

**54th CONFERENCE OF
DIRECTORS GENERAL OF CIVIL AVIATION
ASIA AND PACIFIC REGIONS**

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**AGENDA ITEM 3: AVIATION SAFETY AND
AIR NAVIGATION**

**THE TWENTY-SECOND MEETING OF THE REGIONAL
AIRSPACE SAFETY MONITORING ADVISORY GROUP
(RASMAG/22) OUTCOMES**

(Presented by the International Civil Aviation Organization)

INFORMATION PAPER

SUMMARY

This paper provides feedback from the Asia/Pacific airspace safety monitoring body, the APANPIRG Regional Airspace Safety Monitoring Advisory Group (RASMAG). The paper describes safety concerns related to the application of Reduced Vertical Separation Minimum (RVSM) and with the continued presence of non-RVSM compliant aircraft. It also discusses issues with datalink monitoring and safety reporting, State responses to Regional Monitoring Agencies (RMAs), and State preparedness for Performance Based Communications and Surveillance (PBCS).

THE TWENTY-SECOND MEETING OF THE REGIONAL AIRSPACE SAFETY MONITORING ADVISORY GROUP (RASMAG/22) OUTCOMES

1. INTRODUCTION

1.1 The Twenty-Second Meeting of the Regional Airspace Safety Monitoring Advisory Group (RASMAG/22) was held from 10 – 13 July 2017 at Bangkok, Thailand. A total of 51 participants attended RASMAG/22 from Australia, Bangladesh, China, India, Indonesia, Japan, Malaysia, New Zealand, Philippines, Republic of Korea (ROK), Singapore, Thailand, United States, Viet Nam, IATA, IFALPA and ICAO.

2. DISCUSSION

2.1 **Figure 1** provides the Asia/Pacific regional Reduced Vertical Minimum Separation Target Level of Safety (RVSM TLS) compliance for 2016:

