International Civil Aviation Organization

The Twenty-Second Meeting of the APANPIRG ATM/AIS/SAR Sub-Group (ATM/AIS/SAR/SG/22)

Bangkok, Thailand, 25 – 29 June 2012

Agenda Item 4: Review outcome of relevant meetings

REGIONAL AIRSPACE SAFETY MONITORING ADVISORY GROUP OUTCOMES

(Presented by the Secretariat)

SUMMARY

This paper presents the key outcomes from the RASMAG/15 (1-4 August 2010, Bangkok, Thailand) and RASMAG/16 (20-23 February 2011, Bangkok) meetings.

This paper relates to –

Strategic Objectives:

*A: **Safety** – Enhance global civil aviation safety*

*C: **Environmental Protection and Sustainable Development of Air Transport** – Foster harmonized and economically viable development of international civil aviation that does not unduly harm the environment*

Global Plan Initiatives:

GPI-2 Reduced vertical separation minima
GPI-8 Collaborative airspace design and management
GPI-9 Situational awareness
GPI-16 Decision support systems and alerting systems
GPI-21 Navigation systems
GPI-22 Communication infrastructure

1. INTRODUCTION

1.1 The Fifteenth Meeting of the Regional Airspace Safety Monitoring Advisory Group (RASMAG/15) was held in Bangkok, Thailand from 1 to 4 August 2011. The meeting was attended by 50 participants from Afghanistan, Australia, Bangladesh, China, India, Indonesia, Japan, Lao PDR, Malaysia, New Zealand, Philippines, Republic of Korea, Singapore, Thailand, United States, Viet Nam and IFALPA. The meeting agreed to two (2) Draft Conclusions, three (3) Draft Decisions, and one (1) Decision.

1.2 The Sixteenth Meeting of the Regional Airspace Safety Monitoring Advisory Group (RASMAG/16) was held in Bangkok, Thailand from 20 to 23 February 2012. The meeting was attended by 52 participants from Australia, Bangladesh, China, India, Indonesia, Japan, Lao PDR, Malaysia, Mongolia, Nepal, New Zealand, Philippines, Republic of Korea, Singapore, Thailand, United States and IFALPA. The meeting agreed to one (1) Draft Conclusion and one (1) Decision.

2. DISCUSSION

Australian Airspace Monitoring Agency (AAMA)

2.1 Australia presented the results of safety assessments undertaken by the AAMA for the twelve month period ending 30 November 2011, covering the Brisbane, Honiara, Jakarta, Melbourne, Nauru, Port Moresby and Ujung Pandang FIRs. Monthly collision risk estimate trends using the appropriate cumulative 12-month Large Height Deviations (LHD) reports since 1 December 2010 of Australian, Solomon Islands and Nauru airspace are indicated in **Figure 1**. The Reduced Vertical Separation Minimum (RVSM) airspace estimate of total risk for this airspace was **3.93 x 10^{-9}** (RASMAG/15, August 2011: **4.27 x 10^{-9}**), which was below the overall TLS.

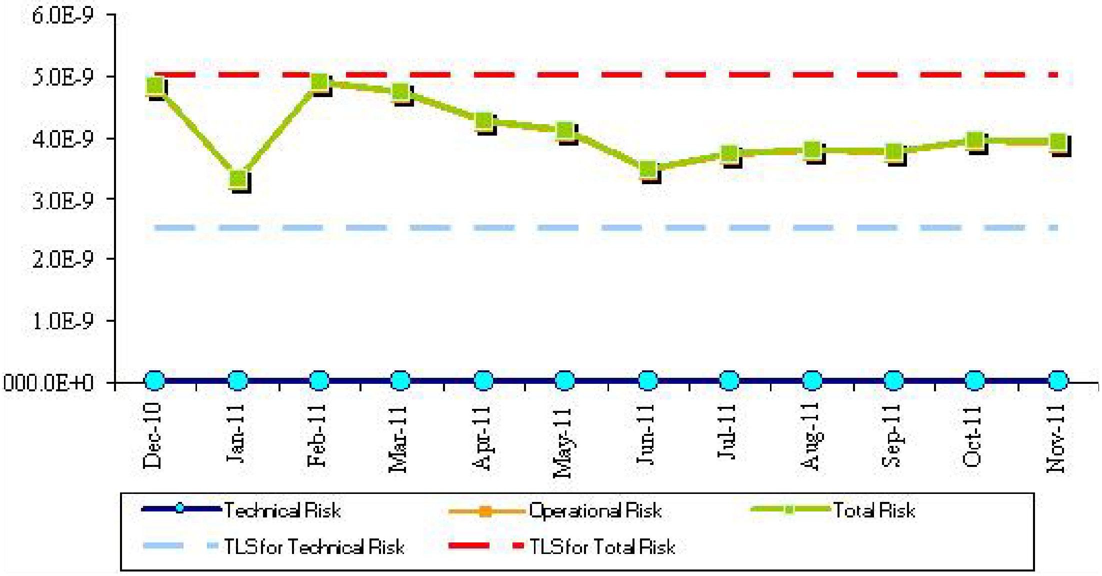


Figure 1: RVSM risk estimates for Australian, Solomon Islands and Nauru airspace

2.2 **Figure 2** presents the Indonesian airspace RVSM collision risk estimate trends from January to December 2011. The estimate of total risks was **5.47 x 10^{-9}**, which was above the overall TLS.

