INTERNATIONAL CIVIL AVIATION ORGANIZATION

[DRAFT]

REPORT OF THE THIRTY-FIRST MEETING OF THE REGIONAL AIRSPACE SAFETY MONITORING ADVISORY GROUP (RASMAG/31)

BANGKOK, THAILAND, 29 JUNE – 3 JULY 2026

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

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

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APPENDICES TO THE REPORT

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INTRODUCTION

Meeting

1.1 The Thirty-First Meeting of the Regional Airspace Safety Monitoring Advisory Group (RASMAG/31) was held from 29 June to 3 July 2026, at the Kotaite Wing of the ICAO Asia and Pacific (APAC) Office in Bangkok, Thailand.

1.2 An Airspace Safety Seminar was conducted in conjunction with the RASMAG/31 on 29 June 2026.

Attendance

2.1 The Meeting was attended by 52 in-person and eight online participants from 18 States, one Special Administrative Region of China, and one International Organization including Australia, Cambodia, China, Hong Kong China, Fiji, India, Japan, Lao PDR, Malaysia, Mongolia, New Zealand, Pakistan, Papua New Guinea, Philippines, Republic of Korea, Singapore, Sri Lanka, Thailand, United States and ICAO.

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

Officers and Secretariat

3.1 Ms. Saifon Obromsook, Director of Safety Management Department, AEROTHAI, presided over the RASMAG/31, as Chairperson.

3.2 Mr. Mior Adli Bin Mior Sallehhuddin, Regional Officer Air Traffic Management (ATM) was the Secretary for the Meeting. He was supported by Mr. Hiroyuki Takata, Regional Officer ATM and Dr. Trish Prakayphet Chalayonnawin, Programme Analysis Associate ATM.

Language and Documentation

4.1 The RASMAG met as a plenary throughout the Meeting. The working language of the meeting was English for all documentation and this Report. A total of 34 Working Papers (WPs), five Information Papers (IPs), eight presentations, and one Flimsy considered by the Meeting.

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

4.2 The list of working and information papers is at **Appendix B** to the Report.

4.3 **DISCLAIMER**: The presentation of material in this report does not imply the expression of any opinion whatsoever on the part of ICAO, Asia/Pacific Air Navigation Planning and Implementation Regional Group (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.

Opening of the Meeting

Chairperson of APSAR/WG

5.1 Ms. Saifon Obromsook welcomed participants to the Meeting.

ICAO APAC Office

5.2 On behalf of Mr. Tao Ma, Regional Director of ICAO APAC Office, Mr. Mior Adli Bin Mior Sallehhuddin welcomed all participants to the Meeting.

Draft Conclusions, Conclusions, Draft Decisions and Decisions of RASMAG – Definition

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

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

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

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

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

List of Draft Conclusions, Conclusions, Draft Decisions and Decisions

7.1 List of Draft Conclusions

<table>
<tr><td colspan="3">Draft Conclusion RASMAG/31-3: Transfer of RVSM Safety Assessment and Monitoring Responsibilities of Hong Kong, China and Macao, China from MAAR to China RMA</td></tr>
<tr><td colspan="2">What: That,
1. effective from 1 January 2027, the competent airspace safety monitoring organizations for safety assessment and monitoring in the vertical plane [i.e. Reduced Vertical Separation Minimum (RVSM)] for Hong Kong, China and Macao, China be transferred to China RMA; and
2. the revised Asia/Pacific Flight Information Regions and Responsible Monitoring Agency at Appendix F to the Report be uploaded to the ICAO APAC 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 further streamline the RVSM safety assessment and monitoring structure in China and thereby improving the overall efficiency and consistency of RVSM operations across the airspace system.</td><td colspan="2">Follow-up: ☒Required from States</td></tr>
<tr><td>When: 25-Nov-26</td><td colspan="2">Status: Draft to be adopted by PIRG</td></tr>
<tr><td colspan="3">Who: ☒Sub groups ☒APAC States ☒ICAO APAC RO ☐ICAO HQ ☒Other: Aircraft Operators and RMAs</td></tr>
</table>

7.2 List of Conclusions

<table>
<tr><td colspan="3">Conclusion RASMAG/31-1: Establishment of RASMAG Conclusions/Decisions Tracking List on Monitoring the Application of Performance-based Horizontal Separation Minima</td></tr>
<tr><td colspan="2">What: That,
1. a RASMAG Conclusions/Decisions Tracking List on Monitoring the Application of Performance-based Horizontal Separation Minima be established, to record current changes agreed by RASMAG to the information in ICAO Doc 10063, until the document is amended; and
2. the RASMAG Conclusions/Decisions Tracking List on Monitoring the Application of Performance-based Horizontal Separation Minima at Appendix D to the Report be adopted and uploaded on the ICAO APAC Office eDocuments webpage.</td><td>Expected impact:
☐ Political / Global
☐ Inter-regional
☐ Economic
☐ Environmental
☒ Ops/Technical</td></tr>
<tr><td>Why: With the removal of the Asia/Pacific Regions En-route Monitoring Agency (EMA) Handbook, APAC States and monitoring agencies need a mechanism to track regionally agreed changes to the information in ICAO Doc 10063, until the document is amended.</td><td colspan="2">Follow-up: ☒Required from States</td></tr>
<tr><td>When: 3-Jul-26</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: APAC EMAs</td></tr>
</table>

<table>
<tr><td colspan="3">Conclusion RASMAG/31-2: Guidance Material for the Continued Safety Monitoring of the Asia Pacific RVSM Airspace Version 4.0</td></tr>
<tr><td colspan="2">What: That,
1. the Guidance Material for the Continued Safety Monitoring of the Asia Pacific RVSM Airspace Version 4.0 be adopted; and
2. the Guidance Material for the Continued Safety Monitoring of the Asia Pacific RVSM Airspace Version 4.0 be uploaded to the ICAO APAC 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 the Guidance Material to include new categories of LHD and the current practices of the RASMAG.</td><td colspan="2">Follow-up: ☒Required from States</td></tr>
<tr><td>When: 3-Jul-26</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: APAC RMAs</td></tr>
</table>

7.3 List of Draft Decisions

<table>
<tr><td colspan="3">Draft Decision RASMAG/31-4: Update Regional Airspace Safety Monitoring Advisory Group (RASMAG) Terms of Reference (TOR)</td></tr>
<tr><td colspan="2">What: That, the updated RASMAG TOR at Appendix I to the Report be adopted.</td><td>Expected impact:
☐ Political / Global
☐ Inter-regional
☐ Economic
☐ Environmental
☒ Ops/Technical</td></tr>
<tr><td>Why: To update the TOR to better reflect the objectives and tasks of RASMAG to identify, review and update the APANPIRG Air Navigation Deficiencies List, as an APANPIRG sub-group.</td><td colspan="2">Follow-up: ☐Required from States</td></tr>
<tr><td>When: 25-Nov-26</td><td colspan="2">Status: Draft to be adopted by PIRG</td></tr>
<tr><td colspan="3">Who: ☒Sub groups ☒APAC States ☒ICAO APAC RO ☐ICAO HQ ☐Other: APAC RMAs and EMAs</td></tr>
</table>

7.4 List of Decisions

Nil.

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REPORT ON AGENDA ITEMS – RASMAG/31

Agenda Item 1: Adoption of Agenda

Adoption of Agenda (WP/01)

1.1 The provisional agenda 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/02)

2.1 The Sixteenth Meeting of the FANS Interoperability Team-Asia (FIT-Asia/16) was held in Bangkok, Thailand, from 9 to 11 June 2026.

FIT-Asia Problem Reports (PRs)

2.2 FIT-Asia/16 was presented with updated information on the status of APAC States engagement in data link problem reporting through the FANS-CRA website, and performance analysis reporting to a recognized FIT. **Figure 1** illustrated the number of PRs submitted by the FIT-Asia States per calendar year, since 2016.

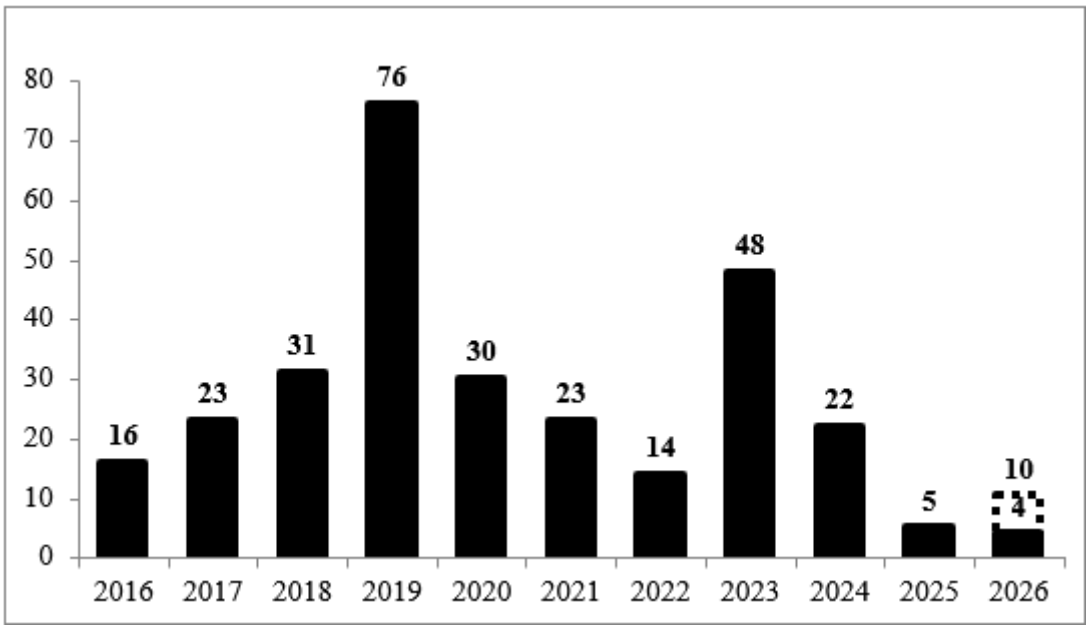

Figure 1. FIT-Asia PR Submissions

CPDLC Uplink Issue Caused by Duplicate 5LNC

2.3 FIT-Asia/16 reviewed the safety implications of duplicate five-letter name-codes (5LNCs) on Controller-pilot Data Link Communications (CPDLC) route uplink operations and noted that such duplications could lead to incorrect route loading, increased flight crew workload, and potential route deviations.

2.4 The Secretariat highlighted ongoing regional efforts to eliminate duplicated 5LNCs, noting that while the number of duplications in the APAC region had been significantly reduced since 2018, over 1,200 duplications remained, requiring continued collaboration among States and stakeholders. Boeing further advised that a software modification for the B737 had been developed and was undergoing certification to mitigate these effects, while testing had not identified similar issues in the B777 and B787 fleets.

Regional PBCS Implementation Update

2.5 FIT-Asia/16 noted that only 19 APAC Administrations submitted completed annual *Survey of the Status of Current and Planned Implementation of Performance-Based Horizontal Separation Minima* form for 2026 update. It was emphasized that the survey form was based on the relevant provisions and guidance material in the *Performance-based Communication and Surveillance (PBCS) Manual* (ICAO Doc 9869). States and Air Navigation Service Providers (ANSPs) implementing PBCS were expected to complete all survey sections (Groups A–E), while those not yet implementing were encouraged to complete Groups D and E to indicate future plans, readiness, and approvals. It was recalled that aircraft and operator approvals by the State of the Operator or State of Registry might still be required to allow correct PBCS capability reporting in flight plans where such procedures were applied.

Asia/Pacific Region Combined PBCS Monitoring Report

2.6 Indonesia and Malaysia prepared and provided the aggregated data link performance monitoring report for the APAC region. States/Administrations were invited to double-check the data before submission each year to avoid format errors and consistency issues. The details, including PBCS data provided by States/Administrations, could be found in **RASMAG/31 WP/02 Attachment A**.

2.7 **Table 1** showed the combined data for Required Surveillance Performance (RSP) across all media types in 2025. The 95 per cent criterion was met in all Flight Information Regions (FIRs). All FIRs achieved marginal performance (99.0–99.89 per cent) in both halves of 2025, except VABF during the first half of the year. VABF improved in the second half and achieved marginal performance.

Table 1. RSP Aggregated Data (All Media Types)

REQUIRED SURVEILLANCE PERFORMANCE						
Region	FIT-ASIA					
Performance Criteria	RSP180					
Time Period	2025 January-June			2025 July-December		
Colour Key Meets Criteria 99.0%-99.89% Under Criteria ***Aggregate All RGS***	No. Messages	Criteria 95% % < = 90sec	Criteria 99.90% % <= 180sec	No. Messages	Criteria 95% % < = 90sec	Criteria 99.90% % <= 180sec
KZAK	6,977,167	98.92%	99.70%	7,536,130	98.98%	99.69%
NFFF						
NZZO	489,785	98.73%	99.55%	522,067	98.79%	99.68%
PAZN	2,188,453	99.00%	99.68%	2,335,929	99.04%	99.65%
RJJJ	3,335,318	98.65%	99.65%	3,899,879	98.94%	99.72%
RPHI	581,773	98.64%	99.59%	809,819	98.14%	99.17%
VABF	823,094	96.44%	98.96%	840,287	97.73%	99.42%
VCCF	541,258	98.54%	99.79%	516,832	98.29%	99.68%
VECF	524,888	98.48%	99.54%	667,011	98.61%	99.59%
VOMF	299,161	97.63%	99.31%	320,696	98.19%	99.49%
VVTS	275,766	98.49%	99.57%	269,007	98.58%	99.58%
WAAA	300,149	99.10%	99.56%	326,663	99.09%	99.51%
WMFC	463,778	98.40%	99.25%	534,048	98.65%	99.43%
WSJC	777,377	98.71%	99.68%	819,846	98.68%	99.69%
ZLLL	627,895	98.50%	99.50%	623,189	98.50%	99.50%
ZWWW	300,139	98.60%	99.50%	120,242	98.70%	99.50%

2.8 CPDLC performance across the APAC region remained strong throughout 2025. All reporting FIRs met the 95 per cent Actual Communication Performance (ACP) and Actual Communication Technical Performance (ACTP) criteria, and most achieved the 99.9 per cent criteria, demonstrating stable performance across the region, including in high-volume FIRs. **Table 2** showed the aggregated Required Communication Performance (RCP) 240 performance for all media types across all FIRs during January–June and July–December 2025.

Table 1. RCP Aggregated Data (All Media Types)

REQUIRED COMMUNICATIONS PERFORMANCE										
Region	FIT-ASIA									
Performance Criteria	RCP240									
Time Period	2025 January-June					2025 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%	99.90%	95%	99.90%		95%	99.90%	95%	99.90%
Aggregate All RGS		% <= 180sec	% <= 210sec	% <= 120sec	% <= 150sec		% <= 180sec	% <= 210sec	% < = 120sec	% <=150sec
KZAK	373,184	99.40%	99.62%	99.56%	99.71%	416,414	99.42%	99.62%	99.68%	99.80%
NFFF	10,382	99.56%	99.75%	99.65%	99.75%	10,921	99.34%	99.54%	99.66%	99.75%
NZZO	90,642	98.99%	99.30%	99.30%	99.48%	94,476	99.25%	99.49%	99.61%	99.73%
PAZN	136,677	99.26%	99.47%	99.64%	99.75%	143,012	99.25%	99.46%	99.60%	99.69%
RJJJ	74,522	99.70%	99.83%	99.72%	99.80%	82,427	99.71%	99.84%	99.73%	99.81%
RPHI	33,354	98.27%	98.52%	98.70%	98.89%	67,227	97.21%	97.52%	98.61%	98.83%
VABF	74,261	99.15%	99.49%	99.38%	99.66%	85,388	99.27%	99.61%	99.46%	99.73%
VCCF	31,543	99.06%	99.37%	99.13%	99.50%	34,599	99.15%	99.45%	99.30%	99.61%
VECF	12,480	99.13%	99.39%	99.20%	99.39%	18,643	99.08%	99.33%	99.07%	99.33%
VOMF	123,190	99.70%	99.85%	99.74%	99.82%	150,456	99.70%	99.86%	99.71%	99.83%
VVTS	68,681	97.98%	98.66%	99.42%	99.72%	53,632	98.08%	98.70%	99.39%	99.66%
WAAA	58,638	99.42%	99.54%	99.78%	99.81%	54,860	99.30%	99.43%	99.80%	99.82%
WMFC	50,019	95.55%	96.30%	99.03%	99.33%	60,895	98.47%	98.84%	99.06%	99.34%
WSJC	47,186	99.23%	99.46%	99.34%	99.58%	46,032	99.23%	99.47%	99.37%	99.63%
ZLLL	1,977	99.44%	99.54%	98.68%	99.29%	1,855	99.08%	99.51%	98.27%	99.13%
ZWWW	8	100.00%	100.00%	100.00%	100.00%	9	100.00%	100.00%	100.00%	100.00%

Air Navigation Deficiencies Relating to Data Link Performance Monitoring and Analysis

2.9 FIT-Asia/16 participants were reminded that operational PBCS implementation required a formal service agreement with the APANPIRG-recognized Central Reporting Agency (CRA) and were encouraged to complete the necessary arrangements in support of the APAC Project 30/10 target for 2028, with the status reflected in **Table 3**:

Table 3. CRA Formal Service Agreements Status

	APANPIRG-recognized CRA	**Scope of Application**	**Formal Service Agreement**
IPACG and ISPACG (United States)	CRA Boeing	IPACG States, ISPACG States, NAT States	Yes
Japan	CRA Japan	Japan	Yes
SEASMA (Singapore)	CRA Boeing	Singapore, Philippines, Viet Nam	Yes
China	CRA Boeing	China	Yes (2026)
Malaysia	CRA Boeing	Malaysia	In progress (by 2026)
India	CRA Boeing	India	Coordination in progress
Indonesia	CRA Boeing	Indonesia	Coordination in progress
Sri Lanka	CRA Boeing	Sri Lanka	Coordination in progress

2.10 It was noted that no APANPIRG ATM and Airspace Safety Deficiencies in the data link field would be proposed for 2026.

Updating of Relevant ICAO Documents

2.11 Japan and Singapore provided updates on the development of the second edition of the *Global Operational Data Link (GOLD) Manual* (ICAO Doc 10037) and the third edition of the ICAO Doc 9869. FIT-Asia/16 noted that both manuals had been updated to reflect recent ICAO provisions, including enhanced guidance on advanced data link operations, implementation, approvals, monitoring, compliance, and new RCP/RSP specifications. It was further noted that both manuals were progressing towards publication following ICAO review and endorsement.

