining monitoring burden of 45% (RASMAG/28)~~	~~Pakistan~~	~~RASMAG24~~	~~A~~
~~Papua New Guinea~~	~~Non-compliance with LTHM requirement (remaining monitoring burden more than 30%)~~	~~RASMAG/ 28~~	~~Remaining monitoring burden of 69% (RASMAG/28)~~	~~Papua New Guinea~~	~~TBD~~	~~A~~
~~Solomon Islands~~	~~Non-compliance with LTHM requirement (remaining monitoring burden more than 30%)~~	~~RASMAG/ 28~~	~~Remaining monitoring burden of 50% (RASMAG/28)~~	~~Solomon Islands~~	~~TBD~~	~~A~~
India	Non-compliance with LTHM requirement (remaining monitoring burden more than 30%)	RASMAG/ 29	Remaining monitoring burden of 48% (RASMAG/29)	India	TBD	A
Philippines	Non-compliance with LTHM requirement (remaining monitoring burden more than 30%)	RASMAG/ 29	Remaining monitoring burden of 40% (RASMAG/29)	Philippines	TBD	A
	Data Link Performance Monitoring and Analysis Requirements of Paragraph 2.28 and/or 3.3.5.2 of Annex 11 not met					

	Deficiencies			Corrective Action		
States/facilities	**Description**	**Date first reported**	**Remarks**	**Executing body**	**Target date**	**Priority ****
India	Post-implementation monitoring not implemented	13/07/2017	Performance monitoring and analysis was reported for the Chennai and Kolkata FIRs, but was not reported for the Mumbai FIR. (FIT-Asia/14): Insufficient data/evidence to discuss the deficiency	India	TBD	A
~~Maldives~~	~~Post-implementation monitoring not implemented~~	~~29/5/2015~~	~~Problem Reports not provided to CRA. Performance monitoring and analysis not reported to FIT.~~ (FIT-Asia/14): Disabled the ADS-C function from the ATM system due to an application issue, and CPDLC/HF is used beyond VHF coverage.	~~Maldives~~	~~TBD~~	~~A~~

** Note: In accordance with the *APANPIRG Handbook - Asia/Pacific Supplement to the Uniform Methodology for the Identification, Assessment and Reporting of Air Navigation Deficiencies*, priority for Air Navigation Deficiencies is guided by the principle that a deficiency with respect to an ICAO Standard is accorded a “U” status, while a non-compliance with a Recommended Practice or a PANS is considered as “A” or “B” subject to additional expert evaluation. The final prioritization of deficiencies is the prerogative of APANPIRG.

RASMAG — TASK LIST

(last updated 24 August 2023)

ACTION ITEM	DESCRIPTION	TIME FRAME	RESPONSIBLE PARTY	STATUS	REMARKS
25/2	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 (RASMAG/25/WP04).	~~ATM/SG/9~~ ~~RASMAG/28~~ RASMAG/29	ICAO	Open	RASMAG/26 update ATM/SG/8 was informed of RASMAG/25 advice. Draft Conclusion RASMAG/26-3 to also be discussed and endorsed at ATM/SG/9 RASMAG/27 Update para 5.27 ref paper to Assembly. RASMAG/28 WP/32 Continue to monitor
26/1	Noting that there were cases where some States were using a process other than direct operational approvals to enable aircraft operators to file PBCS indicators in flight plans, ICAO undertook to study how information on such State regulatory processes could be obtained	~~RASMAG/27~~ ~~RASMAG/28~~ RASMAG/29	ICAO, States?	~~Open~~ Completed	RASMAG/26 Report para. 2.8 RASMAG/28 report para X.X – RASMAG/28 agreed to conduct a survey. RASMAG29/ WP/23
26/5	The Chair informed the meeting that the process of identification and monitoring of LHD hot spots had been developed informally over several years to facilitate the focus of RASMAG on areas requiring specific attention. The MAWG was invited to consider drafting a formalized process for this purpose, for consideration by RASMAG	~~RASMAG/27~~ ~~RASMAG/28~~ RASMAG/29	MAAR	~~Open~~ Completed	RASMAG/26 Report para 3.116 RASMAG/27 WP/7 RASMAG/27 Update: Hot Spot methodology trial to be validated at RASMAG/28. RASMAG/28 WP/19 the hot spot identification method is still in trial basis. RASMAG/29 report para 2.25