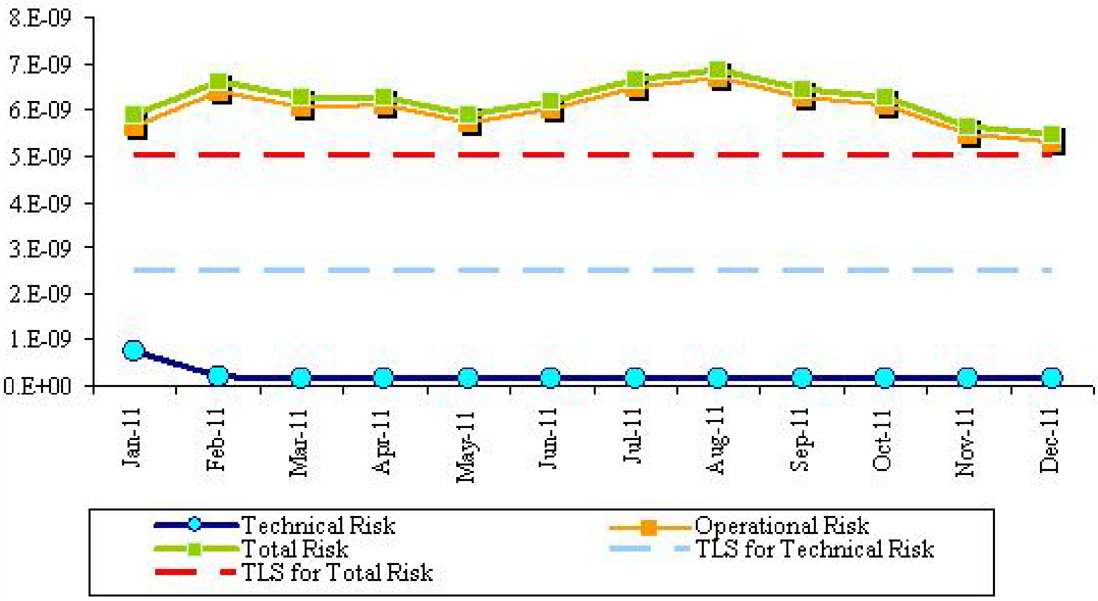


Figure 2: Indonesian Airspace RVSM Risk Estimate Trends

2.3 The AAMA report confirmed that the Australian, Nauru and Solomon Islands airspace met the target level of safety (TLS). For Indonesian airspace, the risk has reduced notably since the last report to RASMAG, and remains marginally in excess of the target. No assessment was completed for Papua New Guinea airspace in November.

2.4 Since the completion of the assessments, the AAMA had completed further assessments for the months of December 2011 and January 2012 for the Australian, Nauru, Papua New Guinea and Solomon Islands airspace. The Papua New Guinea airspace had been integrated into the RVSM risk assessment effective January 2012. These assessments indicated that the assessed risk for the period to end of January 2012 had increased since November to approximately **4.84×10^{-9}**.

2.5 For the Indonesian airspace, assessments have been completed up to December 2011. The total risk for November 2011 approximated **5.62×10^{-9}** and had reduced marginally since then to be **5.47×10^{-9}** at the end of December.

2.6 The United States asked whether the LHDs relating to coordination errors were more prevalent on the Flight Information Region Boundaries (FIRBs) or internally. Australia stated that there had been a recent increase of this type of LHDs between sectors in the Australian airspace, and there had been a noticeable increase in coordination errors across some of the FIRBs.

2.7 Indonesia was asked about the current status of ATS Inter-facility Data-link Communication (AIDC) in their Air Traffic Control (ATC) Centres. Indonesia stated that the recent AIDC trial revealed a technical problem which is being addressed, however currently the system is confined to Transfer of Control (TOC) and Acceptance (AOC) Messages between Makassar and Brisbane Centres. Indonesia informed the meeting that it was expected that full AIDC functionality would be restored and trialled from mid-2012.

Bay of Bengal, Arabian Sea and Indian Ocean Monitoring Agency (BOBASMA)

2.8 India presented a revised airspace analysis and safety assessment from BOBASMA in support of the 50NM separation being implemented on various RNP10 routes. The assessment had been peer reviewed by the AAMA and the Southeast Asia Safety Monitoring Agency (SEASMA). The lateral and longitudinal risk estimation for December 2011 was **1.04×10^{-9}** and **0.67×10^{-9}** respectively, both well below overall TLS.

2.9 The report noted there had been difficulty in completing Letters of Agreement (LOA) for data sharing, as many States had internal administrative issues in signing agreements with foreign entities, thus the provision of TSD from States in support of BOBASMA activity was on an informal basis. Data was not received from a number of States, which hindered BOBASMA in undertaking the assessment, although Afghanistan, Pakistan and Sri Lanka provided data prior to the meeting.

2.10 There was general discussion as to how the necessary data to support BOBASMA could be provided to India. The meeting recognized that a single source of data using the RMA TSDs stored on the RMA's web site hosted by the FAA on its Knowledge Sharing Network (KSN) would be advantageous. The United States agreed to investigate the practicality of providing access and would advise the next meeting of outcomes.

2.11 At the Second Bay Of Bengal, Arabian Sea and Indian Ocean Region (BOBASIO/02, Chennai, India, 11–13 April, 2012), India noted that since 1 July 2010, there has been no report of occurrence of either Large Lateral Deviation (LLD) or Large Longitudinal Error (LLE) for the Bay of Bengal area. India suggested that air traffic controllers needed to be trained and directed to understand the importance of reporting LLD and LLE correctly.

China Regional Monitoring Agency

2.12 China provided the results of the RVSM safety oversight for the Chinese FIRs and Pyongyang FIR, from December 2010 until November 2011. China had reported at RASMAG/15 that the main contributor to the operational risk of Chinese RVSM airspace was flight crew failing to climb/descend the aircraft as cleared (Category A). RASMAG/16 discussed the RVSM transition issue from the Russian Federation. China clarified that there was a lack of ATC surveillance in the area and that the issue was largely unrelated to the differences in the RVSM Flight Level Orientation Scheme (FLOS) between Russia and China.

2.13 **Figure 3** presents RVSM collision risk estimate trends for Chinese airspace from December 2010 until November 2011. The estimate of total risks was **1.67 x 10^{-9}**, which was below the overall TLS.