2.12 The Meeting welcomed the comprehensive report and noted the continued improvement in regional data link performance monitoring and analysis. The Meeting observed that the overall PBCS communication and surveillance performance across the APAC region remained satisfactory despite increasing message volumes. In discussing recurring PBCS performance issues affecting individual aircraft operators and aircraft types across multiple FIRs, the Meeting noted that the timely sharing of non-compliance information among Regional Monitoring Agencies (RMAs), CRAs, States and aircraft operators was essential for identifying root causes, facilitating coordinated investigations and supporting timely corrective actions.

2.13 India highlighted its experience in analysing abnormal ADS-C message transit times and expressed concern regarding significant delays that appeared to be associated with Communication Service Provider (CSP) network performance. The ensuing discussion recognized that identifying the root cause of such issues often required close coordination among States, CSPs, CRAs, aircraft operators and industry partners. The Meeting emphasized the importance of detailed technical investigations, timely submission of PRs, and the continued sharing of investigation outcomes and best practices through FIT-Asia and other relevant regional forums to improve regional data link performance.

2.14 The Meeting further noted that formal service agreements with APANPIRG-recognized CRAs were an essential component of PBCS implementation, enabling States to submit PRs and obtain technical support for performance investigations. In response to an enquiry regarding the establishment of a national CRA, the Secretariat advised that the recognition of a new CRA would require further study and demonstration of technical capability through the appropriate ICAO processes. The Secretariat encouraged States to continue their coordination with the Boeing CRA whilst drawing upon the experience of other States that had recently completed similar arrangements, and the Meeting noted that efforts to establish formal service agreements with the Boeing CRA were ongoing.

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

2.1 The Meeting was provided with updates and relevant discussions on airspace safety monitoring arising from:

a) Thirteenth Meeting of the Regional Airspace Safety Monitoring Advisory Group Monitoring Agencies Working Group (RASMAG/MAWG/13), held in Bangkok, Thailand, from 3 to 6 February 2026; and

b) Twenty-First Meeting of RMA Coordination Group (RMACG/21), held in Brussels, Belgium, from 8 to 12 June 2026.

Adoption of the New RVSM Minimum Monitoring Requirements (MMR)

2.15 The RMACG/21 reviewed and adopted the *RVSM Monitoring Groups and Minimum Monitoring Requirements Version 2026* (**RASMAG/31 WP/03 Appendix A**). It was further noted that the same document would be published on the respective RMAs' websites.

2.16 The revisions, as compared to the previous version, were summarized as follows:

a) civilian MMR Category 2 – new entrants:

   i) Gulfstream G800 (s/n 88001 onward), which entered service in late 2025. It shared engines and wings with the G700 but had a shorter fuselage. Both aircraft were classified as GLF8; the existing GLF8 Monitoring Group (G700 only) was renamed GLF8-I, and a new group for the G800 was designated GLF8-II.

b) military MMR Category 3 – new entrants:

   i) EC37-B (a modified GLF5/G550) operating in the United States;

   ii) FA8X Archange (prototype under testing);

   iii) PRTS (or Scaled Composites Proteu), with one aircraft in service capable of operating up to FL600; and

   iv) S211, an older training aircraft with a limited number of airframes still in service in the United States.

Communication of Results from RVSM Approval Scrutiny

2.17 RMACG/21 discussed the importance of ensuring that RMA activity reporting was based on validated information to maintain data quality and avoid the inclusion of unvalidated data. It was agreed that the reporting process should be clearly defined without hindering timely State action. As no consensus had been reached on the proposal discussed at RMACG/21 and RMACG Action 20/14 remained open, an alternative approach was proposed whereby identifying details, such as aircraft registration numbers, would not be published in reports for unvalidated cases, while still being shared with relevant stakeholders for investigation and follow-up. The European Regional Monitoring Agency (EUR RMA) also updated the RMACG/21 on the planned expansion of the European RVSM Restriction List (ERL), noting that a 2025 Eurocontrol survey of Integrated Initial Flight Plan Processing System (IFPS) States showed broad support for the ERL as beneficial to RVSM safety; consequently, the ERL was to be expanded from Summer 2026 to include five additional IFPS States, bringing the total to 15 participating States.

Risk Assessment of Non-Approved RVSM Operations

2.18 RMACG/21 discussed various approaches to assessing safety risks associated with non-approved RVSM operations and the erroneous use of RVSM designators. Although different methodologies were presented, including treating such operations as technical or operational risks, no consensus was reached. RMACG/21 agreed to continue examining the issue, including defining applicable operation types and aircraft, and further evaluating methodologies such as pair-wise risk assessment and individual aircraft performance assessment.

Review of the RMA's Support to Verify the PBCS Authorization Information

2.19 RMACG/21 discussed the challenges faced by RMAs in supporting the regional PBCS monitoring programme, particularly in maintaining and verifying RCP and RSP authorization information. It was noted that, although requirements for RCP and RSP were defined in ICAO Annex 6, these operations were not subject to specific approvals. As a result, States recorded RCP and RSP capabilities within existing systems using non-standardized formats and methods. Accordingly, RMACG/21 recommended that RMAs review their responsibilities related to PBCS authorization verification and consider removing these tasks from their Terms of Reference (TORs). RMAs agreed to coordinate with regional planning groups and relevant bodies to review and update their TORs as appropriate.

Large Altimetry System Error (ASE) Cases and Solutions

2.20 The Pacific Approvals Registry and Monitoring Organization (PARMO) / North American Approvals Registry and Monitoring Organization (NAARMO) presented statistics and case studies of large ASE events observed between 2016 and 2026, outlining identification processes, stakeholder notification, corrective actions, and post-correction monitoring. A total of 278 aircraft were identified with large ASE events, with 27 still under evaluation, and an increasing proportion involved International General Aviation (IGA) aircraft compared to commercial operators. RMACG/21 emphasized the need for enhanced coordination among RMAs in managing cross-jurisdictional high ASE events and agreed to identify aircraft monitored by multiple systems with inconsistent ASE calculations and share findings. It also supported establishing a formal global high ASE reporting system to enable information sharing, investigation tracking, corrective action follow-up, and coordinated closure.

Summary and Outcomes of ASE Technical Interchange Meeting

2.21 NAARMO presented a summary of the 2025 ASE Technical Interchange Meeting, jointly hosted with EUR RMA in Seattle, United States, which focused primarily on the feasibility of extending RVSM above FL410, along with discussions on height monitoring, ASE trends and resolutions, approvals, avionics, certification, and meteorological data, with participation from a broad range of aviation stakeholders.

2.22 RMACG/21 also reviewed outcomes from the Fifth ICAO Separation and Airspace Safety Panel (SASP/5), noting that while initial assessments indicated the potential expansion of RVSM above FL410 was technically feasible, significant coordination, certification, operational considerations, and system modifications were required prior to implementation.

Promotion of Global Navigation Satellite System (GNSS) Radio Frequency Interference (RFI) Reporting as a Large Height Deviation (LHD)

2.23 The Monitoring Agency for Asia Region (MAAR) presented initiatives to promote reporting of GNSS RFI occurrences in the APAC region, including introducing a dedicated Category R within the LHD/Large Lateral Deviation (LLD)/ Large Longitudinal Error (LLE) taxonomy to support trend identification and mitigation development, while noting further refinement of reporting criteria and relevance to RVSM safety assessments was required. Supporting papers from EUR RMA and North Atlantic Central Monitoring Agency (NAT CMA) highlighted the increasing occurrence of GNSS jamming and spoofing events and their impacts on RVSM operations, collision risk assessment, and ASE monitoring, and outlined current approaches to detection, classification, mitigation, and their treatment in safety monitoring.

2.24 RMACG/21 supported the promotion of Category R for GNSS RFI occurrence reporting, recognizing its value in enhancing data collection, facilitating trend analysis, and supporting the development of mitigation measures.

Publication of RASMAG Safety Bulletin Issue 03

2.25 The RASMAG Safety Bulletin Issue 03 was published in January 2026 was made available for download on the ICAO APAC Office eDocuments webpage (https://www.icao.int/APAC/apac-electronic-documents#tabs-3).

PIRG and RASG Regional Coordination Meeting

2.26 The Meeting noted that the PIRG and RASG Regional Coordination Meeting was held twice yearly, with the next meeting planned for August 2026 focusing on establishing an effective coordination mechanism between APANPIRG and the Regional Aviation Safety Group – Asia Pacific (RASG–APAC), to ensure consistency and avoid duplication across subsidiary bodies.

2.27 The Meeting was informed that RASMAG Chairperson participated alongside other contributory subgroup Chairpersons to strengthen coordination and address overlapping initiatives, including the development of the first RASG-APAC Safety Advisory (i.e. RSA 25-001 *Elevated MAC Risk in RVSM Airspace*, which could be found at https://www.icao.int/APAC/rasg/RegionalSafetyAdvisory). It was further noted that the APAC monitoring agencies agreed to discontinue the RASMAG Safety Bulletin and adopt the RSA as the platform for safety promotion.

2.28 The Meeting discussed the various terminologies used in RASMAG meetings, including "non-approved RVSM operations," "non-RVSM approved aircraft," and "RVSM approval status pending verification." To ensure common understanding and clarity, the Meeting agreed that this matter would be further discussed at the RASMAG/MAWG meetings to define appropriate terminologies, potentially based on weightage criteria.

2.29 In response to an inquiry regarding coordination among relevant APANPIRG and RASG–APAC contributory bodies on discussions related to GNSS RFI, the Secretariat informed the Meeting that WPs had been presented at the relevant meetings for awareness and updates. It was further clarified that the proposed reporting by States to the ICAO APAC Office on GNSS RFI events was intended to support trend analysis, identify geographical areas with recurring occurrences or significant operational impacts, assess operational safety implications, and prioritize associated regional safety risks.

2.30 With regard to the RMACG/21 recommendation for RMAs to review their responsibilities related to PBCS authorization verification and to consider removing these tasks from their TORs, the Meeting noted that this matter would be further discussed at RASMAG/MAWG/14, with the outcomes to be reported to RASMAG/32.

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

RVSM Risk Assessment in the Brisbane, Honiara, Melbourne, Nauru, and Port Moresby Flight Information Regions, 1 January 2025 to 31 December 2025 (WP/04)

3.1 The Australian Airspace Monitoring Agency (AAMA) presented the airspace safety review of RVSM airspace risk reported in the Brisbane, Honiara, Melbourne, Nauru, and Port Moresby FIRs for calendar year 2025.

3.2 **Table 4** provided the technical, operational, and total risk for the RVSM implementation in Brisbane, Honiara, Melbourne, Nauru, and Port Moresby FIRs for 2025, each of which met the Target Level of Safety (TLS).

Table 4. RVSM Risk Estimates in Brisbane, Honiara, Melbourne, Nauru, and Port Moresby FIRs for Calendar Year 2025

Brisbane, Honiara, Melbourne, Nauru, and Port Moresby FIRs Estimated annual flying hours = 1,354,591 hours *(Note: estimated hours based on December 2025 TSD)*			
Source of Risk	**Risk Estimation**	**TLS**	**Comparison with TLS**
Technical Risk	0.10×10^{-9}	2.5×10^{-9}	Below technical TLS
Operational Risk	2.1×10^{-9}	-	-
Total Risk	**2.2×10^{-9}**	5.0×10^{-9}	**Below total TLS**

3.3 The reporting safety culture metric measured by the reporting rate of occurrence per flight hour, with occurrences grouped by attribution as shown in **Table 5**.

Table 5. Safety Culture Metric for Australia, Nauru, Papua New Guinea, and Solomon Islands by LHD Attribution for 2025

Attribution	**Number of Reports**	**Flight Hours**	**Number of Reports per Flight Hour ($\times 10^{-5}$)**
Pilot/Aircrew (A, B, C)	61	1,354,591	4.5
ATC (D, E, F)	48	1,354,591	3.54
Others	14	1,354,591	1.03

3.4 **Figure 2** illustrated the geographic location of LHD occurrences intended to provide a mean to identify and visualize risk hot spots related to RVSM operations. The occurrences at each location were represented by a coloured circle, with the radius proportional to the total risk at that location.

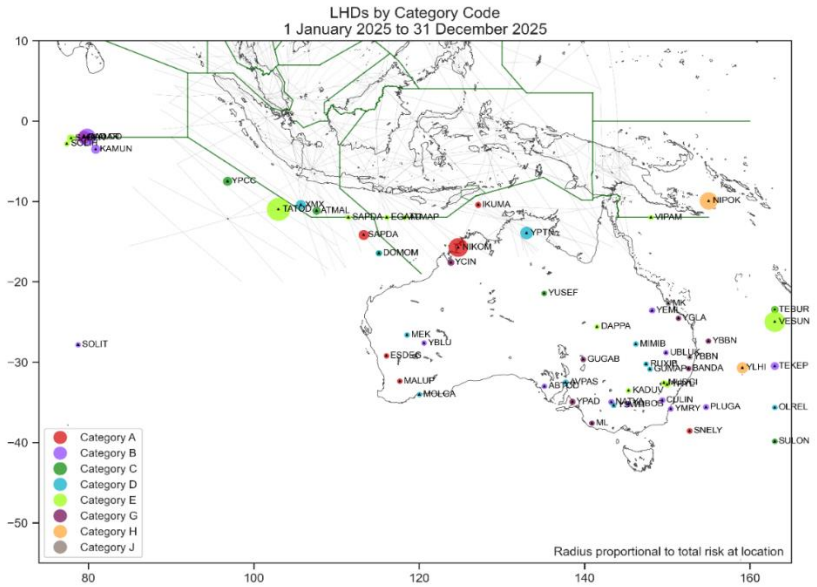

Figure 2. Geolocation of LHDs for Brisbane, Honiara, Melbourne, Nauru, and Port Moresby FIRs for Calendar Year 2025

3.5 There were 123 LHDs identified in 2025, compared with 71 in 2024. Similarly, the total risk (2.24×10^{-9}) was also greater (0.92×10^{-9} reported at RASMAG/30).

3.6 Category E was the most common LHD category (38), and a third of those were assessed as risk-bearing (contributing 31 per cent of the total operational risk). The others mostly involved aircraft coordinated to the relevant FIR boundary at the wrong flight level, which mistakes that were queried by receiving ATC and rectified before the aircraft transited the boundary.

RVSM Risk Assessment in the Jakarta and Ujung Pandang Flight Information Regions, 1 January 2025 to 31 December 2025 (WP/05)

3.7 AAMA presented the airspace safety review of RVSM airspace risk reported in the Indonesian FIRs (i.e. Jakarta and Ujung Pandang) for calendar year 2025.

3.8 **Table 6** provided the technical, operational, and total risk for the RVSM implementation in Jakarta and Ujung Pandang FIRs, each of which met TLS.

Table 6. RVSM Risk Estimates in Jakarta and Ujung Pandang FIRs for Calendar Year 2025

Indonesian FIRs Estimated annual flying hours = 852,382 hours *(Note: estimated hours based on December 2025 TSD)*			
Source of Risk	**Risk Estimation**	**TLS**	**Comparison with TLS**
Technical Risk	0.15×10^{-9}	2.5×10^{-9}	Below technical TLS
Operational Risk	2.03×10^{-9}	-	-
Total Risk	**2.17×10^{-9}**	5.0×10^{-9}	**Below total TLS**

3.9 The reporting safety culture metric measured by the reporting rate of occurrence per flight hour, with occurrences grouped by attribution as shown in **Table 7**.

Table 7. Safety Culture Metric for Indonesia by LHD Attribution for 2025

Attribution	**Number of Reports**	**Flight Hours**	**Number of Reports per Flight Hour ($\times 10^{-5}$)**
Pilot/Aircrew (A, B, C)	174	852,381.9	20.4
ATC (D, E, F)	18	852,381.9	2.1
Others	4	852,381.9	0.47

3.10 **Figure 3** illustrated the geographic location of LHD occurrences for calendar year 2025. The occurrences at each location were represented by a coloured circle, with the radius proportional to the total risk at that location.

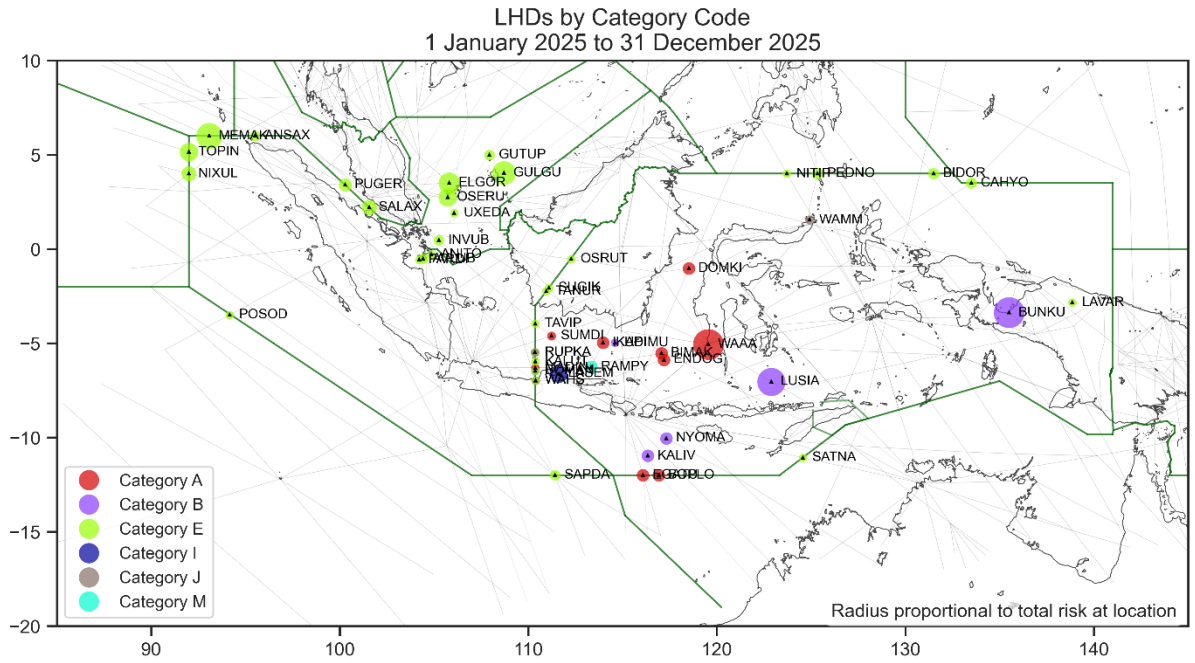

Figure 3. Geolocation of LHDs for the Indonesian FIRs for Calendar Year 2025

3.11 The total risk in 2025 (2.17×10^{-9}) was comparable with the risk value reported for calendar year 2024 (i.e. 2.25×10^{-9}). 49 per cent of the operational risk was presented by 174 Category E LHDs, which mostly involved aircraft flying on bi-directional ATS routes, and their mean duration was almost 30 seconds.