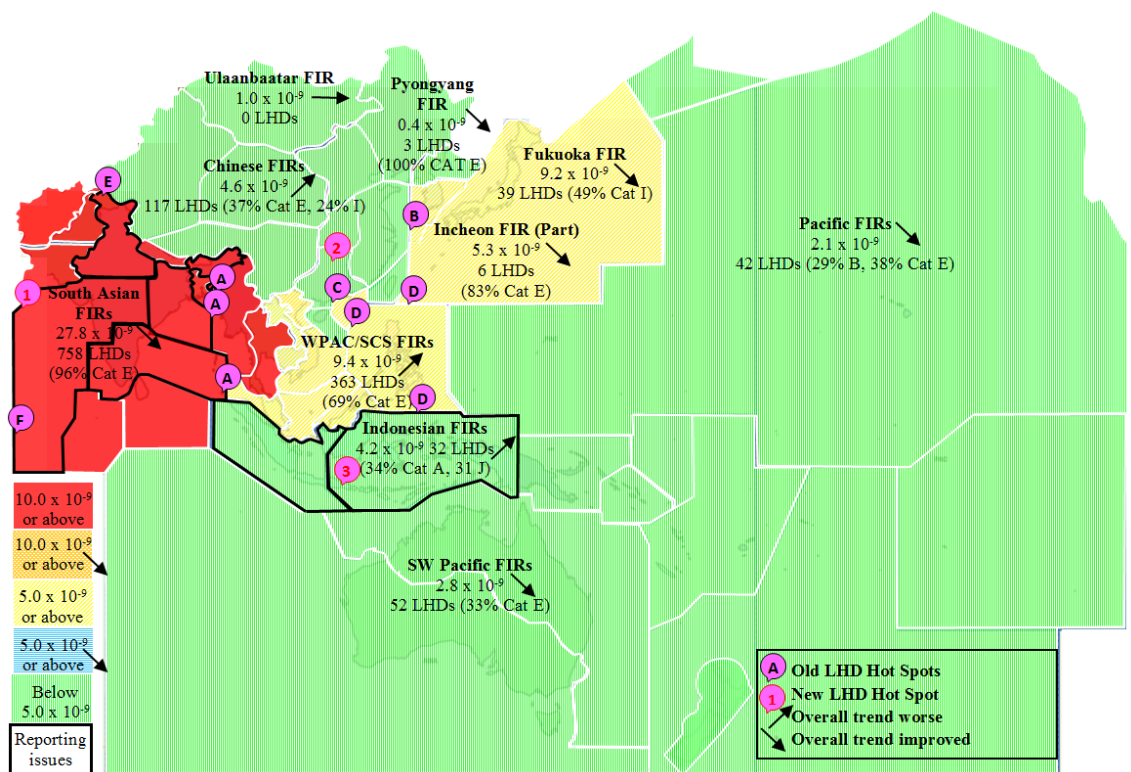


Figure 1: Asia/Pacific TLS compliance reported to RASMAG/22

2.2 **Figure 1** indicated the following sub-regional RVSM trends.

South Asia

2.3 The risk at Mogadishu – Mumbai interface significantly decreased, but remained an issue with nine Large Height Deviations (LHDs) reported at position ORLID (old **Hot Spot F**). However the operational risk and LHDs along the interface between Mumbai Flight Information Region (FIR) and Muscat FIR increased, with 33 LHDs reported along this boundary (new **Hot Spot 1**).

2.4 According to the Monitoring Agency for the Asian Region (MAAR), the western boundary of the Mumbai FIR accounted for 74% of total operational risk in South Asian airspace, with contributing factors for the Mogadishu interface including ‘coordination difficulty’, and poor communications and surveillance capability (however this should not be the case for the Muscat – Mumbai interface). Actions to address these trans-regional shortcomings should be prioritised, in conjunction with the ICAO MID Region.

2.5 The Kolkata/Chennai – Yangon FIR and Chennai/Kuala Lumpur FIR interfaces had been previously identified as old **Hot Spot A**. Although total operational risk decreased in 2016 with the LHDs being of short and moderate duration, the number of LHDs inevitably impacts on ATC workload and the overall risk is still one of the highest in the Asia/Pacific Region.

2.6 The implementation of Air Traffic Services (ATS) Inter-facility Datalink Communications (AIDC) had been previously urged as a high priority, but was not yet operational, and any operational measures that may have been used to minimize the incidence of LHDs had not proven to be effective. Therefore, a concerted effort to bring this situation to the attention of senior decision-makers in the affected States was considered necessary, so the monitoring agencies could be empowered to take appropriate action.

2.7 Bangladesh informed the meeting that their Automatic Dependent Surveillance-Broadcast (ADS-B) programme to improve surveillance capability had been put into hiatus. ICAO emphasised that key projects supporting necessary safety enhancements such as ADS-B needed to be supported by governments.

Southeast Asia

2.8 The Southeast Asian area has also not met the Target Level of Safety (TLS), with a significant increase in LHD reports from 166 (of which 143 were Category E, *ATC transfer of control coordination errors due to human factors*) in 2015 to 363 (251 Category E) in 2016. This deteriorating situation was largely attributed to the poor performance of the Manila FIR; however RASMAG/22 noted that the Philippines stated that a significant proportion of incidents were caused by errors emanating from other FIRs.

2.9 The Philippines had reported an improvement plan to modernize their ATC system for some years, but this has not yet yielded any improvement in performance. As mentioned by RASMAG/21 when identifying old **Hot Spot D**, RASMAG/22 noted that this problem should be highlighted to the Philippines' authorities, to ensure the highest priority was given to urgent improvement in equipment and human performance within the Manila FIR; otherwise temporary delegation of parts of the Manila FIR may be necessary to ensure safety.

East Asia

2.10 Chinese airspace met the TLS, although a new **Hot Spot 2** emerged within the Guangzhou FIR, and the overall conformance had deteriorated close to TLS, which would require concerted attention to manage.