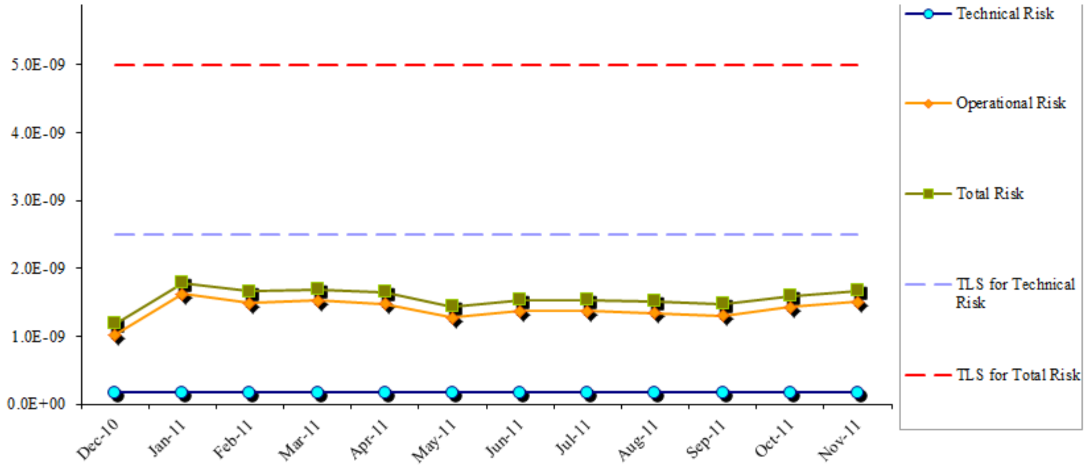


Figure 3: Chinese Airspace RVSM Risk Estimate Trends

2.14 China continued to assume a risk level for the Democratic People's Republic of Korea (DPRK), as the DPRK had not reported any LHD for the Pyongyang FIR, despite continued efforts to ensure the DPRK understood the LHD definition. To make a conservative estimate for the operational risk, China RMA applied the same operational risk value used in the preliminary assessment for Pyongyang FIR.

2.15 **Figure 4** presents RVSM collision risk estimate trends for DPRK airspace from May 2010 until April 2011. The estimate of total risks was **1.95 x10^{-9}**, which was below the overall TLS.

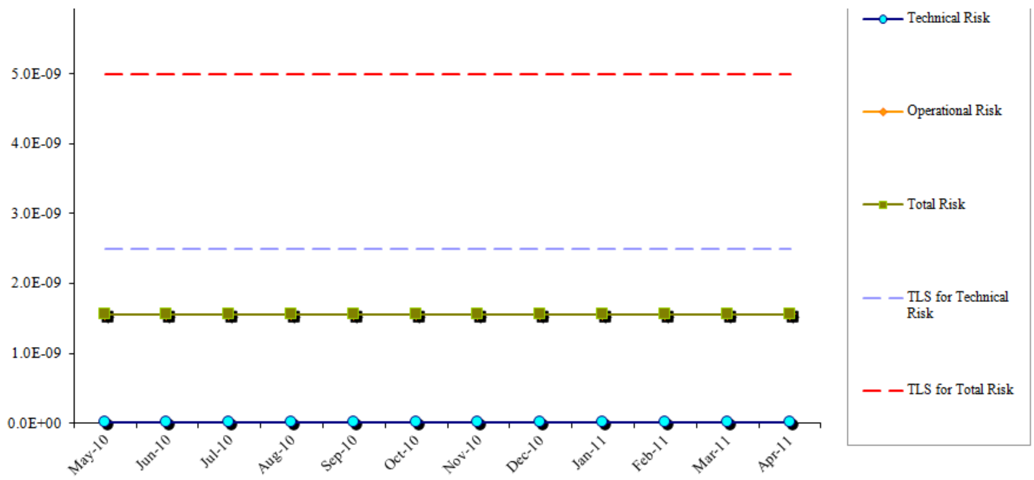


Figure 4: DPRK Airspace RVSM Risk Estimate Trends

Japan Airspace Safety Monitoring Agency (JASMA)

2.16 The JASMA presented the results of the Fukuoka FIR safety assessment for the period from December 2010 until November 2011. There were a total of 26 large height deviations that occurred during this period. The estimated risk value showed a downward tendency until July 2011, however one transfer error caused a deviation with an assessed duration of eleven minutes that reversed a downward trend in August. The total risk estimate continued to meet the TLS.

2.17 **Figure 5** presents RVSM collision risk estimate trends for Japanese airspace from December 2010 until November 2011. The airspace estimate of total risks was **4.85 x10^{-9}**, which was below the overall TLS.

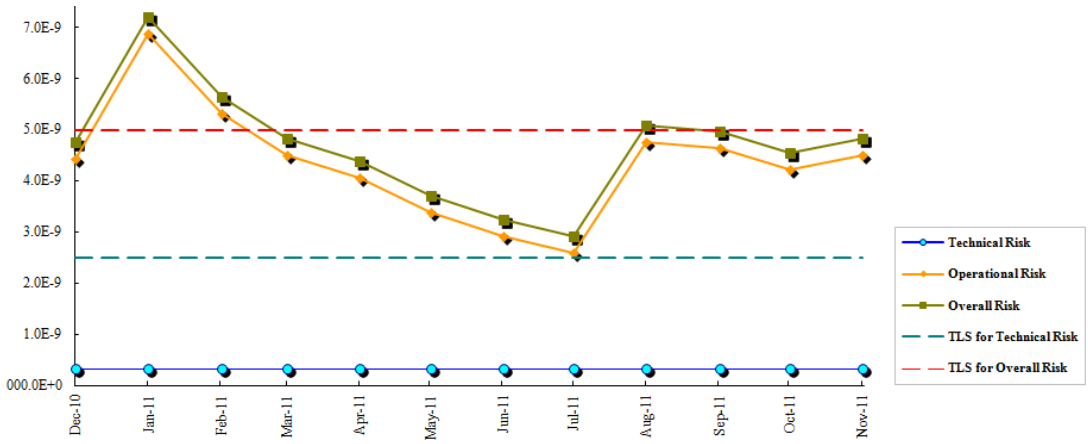


Figure 5: Japanese Airspace RVSM Risk Estimate Trends

2.18 At RASMAG/15 Japan reported that ATC loop errors accounted for the largest number of LHD reports as well as the longest duration. The second biggest contributor was in the ATC transfer of control coordination errors as a result of human factors. Japan stated that transfer errors on aircraft flying ATS route B576 between Fukuoka FIR and Incheon FIR had not occurred since November 2010 since the advent of AIDC (ATS Inter-facility Data-link Communications).

2.19 **Figure 6** shows the implementation status of AIDC, ADS-C and/or radar along the boundary of the Fukuoka FIR. The red dots indicate where Category E/F transfer errors occurred during this reporting period. Three transfer errors occurred at the FIR boundary where both AIDC and ADS-C/radar were not introduced. One transfer error occurred at the FIR boundary where AIDC and ADS-C had been implemented, but was inoperative due to the 11 March 2011 earthquake.