3.12 There was one cluster of LHDs that meets the definition of a hot spot. It rests along the Jakarta/Ujung Pandang FIR boundary just north of the island of Java where the airspace structure of unidirectional ATS routes was relatively dense. 90 NM separate the endpoints of this hot spot (ANY VOR to the south and RUPKA to the north).

3.13 In response to an inquiry, AAMA confirmed that the number of LHDs in Indonesian airspace approximately doubled in 2025 compared to 2024, corresponding to a similar increase observed along the proposed new hot spot (ANY VOR and RUPKA).

2025 Analyses for the Transfer of Control Point between Incheon ACC and Shanghai ACC, Hot Spot B1 (WP/06)

3.14 PARMO presented the analysis of the Hot Spot B1, transfer of control point between Incheon Area Control Centre (ACC) and Shanghai ACC.

3.15 There were 86 LHDs reported for calendar year 2025 representing a 30 per cent decrease in the overall number of reported LHDs compared to 123 LHDs reported in calendar year 2024. Most of the reported LHDs involved errors in ATC transitions and were attributed to LHD Category E-RI. It was noted that all reported LHDs were identified by the receiving ATC unit prior to the aircraft entered their airspace, as a result all reported LHD occurrences were categorized as non-risk bearing (i.e. all reported LHDs had zero duration and did not affect the operational vertical collision risk estimates).

3.16 None of the reported LHDs in calendar year 2025 contribute towards the estimate of operational vertical risk. Therefore, the vertical operational risk estimate was zero for calendar year 2025. The vertical technical risk was 0.68×10^{-9}.

3.17 PARMO recognized the new process for sharing reported LHD information was much improved compared to the previous process. From PARMO's perspective, the new process was more efficient and enhanced airspace safety. The previous process required LHD reports to be relayed via the designated RMAs. Due to the delays associated with the previous process, data retention would often expire before the adjacent ATC unit could confirm the report but more importantly, data retention expiration limited the investigation of underlying causal factors.

3.18 The Meeting noted that the number of reported LHD events was concentrated in the Hot Spot B1 area. In accordance with the defined process for hot spot identification, the area would continue to be classified and monitored as a hot spot, and was to remain under observation until further safety improvement initiatives or mitigation measures were implemented.

Update on AKARA LHD Events and Progress on Sharing Mechanism (WP/07)

3.19 In 2025, China RMA recorded a total of 36 LHD events reported by Shanghai ACC, all of which occurred within RVSM airspace. 50 LHD events were reported by Incheon ACC, of which 37 occurred within RVSM airspace and 13 occurred outside RVSM airspace. Through collaborative verification efforts under the new sharing mechanism, 24 events from Shanghai ACC reports were confirmed by Incheon ACC, and 29 events from Incheon ACC reports within RVSM airspace were confirmed by Shanghai ACC.

3.20 **Figure 4** illustrated LHD events occurred from January to May 2026, China RMA recorded seven LHD occurrences reported by Shanghai ACC, six of which occurred within RVSM airspace and one outside RVSM airspace. Incheon ACC reported 12 occurrences, ten of which occurred within RVSM airspace and two outside RVSM airspace. Through collaborative verification under the new sharing mechanism, five occurrences reported by Shanghai ACC were confirmed by Incheon ACC, and nine RVSM occurrences reported by Incheon ACC were confirmed by Shanghai ACC. The majority of reported LHDs were classified as Category E events, primarily involving no transfer, late transfer, or no flight level revision.

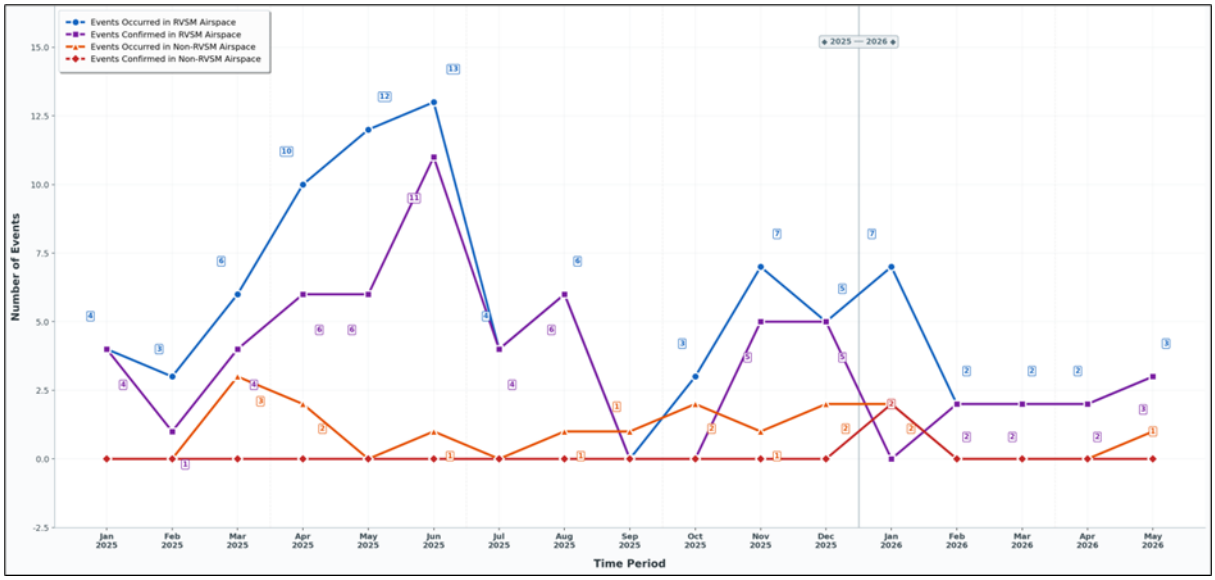

Figure 4. LHD Events from January 2025 to May 2026

3.21 Statistical data for 2025 demonstrated that, although LHD events continued to occur, the confirmation rate and data quality improved under the new mechanism. Data from January to May 2026 demonstrated a significant decrease in the number of LHD events.

3.22 The Meeting noted that the implementation of the new LHD event sharing mechanism between China and the Republic of Korea improved airspace safety monitoring in the concerned airspace. Enhanced timeliness and accuracy of data exchange contributed to more effective identification and analysis of LHD events, thereby supporting risk mitigation efforts in this airspace.

3.23 The Republic of Korea informed the Meeting that, in addition to sharing reported LHD information, it had conducted root cause analyses of confirmed LHD events and shared the findings with China and PARMO.

2025 Central East Pacific Traffic Flow Assessment (Hot Spot N) (WP/08)

3.24 PARMO presented the 2025 vertical risk assessment for the Central East Pacific (CEP) traffic flow in Pacific airspace (between mainland North America and Hawaii). The area had been designated a Hot Spot N at RASMAG/24 owing to several reported occurrences and resulting increased risk estimates.

3.25 In 2025, 42 LHD events were reported within the CEP traffic flow, a slight increase from 40 reported in 2024. The LHD category with the longest cumulative duration was Category E-RI. Reported LHD events comprised one Category A, four Category B, and 37 Category E-RI events.

3.26 **Figure 5** showed that the durations associated with reported LHDs in 2025 had decreased by 50 per cent compared with 2024.

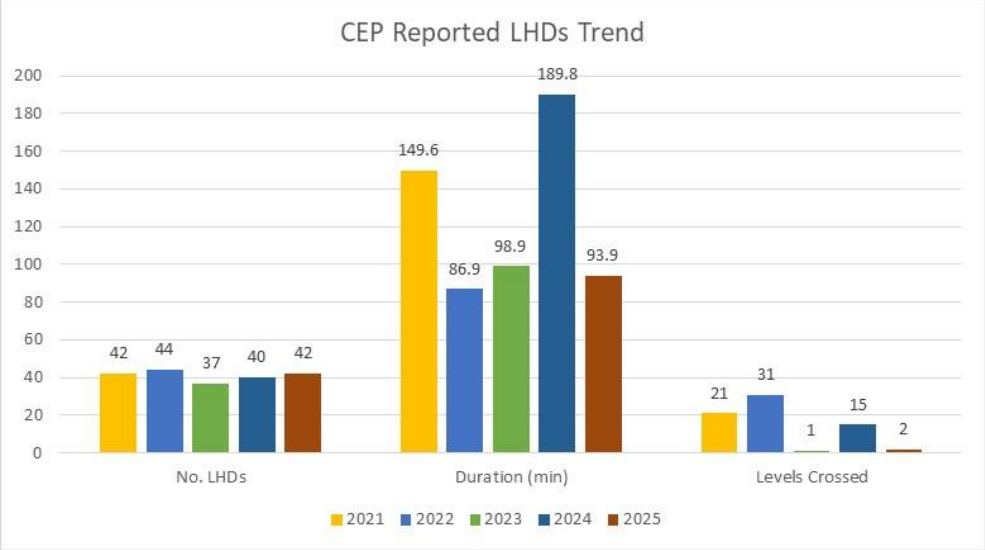

Figure 5. Reported LHDs Comparison Summary

3.27 Various mitigation strategies had been implemented prior to the planned En Route Automation Modernization (ERAM) implementation at the Honolulu Control Facility (HCF). HCF was testing the ERAM system, with full implementation scheduled for calendar year 2027. The FAA's Air Traffic Safety Oversight Service provided oversight of the development and implementation of additional mitigations aimed at reducing the vertical risk estimate in the CEP prior to ERAM deployment.

3.28 The overall vertical risk for the CEP in 2025 was 6.4 x 10^{-9} fapfh, exceeded the TLS. This represented 57 per cent decrease from the 2024 value of 15.1 x 10^{-9} fapfh.

3.29 **Figure 6** illustrated the two-year (rolling 12-month) trend for CEP vertical collision risk estimates, which showed a decreasing trend attributable to corrective actions implemented by ATC units to mitigate Category E-RI LHD occurrence.

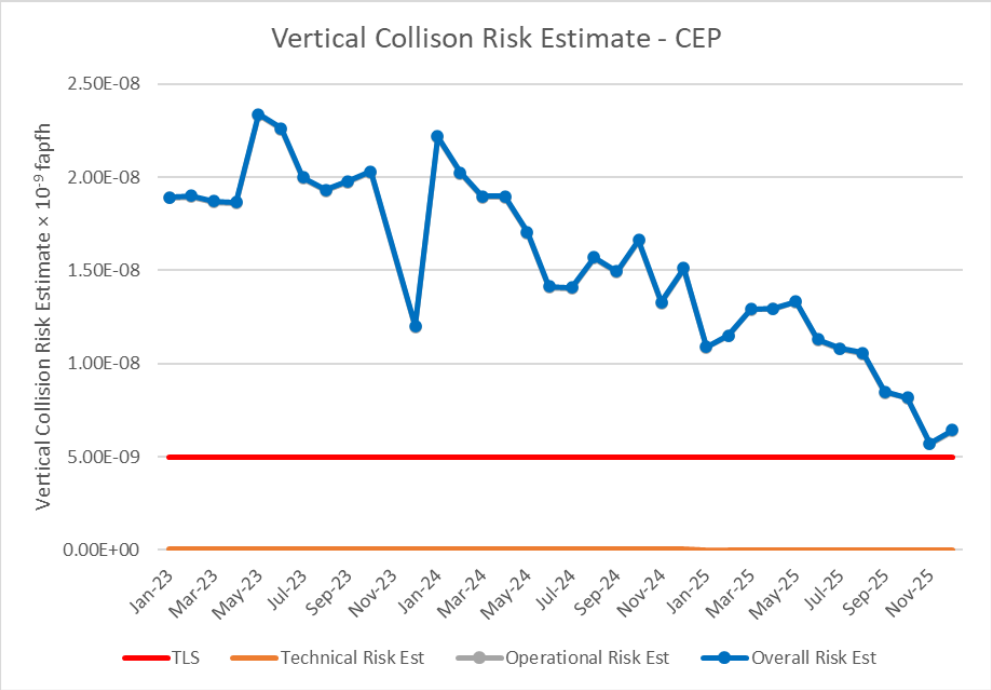

Figure 6. CEP Vertical Collision Risk Estimates by Calendar Year (Rolling 12-month)

3.30 In response to an inquiry, it was noted that the Enhanced Trial Probe (ETP) had been an effective tool in improving controller situational awareness by providing visual alerts of potential conflicts arising from incorrect transfer information, enabling controllers to take timely preventive action. It was further noted that the probing function still required manual initiation by the controller and was not a continuously running background process.

China RMA Vertical Safety Report (WP/09)

3.31 China RMA presented the results of the airspace safety oversight for the RVSM operations in the airspace of nine Chinese FIRs and Pyongyang FIR for calendar year 2025.

Risk Estimates for RVSM Airspace of Chinese FIRs

3.32 **Table 8** provided the technical, operational, and total risk for the RVSM implementation in all Chinese FIRs, of which met TLS.

Table 8. RVSM Risk Estimates in all Chinese FIRs for Calendar Year 2025

Chinese FIRs **Estimated annual flying hours = 2,343,365 hours** ***(Note: estimated hours based on December 2025 TSD)***			
Source of Risk	**Risk Estimation**	**TLS**	**Comparison with TLS**
Technical Risk	0.13 x 10-9	2.5 x 10-9	Below technical TLS
Operational Risk	0.79 x 10-9	-	-
Total Risk	**0.92 x 10^{-9}**	5.0 x 10^{-9}	**Below TLS**

3.33 A total of 251 LHD events were reported during the year. **Figure 7** illustrated the geographic location of risk-bearing LHD reports received by China RMA during the assessment period.

Figure 7. Geographical Location of LHDs Reported to China RMA

Risk Estimates for RVSM Airspace of Pyongyang FIR

3.34 **Table 9** provided the technical, operational, and total risk for the RVSM implementation in Pyongyang FIR, of which met TLS.

Table 9. RVSM Risk Estimates in Pyongyang FIR for Calendar Year 2025

Pyongyang FIR Estimated annual flying hours = 319 hours *(Note: estimated hours based on December 2025 TSD)*			
Source of Risk	**Risk Estimation**	**TLS**	**Comparison with TLS**
Technical Risk	0	2.5×10^{-9}	Below technical TLS
Operational Risk	0	-	-
Total Risk	**0**	5.0×10^{-9}	**Below TLS**

3.35 China RMA informed that according to the email response from DPR Korea, there was no LHD event reported in 2025.

3.36 The Chairperson explained that Category I LHD referred to instances where weather turbulence displaced the aircraft from its flight level by 300 feet or more. China was requested to verify whether the 100 Category I LHD events met this criterion or represented the total number of reported turbulence occurrences. In response, China RMA indicated that it would provide further details through a Flimsy on Category I LHDs.

3.37 The Republic of Korea highlighted a discrepancy in the **RASMAG/31 WP/09 Appendix A**. The revised version of the WP was to be uploaded to the Meeting webpage.

Supplementary Sharing of Category I Events (FL/01)

3.38 China RMA presented supplementary information on Category I LHD events presented in **RASMAG/31 WP/09**, identifying a total of 100 events with a cumulative duration of 13.4 minutes and 112 levels crossed without clearance. The events were primarily attributed to turbulence and weather-related factors, with examples illustrating deviations due to thunderstorms and moderate to severe turbulence. It was observed that some events involved significant altitude fluctuations with recorded durations, while others involved minimal fluctuations with no recorded duration. The Meeting further noted that all Category I events were classified as technical risk events and that China RMA intended to enhance the reporting and analysis of such events in future reports.

JASMA Vertical Safety Report (WP/10)

3.39 The Japan Airspace Safety Monitoring Agency (JASMA) presented the airspace safety review of RVSM airspace risk reported in the Fukuoka FIR for calendar year 2025.

3.40 **Table 10** provided the technical, operational, and total risk for the RVSM implementation in Fukuoka FIR, of which met TLS.

Table 10. RVSM Risk Estimates in Fukuoka FIR for Calendar Year 2025

Fukuoka FIR Estimated annual flying hours = 1,884,750 hours *(Note: estimated hours based on December 2025 TSD)*			
Source of Risk	**Risk Estimation**	**TLS**	**Comparison with TLS**
Technical Risk	0.35×10^{-9}	2.5×10^{-9}	Below technical TLS
Operational Risk	2.86×10^{-9}	-	-
Total Risk	**3.21×10^{-9}**	5.0×10^{-9}	**Below TLS**

3.41 A total of 59 LHD events were reported in 2025. **Figure 8** illustrated the geographic location of risk-bearing LHD reports within Fukuoka FIR during the assessment period. Filled blue square symbols represented LHD locations within the RVSM stratum of the Fukuoka FIR, while the circle size indicated LHD durations of 50 seconds or more.

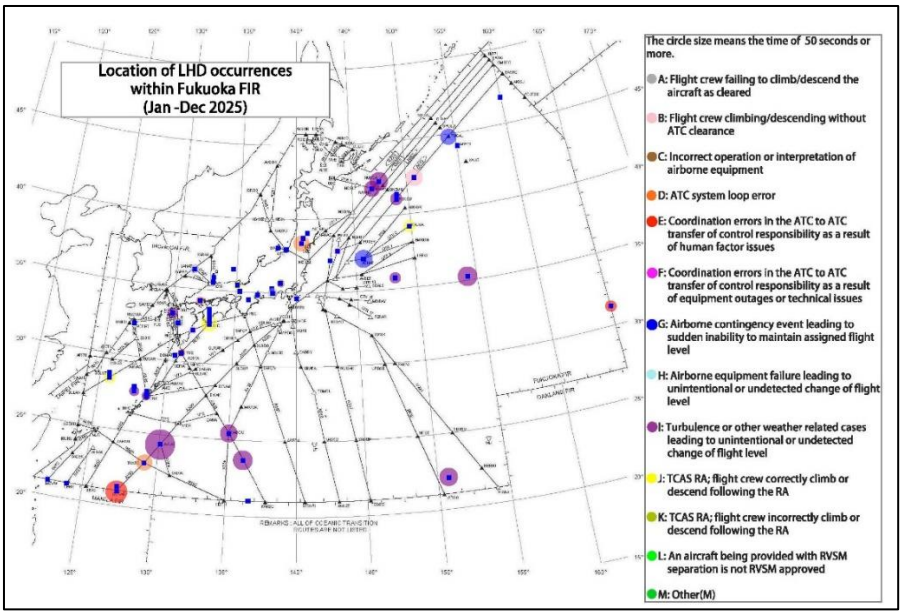

Figure 8. Geographical Location of LHDs within Fukuoka FIR

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

3.42 To mitigate transfer errors caused by human factors at Hot Spot D1, bilateral meetings between the Fukuoka and Manila ACCs had been regularly conducted since December 2022, fostering mutual understanding between both ACCs. The number of LHD events at Hot Spot D1 had shown a steady decrease (**Figure 9**). The Meeting was informed that one Category E LHD event had occurred during the transfer from Manila ACC to Fukuoka ACC in 2025.