2.11 The Hong Kong FIR – Guangzhou/Sanya FIRs interface (old **Hot Spot C**) LHDs were reported as being mainly due to a late revision of time or altitude. China advised that considerable attention was being paid to systems that supported enhanced human performance, including AIDC.

2.12 Regarding old **Hot Spot E** on the Urumqi FIR – Lahore FIR interface, China was continuing to work with Pakistan to improve the surveillance and communication situation and the number of LHDs had reduced.

2.13 Mongolian airspace achieved TLS, although no LHDs were reported. The Pyongyang FIR airspace risk estimate also achieved the TLS.

2.14 The Incheon FIR failed to meet the TLS. The results of a special safety assessment of the AKARA Corridor in the southern portion of the Incheon FIR, old **Hot Spot B**) revealed that due to the high opposite direction passing frequency, only one vertical deviation per annum of more than 0.125 minutes (approximately 7.5 seconds) would breach the TLS in the Corridor. Hence the safety assessment for the Corridor was 46.2×10^{-9} fatal accidents per flight hour (fafh) from March 2015 until February 2016, which reduced to below TLS (5.0×10^{-9}) by December 2016 at 2.08×10^{-9} , highlighting the extreme sensitivity of the airspace to any LHD event.

2.15 In addition, operational factors associated with the AKARA Corridor within the Incheon FIR which may contribute to a deviation should be taken into account when considering the probability and severity of any safety event for safety mitigation actions, include the:

- a) operation of several Area Control Centres (ACCs) in the same portion of airspace on different frequencies (non-compliant with Annex 11);
- b) possible presence of non-RVSM approved airframes;
- c) possibility of turbulence (reported regularly southwest of Japan), either not allowing adequate height-keeping, or necessitating a descent or climb;
- d) lack of any emergency descent procedures;
- e) possibility of non or under-reporting (in some cases due to lack of awareness of all traffic due to the Flight Level Allocation Scheme, FLAS);
- f) reported lack of a voice communication link between Shanghai and Incheon ACCs (and possibly AIDC); and
- g) inconsistent use of Strategic Lateral Offset Procedure (SLOP).

2.16 Noting the extreme lack of tolerance for any deviation in the AKARA Corridor RASMAG/22 and the associated operational latent factors, RASMAG/22 urged the Republic of Korea, Japan, and China to establish safety mitigation measures in the airspace concerned until improvements to the safety of the airspace were possible and report the progress of such improvements to the Air Traffic Management Subgroup (ATM/SG).

2.17 Japanese airspace also failed to meet the TLS, although this was largely because of the LHDs on—the Manila FIR boundary (old **Hot Spot D**), and a number of severe turbulence events commonly reported southwest and south of the Japanese mainland (note: RASMAG/21 suggested an emphasis on special meteorological forecasting in that area was required so that appropriate avoidance action might be taken).

2.18 MAAR would complete a separate safety assessment for the Taipei FIR as it was not covered by the West Pacific/South China Sea (WPAC/SCS) report.

Southwest Pacific

2.19 The Southwest Pacific achieved TLS, exhibiting a downward trend in reported LHDs.

2.20 Regarding Indonesian airspace, this had met TLS but a new **Hot Spot 3** was identified near Surabaya, which could have been due to increased reporting.

Pacific

2.21 The Pacific easily met TLS, although two long duration events in April 2016 affected the result. The events occurred in the western part of the Oakland FIR with the aircraft operating from Palau to the Manila FIR without a flight plan and no ATC approval within Oakland oceanic airspace.

2.22 **Table 1** provides a comparison of Asia/Pacific RVSM risk as a measure against the TLS, either by RMA ‘sub-region’ (*APANPIRG Conclusion 20/4 – Asia/Pacific Performance Metrics* refers), or by FIRs. The result for 2016 had been an overall improvement to 51% conformance with TLS, but this was still far from acceptable, given significant ‘hot spot’ problem areas in much of South and Southeast Asia.