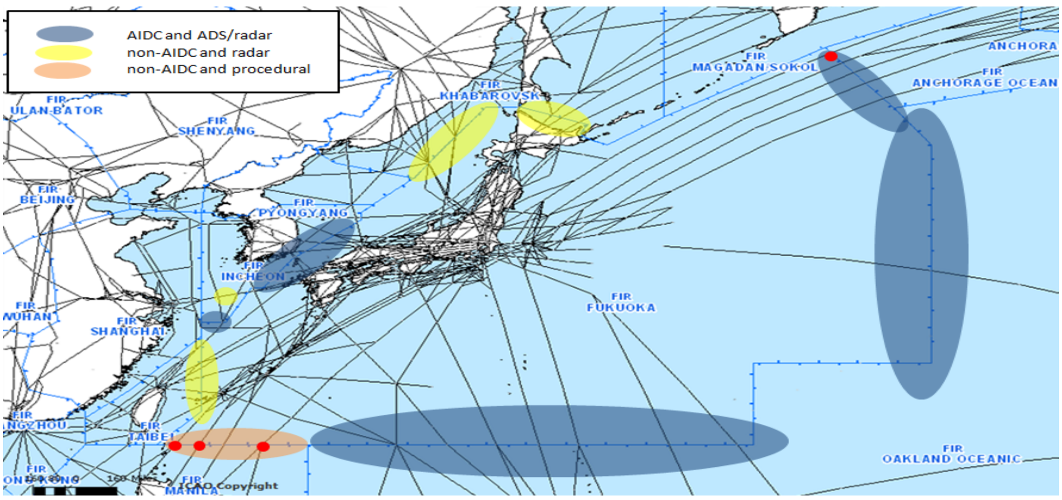


Figure 6: AIDC, ADS-C and/or radar status on the Fukuoka FIRB

2.20 RASMAG/15 noted the extensive work undertaken by Japan to identify possible causes of LHDs in their airspace and the activity to put in place effective risk controls.

2.21 Three LLD reports had been received by JASMA between 1 December 2010 until 30 November 2011. Two were classified as Category D errors (ATC system loop error) and one as Category G (Turbulence or other weather related causes, other than approved). The meeting noted that the horizontal safety assessment was still being completed. JASMA had clarified LLDs and LLEs in conformance with the En-route Monitoring Agency (EMA) Handbook definition, to assist ATC reporting (**Table 1**).

Error Type	Category of Error	Criterion for Reporting
LLD	Individual-aircraft	Any deviation of 15 NM or more to the left or right of the current flight plan track observed on the radar and/or ADS-C display.
LLE	Aircraft-pair (Distance-based separation applied)	Infringement of ADS-C based longitudinal separation standard.
		Expected distance between an aircraft pair varies by 10 NM or more, even if ADS-C based separation standard is not infringed.

Table 1: LLD and LLE Definition (Simplified)

2.22 JASMA had reviewed the data-link performance analysed by the Japan Central Reporting Agency (CRA), which was the basis for the reduced separation minima. The Japan CRA observed that the average Controller Pilot Data-Link Communication (CPDLC) uplink performance success rate during the observation period between July and December 2011 was 99.16%.

<u>Monitoring Agency for the Asia Region (MAAR)</u>

2.23 **Figure 7** presents RVSM collision risk estimate trends for Mongolian airspace from January 2011 until December 2011. The airspace estimate of total risks was $\mathbf{3.47 \times 10^{-9}}$, which was below the overall TLS.

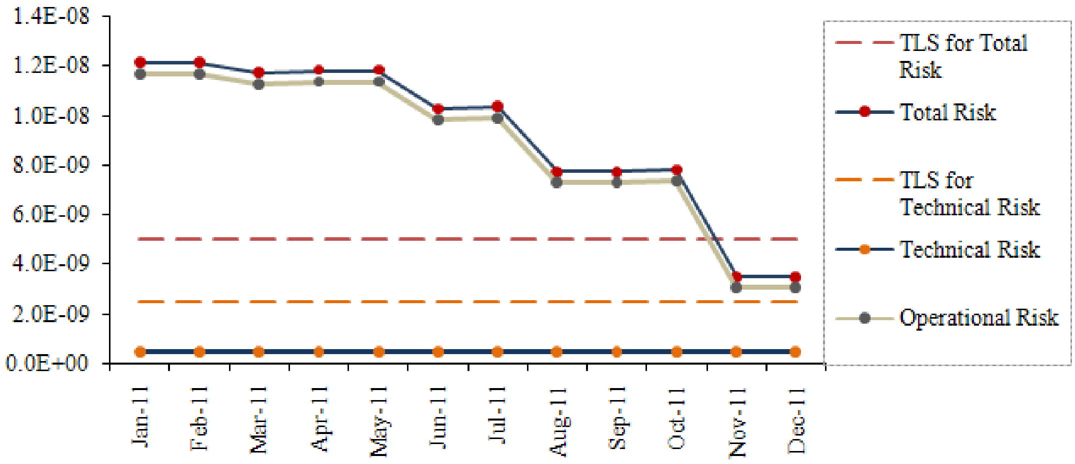


Figure 7: Mongolian Airspace RVSM Risk Estimate Trends

2.24 RVSM was implemented within Mongolian airspace using the RVSM-Metre FLAS specified in Annex 2, Appendix 3 b). Transition to the more commonly used flight level (ft) scheme in Annex 2, Appendix 3 a) would take place within 18 months. Mongolia stated that there would be full radar control capability by June 2012, which had been delayed due to airspace organization and radio coverage issues. Mongolia intended to implement Automatic Dependent Surveillance – Broadcast (ASD-B) over the next five years to fill the surveillance gaps.

2.25 **Figure 8** presents collision risk estimate trends for BOB airspace from December 2010 until November 2011. The RVSM airspace estimation of total risks was **1.16 x 10^{-9}**, which was well below the overall TLS. However, recalling the lack of LLD and LLE reports noted by BOBASIO/02, these results should be treated with caution if there had been a similar lack of LHD reporting.