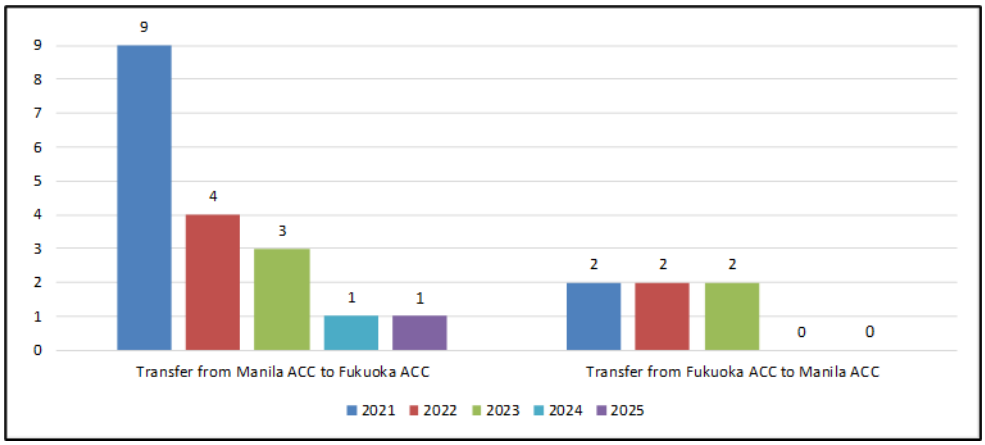

Figure 9. Number of LHDs at Hot Spot D1 between Fukuoka and Manila FIRs

3.43 In response to an inquiry regarding whether the increase in Category I LHDs was attributable to climate change (e.g. severe weather), increased traffic, or other factors, JASMA stated that they would review the matter.

MAAR Vertical Safety Report (WP/11)

3.44 MAAR presented the airspace safety review of RVSM airspace risk reported in the South Asia and Indian Ocean (SA/IO) airspace, Southeast Asia (SEA) airspace and Mongolian airspace, for calendar year 2025.

SA/IO Airspace

3.45 **Table 11** provided the technical, operational, and total risk for the RVSM implementation in the SA/IO airspace, which met TLS.

Table 11. RVSM Risk Estimates within SA/IO Airspace for Calendar Year 2025

SA/IO Airspace Estimated annual flying hours = 3,117,151 hours *(Note: estimated hours based on December 2025 TSD)*			
Source of Risk	**Risk Estimation**	**TLS**	**Comparison with TLS**
Technical Risk	1.029×10^{-9}	2.5×10^{-9}	Below Technical TLS
Operational Risk	0.108×10^{-9}	-	-
Total Risk	**1.137×10^{-9}**	5.0×10^{-9}	**Below TLS**

3.46 A total of 100 LHD events were reported in 2025, compared to 207 in 2024. It was noted that almost all LHD events fell under Category E. When divided into sub-categories, the most frequent sub-category was E-RI at 69 per cent, followed by E-NT at 27 per cent.

3.47 **Figure 10** illustrated the geographic location of risk-bearing LHD reports within SA/IO airspace during the assessment period.

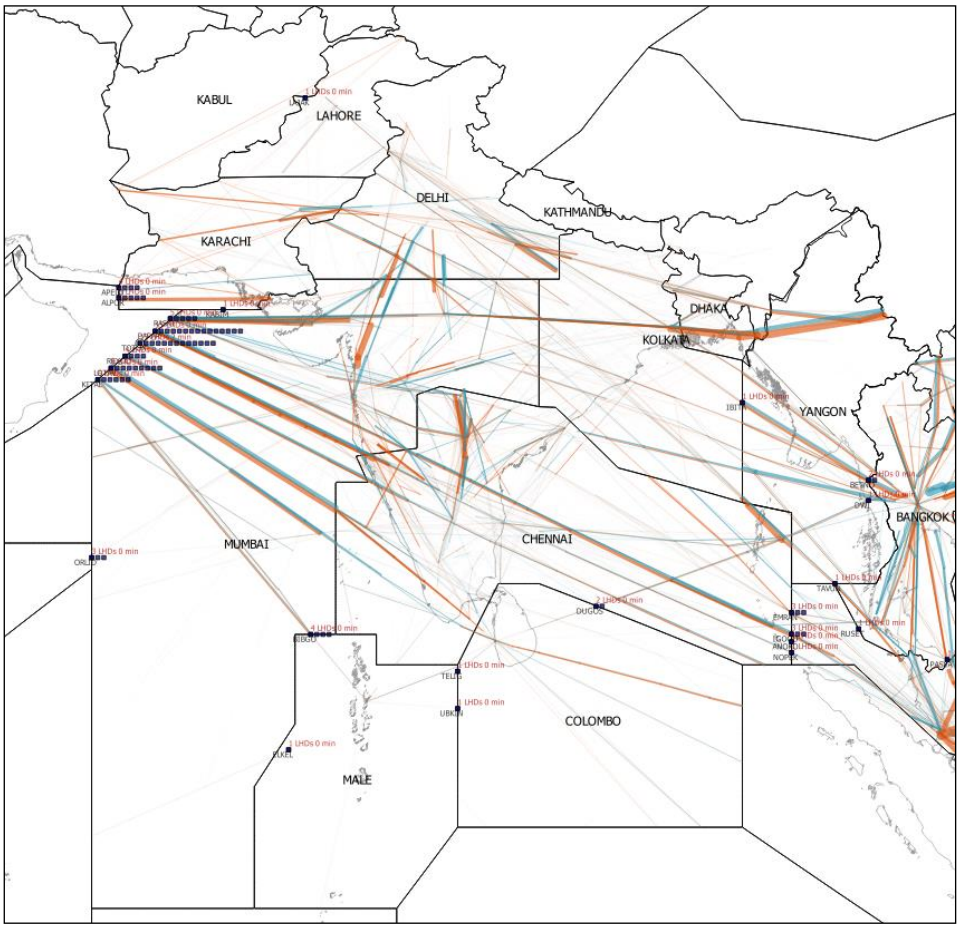

Figure 10. Geographical Location of LHDs within SA/IO Airspace

3.48 **Table 12** presented the number of LHDs and the operational risk for each cluster, as well as the results of the assessment against the established criteria within the SA/IO airspace. A "Negative" result indicated that the cluster did not satisfy the respective criterion, whereas a "Positive" result indicated that the cluster met the criterion and could therefore be identified as a hot spot.

Table 12. Results of Identifying Hot Spots in SA/IO Airspace

2025 Clusters (SA/IO)	**Mumbai/ Muscat (Hot Spot G1)**	**Chennai/ Kuala Lumpur**	**Karachi/ Muscat**
Number of LHDs	52	8	9
Check Criteria: Number >= 25	Positive	Negative	Negative
Operational Risk (x 10^{-9} fapfh)	0.04	0	0
Check Criteria: Risk >= 0.027 x 10^{-9} fapfh	Positive	Negative	Negative
Check Criteria: Operational Risk >= 5.00 x 10^{-9} fapfh	Negative	Negative	Negative

3.49 Based on the analysis of hot spots, the following observations and recommendations were proposed:

a) Hot Spot G1 was identified as the only cluster that met the established hot spot criteria for 2025 and therefore should remain on the list of hot spots until safety improvement initiatives or mitigation measures had been completed; and

b) Hot Spot A1 (Chennai/Dhaka/Kolkata/Yangon), Hot Spot F (Mogadishu/Mumbai), and Hot Spot G2 (Mumbai/Sanaa) should remain on the hot spots list until safety improvement initiatives or mitigation measures had been completed.

3.50 The Meeting was updated that, during the Special ATM Coordination Meeting between India and Oman held in June 2026, the ATM system at Mumbai ACC was in the process of being upgraded, with completion planned for Q4 of 2026. As a result, the new ATM system would be ready to support AIDC implementation.

SEA Airspace

3.51 **Table 13** provided the technical, operational, and total risk for the RVSM implementation in the SEA airspace, which met TLS.

Table 13. RVSM Risk Estimates within SEA Airspace for Calendar Year 2025

SEA Airspace **Estimated annual flying hours = 5,638,171 hours** ***(Note: estimated hours based on December 2025 TSD)***			
Source of Risk	**Risk Estimation**	**TLS**	**Comparison with TLS**
Technical Risk	1.356×10^{-9}	2.5×10^{-9}	Below technical TLS
Operational Risk	0.462×10^{-9}	-	-
Total Risk	**1.818×10^{-9}**	5.0×10^{-9}	**Below TLS**

3.52 A total of 63 LHD events were reported in 2025, compared to 89 in 2024. It was noted that almost all LHD events fell under Category E. When divided into sub-categories, the most frequent sub-category was E-RI at 55 per cent, followed by E-NT at 34 per cent.

3.53 **Figure 11** illustrated the geographic location of risk-bearing LHD reports within SEA airspace during the assessment period.

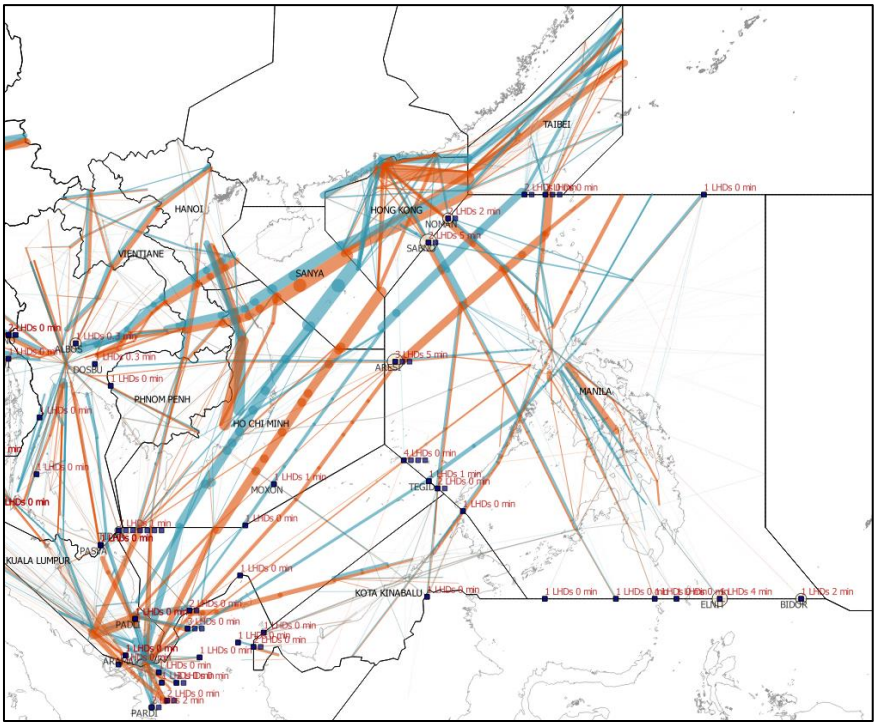

Figure 11. Geographical Location of LHDs within SEA Airspace

3.54 **Table 14** presented the number of LHDs and the operational risk for each cluster, as well as the results of the assessment against the established criteria within the SEA airspace. A "Negative" result indicated that the cluster did not satisfy the respective criterion, whereas a "Positive" result indicated that the cluster met the criterion and could therefore be identified as a hot spot.

Table 14. Results of Identifying Hot Spots in SEA Airspace

2025 Clusters (SEA)	**Bangkok/Ho Chi Minh/ Kuala Lumpur/Singapore (Hot Spot O)**	**Jakarta/Kota Kinabalu/ Singapore**	**Jakarta/Singapore (Hot Spot J)**	**Manila/Singapore**	**Manila/Taibei**	**Manila/Ujung Pandang (Hot Spot D8)**
Number of LHDs	7	6	8	5	5	6
Check Criteria: Number >= 9	Negative	Negative	Negative	Negative	Negative	Negative
Operational Risk (x 10^{-9} fapfh)	0.021	0.000	0.013	0.007	0.000	0.126
Check Criteria: Risk >= 0.066 x 10^{-9} fapfh	Negative	Negative	Negative	Negative	Negative	Positive
Check Criteria: Operational Risk >= 5.00 x 10^{-9} fapfh	Negative	Negative	Negative	Negative	Negative	Negative

3.55 Based on the analysis of hot spots, the following observations and recommendations were proposed:

a) Hot Spot D8 was identified as the only cluster that met the established hot spot criteria for 2025 and therefore should remain on the list of hot spots until safety improvement initiatives or mitigation measures had been completed;

b) Hot Spot D5 (Ho Chi Minh/Manila) should remain on the list of hot spots until safety improvement initiatives or mitigation measures had been completed;

c) Hot Spot D1 (Fukuoka/Manila) and Hot Spot J (Jakarta/Singapore) were proposed for removal, given that the mitigation measures had been successfully implemented;

d) Hot Spot D7 (Kota Kinabalu/Manila) was proposed as a potential non-hot spot, given that it had not met the hot spot criteria since 2021 and that the mitigation measures had been successfully implemented.

e) Hot Spot O (Bangkok/Ho Chi Minh/ Kuala Lumpur/Singapore) should remain on the list of hot spots until safety improvement initiatives or mitigation measures had been completed. It was noted that Singapore ACC conducted regular LHD analysis sharing sessions and provided operational aids, such as visual reminders on the air situation display, to enhance controllers' situational awareness. A coordination meeting between Malaysia, Singapore, and Thailand was required to initiate collaboration and develop appropriate mitigation measures.

Mongolian Airspace

3.56 **Table 15** provided the technical, operational, and total risk for the RVSM implementation in Mongolian airspace, which met TLS.

Table 15. RVSM Risk Estimates within Mongolian Airspace for Calendar Year 2025

Mongolian Airspace Estimated annual flying hours = 128,475 hours *(Note: estimated hours based on December 2025 TSD)*			
Source of Risk	**Risk Estimation**	**TLS**	**Comparison with TLS**
Technical Risk	0.755×10^{-9}	2.5×10^{-9}	Below technical TLS
Operational Risk	0.283×10^{-9}	-	-
Total Risk	**1.038×10^{-9}**	5.0×10^{-9}	**Below TLS**

3.57 In 2025, there were two LHD events were recorded in Mongolian airspace. One was a Category B LHD, in which the flight crew initiated a climb without ATC clearance. Another LHD resulted from a turbulence-induced deviation.

APANPIRG Air Navigation Deficiency List

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

3.59 MAAR reported that it had not received any data from Afghanistan since the political situation in August 2021. In addition, no LHD reports for 2025 had been received from Myanmar. Consequently, MAAR proposed to retain Afghanistan and to include Myanmar in the APANPIRG List of Deficiencies in ATM and Airspace Safety under "Non-Provision of Safety-related Data".

Reporting Culture

3.60 Over the past several years, MAAR had observed continuous improvement among the States and ANSPs under its jurisdiction. Almost all States now regularly submit their LHD reports to MAAR through the Online LHD Submission System and cooperate in addressing LHD-related matters. Only Nepal and Myanmar continued using LHD reporting template and submit their reports via email.

3.61 Furthermore, most reported LHDs in MAAR's area of responsibility were located at the boundary of FIRs and classified as Category E LHD. There were a small number of other LHD categories observed. Additionally, MAAR had received several nil reports, indicating that no LHDs occurred in that particular month for Delhi, Dhaka, Hanoi, Kathmandu, Phnom Penh and Vientiane FIRs over the past three years. The number of nil reports might raise concerns about whether all LHDs were being captured and reported, suggesting the possibility of under-reporting.

3.62 The Chairperson encouraged States LHD Points of Contact (POCs) to expand their focus on other LHD occurrences in addition to Category E, while promoting a positive safety reporting culture within their States/organizations.

3.63 Additionally, the Chairperson also encouraged States LHD POCs to monitor GNSS RFI-related occurrences and to report them where they could be classified as LHD, LLD, or LLE, in accordance with the proposed classification outlined in **RASMAG/30 WP/22**, as well as the latest update of the *Guidance Material for the Continued Safety Monitoring of the Asia-Pacific RVSM Airspace*.

PARMO Vertical Safety Monitoring Report 2025 (WP/12)

3.64 PARMO presented the airspace safety review of RVSM airspace risk reported in the Pacific and a portion of the Northeast Asia airspace, for calendar year 2025.

Pacific Airspace

3.65 **Table 16** provided the technical, operational, and total risk for the RVSM implementation in the Pacific airspace, which exceeded TLS.

Table 16. RVSM Risk Estimates within Pacific Airspace for Calendar Year 2025

Pacific Airspace Estimated annual flying hours = 1,955,758.10 hours *(Note: estimated hours based on December 2025 TSD)*			
Source of Risk	**Risk Estimation**	**TLS**	**Comparison with TLS**
Technical Risk	0.09×10^{-9}	2.5×10^{-9}	Below technical TLS
Operational Risk	7.96×10^{-9}	-	-
Total Risk	**8.05×10^{-9}**	5.0×10^{-9}	**Above TLS**

3.66 A total of 74 LHD events were reported during the year. **Figure 12** illustrated the geographic location of risk-bearing LHD reports within Pacific airspace during the assessment period.

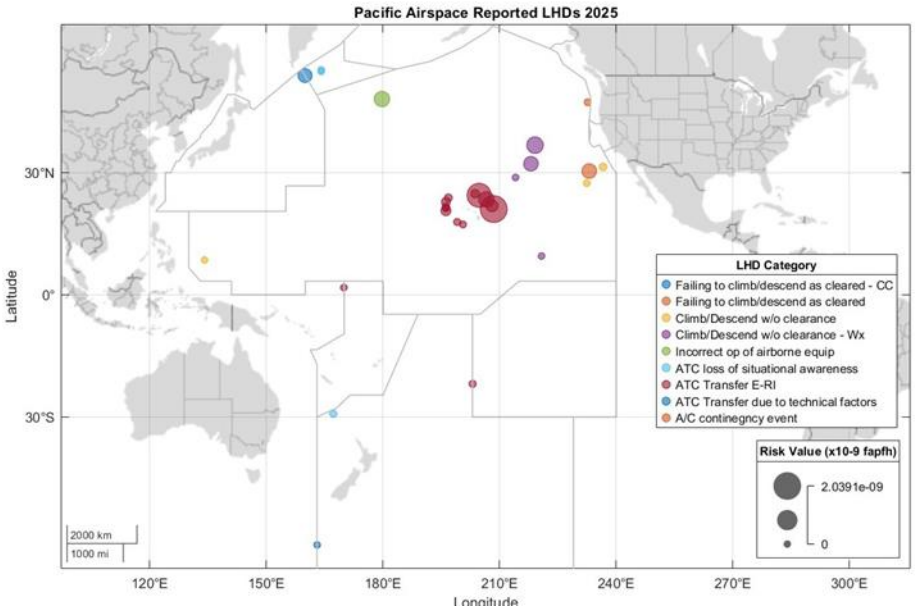

Figure 12. Geographical Location of LHDs within Pacific Airspace

3.67 The Meeting was informed that a software change to the ATM automation had been implemented as a corrective action following a long-duration LHD report. The reported LHD event had a duration of 64 minutes and had been classified as a Category F LHD. The impact of this occurrence on the collision risk estimate had been mitigated by the existing route structure in the relevant area of the Pacific. In addition, ATC refresher training had been implemented to enhance awareness.