	RASMAG19	RASMAG20	RASMAG21	RASMAG22
RMA ‘sub-regions’	22%	67%	33%	56%
FIRs	16%	53%	32%	51%

Table 1: Comparison of Sub-Regional and Regional RVSM TLS Achievement

Non-RVSM Approved Aircraft

2.23 The highest number of non-RVSM airframes from Asia/Pacific States that were observed for a significant length of time by the Regional Monitoring Agencies (RMAs) were as follows:

- AAMA: Indonesian registered aircraft PKCMU, PKCMV, PKCMW and PKELX;
- China RMA: ROK (8, including a number of multiple operations by A321 HL8074 – 307, B738 HL8052 – 182, B77L HL808046 – 88, and B738s HL8053 and HL8057 – 79 and 78 respectively), China (5), Viet Nam (5), Philippines (3), India (2), Singapore (2);
- JASMA: Republic of Korea registered aircraft HL8073, HL8052 (14 months), HL8053 (13 months), HL8057 (10 months), and HL8058 (10 months);
- MAAR: Indian registered aircraft totalled 51 (down from 60 in 2015), but Indian aircraft accounted for 77% of the total 66 rogue aircraft registered in the MAAR area of responsibility and 19 of the 51 Indian rogue aircraft had been identified as rogue in RASMAG/21, **10** (VTAJY, VTAVG, VTIDP, VTIDQ, VTIDR, VTIDS, VTRSG, VTWGB, VTWGC, VTWGD) which had also been reported to RASMAG/20 (India was already on the List of Deficiencies regarding Annex 6);
- PARMO: United States (seven, including SF34 N135GU, observed 13 times in the December 2016 TSD), Australia (5), Vanuatu (1), ROK (3) and China (2).

2.24 Overall, the trend was now increasing again, despite a 56.4% reduction in observed non-compliant airframes from 2014 to 2015 due to the proactive work of State authorities, RMAs and the APANPIRG *Conclusion 24/26 Repetitive Non-RVSM Approved Aircraft Operating as RVSM Approved Flights (Figure 2)*. The Chair confirmed that RMACG was also observing an increase again across the global RMA monitoring activity highlighting this as a global issue.

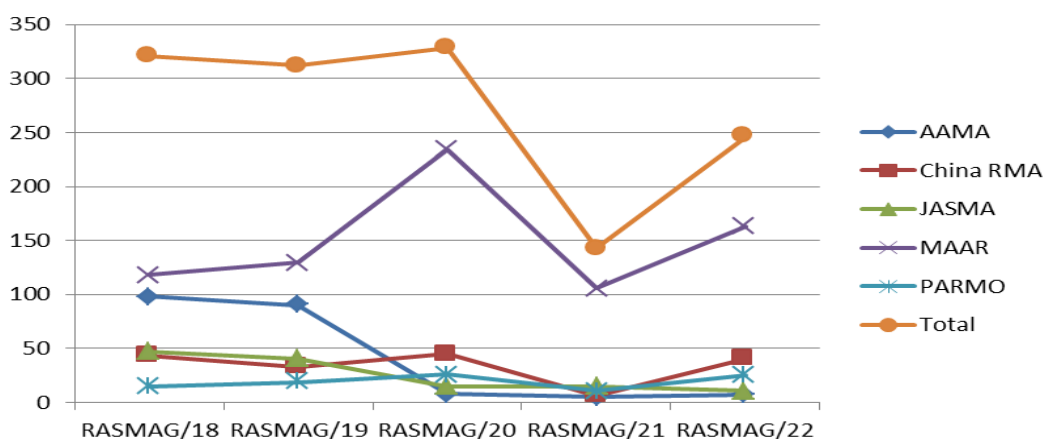


Figure 2: Trend of Non-RVSM Airframes Observed by Asia/Pacific RMAs

2.25 The data indicated that the increase in non-RVSM airframes was not originating from a single source, but from many places around the world. RASMAG/22 considered it was necessary to direct APANPIRG's attention to the main Asia/Pacific States concerned (China, India, Indonesia, Philippines, ROK and Viet Nam), and to additionally request the PIRGs from other concerned regions to be advised of the situation.