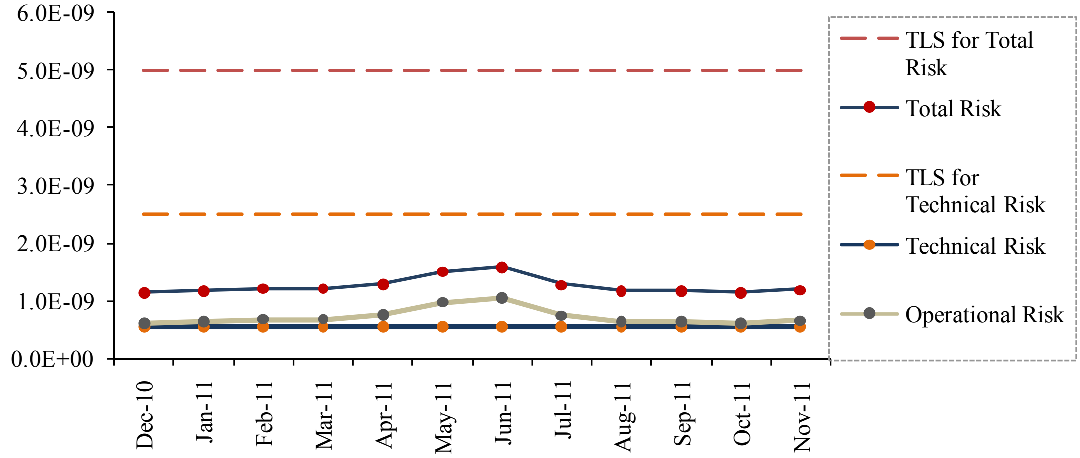


Figure 8: BOB Airspace RVSM Risk Estimate Trends

2.26 **Figure 9** presents collision risk estimate trends for West Pacific/South China Sea (WPAC/SCS) airspace from December 2010 until November 2011. The RVSM airspace estimation of total risks was **5.28 x 10^{-9}**, which was <u>above</u> the overall TLS.

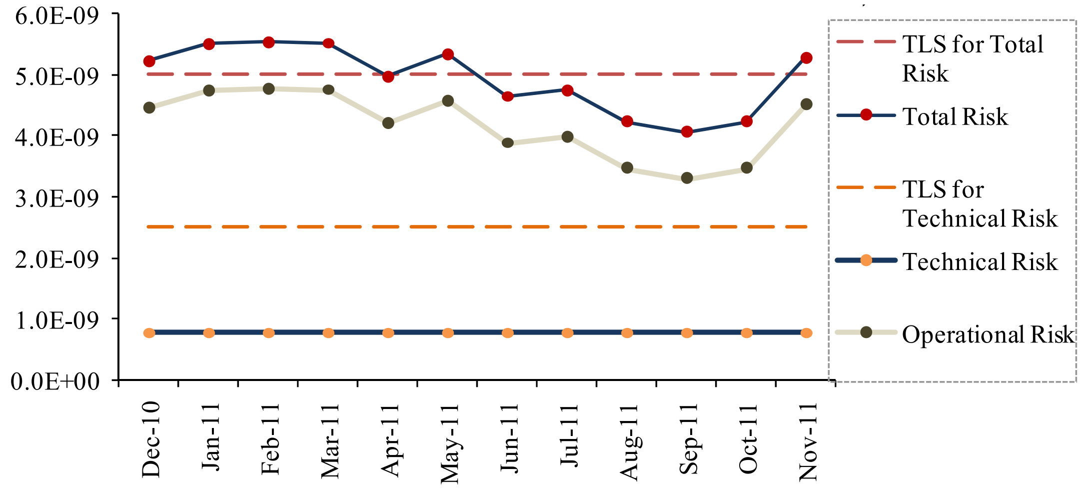


Figure 9: WPAC/SCS Airspace RVSM Risk Estimate Trends

2.27 The meeting noted the increase in risk since October 2011. MAAR explained that this was mainly due to a number of high risk-bearing LHDs involving aircraft operating in the incorrect direction. In this regards, MAAR was coordinating with States to have preventive measures to minimise the likelihood of this type of incident re-occurring.

2.28 MAAR provided the results of the readiness and safety assessment process to RASMAG/15 regarding RVSM implementation in the Mongolia airspace, which was accomplished on 17 November 2011.

Pacific Approvals Registry and Monitoring Organization (PARMO)

2.29 PARMO presented Pacific airspace collision risk estimate trends from December 2010 until November 2011 (**Figure 10**). The RVSM airspace estimation of total risks was **3.32 x 10^{-9}**, which was well below the overall TLS.

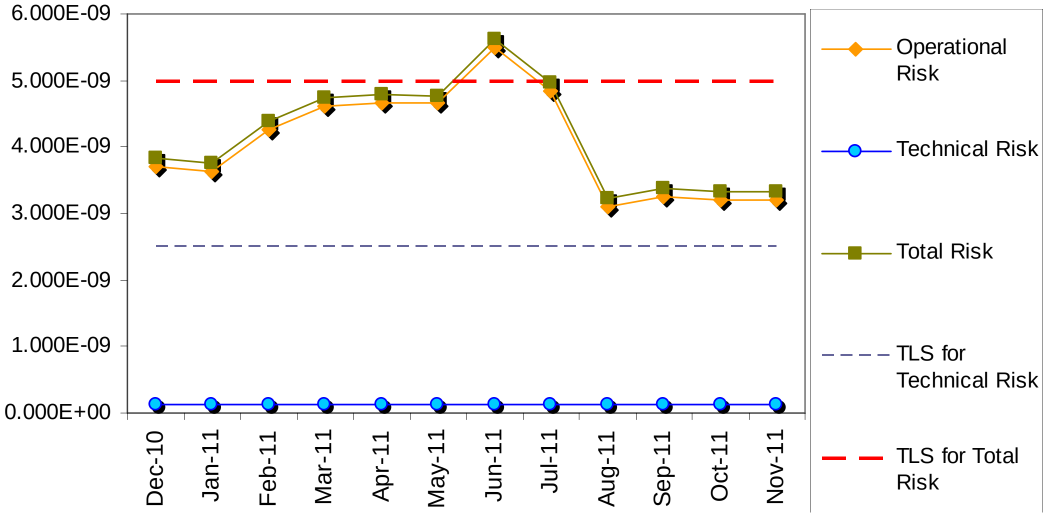


Figure 10: Pacific Airspace RVSM Risk Estimate Trends

2.30 The estimate of vertical collision risk in Pacific airspace was greater than the TLS in June 2011, due to two events of 25 minutes at an incorrect flight level in the North Pacific (NOPAC) traffic flow. As the NOPAC traffic flow accounted for a large proportion of flying hours in Pacific airspace and had relatively high passing frequencies, the time spent at incorrect flight levels within the NOPAC traffic flow had a larger effect on the estimate of risk than in other traffic flows.