Northeast Asia Airspace

3.68 **Table 17** provided the technical, operational, and total risk for the RVSM implementation in the Northeast Asia airspace, of which met TLS.

Table 17. RVSM Risk Estimates within Northeast Asia Airspace for Calendar Year 2025

Northeast Asia Airspace Estimated annual flying hours = 182,037.60 hours *(Note: estimated hours based on December 2025 TSD)*			
Source of Risk	**Risk Estimation**	**TLS**	**Comparison with TLS**
Technical Risk	0.26×10^{-9}	2.5×10^{-9}	Below technical TLS
Operational Risk	0.68×10^{-9}	-	-
Total Risk	**0.94×10^{-9}**	5.0×10^{-9}	**Below TLS**

3.69 A total of 87 LHD events were reported during the year. **Figure 13** illustrated the geographic location of reported LHD events, within Incheon FIR, during the assessment period.

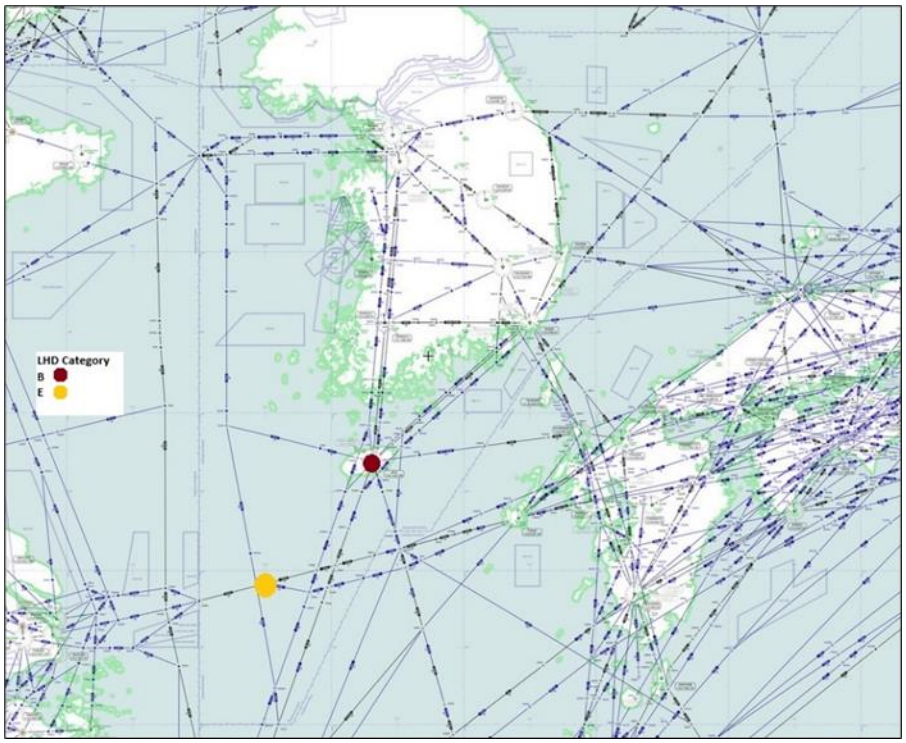

Figure 13. Geographical Location of LHDs within Incheon FIR

BOBASMA Horizontal Safety Monitoring Report (WP/13)

3.70 The Bay of Bengal Airspace Safety Monitoring Agency (BOBASMA) presented the horizontal safety assessment report for the implementation of 50 NM horizontal separation in the Bay of Bengal Arabian Sea Indian Ocean (BOBASIO) airspace for the period January to December 2025.

3.71 The lateral and longitudinal risks remained below TLS, as shown in **Table 18**.

Table 18. BOBASIO Airspace Horizontal Risk Estimates

Bay of Bengal Arabian Sea Indian Ocean Airspace Estimated annual flying hours = 617,741 hours *(Note: estimated hours based on December 2025 TSD)*			
Source of Risk	**Risk Estimation**	**TLS**	**Remarks**
RASMAG/30 Lateral Risk	*1.59777 x 10^{-9}*	*5.0 x 10^{-9}*	*Below TLS*
RASMAG/30 50 NM Longitudinal Risk	*1.65722 x 10^{-9}*	*5.0 x 10^{-9}*	*Below TLS*
Lateral Risk	**1.32085 x 10^{-9}**	5.0 x 10^{-9}	**Below TLS**
50 NM Longitudinal Risk	**1.48931 x 10^{-9}**	5.0 x 10^{-9}	**Below TLS**

3.72 There were zero LLD and LLE reported in 2025.

3.73 BOBASMA clarified that during adverse weather conditions, where flights might deviate to adjacent ATS routes, ATC coordination with adjacent ACCs would be affected. The affected routes were managed as a single route to ensure that aircraft were not assigned the same flight level, thereby contributing to a reduction in LLD and LLE events.

JASMA Horizontal Safety Report (WP/14)

3.74 JASMA presented the horizontal safety assessment report for the North Pacific Ocean airspace for the period January to December 2025. The risk estimation reports covered the horizontal separation standards for:

a) 50 NM lateral separation;

b) 25 NM lateral separation;

c) 10 minutes time-based longitudinal separation (without Mach number technique); and

d) 30 NM distance-based longitudinal separation (PBCS and RNP4).

3.75 The lateral and longitudinal risks remained below TLS, as shown in **Table 19**.

Table 19. North Pacific Ocean Airspace Horizontal Risk Estimates

North Pacific Ocean Airspace Estimated annual flying hours = 1,884,750 hours *(Note: estimated hours based on December 2025 TSD)*			
Source of Risk	**Risk Estimation**	**TLS**	**Remarks**
RASMAG/30 50 NM Lateral Risk	*2.25×10^{-9}*	*5.0×10^{-9}*	*Below TLS*
RASMAG/30 25 NM Lateral Risk	*0.78×10^{-9}*	*5.0×10^{-9}*	*Below TLS*
RASMAG/30 10 Minutes Time-Based Longitudinal Risk	*0.22×10^{-9}*	*5.0×10^{-9}*	*Below TLS*
RASMAG/30 30 NM Distance-based Longitudinal Risk	*0.016×10^{-9}*	*5.0×10^{-9}*	*Below TLS*
50 NM Lateral Risk	**0.26×10^{-9}**	5.0×10^{-9}	**Below TLS**
25 NM Lateral Risk	**0.12×10^{-9}**	5.0×10^{-9}	**Below TLS**
10 Minutes Time-Based Longitudinal Risk	**0.22×10^{-9}**	5.0×10^{-9}	**Below TLS**
30 NM Distance-Based Longitudinal Risk	**0.029×10^{-9}**	5.0×10^{-9}	**Below TLS**

3.76 A total of 44 LLD and LLE events were reported to JASMA in 2025. Category A incidents accounted for the highest number, increasing significantly from two in 2024 to 13. Category B incidents, the second highest, also rose from eight in 2024 to 11. An increase in operational errors by flight crew was observed in 2025.

3.77 The Meeting was informed that at GURAG (boundary between Fukuoka and Manila FIRs), there were five LLDs and five LLEs reported, representing an increase compared to 2024, when zero LLDs and two LLEs were recorded.

PARMO Horizontal Safety Monitoring Report 2025 (WP/15)

3.78 PARMO presented the horizontal safety assessment report for the for the Anchorage, Auckland, Nadi, Oakland, and Tahiti FIRs for the period January to December 2025.

3.79 The lateral and longitudinal risks remained below TLS, as shown in **Table 20**.

Table 20. Pacific Airspace Horizontal Risk Estimates

Pacific Airspace Estimated annual flying hours = 1,955,758 hours *(Note: estimated hours based on December 2025 TSD)*			
Source of Risk	**Risk Estimation**	**TLS**	**Remarks**
RASMAG/30 Lateral Risk	*1.15×10^{-9}*	*5.0×10^{-9}*	*Below TLS*
RASMAG/30 Longitudinal Risk	*0.014×10^{-9}*	*5.0×10^{-9}*	*Below TLS*
Lateral Risk	**0.71×10^{-9}**	5.0×10^{-9}	**Below TLS**
Longitudinal Risk	**0.015×10^{-9}**	5.0×10^{-9}	**Below TLS**

3.80 A total of 177 LLD and LLE events were reported to PARMO in 2025. The data indicated a decrease in the number of reported LLDs compared to calendar year 2024. The LLD category with the most significant reduction was Category A, with eight Category A LLDs reported in 2025 compared to 24 in 2024.

3.81 An increasing trend in coordination occurrences between HCF and Oakland ARTCC was observed to have continued in calendar year 2025. These occurrences affected multiple traffic flows within Pacific airspace due to the central geographic location of HCF. However, the metrics for the CEP traffic flow were the most significant due to the high traffic density. The related analysis was provided in **RASMAG/31 WP/08**.

3.82 In response to an inquiry on whether PARMO had experience in identifying hot spots in the horizontal plane, the Meeting was informed that current horizontal risk estimates in the Pacific airspace were below TLS. PARMO indicated that further assessments would be conducted to explore the identification of hot spots in the horizontal plane.

SEASMA Horizontal Safety Report (WP/16)

3.83 The South East Asia Safety Monitoring Agency (SEASMA) presented the 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 to RNP 10 and RNP 4 operations for the period January to December 2025.

3.84 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 provided in the paper reflected the risk assessment of these two ATS routes.

3.85 **Table 21** provided the horizontal risk estimates for the airspace over the South China Sea.

Table 21. South China Sea Airspace Horizontal Risk Estimates

South China Sea Airspace Estimated annual flying hours = 54,752 hours *(Note: estimated hours based on December 2025 TSD)*			
Source of Risk	**Risk Estimation**	**TLS**	**Remarks**
Lateral Risk (RNP 10)	**0.156×10^{-9}**	5.0×10^{-9}	**Below TLS**
Longitudinal Risk (RNP 10)	**0.375×10^{-9}**	5.0×10^{-9}	**Below TLS**

Lateral Risk (RNP 4)	**0.199 x 10^{-9}**	5.0 x 10^{-9}	**Below TLS**
Longitudinal Risk (RNP 4)	**0.786 x 10^{-9}**	5.0 x 10^{-9}	**Below TLS**

3.86 The number of LLD events increased from two in calendar year 2024 to five in calendar year 2025, while LLE occurrences remained at one. Most LLDs in calendar year 2025 were classified as Category A, primarily due to flight crew deviations without ATC clearance, with contributing factors including weather avoidance and deviations exceeding approved limits or initiated prior to clearance. In contrast, all LLDs and LLEs in calendar year 2024 were classified as Category E, mainly due to coordination errors during ATC-to-ATC transfer of control associated with human factors. In calendar year 2025, only one Category E deviation was recorded, possibly reflecting increased controller awareness. Despite the increase in LLD events, the overall number of events remained low, indicating continued effective collaboration among ANSPs in maintaining safe and efficient operations.

APAC Consolidated Safety Report (WP/17)

3.87 MAAR presented the APAC Consolidated Safety Report, on behalf of the APAC RMAs and En-Route Monitoring Agencies (EMAs). The report was divided into the Pacific (PAC) area, and Asia area (**Figure**).

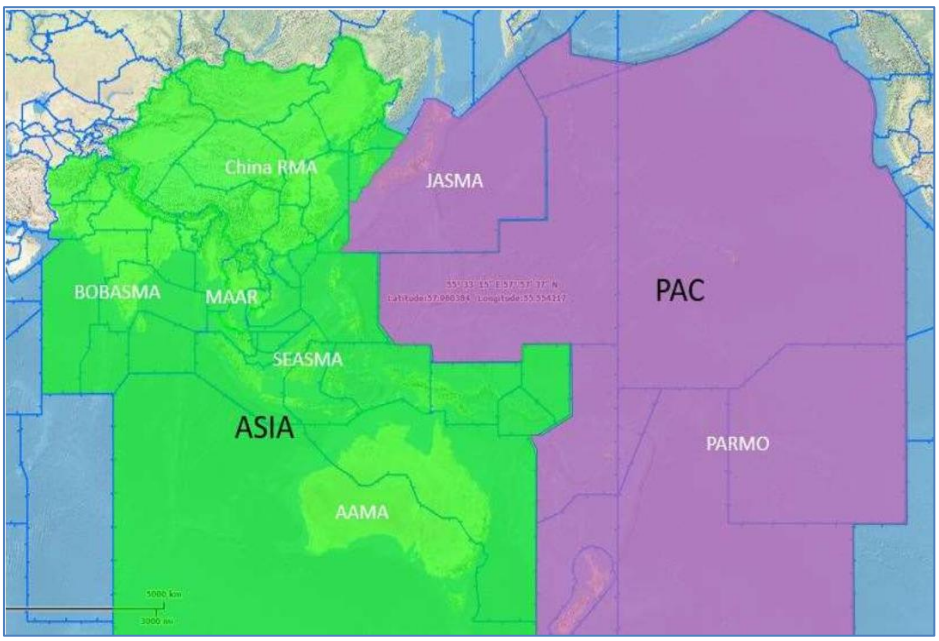

Figure 14. Asia and Pacific Safety Reporting Areas

Pacific Area Vertical Collision Risk

3.88 **Table 22** presented the estimated vertical collision risk for 2025 for the Pacific area, which exceeded TLS.

Table 22. 2025 Pacific Area Vertical Collision Risk Estimates

Pacific Area Estimated annual flying hours = 3,840,508 hours *(Note: estimated hours based on December 2025 TSD)*		
Source of Risk	**Risk Estimation**	**Comparison with TLS**
Vertical Technical Risk	0.22 × 10^{-9}	Below technical TLS

Pacific Area Estimated annual flying hours = 3,840,508 hours *(Note: estimated hours based on December 2025 TSD)*		
Source of Risk	**Risk Estimation**	**Comparison with TLS**
Operational Risk	5.45×10^{-9}	-
Total Risk	**5.67×10^{-9}**	**Above TLS**

3.89 The Pacific area vertical collision risk estimates had been above TLS and trending upwards each year from 2016 to 2019. In 2025, there was a decrease when compared to the previous year (**Figure**).

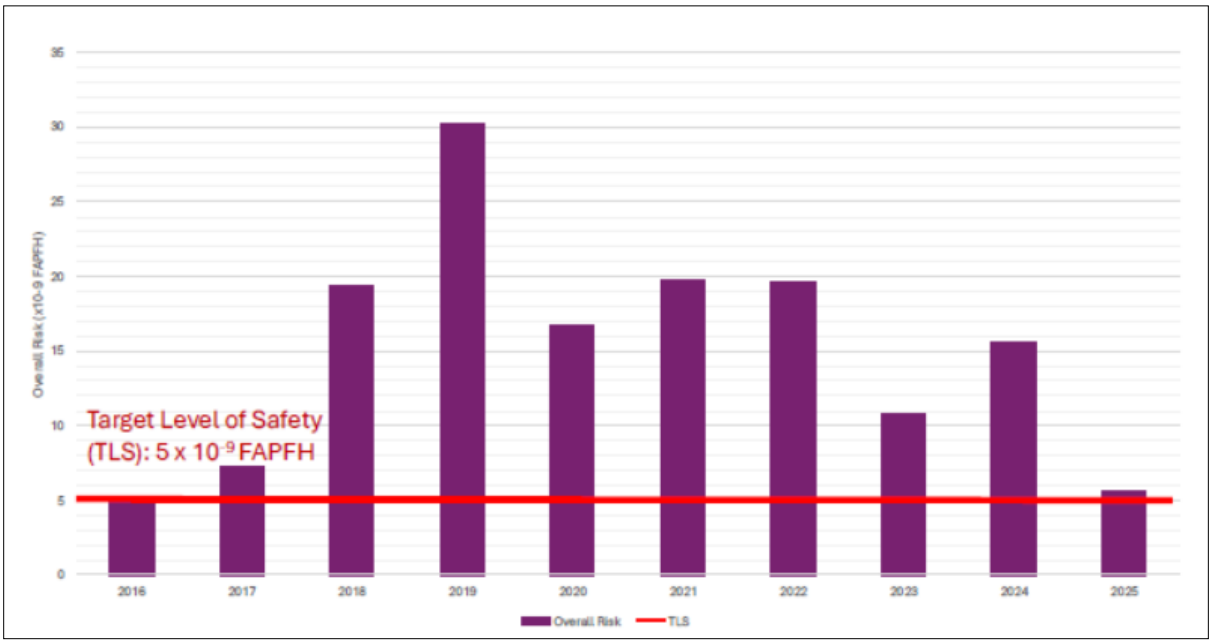

Figure 15. Pacific Area Vertical Collision Risk Estimates 2016 – 2025

3.90 There was a total of 147 LHDs in the Pacific area in 2025 (increased from 139 in 2024), with total duration 383.1 minutes and 33 levels crossed. 28 of the occurrences were Category A, B or C (19%), 78 were Category D, E or F (53%), six were Category G or H (4%), 23 in Category I (16%), 12 were Category J or K (8%), and zero in Category L, M or R.

Pacific Area Horizontal Collision Risk

3.91 The estimated horizontal collision risk for 2025 for the Pacific area met TLS in all lateral and longitudinal risk categories. **Table 23** presented a comparison of the estimated horizontal collision risks for 2024 and 2025.

Table 23. Pacific Area Horizontal Collision Risk Estimates (2024 vs 2025)

2024 Horizontal Risk Estimates	**Risk Estimation**	**Remarks**
Total Lateral Risk	1.22×10^{-9}	Below TLS
Total Longitudinal Risk	0.01×10^{-9}	Below TLS
2025 Horizontal Risk Estimates	**Risk Estimation**	**Remarks**
Total Lateral Risk	0.68×10^{-9}	Below TLS
Total Longitudinal Risk	0.02×10^{-9}	Below TLS

3.92 There was a total of 221 LLDs and LLEs in the Pacific area in 2025 (increased from 171 in 2024), with a total duration of 602.5 minutes and total horizontal deviation of 1,603 NM. 49 occurrences were Category A, B or C (22%), 161 were Category D, E or F (73%), two were in Category G (1%), three were Category H (1%) and six in Category I, J or R (3%).

Asia Vertical Collision Risk

3.93 **Table 24** presented the estimated vertical collision risk for 2025 for the Asia area, which met TLS.