2.26 Given the gravity and the long-term problem posed by non-RVSM airframes, the following Draft Conclusion was intended to meet the aims of the RMA Coordination Group's (RMACG's) observations on this matter:

2.27 ...there should be a more stringent stance taken by ANSPs, under the direction of State authorities, to ensure that more appropriate action was taken...

2.28 RASMAG/22 endorsed the following Draft Conclusion, for APANPIRG/28's consideration:

Draft Conclusion RASMAG/22-10: Management of Non-RVSM Aircraft

That, due to the continuing problem of non-Reduced Vertical Separation Minimum (RVSM) aircraft operating inappropriately within the RVSM stratum on a long-term basis:

- (a) Asia/Pacific States should respond in a timely manner to Regional Monitoring Agency (RMA) recommendations; and
- (b) Asia/Pacific States and Administrations should enact policies, legislation (including appropriate enforcement actions), and procedures to ensure such non-approved aircraft are identified and refused entry into the RVSM stratum unless specifically exempted, or they have Air Traffic Control (ATC) approval, and
- (c) ICAO should survey Asia/Pacific States and Administrations to determine whether such policies, legislation and procedures to exclude non-RVSM aircraft have been implemented; and
- (d) RMAs should treat aircraft with an unverified RVSM approval status by its State of Approval for more than one month, starting from the first RMA notification, as a non-RVSM approved aircraft and that information provided to relevant State authorities for appropriate action; and
- (e) RMAs should be empowered by APANPIRG to have direct communication with transport ministries if required in the event of inadequate response by the State.

Regional Horizontal TLS Compliance

2.29 The application of all horizontal standards met the TLS. However the trend for the Indian/Bay of Bengal airspace was increasing towards the TLS, and should be closely monitored.

Safety Reporting

2.30 The RASMAG/22 analysis suggested that the Asia/Pacific had a wide range of reporting cultures, although the ratio of LHDs/flight hours could not be viewed as a direct indicator in isolation, as some operating environments were more complex and others more prone to air safety incidents. Bay of Bengal Arabian Sea and Indian Ocean airspace (BOBASIO) was an example of the latter, which had doubled the number of LHD reports; yet there was evidence that many more deviations had not been reported, as noted by RASMAG/21.

2.31 RASMAG/22 discussed the effect of reports deemed to be 'non-risk bearing' being hidden from scrutiny or not even reported by ATC in the case of some States, because the error was detected by ATS surveillance (some of which were 'zero duration', being detected before an FIR boundary). ICAO recalled that all deviations, whether deemed to be 'risk bearing' or not, were reportable incidents, and that such occurrences should be analysed for root cause and mitigation, as they may be contributors to a serious safety event in the future.

2.32 RASMAG/22 agreed to the following Decision:

Decision RASMAG/22-11: State Assessment of Airspace Risk

That, States are urged to provide to each RASMAG a summary report of the identified airspace risk occurrences as analysed by the State, and any safety mitigation measures and their effectiveness that have been introduced as a result of that analysis.

2.33 Comparative analysis of FIR boundary reports between adjacent States also indicated a lack of reporting in Indonesian airspace beyond the vicinity of Jakarta and Surabaya.

2.34 Pyongyang FIR reported three LHDs, which indicated the collaborative work with the China RMA was yielding important improvements in data collection.