2.31 PARMO presented the Republic of Korea's (ROK) airspace collision risk estimate trends from December 2010 until November 2011 (**Figure 11**). The RVSM airspace estimation of total risks was **1.628 x 10^{-9}**, which was well below the overall TLS.

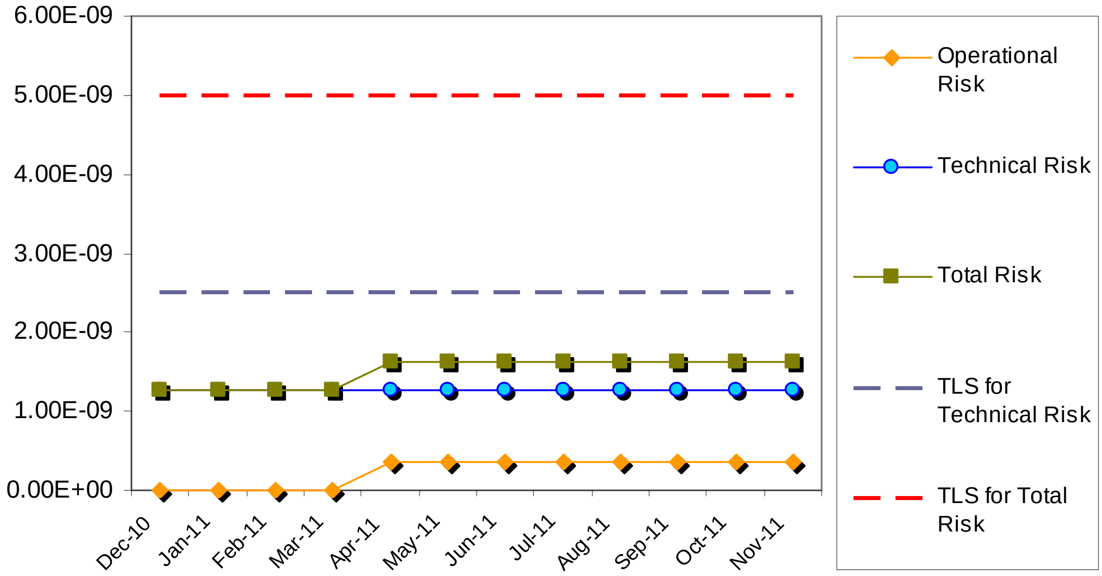


Figure 11: ROK Airspace RVSM Risk Estimate Trends

2.32 RASMAG/15 had discussed the reasons for the technical risk for the Incheon FIR being significantly higher than the Pacific. The United States advised that adoption of a Flight Level

Allocation Scheme (FLAS) would increase opposite direction vertical conjunctions at the separation minimum, and these contributed many times more risk to the calculated value for every single passing encounter. Another factor was the relatively small flight time incurred in the airspace.

2.33 PARMO presented a Pacific airspace horizontal assessment safety report for the period December 2010 until November 2011, containing a summary of the five LLEs and LLDs received by the PARMO and the related performance monitoring activities for the Anchorage and Oakland FIRs:

- one Category A - Flight crew deviates without ATC Clearance;
- three Category B - Flight crew incorrect operation or interpretation of airborne equipment; and
- one Category D - ATC system loop error.

2.34 **Figure 12** presents Pacific airspace 50NM separation lateral collision risk estimate trends from December 2010 until November 2011. The 50NM collision risk estimation was **0.96 x 10^{-9}**.

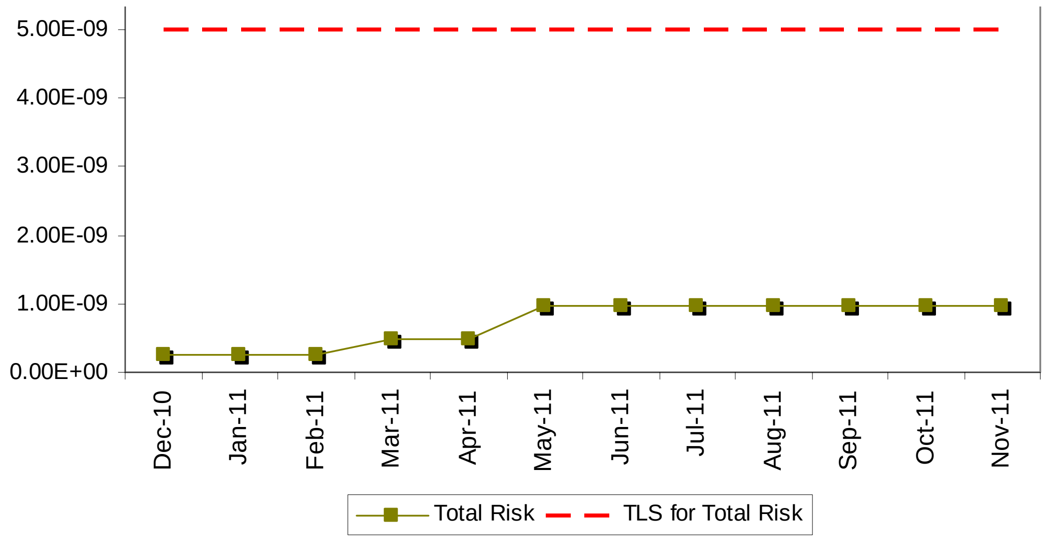
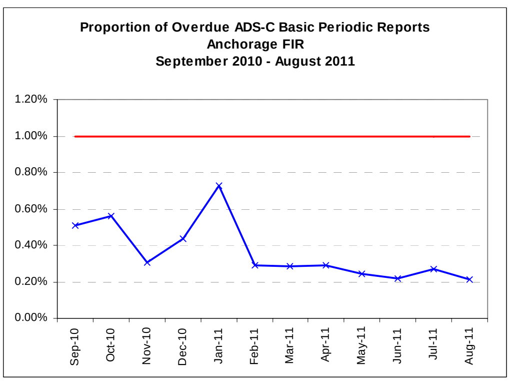
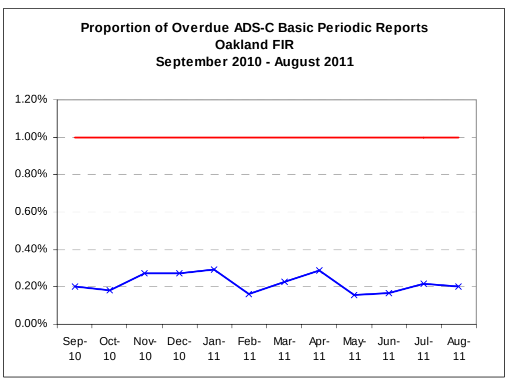


Figure 12: Anchorage and Oakland Airspace 50NM Lateral Collision Risk Estimates

2.35 PARMO examined aircraft Automatic Dependent Surveillance – Contact (ADS-C) periodic reports. An analysis was completed of overdue reports from RNP4 approved aircraft with assigned 14-minute reporting rates. The data indicated that the average proportion of missing ADS-C reports in the Anchorage FIR was 0.36%, and in the Oakland FIR was 0.22%. **Figures 13 and 14** contain the proportion of missing ADS-C reports in Anchorage and Oakland airspace, respectively.