Table 24. 2025 Asia Area Vertical Collision Risk Estimates

Asia Area Estimated annual flying hours = 11,115,453 hours *(Note: estimated hours based on December 2025 TSD)*		
Source of Risk	**Risk Estimation**	**Comparison with TLS**
Vertical Technical Risk	0.84×10^{-9}	Below technical TLS
Operational Risk	0.71×10^{-9}	-
Total Risk	**1.55×10^{-9}**	**Below TLS**

3.94 The Asia area vertical collision risk estimates had been below TLS since 2021 (**Figure 16**).

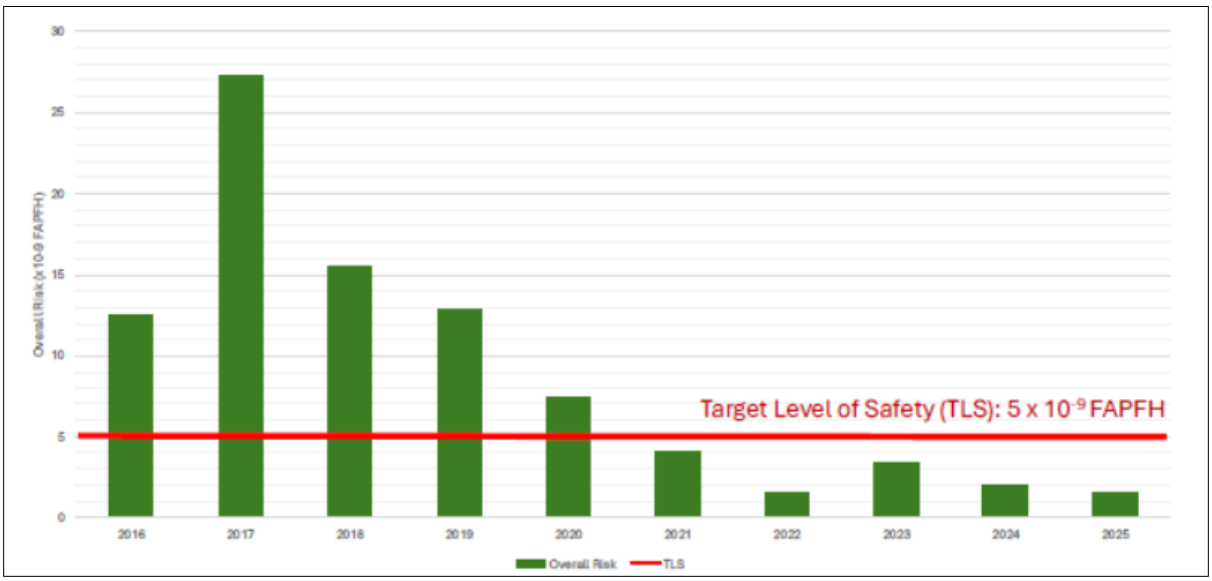

Figure 16. Asia Area Vertical Collision Risk Estimates 2016 – 2025

3.95 There was a total of 813 LHDs in the Asia area in 2025 (increased from 763 in 2024), with total duration 384.1 minutes and 252.8 levels crossed. 78 of the occurrences were Category A, B or C (10%), 504 were Category D, E or F (62%), 12 were Category G or H (1%), 103 in Category I (13%), 22 were Category J or K (2%), and 94 in Category L, M or R (12%).

Asia Area Horizontal Collision Risk

3.96 The estimated horizontal collision risk for 2025 for the Asia area met TLS in all lateral and longitudinal risk categories. **Table** presented a comparison of the estimated horizontal collision risks for 2024 and 2025.

Table 25. Asia Area Horizontal Collision Risk Estimates (2024 vs 2025)

2024 Horizontal Risk Estimates	Risk Estimation	Remarks
Total Lateral Risk	1.54×10^{-9}	Below TLS
Total Longitudinal Risk	1.62×10^{-9}	Below TLS
2025 Horizontal Risk Estimates	**Risk Estimation**	**Remarks**
Total Lateral Risk	1.26×10^{-9}	Below TLS
Total Longitudinal Risk	1.45×10^{-9}	Below TLS

3.97 There was a total of 7 LLDs and LLEs in the Asia area in 2025 (increased from 3 in 2024), with a total duration of zero minutes and total horizontal deviation of 97 NM. Five occurrences were Category A, B or C (71%), two were Category D, E or F (29%), and zero for other categories.

Reporting Rate of LHDs, LLDs and LLEs

3.98 **Table** showed the number of LHDs, LLDs and LLEs reported for 2019 to 2025, and the number of reports per flying hours.

Table 26. Total LHD, LLD and LLE Reports, and Reports per Flying Hours, 2019 – 2025

Airspace	Number of Reports							1 Report : Flying Hours						
	2019	2020	2021	2022	2023	2024	2025	2019	2020	2021	2022	2023	2024	2025
DPRK	0	0	0	0	0	0	0	-	-	-	-	-	-	-
Mongolia	2	0	1	0	0	0	2	1:82,138	-	1:121,621	-	-	-	1:64,238
SEA	152	42	70	62	101	74	69	1:22,275	1:25,106	1:15,456	1:32,620	1:29,400	1:42,001	1:46,259
SA/IO	439	152	135	143	258	204	101	1:7,955	1:7,907	1:11,167	1:21,018	1:10,242	1:20,309	1:36,979
Japan	77	66	80	75	72	76	107	1:20,762	1:14,737	1:13,528	1:18,751	1:23,452	1:25,387	1:19,067
SW Pacific	101	46	47	81	65	71	123	1:9,335	1:6,954	1:11,975	1:5,352	1:18,186	1:17,538	1:11,013
China	79	85	105	72	223	190	251	1:31,119	1:26,867	1:15,477	1:18,003	1:10,525	1:15,149	1:9,336
Pacific	173	134	176	179	203	234	250	1:10,139	1:6,404	1:6,638	1:8,280	1:8,736	1:8,264	1:7,823
Indonesia	37	18	41	54	125	102	196	1:33,321	1:17,346	1:7,402	1:8,060	1:6,099	1:5,379	1:4,349
ROK and AKARA	34	5	24	108	75	126	87	1:18,959	1:25,965	1:6,285	1:1,056	1:2,220	1:1,568	1:2,092
Total	**1,094**	**548**	**679**	**774**	**1,122**	**1,077**	**1,186**	**1:14,330**	**1:13,202**	**1:11,200**	**1:13,230**	**1:12,135**	**1:14,937**	**1:13,309**

3.99 The estimated 15,783,908 flying hours in 2025 were close to the 16,087,567 hours in 2024. The overall reporting rate of LHDs/LLDs/LLEs slightly improved, from one report per 14,937 hours in 2024 to one report per 13,309 hours in 2025.

3.100 The Meeting noted that the reporting rate for SA/IO significantly dropped in 2025 due to the decreased in the number of LHDs, while the flying hours were closed to the number in 2024.

3.101 The reporting rates for China and SW Pacific significantly improved in 2025.

Hot Spots List

3.102 **Table 27** summarized current LHD hot spots, the FIRs involved, the year of identification, and status remarks.

Table 27. LHD Hot Spots in the APAC Region

Hot Spot	Involved FIRs	Identified	Remarks
A1	Chennai/Dhaka/Kolkata/ Yangon	2015	Category E LHDs. Number of reported LHDs and risk level below hot spot criteria.
B1	Incheon (Transfer-of-Control Point between Incheon ACC and Shanghai ACC)	2015	Category E LHDs. Number of reported LHDs and risk level below hot spot criteria.
D1	Fukuoka/Manila	2015	Category E LHDs. Number of reported LHDs and risk level below hot spot criteria. Mitigation measures implemented. **Proposed for removal from the list of hot spots.**
D5	Ho Chi Minh/Manila	2015	Category E LHDs. Number of reported LHDs and risk level below hot spot criteria.
D7	Kota Kinabalu/Manila	2015	Category E LHDs. Number of reported LHDs and risk level below hot spot criteria. Mitigation measures implemented. **Potential non-hotspot.**
D8	Manila/Ujung Pandang	2015	Category E LHDs. Number of reported LHDs below hot spot criteria, but risk level exceeded hot spot criteria.
F	Mogadishu/Mumbai	2015	Category E LHDs. Number of reported LHDs and risk level below hot spot criteria.
G1	Mumbai/Muscat	2015	Category E LHDs. Number of reported LHDs exceeded hot spot criteria, but risk level below hot spot criteria.
G2	Mumbai/Sanaa	2015	Category E LHDs. Number of reported LHDs and risk level below hot spot criteria.
J	Jakarta/Kota Kinabalu/Singapore	2018	Category E LHDs. Number of reported LHDs and risk level below hot spot criteria. Mitigation measures implemented. **Proposed for removal from the list of hot spots.**
N	Hawaii CEP/Oakland USA	2019	Category E LHDs. Number of reported LHDs exceeded hot spot criteria, but risk level below hot spot criteria.
O	Bangkok/Ho Chi Minh/ Kuala Lumpur/Singapore	2023	Category E LHDs. Number of reported LHDs and risk level below hot spot criteria.
P	Jakarta/Ujung Pandang	2026	Category E LHDs. Number of reported LHDs exceeded hot spot criteria, but risk level below hot spot criteria.

3.103 India highlighted that the mitigation measures concerning Hot Spot F and Hot Spot G2 required coordination with States from different regions and would require facilitation from MAAR to coordinate with the Africa Indian Ocean Regional Monitoring Agency (ARMA) and the Middle East Regional Monitoring Agency (MID RMA), respectively.

3.104 Malaysia updated the Meeting regarding the actions taken concerning Hot Spot O. The matter had been briefed to top management and had been registered in State's hazard registry. It was noted that several mitigation measures had been undertaken to address the issue, including incorporating information on the hot spot into controller refresher course and conducting safety promotion through LHD-related safety bulletin planned to be published. As a result, the number of LHD events caused by Kuala Lumpur ACC had been reduced.

3.105 The Meeting was informed that a side meeting between Malaysia, Singapore, and Thailand would be conducted on following day. Noting that several follow-up meetings would be required to agree on the mitigation measures, the States concerned agreed to share the outcomes of their coordination meetings at the next RASMAG meeting, with a view to exploring collaborative improvement initiatives to prevent LHD occurrences at Hot Spot O.

3.106 The Meeting reviewed and provided feedback on the APAC Consolidated Safety Report. The revised version as agreed by the Meeting was provided at **Appendix C** to the Report.

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

Removal of the Asia/Pacific Region En-Route Monitoring Agency (EMA) Handbook from the ICAO APAC Office Website (WP/18)

4.1 The Meeting recalled that the *Manual on Monitoring the Application of Performance-based Horizontal Separation Minima* (ICAO Doc 10063) had been adapted from the *Asia/Pacific Region En-Route Monitoring Agency (EMA) Handbook* and was intended to assist groups of States or regions in describing the functionality needed to monitor the safe application of performance-based horizontal separation minima in procedurally controlled airspace.

4.2 The Meeting noted that ICAO Doc 10063 was more comprehensive than the *EMA Handbook*, contained all necessary *EMA Handbook* content, and included additional references to ICAO Annexes, Standards and Recommended Practices (SARPs) and relevant guidance material. Consequently, at the Twenty-Second Meeting of the Regional Airspace Safety Monitoring Advisory Group (RASMAG/22, Bangkok, Thailand, 10 – 13 July 2017), ***Conclusion RASMAG/22-9*** had been adopted to endorse ICAO Doc 10063 as guidance material and to replace the *EMA Handbook*.

4.3 The Meeting agreed that, since ICAO Doc 10063 was intended to replace the *EMA Handbook* and continued publication of both documents could create unnecessary duplication and confusion, the *EMA Handbook* should be removed for the following reasons:

a) removal had been endorsed by RASMAG via ***Conclusion RASMAG/22-9***;

b) current reporting forms (LHD/LLE/LLD) were owned by the respective RMAs and EMAs;

c) the *Asia Pacific Flight Information Regions and Responsible Monitoring* had been removed from the *EMA Handbook*, published separately, and posted on the ICAO APAC Office eDocuments webpage during RASMAG/28, thereby identifying the monitoring agency responsible for each designated FIR; and

d) updated operational and technical matters, including LLD reporting criteria, had been recorded in ***Conclusion RASMAG 22-8*** and ***Conclusion RASMAG 30-2***.

4.4 In view of the *EMA Handbook* removal, the Meeting determined that a mechanism was required to record regionally agreed changes to ICAO Doc 10063 pending formal amendment. The Meeting therefore agreed to the following Conclusion:

Conclusion RASMAG/31-1: Establishment of RASMAG Conclusions/Decisions Tracking List on Monitoring the Application of Performance-based Horizontal Separation Minima

That,

1. a *RASMAG Conclusions/Decisions Tracking List on Monitoring the Application of Performance-based Horizontal Separation Minima* be established, to record current changes agreed by RASMAG to the information in ICAO Doc 10063, until the document is amended; and
2. the *RASMAG Conclusions/Decisions Tracking List on Monitoring the Application of Performance-based Horizontal Separation Minima* at **Appendix D** to the Report be adopted and uploaded on the ICAO APAC Office eDocuments webpage.

4.5 It was noted that RMAs, EMAs, and States were to refer to ICAO Doc 10063 for global provisions, while the *RASMAG Conclusions/Decisions Tracking List on Monitoring the Application of Performance-based Horizontal Separation Minima* would provide regional specifics for the application of such minima.

4.6 PARMO informed the Meeting that the second edition of ICAO Doc 10063 had been developed and was pending publication.

Revision of the Guidance Material for the Continued Safety Monitoring of the Asia-Pacific RVSM Airspace (WP/19)

4.7 MAAR presented the proposed revision of the *Guidance Material for the Continued Safety Monitoring of the Asia-Pacific RVSM Airspace*, updating it from Version 3.0 (August 2024) to Version 4.0 (July 2026). The Meeting noted that the guidance material served as a key reference for post-implementation RVSM safety monitoring, outlining the roles and responsibilities of States and RMAs and supporting a coordinated regional approach to maintaining safe operations. The revision was proposed to incorporate recent developments and decisions endorsed by the APAC monitoring agencies and relevant RASMAG meetings.

4.8 The paper highlighted three major updates introduced in Version 4.0. First, sub-categories for Category E LHDs (i.e. E-NT: No Transfer or Negative Transfer, E-LT: Late Transfer, E-RI: No or Late Revision of Transfer Information, and E-OT: Any Other Type) were established to better classify coordination-related human factor errors. Second, a new Category R was introduced to capture LHD events associated with GNSS RFI, including jamming and spoofing occurrences. Third, the *LHD Analysis Form* (Form A) was revised to incorporate elements from the Human Factors Assessment Questionnaire, aimed at improving the identification of contributing factors and supporting more comprehensive analysis of operational events. These changes were intended to enhance consistency, accuracy, and analytical capability in RVSM safety monitoring.

4.9 The final version of the *Guidance Material for the Continued Safety Monitoring of the Asia-Pacific RVSM Airspace Version 4.0*, as reviewed and agreed by the Meeting was provided at **Appendix E** to the Report.

4.10 The Meeting agreed to the following Conclusion:

Conclusion RASMAG/31-2: Guidance Material for the Continued Safety Monitoring of the Asia Pacific RVSM Airspace Version 4.0

That,

1. the *Guidance Material for the Continued Safety Monitoring of the Asia Pacific RVSM Airspace Version 4.0* be adopted; and
2. the *Guidance Material for the Continued Safety Monitoring of the Asia Pacific RVSM Airspace Version 4.0* be uploaded to the ICAO APAC Office eDocuments webpage to replace the existing version.

RASMAG's Safety Data Sharing with Stakeholders (WP/20)

4.11 The paper presented by MAAR provided the background and current practices of RASMAG's safety data sharing with stakeholders, in relation to ***RASMAG Task List Action Item 29/1***, which addressed the identification and de-identification of safety reports for wider distribution. It was noted that the discussion originated from earlier requests by international organizations to access more detailed safety occurrence information, particularly LHD events. The safety data sharing within RASMAG currently covered individual LHD/LLD/LLE reports, annual airspace safety reports, and identified hot spots, and aimed to establish a structured approach for data sharing beyond monitoring agencies.

4.12 The Meeting noted the existing practices, highlighting that certain sensitive information, particularly aircraft call signs, was treated as confidential and required de-identification before being shared externally. It was agreed among monitoring agencies that while high-level summaries and categorized information could be shared with broader stakeholders, detailed event descriptions that might reveal the identity of operators or other entities should not be disclosed. It was also noted that aggregate safety reports and hot spot information were already publicly available, with sensitive details removed, while full data with identified information was only shared among relevant monitoring agencies, States, ANSPs, and operators for safety purposes.

4.13 The Meeting was invited to review the current practices and provide guidance on whether the proposed extension of data sharing to international aviation organizations, such as IATA and IFALPA, was appropriate. It was noted that such organizations could serve as intermediaries in addressing safety issues with aircraft operators. Subject to agreement in principle, it was further indicated that additional work would be undertaken to formalize the data sharing framework, including the development of clear processes, assignment of responsibilities, and establishment of conditions governing the use of shared data.

4.14 In response to an inquiry, PARMO shared that, based on its knowledge, one RMA currently had a data sharing arrangement to provide individual LHD/LLD/LLE reports to stakeholders beyond the relevant EMAs, RMAs, States, ANSPs, and aircraft operators. The RMA updated reported occurrences after they had been reviewed by its scrutiny group and made them available through its database. Access was provided via username and password, with the respective State authorities granting access rights. It was further noted that tiered access levels were implemented, determining the type and extent of information that could be made available.

4.15 The Meeting noted the concerns raised by several States, including legal and privacy issues that could restrict the provision of data sharing to external parties. It was therefore suggested that a more concrete proposal be developed, including a clear mechanism for data sharing and a requirement for requesting parties to explicitly state the specific purpose for which the data would be used, prior to States being able to provide comments and/or make a decision.

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

Enhancing Safety in Hot Spot B1 on ATS Route A593 (WP/21)

5.1 In 2025, the Republic of Korea conducted a safety review of Hot Spot B1, the transfer of control point between Incheon ACC and Shanghai ACC. The review indicated that most of occurrences in the area were attributable to human factors. The safety review of Hot Spot B1 was conducted based on LHD data collected from January to December 2025, as well as mandatory and voluntary safety reports. Out of 91 safety data entries, nine cases were excluded from the analysis due to misreporting or insufficient information. Accordingly, 82 cases were subject to a detailed safety review.

5.2 The safety review identified that 77 cases were attributable to errors by controllers, including uncoordinated flight level changes (40 cases), delayed provision of flight information (13 cases), and omission of flight information (eight cases). In addition, three cases were attributed to human errors by pilot, such as incorrect readback. One case of severe turbulence and one case of aircraft system malfunction were also reported. The risk assessment indicated that none of the cases were classified as "Severe" or "Major". However, 55 cases were categorized as "Minor" and required mitigation measures, all of which were attributable to human errors. Although these cases did not pose an immediate significant safety risk, they highlighted the potential for recurring human errors.