ACTION ITEM	DESCRIPTION	TIME FRAME	RESPONSIBLE PARTY	STATUS	REMARKS
27/1	Draw the attention of ATM/SG and APANPIRG to issues related to PBCS non-compliance reporting (lack of reports, gaps in data, delayed reporting, lack of POCs, poor participation in RMA measures on PBCS, reporting processes and tracking of non-compliant aircraft	ATM/SG/10 APANPIRG/33	Secretariat	~~Open~~ Completed	RASMAG/27 report para 2.26 APANPIRG/33 WP/11 & RASMAG/28 WP/21 Meeting agreed to **Conclusion RASMAG/28-X**
27/2	Explore the development of Regional Guidance for PBCS non-compliance reporting (including Nil Occurrence reports) and handling processes	FIT-Asia/13	Secretariat Others?	~~Open~~ Completed	RASMAG/27 report para 2.28 RASMAG/28 WP/21 Meeting agreed to **Conclusion RASMAG/28-X**
27/3	Provide update on AKARA airspace improvement project planning, if any.	ATM/SG/10	China Japan Republic of Korea	~~Open~~ Completed	RASMAG/27 report para 3.6 ATM/SG/10
27/4	ICAO APAC Office to coordinate with ICAO HQ on AKARA airspace improvement project Phase 2	30 September 2022	Secretariat	~~Open~~ Completed	RASMAG/27 report para 3.9 RASMAG/29 report Para 3.XX
27/5	ICAO APAC Regional Office to write to DGCA India seeking contact details for Indian Navy (Hot Spot M mitigations)	30 September 2022	Secretariat	~~Open~~ Completed	RASMAG/27 report para 3.33 Action items and 25/2 and 26/4 refer. ICAO formal letter sent on 8 Feb 2023 and 16 Aug 2023.
27/6	2022 APAC Consolidated Safety Report to be provided to APANPIRG/33 and ANC	~~APANPIRG/33~~ APANPIRG/34	Secretariat	~~Open~~ Completed	RASMAG/27 report para 3.128 APANPIRG/33 WP/11 Appendix A APANPIRG/34 WP/11 Attachment A
27/7	Provide feedback to MAAR on the LHD Material Package, including LHD points of contact, for all APAC Administrations.	30 September 2022	All Administrations and Monitoring Agencies	Open Closed	RASMAG/27 WP/24 and report para 4.3
27/8	Inform Brunei Darussalam of RASMAG/27 recommended ATM and Airspace Deficiency	30 September 2022	Secretariat	~~Open~~ Completed	RASMAG/27 WP/29 and report para 5.19 ICAO letter sent on 29 Aug 2022

ACTION ITEM	DESCRIPTION	TIME FRAME	RESPONSIBLE PARTY	STATUS	REMARKS
27/9	Inform Lao PDR and Mongolia of ATM and Airspace Deficiency to be proposed at RASMAG/28	30 September 2022	Secretariat	~~Open~~ Completed	RASMAG/27 WP/29 and report para 5.19 ICAO letter sent on 29 Aug 2022
27/10	Present survey findings on removal of 1,000 flight hour portion of Annex 6 RVSM monitoring requirement to RMACG	RMACG/17 (Part II)	MAAR	~~Open~~ Completed	RASMAG/27 WP/33 and report para 5.38 RMACG/17
27/11	Present survey findings on continuance of 'W' check of State aircraft	RMACG/17 (Part II)	MAAR	~~Open~~ Completed	RASMAG/27 WP/31 and report para 5.26 RMACG/17
28/1	Review and develop Draft of new version of *Guidance Material for End-to-End Safety and Performance Monitoring of ATS Data Link Systems in the APAC Region* in cooperation with CNS subject matter experts. Include region-specific matters from Appendix B to the GOLD Manual (to be removed from the manual in 2020)	RASMAG/29	Secretariat USA, New Zealand	~~Open~~ Completed	RASMAG/28 WP/2 task transferred from FIT/Asia FIT-Asia/14 WP/05 and RASMAG/29 WP/17
28/2	Discuss the definition of Sub categories of CAT. E LHDs to facilitate effective analysis at the next MAWG meeting	~~MAWG/11~~ MAWG/12	Monitoring Agencies	Open	RASMAG/28 report para 3.14
28/3	Review the data sharing procedure of additional data to support non-compliance reports	FIT/Asia/14	China RMA	Open	RASMAG/28 report para 4.7

ACTION ITEM	DESCRIPTION	TIME FRAME	RESPONSIBLE PARTY	STATUS	REMARKS
~~28/4~~	~~States/Administrations to inform monitoring agencies of their implementation plans for lateral separation minima such as 23 NM lateral separation minima and ASEPS~~	~~Ongoing~~	~~All~~	~~Open~~ Completed	RASMAG/28 report para 5.58 Tracked as part of Annual PBCS implementation Survey to ICAO (refer to new task 29/3)
29/1	Discuss a process of identification and de-identification of reports meant for sharing with stakeholders other than monitoring agencies	MAWG/12	Monitoring Agencies	Open	RASMAG/29 report para
29/2	Consider the use of the options proposed in RASMAG/29 report or other means to assist with the timely exchange of LHD reports	RASMAG/30	China and Republic of Korea	Open	RASMAG/29 report para
29/3	States to complete annual PBCS implementation Survey	28th February annually	All States	Open	Tracked as part of Annual PBCS implementation Survey to ICAO
29/4	ICAO to notify Bangladesh and Nepal of failure to submit the annual RVSM approval snapshot this year, which may result in an inclusion in the APANPIRG List of Deficiencies in the ATM and Airspace Safety fields next year	30 September 2024	ICAO	Open	RASMAG/29 report para 5.16
29/5	Produce the draft of the next RASMAG safety Bulletin	MAWG/12	JASMA	Open	RASMAG/29 report para

— END —