Figures 13 and 14: Proportion of Overdue ADS-C Periodic Reports

2.36 The United States presented a safety assessment for the implementation of the 30NM lateral and 30NM longitudinal separation standards in Anchorage Oceanic and Arctic airspace. **Table 2** details the proportions of operation by filed Required Navigation Performance (RNP) status, from September 2010 until August 2011.

RNP Status	Count	Proportion
RNP 10	39,251	70.71%
RNP 4	13,853	24.96%
Other RNP	1,684	3.03%
Unknown or no RNP filed	722	1.30%
TOTAL	55,510	

Table 2: Proportions of ADS-C Operations by Filed RNP Status

2.37 The study indicated that approximately 2.6% or 89 flight operations per month in the Anchorage Oceanic and offshore airspace had at least one overdue ADS-C report. ADS-C reporting rates had a major effect on the longitudinal collision risk, so the achieved lateral navigational performance for the aircraft population to which the separation minimum was to be applied also had an effect. The study looked specifically at the interaction between the assumed navigation performance of the aircraft population and the required frequency of ADS-C periodic reporting.

2.38 Assuming 50% of operations utilized GPS for navigation with an achieved accuracy better than RNP 4, and the remaining 50% were non-GPS but achieved RNP 4, while using an 11-minute ADS-C periodic report rate, the longitudinal collision risk estimate would be **4.69×10^{-9}** fapfh (fatal accidents per flight hour). Although this value is lower than the agreed TLS, it did not allow much room for future growth and expansion.

2.39 **Figure 15** suggested that the risk estimate will increase with the assumed proportion of operations with an achieved accuracy better than RNP 4. Therefore, the results from this safety assessment showed that an ADS-C periodic report rate of 10 minutes provided an acceptable estimate of collision risk of **2.92×10^{-9}** fapfh for the implementation of the 30NM longitudinal separation standard in Anchorage Oceanic and offshore airspace.

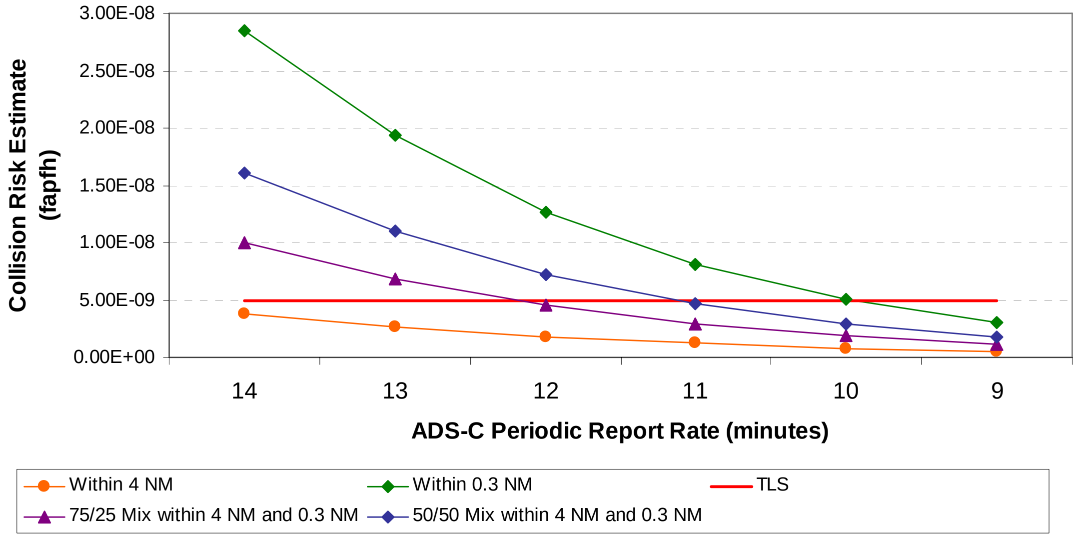


Figure 15: Longitudinal Collision Risk by ADS-C Report Rate and Mixture of Navigation Performance

Southeast Asia Safety Monitoring Agency (SEASMA)

2.40 The SEASMA report examined operations on the six major South China Sea (SCS) Air Traffic Service (ATS) routes during the period from December 2010 until November 2011. Two LLD reports were received in this period, one Category A - Flight crew deviate without ATC Clearance, and one Category D - ATC system loop error.

2.41 **Figure 16** presents SCS airspace 50 NM collision risk estimate trends from December 2010 until November 2011. The 50 NM collision risk estimation was **1.18 x 10^{-9}**, which was well below the overall TLS.