Establishment and Operation of AIDC

5.3 The Republic of Korea highlighted that the establishment and operation of AIDC would constitute the effective measure to mitigate human errors during the transfer of control. Taking these findings into consideration, the Republic of Korea completed the development of the necessary infrastructure at Incheon ACC for AIDC implementation in June 2023 and subsequently requested Shanghai ACC to commence trial operations to enhance safety on ATS route A593. However, China indicated in previous meetings that technical constraints had made it difficult to proceed with trial operations. The Republic of Korea expressed its readiness to engage with Shanghai ACC in discussions on trial operations to resolve technical issues and to facilitate the implementation of AIDC between the two ACCs at the earliest possible opportunity.

Safety Management Cooperation

5.4 The Republic of Korea's Air Traffic Management Office (ATMO), as the ANSP, was responsible for providing safe and efficient air traffic services within the Incheon FIR, while the Korea Office of Civil Aviation (KOCA), as the regulatory authority, was responsible for conducting oversight of its ANSP accordingly. However, safety data related to the airspace delegated to Shanghai ACC had been shared only to a limited extent, with such exchanges largely confined to LHD data. This limitation posed challenges in conducting comprehensive safety reviews and effective safety oversight.

5.5 The Meeting was informed that the Republic of Korea retained responsibility for ensuring continuous and effective safety management in the delegated airspace. Accordingly, as the State responsible for the Incheon FIR, the Republic of Korea requested the establishment of a safety oversight mechanism for the delegated airspace (LAMEN–SADLI segment of ATS route A593). This initiative was expected to contribute not only to strengthening bilateral aviation safety cooperation but also to enhancing overall airspace safety in the APAC region.

Improvement of the Airspace Environment

5.6 At the Thirteenth Meeting of the ATM Sub-Group of APANPIRG (ATM/SG/13, Singapore, 25 – 29 August 2025), China and the Republic of Korea each presented measures aimed at enhancing safety on ATS route A593. Following the discussions, both States agreed to continue their coordination efforts and to submit a joint working paper to ATM/SG/14, scheduled for August 2026, providing an update on the progress of Phase 2 implementation and any associated operational outcomes.

5.7 The Republic of Korea commented that controllers' situational awareness would be enhanced when ATS route structures accurately reflected actual traffic flows. In this regard, the proposed phased implementation plan was developed to align route design with prevailing operational conditions. It was therefore proposed that Phase 2 of the Phased Implementation Plan be implemented at the earliest opportunity, including the establishment of a triple ATS route structure.

Efforts to Enhance Airspace Safety

5.8 To accommodate increasing traffic demand and to maintain airspace capacity and smooth traffic flow, the Republic of Korea indicated that Automatic Dependent Surveillance – Broadcast (ADS–B) equipage would be required for aircraft operating within the Incheon FIR effective 9 April 2027. As a result, surveillance within the Incheon FIR was expected to transition from radar-only surveillance to an integrated ADS–B surveillance environment, thereby enhancing surveillance capability and redundancy.

5.9 Considering the enhanced surveillance capability along the entire ATS route A593, the Republic of Korea expressed its readiness to discuss the reduction of longitudinal separation minima with Fukuoka and Shanghai ACCs in accordance with the ***Fourteenth Air Navigation Conference (AN-Conf/14) Recommendation 3.1/1***. In preparation for Phase 2 operations under the Phased Implementation Plan, the Republic of Korea was also preparing the design of a triple ATS route structure, the removal of Flight Level Allocation Scheme (FLAS), and the improvement of flight information procedures for Visual Flight Rules (VFR) aircraft.

Operational Structure and Terminology of ATS Route A593

5.10 The Republic of Korea opined that the corridor system applied to the ONIKU–LAMEN segment of ATS route A593 within the Incheon FIR (formerly known as the FUKUE–AKARA Corridor) was dismantled with the implementation of Phase 1 on 25 March 2021. Accordingly, Incheon ACC had been providing air traffic services for the SADLI–ONIKU segment (east of 125°E), while Shanghai ACC had been providing air traffic services for the SADLI–LAMEN segment (west of 125°E) under delegation from Incheon ACC. Therefore, the Republic of Korea opined that the terms "Corridor" or "AKARA Corridor" were no longer considered valid, and it was proposed that the terms "A593 Delegated Airspace" or "SADLI–LAMEN Segment" be used instead.

5.11 The Meeting was informed that, as the Phase 2 Implementation Plan required thorough assessment and mutual agreement between both parties, China had been actively preparing for the China–Republic of Korea bilateral ATM meeting, which was expected to take place prior to ATM/SG/14, either in person or virtually, subject to coordination between the two States.

5.12 With regard to the Republic of Korea's proposal to change the terms "Corridor" or "AKARA Corridor," China opined that RASMAG might not be the appropriate forum to discuss the matter. The Chairperson noted that RASMAG focused on airspace safety monitoring, particularly hot spots, and highlighted that the naming had been updated as proposed by the Republic of Korea to "LHD Hot Spot B1 Incheon (Transfer-of-Control Point between Incheon ACC and Shanghai ACC)".

5.13 The Republic of Korea opined that the objective of RASMAG was to enhance airspace safety and efficiency within the RVSM airspace. Given the high traffic volume and limited route capacity in the area, it was emphasized that greater attention should be given to addressing the associated challenges and implementing appropriate mitigation measures.

5.14 In response, the Chairperson explained that RASMAG monitored airspace safety through the identification of airspace safety concerns, including hot spot lists where appropriate, and by tracking the progress of mitigation measures implemented by the concerned States. The Chairperson agreed with the need for continued attention but clarified that RASMAG would not engage in detailed resolution processes, as these would require more extensive bilateral or multilateral coordination. It was further highlighted that, for the removal of a hot spot, States needed to implement mitigation measures and provide supporting evidence demonstrating a reduction in LHD events.

Transfer of RVSM Safety Assessment and Monitoring Responsibilities of Hong Kong China and Macao China to China RMA (WP/22)

5.15 China RMA presented a proposal for the transfer of RVSM safety assessment and monitoring responsibilities for Hong Kong China and Macao China, from MAAR to China RMA. It was highlighted that MAAR had provided these services for the Hong Kong FIR since 2002. The proposal was developed in the context of increasing collaboration within the Greater Bay Area (GBA), which provided a strong foundation for consolidating monitoring responsibilities under China RMA to enhance regional coordination.

5.16 The Meeting was informed that the proposed transfer aimed to consolidate the RVSM safety assessment and monitoring services under the China RMA. This unified approach leverages the established coordination mechanisms and proven track record of cooperation to ensure streamlined operations and enhanced safety oversight for the entire region. The proposal had been presented and/or discussed at several meetings, including APANPIRG/36, RASMAG/MAWG/13 and RMACG/21, and was supported by all relevant stakeholders.

5.17 A structured transition plan was presented, with responsibilities remaining with MAAR prior to RASMAG/31, followed by data handover and a transition period from mid-2026 to the end of 2026 during which China RMA would progressively assume operational duties with MAAR's support. Full implementation was scheduled for 1 January 2027, after which China RMA would assume complete responsibility for monitoring and safety assessment, including preparation of the 2026 safety assessment report.

5.18 RASMAG/31 agreed to the following Draft Conclusion:

Draft Conclusion RASMAG/31-X: Transfer of RVSM Safety Assessment and Monitoring Responsibilities of Hong Kong, China and Macao, China from MAAR to China RMA

That,

1. effective from 1 January 2027, the competent airspace safety monitoring organizations for safety assessment and monitoring in the vertical plane [i.e. Reduced Vertical Separation Minimum (RVSM)] for Hong Kong China and Macao China be transferred to China RMA; and
2. the revised *Asia/Pacific Flight Information Regions and Responsible Monitoring Agency* at **Appendix F** to the Report be uploaded to the ICAO APAC Office eDocuments webpage to replace the existing version.

AAMA Assessment of Non-RVSM Approved Aircraft (WP/23)

5.19 AAMA presented the non-RVSM approved airframes that had filed flight plans to operate within RVSM airspace from June 2025 to March 2026, which was based on the monthly cross-check and comparison of aircraft registrations identified from flight plan data and the lists of RVSM-approved aircraft available from individual RMAs on the ICAO Knowledge Services Network (KSN) website. Only aircraft that had filed flight plans for RVSM levels with a "W" indicated in Item 10 were considered.

5.20 Aircraft that had incorrectly filed flight plans between June 2025 and March 2026 were consequently identified as non-RVSM approved airframes. It was noted that AAMA had seven such unapproved airframes, while NAARMO and PARMO each had one unapproved airframe. Detailed information regarding these aircraft was provided in **RASMAG/31 WP/23**.

5.21 PARMO highlighted that the suspected non-RVSM approved aircraft under the responsibility of NAARMO remained classified as non-RVSM approved and were still under investigation. Regarding the airframe under PARMO's responsibility, it was noted that the aircraft was unlikely to achieve RVSM levels. The operator had filed a "W" in December, which led to its capture by AAMA. However, based on subsequent communication with AAMA, it was understood that no further "W" filings had been made since December 2025.

JASMA Assessment of Non-RVSM Approved Aircraft (WP/24)

5.22 JASMA presented the non-RVSM approved airframes that had filed flight plans to operate within RVSM airspace from January to April 2026. The analysis was based on a monthly cross-check and comparison of aircraft registrations identified from flight plan data extracted from the Flight Object Administration Center System (FACE) of the Japan Civil Aviation Bureau (JCAB) against the lists of RVSM-approved aircraft available in individual RMAs' databases.

5.23 Aircraft that had operated within the RVSM airspace of the Fukuoka FIR between January and April 2026 with "W" filed in Item 10 of their flight plans, but whose RVSM approvals were not registered in the databases as of the tenth day of the following month, were identified and presented in **RASMAG/31 WP/24**. It was noted that one aircraft had operated in RVSM airspace for four consecutive months without its approval being verified in the RMA approval database.

5.24 The Meeting noted that JASMA had communicated the details of the aircraft listed in the WP to the respective RMAs. It was further noted that only PARMO had provided verification confirming that the aircraft under its responsibility was RVSM approved.

MAAR Assessment of Aircraft with RVSM Approval Status Pending Verification (WP/25)

5.25 MAAR presented the results of its annual "W" verification of flight plans for aircraft operating in RVSM airspace across MAAR-designated States. The analysis was based on data from the 2025 TSD and monthly Bangkok FIR flight plan records. A total of 20 aircraft operated in RVSM airspace were identified as having pended RVSM approval status verification, representing a reduction from the 26 aircraft reported at RASMAG/30.

5.26 Overall, the findings indicated that most of the identified cases were attributable to administrative factors, such as delays in F2 Form submissions and aircraft de-registration or transfer, rather than intentional non-compliance. Continued coordination and prompt follow-up were therefore considered essential to ensure the accuracy of RVSM approval data and the correct use of the "W" indicator in flight plans. MAAR noted that it would continue to monitor the situation and explore opportunities to enhance verification processes and information exchange among RMAs and States.

5.27 It was observed that three Indian-registered aircraft were identified as repeat cases, having remained on the list for two consecutive years. These aircraft were observed operating exclusively within Indian FIRs. MAAR had promptly contacted the Directorate General of Civil Aviation (DGCA) India, in parallel with the aircraft operators, following the release of the audit results to request confirmation of their RVSM approval status. Although several operators had verbally confirmed that the aircraft held valid RVSM approvals, MAAR required official confirmation from the State authority. While DGCA India had been submitting F2 Forms to MAAR, the confirmations had been provided gradually and did not yet cover all aircraft on the list. As a result, the RVSM approval status of several Indian-registered aircraft remained pending verification.

5.28 MAAR updated the Meeting that DGCA India had submitted F2 Forms for two of the three aircraft mentioned above during RASMAG/31. MAAR would continue to coordinate with DGCA India to obtain the remaining confirmation documents and update the records accordingly.

RASMAG Task List Action Item 30/6

5.29 The Meeting was informed that MAAR had initiated preliminary discussions on developing a consolidated list of non-RVSM approved aircraft among APAC RMAs in support of ***RASMAG Task List Action Item 30/6***. At RMACG/21, RMAs discussed the need for consistent terminology to distinguish between aircraft with pending RVSM approval verification and those confirmed as non-RVSM approved, and agreed that the Action Item should focus only on confirmed non-RVSM approved aircraft.

5.30 The Meeting noted that the establishment of common terminology was a key initial step prior to further development, and that discussions on this Action Item would continue at future RASMAG/MAWG meetings.

APANPIRG Air Navigation Deficiency List

5.31 The annual RVSM approval snapshot provided by each State was essential for verifying RVSM approval status and identifying aircraft with pending verification. MAAR observed that regular submission of these snapshots enabled States to detect missing approval records and promptly notify MAAR, as well as identify de-registered aircraft for removal from the database, thereby preventing them from contributing to the monitoring burden. MAAR strongly encouraged all States to routinely submit their annual RVSM approval snapshots to maintain the accuracy and currency of the MAAR RVSM database.

5.32 MAAR highlighted that Mongolia and Pakistan did not submit the 2025 annual RVSM approval snapshot and invited RASMAG to consider whether continued non-submission should be brought to the attention of APANPIRG. It was further noted that, should the issue persist, it might warrant inclusion in the APANPIRG Air Navigation Deficiencies in the ATM and Airspace Safety fields.

PARMO RVSM Traffic Compliance Monitoring (WP/26)

5.33 PARMO presented its assessment of aircraft operating within RVSM airspace without a valid RVSM approval record in the Pacific and parts of Northeast Asia under its oversight. The analysis was based on TSD for December 2025, comprising 96,318 operations, where observed RVSM flight levels and corresponding flight plan indications were compared against the May 2026 combined approvals database.

5.34 A total of 18 aircraft were initially identified as having no valid or expired approval and required further analysis. Of these, seven were subsequently confirmed as approved, ferried, or exported, and six were attributed to flight plan misfiles or typographical errors, leaving five aircraft identified as non-approved. It was noted that most discrepancies were due to delays in State notification of RVSM approvals to the relevant RMAs, highlighting the importance of timely data submission.

5.35 AAMA updated the Meeting that the suspected non-RVSM-approved aircraft under its responsibility had been confirmed as RVSM approved, and that the approval status would be updated accordingly in the latest approval database.

China RMA Approval Check of Non-RVSM Aircraft in 2026 (IP/02)

5.36 China RMA presented an overview of its efforts to monitor and update RVSM approval statuses for aircraft operating within RVSM airspace from January to May 2026, reflecting its ongoing commitment to ensuring compliance and continuous monitoring.

5.37 A list of aircraft identified by China RMA as operating in RVSM airspace without corresponding RVSM approval records was provided in the paper.

5.38 **Figure 17** illustrated the monthly distribution of questionable aircraft, confirmed cases, pending confirmations, and the confirmation rate trend from January to May 2026.

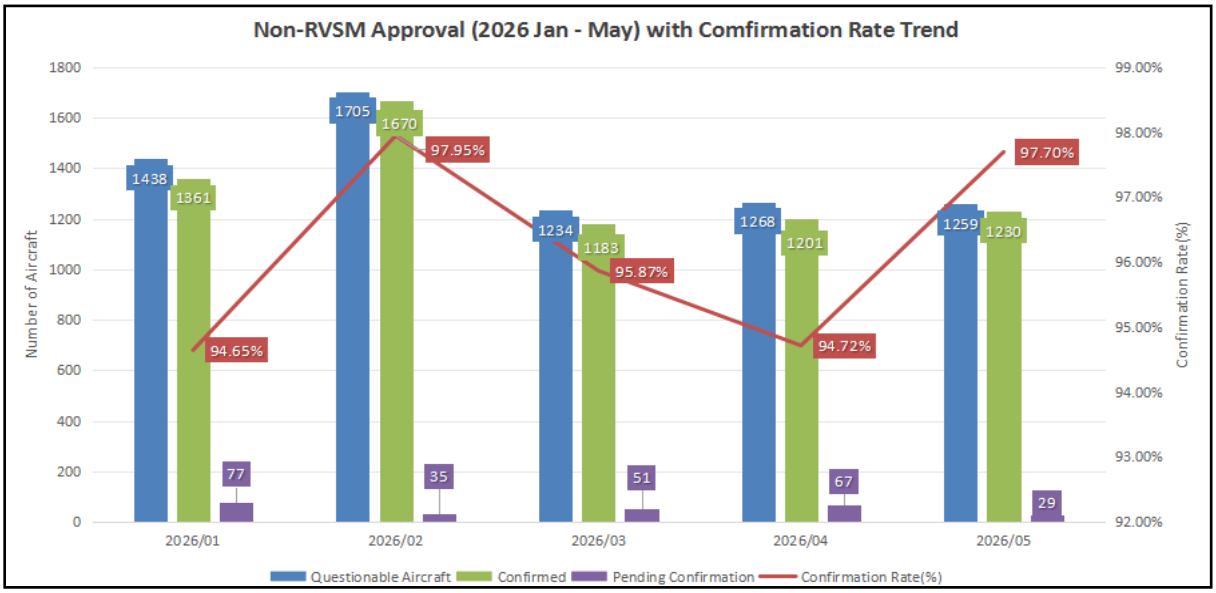

Figure 17. Non-RVSM Approval Status of China RMA from January to May 2026

5.39 The Republic of Korea confirmed that several Republic of Korea-registered aircraft listed in the WP were RVSM approved. The Republic of Korea indicated that it would share this information with PARMO to update the approval database for the validation process.

AAMA RVSM Long Term Height Monitoring Burden (WP/27)

5.40 AAMA presented the monitoring burden based on approvals contained within the AAMA approvals database and global monitoring data available as of 31 May 2026.

5.41 The total number of unique airframes holding RVSM approval from States of Registry under AAMA responsibility as of 31 May 2026 was 1,466. Based on this population, the monitoring burden was calculated at 466 airframes, of which 72 had not been monitored within the preceding two years.

5.42 A breakdown of monitoring burden by State of Registry for States under AAMA responsibility was provided in **RASMAG/31 WP/27**.

5.43 With regard to the Vanuatu-registered aircraft, the Meeting noted that the aircraft's height-keeping monitoring had previously been conducted through ADS–B Height Monitoring System (AHMS), captured via ADS–B while operating over continental Australia. It was further noted that efforts were underway to expand AHMS capabilities, and that access to ADS–B data from other regions would be considered, subject to its suitability for ASE processing. AAMA informed the Meeting that the matter would be urgently discussed with Vanuatu in order to avoid a potential APANPIRG Air Navigation Deficiency.