2.35 The Japanese reporting ratio was quite low at 1:37,304; and Mongolian airspace had no LHDs reported during 2016.

2.36 It was appropriate to remind States, even those which had taken significant positive steps to improve reporting, to continually monitor their reporting culture and systems to optimise reporting. Experience from developed nations had shown that educating operational personnel was not enough to achieve the open reporting objective of the ‘aviation culture’ described in the Asia/Pacific Seamless ATM Plan. Noting that punitive action against a group for an incident was not acceptable; RASMAG/22 agreed that States should enact policies to ensure that there was a safe airspace safety reporting culture in place.

2.37 RASMAG/22 agreed to the following technical Conclusion (the results of the survey would be presented to RASMAG/23, the RASG-APAC/7 and APANPIRG/29):

Conclusion RASMAG22-12: Airspace Safety Reporting Policy Survey

That, due to the continuing incidence of inconsistent airspace safety reporting, ICAO should survey States and Administrations to determine if policies and rules are enacted to ensure:

- (a) personnel who report airspace safety incidents are not subjected to punitive action (except for personnel who did not report incidents, or whose wilful actions negatively impacted or had the potential to negatively impact airspace safety); and
- (b) managers are not rewarded specifically for the level of reported incidents (or for performance indicators or targets using reported incidents as a metric).

Performance Based Communications and Surveillance

2.38 Noting the potential ramifications for flights by aircraft registered in a State where the necessary Performance Based Communications and Surveillance (PBCS) operational approvals had not been issued, and the burden on the ATM systems of other States in cases where such aircraft would be separated by non-performance-based horizontal minima, RASMAG/22 endorsed the following Draft Conclusion, for APANPIRG/28’s consideration:

Draft Conclusion RASMAG/22-4: PBCS Operational Approvals

That, noting the expected implementation of Performance-Based Communications and Surveillance (PBCS) provisions of ICAO Annexes, PANS and Guidance Material by not later than 29 March 2018, Asia/Pacific States are urged to:

1. Expedite the development and implementation of the PBCS authorization process;
2. Share information through the ICAO Asia/Pacific Regional Office on the availability of PBCS regulatory material and on the expected readiness of their aircraft operators; and
3. Monitor communications and surveillance performance against RCP240 and RSP180 specifications as described in Doc 9869 – *PBCS Manual* for all individual aircraft using datalink in their area of responsibility, and make the performance data available on request to all States of Registry.

APANPIRG Deficiencies

2.39 Regarding the list of APANPIRG Air Navigation Service (ANS) Deficiencies in the ATM field relating to data link performance monitoring and analysis, RASMAG/22 agreed to propose to APANPIRG/28 that the following current Deficiency be deleted:

China - Post-implementation monitoring not implemented - Problem Reports not provided to CRA.

2.40 RASMAG/22 agreed to propose to APANPIRG/28 that the following current Deficiencies be modified, as recommended by FIT-Asia/6:

Indonesia – Post implementation monitoring not implemented – Performance monitoring and analysis was conducted, but problem reports were not provided to the CRA.

Sri Lanka – Post implementation monitoring not implemented – Problem reports were not provided to CRA, performance monitoring and analysis was not reported to FIT, but Sri Lanka was now registered with a competent CRA.

Viet Nam – Post implementation monitoring not implemented. Performance monitoring and analysis was not reported to FIT, but problem reports had been submitted to CRA.

2.41 RASMAG/22 agreed to propose to APANPIRG/28 that the following new Deficiencies be recorded, as recommended by FIT-Asia/6:

India- Performance monitoring and analysis was reported for the Chennai FIR, but was not reported for the Kolkata and Mumbai FIRs.

2.42 RASMAG/22 also agreed to propose the following States to be added to the APANPIRG List of Deficiencies in the ATM/AIS/SAR fields, related to *Conclusion 16/6 – Non Provision of safety related data by States*:

- Bangladesh (was on the Deficiencies List previously);
- Lao PDR; and
- Maldives.

3. ACTION BY THE CONFERENCE

3.1 The Conference is invited to note information contained in this Paper.

— END —