JASMA LTHM Burden Estimate Update (WP/28)

5.44 JASMA presented the monitoring burden for aircraft registered and operated by Japanese operators to meet ICAO Annex 6 Long Term Height Monitoring (LTHM) requirements as of May 2026.

5.45 As of 31 May 2026, a total of 827 airframes were recorded as RVSM approved in the JASMA approvals database. Applying the MMR to this population resulted in a total monitoring burden of 173 airframes.

5.46 After accounting for aircraft newly approved or monitored within the preceding two years, the outstanding monitoring burden was reduced to 12 airframes (1.5%). These remaining aircraft were primarily operated by small operators, whose flight hours were considered unlikely to have reached 1,000 hours within the recent two-year period.

PARMO RVSM Long Term Height Monitoring Burden (WP/29)

5.47 PARMO presented its analysis of the monitoring burden associated with LTHM requirements for airframes under its responsibility, based on the PARMO RVSM approvals database as of April 2026.

5.48 A total of 572 unique airframes were identified as holding full RVSM approval from States of Registry under PARMO responsibility, resulting in a monitoring burden of 155 airframes, with 13 aircraft not successfully monitored within the preceding two years. This figure may include airframes subject to the 1,000-hour monitoring requirement, for which operators are responsible for providing proof of compliance.

5.49 A summary by State of Registry with a more detailed breakdown was provided in **RASMAG/31 WP/29**.

5.50 New Zealand updated that four of the nine airframes mentioned in the WP had only operated between 120 to 500 hours since they were last monitored, while coordination on the other five airframes was ongoing to ensure that they fulfil Annex 6 requirements. The information had been provided to PARMO, but not in time for it to be reflected in the WP. New Zealand sought for the four airframes to be removed from the long term height monitoring burden.

5.51 With regard to the Cook Islands-registered aircraft, PARMO confirmed that they had been in contact with the operator and had provided guidance on the specific data required to be collected from the ADS–B Out station or the airframe, including the necessary data fields and instructions on the mode of flight. PARMO expressed optimism that the following day's flight would yield satisfactory monitoring results and could enable removal from the proposed potential APANPIRG Air Navigation Deficiency list.

China RMA LTHM Burden Estimate Update (IP/03)

5.52 China RMA presented the monitoring burden for aircraft registered and operated under its responsibility to meet LTHM requirements, based on the RVSM approval database as of the end of April 2026.

5.53 As of April 2026, for China, a total of 4,750 RVSM-approved aircraft were recorded, resulting in a monitoring burden of 559, with 40 aircraft outstanding. For the Democratic People's Republic of Korea, one operator with four aircraft initially required monitoring; however, following Height-Keeping Performance (HKP) monitoring conducted by China RMA in October 2025, all aircraft were found compliant, with a monitoring burden of zero.

5.54 It was noted that the 40 outstanding China-registered aircraft might not have had ADS-B Out capability; therefore, on-board height monitoring was required to be conducted.

NAARMO RVSM Long Term Height Monitoring Burden (IP/04)

5.55 PARMO presented the analysis of the monitoring burden associated with LTHM requirements for airframes under the NAARMO responsibility, based on the NAARMO RVSM approvals database as of March 2026.

5.56 A total of 25,158 unique airframes were identified as holding full RVSM approval from States of Registry under NARMO responsibility, resulting in a monitoring burden of 13,461 airframes, with 660 aircraft (i.e. 5 per cent) not successfully monitored within the preceding two years. This figure may include airframes subject to the 1,000-hour monitoring requirement, for which operators are responsible for providing proof of compliance.

5.57 It was noted that due to incomplete information provided within the RVSM approvals data as well as the limited number of approvals received from Mexico, a monitoring burden calculation was not performed for Mexico for this reporting period.

5.58 A summary by State of Registry with a more detailed breakdown was provided in **RASMAG/31 IP/04**.

ASE Comparison Before and After the Update of Setouchi HMU (IP/05)

5.59 The paper provided information on a verification study comparing ASE values before and after the update of the Setouchi Height Monitoring Unit (HMU), as well as between different monitoring methods. Following the December 2025 update, the system transitioned to a hybrid configuration combining AHMS as the primary tool and en-route Wide Area Multilateration (WAM) as a supplementary method. Data collected from 14 February to 29 May 2026 covered a total of 34,080 flight tracks; however, limitations in data separation and retention meant that only a relatively short observation period was available. Initial analysis showed that the mean ASE derived from AHMS exhibited a trend toward a narrower distribution compared to pre-update values, suggesting improved stability in aircraft height-keeping performance.

5.60 The comparison between AHMS and WAM was inconclusive due to the small sample size of WAM data, representing only about 5 per cent of total observations. Therefore, the study focused on comparing pre-update HMU data (2025) with post-update AHMS data (2026), particularly for aircraft types with sufficient sample sizes such as A320 and B737NX.

5.61 The results demonstrated that ASE variation under AHMS was significantly reduced, and extreme ASE values observed in the legacy HMU system were no longer present, indicating performance improvement after the upgrade. While preliminary WAM results appeared comparable or slightly worse than the legacy system, the limited dataset prevented firm conclusions, and further monitoring was recommended to validate long-term performance.

APAC Consolidated LTHM Compliance Status (WP/30)

5.62 MAAR presented a consolidated overview of LTHM compliance status in the APAC region, including assessments conducted by the five APAC RMAs (i.e. AAMA, China RMA, JASMA, MAAR and PARMO). Based on RVSM approval data as of 30 April 2026, the assessment indicated a remaining monitoring burden in the APAC region of 326 aircraft. This reflected a stable trend compared to the 324 aircraft reported at RASMAG/30.

APANPIRG Air Navigation Deficiency List

5.63 Based on the criteria for State responsibility to comply with the ICAO Annex 6 Height-Keeping Monitoring Requirement, specifically for cases of non-compliance with LTHM requirement where the remaining monitoring burden was 30 per cent or more, recommendations were proposed to add, remove, or retain States in the APANPIRG Air Navigation deficiency list. These recommendations were derived from assessments of RVSM approval data as of 30 April 2026 and were summarized in **Table 28**, which identified States subject to changes in their deficiency status.

Table 28. APANPIRG Deficiency Status based on RVSM Approval Data as of 30 April 2026

State	2024	2025	Recommendation
Afghanistan (MAAR)	50%	50%	Retain
India (MAAR)	46%	48%	Retain
Cook Islands (PARMO)	0%	100%	Add
Pakistan (MAAR)	24%	32%	Add
Vanuatu (AAMA)	0%	100%	Add
Nepal (MAAR)	45%	11%	Remove

5.64 The paper also outlined several recommendations for States and operators:

a) States were encouraged to:

i) promptly inform their RMAs of any changes, such as transferred or de-registered aircraft, as these would impact the number of aircraft requiring height monitoring;

ii) provide RMAs with lists of aircraft meeting the 1,000-flight hour criterion, enabling these aircraft to be excluded from the remaining monitoring burden calculations and thereby reducing the overall percentage;

iii) promote the retrofit of ADS–B Out capability among operators, where feasible, as a more efficient and cost-effective solution for height monitoring in the long term;

iv) actively share ADS–B data with their designated RMAs as an additional means of alleviating the monitoring burden; and

b) Operators with ADS–B Out-equipped aircraft that had not yet fulfilled monitoring requirements were advised to consult their respective RMAs for alternative arrangements.

5.65 PARMO acknowledged the information provided by New Zealand for the four airframes and agreed that the four airframes could be removed from the long term height monitoring burden. The figures and percentage for the consolidated long term height monitoring burden list would need to be revised.

Competent Airspace Safety Monitoring Organizations List (WP/31)

5.66 The Meeting reviewed the *RASMAG List of Competent Airspace Safety Monitoring Organizations* (**Appendix G** to the Report).

Agenda Item 6: Air Navigation Deficiencies

APANPIRG ATM and Airspace Safety Deficiencies List (WP/32)

6.1 The Meeting reviewed the APANPIRG ATM and Airspace Safety Deficiencies List and agreed to make the following recommendation to APANPIRG/37, as recorded in **Appendix H** to the Report. The Meeting was informed that the deadline for submission of information (such as on reduction of the remaining monitoring burden or RVSM approval status verification) must reach MAAR by 19 October 2026 in order to be processed in time for APANPIRG/37.

a) To be retained in the Deficiencies list:

Safety Reporting Deficiencies

i) **Afghanistan** [Failure to submit Kabul FIR Large Height Deviation (LHD) data and traffic sample data (TSD)].

Long Term Height Monitoring Requirement Deficiencies

i) **Afghanistan** (Remaining monitoring burden of 50%, RASMAG/31).

ii) **India** (Remaining monitoring burden of 48%, RASMAG/31).

b) Removal of Deficiency:

Long Term Height Monitoring Requirement Deficiencies

i) **Nepal** (Remaining monitoring burden of 11%, RASMAG/31).

c) Add new Deficiency:

Long Term Height Monitoring Requirement Deficiencies

i) **Cook Islands** (Remaining monitoring burden of 100%, RASMAG/31);

ii) **Pakistan** (Remaining monitoring burden of 32%, RASMAG/31); and

iii) **Vanuatu** (Remaining monitoring burden of 100%, RASMAG/31).

6.2 The Meeting noted that this recommendation reflects the current status as of RASMAG/31 and confirmed that, should accurate updates be provided by the deadline, the Secretariat would exclude such items from the recommendations to APANPIRG. Accordingly, relevant States/Administrations/ agencies were encouraged to submit any necessary updates to the Secretariat and MAAR, by 19 October 2026.

Agenda Item 7: Any Other Business

Airspace Safety Seminar

Introduction and Overview of RVSM Implementation

7.1 The presentation provided an overview of RVSM implementation and emphasized the importance of continued safety monitoring to ensure the safe application of RVSM. It was highlighted that RMAs had been established to support the ongoing safety of RVSM operations by maintaining approvals registries, monitoring ASE, verifying aircraft approval status, and conducting safety assessments and collision risk analyses. In addition, EMAs monitor the application of performance-based horizontal separation by collecting and analyzing LLD and LLE reports, assessing associated risks, and coordinating with States and air traffic service providers to address performance issues.

7.2 The Meeting was also presented on the technical objectives related to aircraft HKP. It was noted that RMAs implemented monitoring programmes to assess ASE and identify adverse performance trends in aircraft and fleet groups. HKP was measured using specialized monitoring systems such as GPS-based units, ADS–B monitoring, and ground-based systems, as ASE was not detectable by aircrew or controller, but had a significant impact on operational risk. These monitoring activities supported early detection of performance degradation and ensured that aircraft continued to meet required RVSM standards.

7.3 Furthermore, the MMR was highlighted as a key mechanism to ensure ongoing compliance with RVSM performance standards. It was explained that operators were required to conduct periodic height monitoring of their aircraft fleets based on defined monitoring categories, ensuring that representative aircraft within each group were assessed. Long-term monitoring requirements were enforced, requiring aircraft to be monitored at least once every two years or within 1,000 flight hours. These measures would ensure sustained performance, reduced monitoring burden through structured grouping, and supported the identification and mitigation of long-term safety risks in RVSM airspace.

Implementation and Monitoring for Reduced Horizontal Separation Minima (PBN and PBCS)

7.4 The regional airspace safety monitoring structure was established under RASMAG, supported by RMAs for vertical separation and EMAs for horizontal separation, to ensure harmonized safety oversight across the APAC region. It was highlighted that the evolution of reduced horizontal separation minima progressed from conventional navigation to Performance-based Navigation (PBN) and Performance-based Communication and Surveillance (PBCS), enabling more precise navigation, reliable communication and surveillance, and ultimately the implementation of performance-based horizontal separation while maintaining safety through continuous monitoring.

7.5 It was noted that the implementation of performance-based horizontal separation followed structured steps including safety assessments, trial implementation, and post-implementation monitoring, with ongoing oversight focusing on aircraft performance and compliance with required communication and surveillance specifications. Monitoring activities included the identification and management of horizontal plane deviations such as LLD and LLE, with results used to support corrective actions and continuous safety assurance. It was emphasized that these measures enhanced airspace capacity, operational efficiency, and safety, while supporting sustainable growth and global harmonization.

Provisions on Safety Monitoring Activities for RVSM Airspace

7.6 The Meeting noted that ICAO provisions for safety monitoring activities in RVSM airspace were established through a comprehensive framework of Standards and Recommended Practices (SARPs), procedures, and guidance material, including ICAO Annex 6, ICAO Annex 8, and ICAO Annex 11, as well as ICAO Doc 4444, ICAO Doc 7030, ICAO Doc 9574, and ICAO Doc 9937. These provisions defined the responsibilities of States, operators, and RMAs to ensure that only approved aircraft operated in RVSM airspace, that aircraft continued to meet HKP requirements, and that effective monitoring programmes were implemented to verify compliance and maintain safety objectives. The framework also emphasized coordination, data exchange, and corrective actions for non-compliant aircraft, supported by regional guidance to ensure consistent implementation and oversight across RVSM regions.

RVSM Approval Check

7.7 The presentation highlighted the importance of ensuring accurate RVSM approval status to maintain airspace safety, noting that aircraft indicating RVSM approval in flight plans could be treated as approved by ATC even if not properly verified in RMA databases. It further emphasized that delays or omissions in submitting RVSM approval information to RMAs could result in aircraft being classified as having unverified approval status, thereby posing potential safety risks and increasing the workload associated with verification and coordination among States and RMAs.

7.8 It was further noted that effective management of RVSM approval data relied on the timely submission of approval information, particularly through the F2 reporting format, and regular database exchanges among RMAs. Challenges such as delayed submissions and lack of responses to inquiries were identified, and it was emphasized that timely reporting and enhanced coordination would reduce the number of unverified aircraft, improve database accuracy, strengthen airspace safety, and reduce the administrative burden on RMAs.

HKP Monitoring Program and MMR

7.9 The Meeting noted that RVSM monitoring was required under ICAO provisions to ensure that the continued application of 1,000 ft vertical separation maintained the required level of safety. It was highlighted that aircraft HKP monitoring was essential to detect potential altimetry system issues and to determine the range of total vertical error for use in safety assessments. The monitoring programme also supported verification of RVSM approval effectiveness, evaluation of ASE stability, and overall assurance that safety objectives continued to be met in RVSM airspace.

7.10 The Meeting further noted that the MMR defined the minimum number of aircraft to be monitored by type and category to ensure representative fleet performance, with operators required to conduct initial monitoring within six months of RVSM approval and at periodic intervals thereafter. It was also highlighted that various height monitoring systems were used, including on-board systems, ground-based monitoring units, and AHMS, which collectively enabled performance assessment, detection of trends, and validation of aircraft compliance with RVSM requirements.

RVSM Vertical Safety Assessment

7.11 The presentation provided an overview of RVSM safety assessment aimed to quantify collision risk in RVSM airspace and compare it against TLS using established collision risk models. The assessment considered total risk as the sum of technical and operational risk and relied on inputs such as height-keeping monitoring data, TSD, and reported LHDs. Technical risk represented the likelihood of collision due to aircraft performance limitations in maintaining assigned altitude, including ASEs, assigned altitude deviations, and the presence of non-RVSM-approved aircraft, while operational risk was associated with LHDs arising from pilot actions, ATC coordination or system errors, weather, or contingency events, evaluated based on the duration at incorrect flight levels and the number of levels crossed.

7.12 It was noted that total risk was determined by combining both technical and operational risks and comparing the result against the global safety target, with thresholds set at 2.5×10^{-9} fapfh for technical risk and 5×10^{-9} for total risk. It was emphasized that consistent monitoring, accurate classification of LHDs, and robust data collection were essential to ensure reliable risk assessment. The key takeaway was that maintaining RVSM safety required continuous monitoring of aircraft performance and operational errors, as well as coordinated efforts among stakeholders to ensure that overall risk remained within acceptable safety levels.

Consolidated Safety Reports and Hot Spot Management

7.13 The Meeting reviewed the APAC Consolidated Safety Report and outlined the processes for hot spot identification, monitoring, and removal. It was explained that hot spots had been identified by first detecting clusters of reported events, followed by applying criteria such as the number of occurrences, operational risk contribution, and whether the risk exceeded TLS. Clusters meeting at least one of these criteria had been classified as hot spots.

7.14 The Meeting also noted that hot spots had been continuously monitored by RASMAG through regular reviews and updates from States/Administrations, with progress reported to APANPIRG. For removal, it was emphasized that evidence of effective mitigation measures had been required, demonstrated by sustained reduction in occurrences and risk. A hot spot had only been removed after it no longer met any criteria for at least two consecutive years, subject to formal approval.

Conclusion

7.15 The Airspace Safety Seminar concluded with a summary of key safety responsibilities and actions required to enhance airspace safety. It was emphasized that States, operators, and air traffic service providers should continuously maintain accurate approvals registries, ensure timely reporting and investigation of LHDs, LLDs, and LLEs, and complied with monitoring requirements. Coordination with RMAs should be undertaken to update data, resolve discrepancies, and support safety assessments.

7.16 Additionally, it was highlighted that continuous monitoring, data submission, and the implementation of corrective actions were essential in maintaining compliance and mitigating risks. Stakeholders were expected to ensure the proper application of separation standards, maintain effective communication channels, and support long-term safety improvements through proactive monitoring and regional collaboration.

7.17 The Meeting expressed its appreciation to all presenters for their informative presentations and the valuable information shared, noting that these would contribute to future improvements in airspace safety in the region.

Airspace Safety Points of Contact (WP/33)

7.18 The consolidated ATM POC was circulated to all RASMAG/31 participants for review and update. All States/Administrations were reminded to inform the ICAO APAC Office if at any time there was a change to their Airspace Safety and FIT (SAF) POC.

Agenda Item 8: Review and Update RASMAG Task List

RASMAG Terms of Reference and Task List (WP/34)

8.1 The Meeting reviewed the RASMAG TOR and agreed the following Draft Decision to better reflect RASMAG's objectives and tasks in identifying, reviewing, and updating the APANPIRG Air Navigation Deficiencies List, as an APANPIRG sub-group:

Draft Decision RASMAG/31-4: Update Regional Airspace Safety Monitoring Advisory Group (RASMAG) Terms of Reference (TOR)

That, the updated RASMAG TOR at **Appendix I** to the Report be adopted.

8.2 The Task List, as updated by the Meeting, was provided in **Appendix J** to the report.

Agenda Item 9: Date and Venue of Next Meeting

9.1 The Thirty-Second Meeting of the Regional Airspace Safety Monitoring Advisory Group (RASMAG/32) was tentatively scheduled for June or July 2027, in Bangkok, Thailand.

Closing of the Meeting

10.1 In closing the Meeting, the Chairperson thanked and congratulated the efforts made by the participants for their contributions to the Meeting.

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