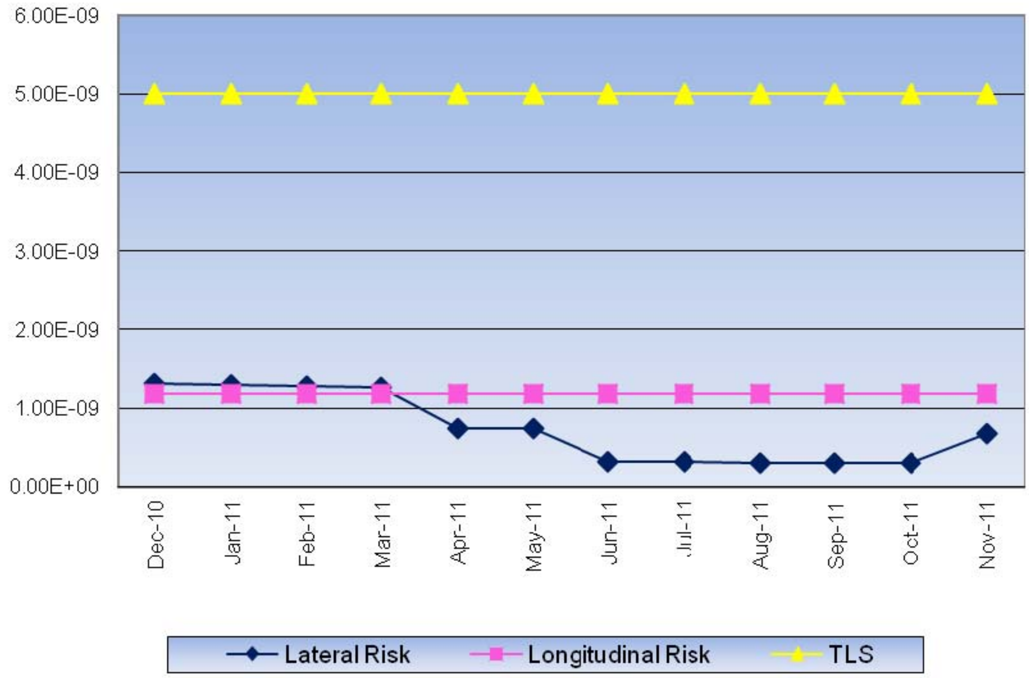


Figure 16: SCS 50NM Lateral Collision Risk Estimates

2.42 SEASMA presented the results of an assessment of the risk associated with the implementation of 50NM lateral and 50NM longitudinal separation standards on new RNAV routes M635 and M774 between the Singapore and Jakarta FIRs, which were **0.001 x 10^{-9}** and **0.02 x 10^{-9}** respectively, well below the TLS (**Figure 17**).

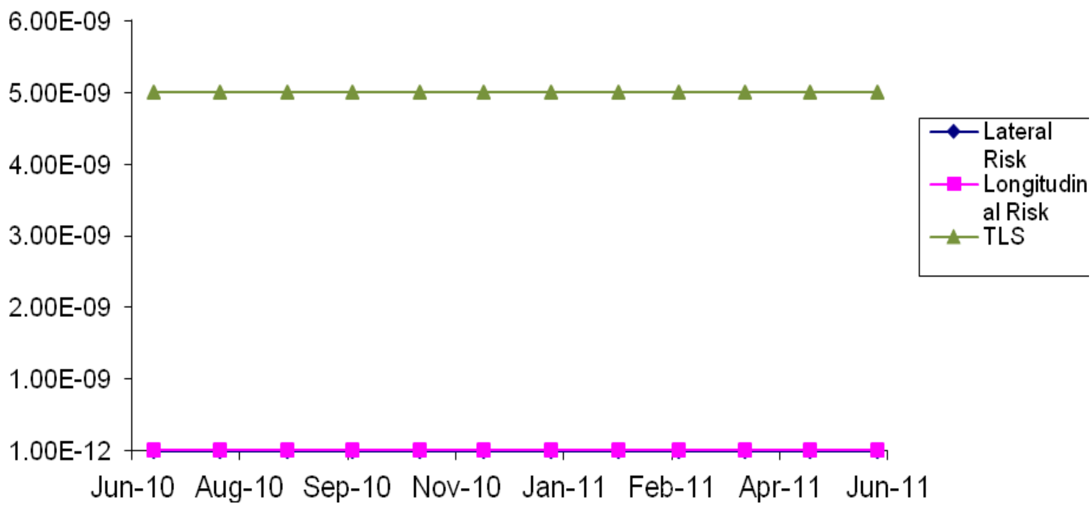


Figure 17: M635 and M774 50NM Lateral Collision Risk Estimates

Asia/Pacific RVSM TLS Compliance

2.43 **Figure 18** provides an assessment of Asia/Pacific RVSM TLS compliance as reported to APANPIRG/22, compared to the overall assessment reported to RASMAG/16 in **Figure 19**.

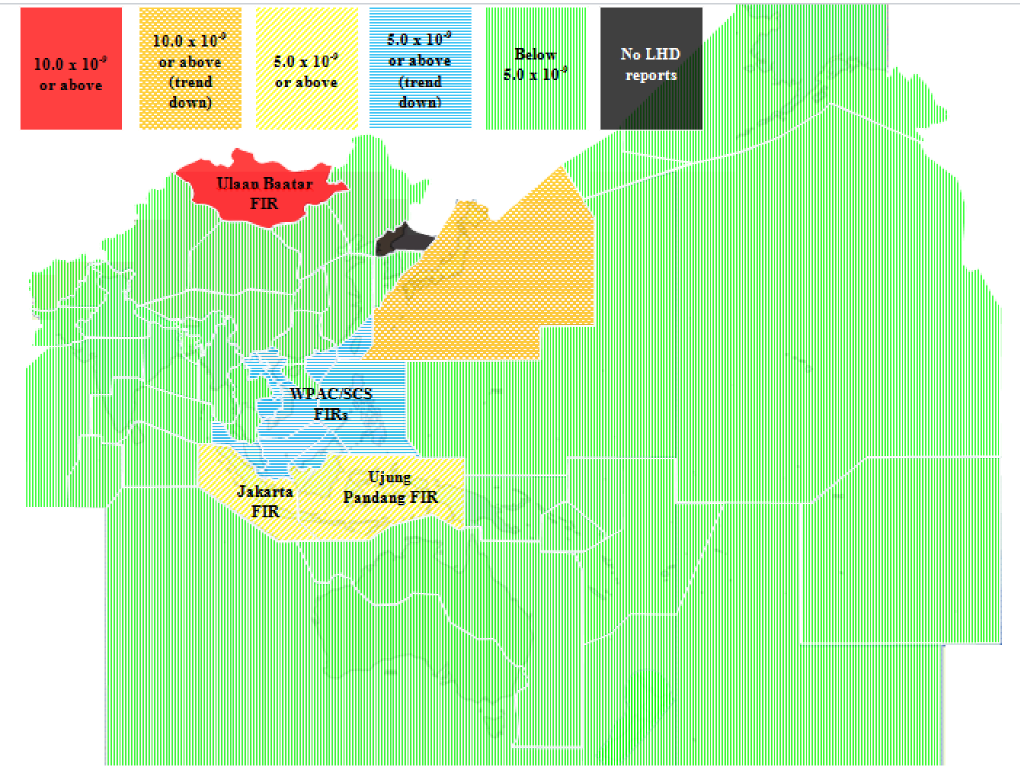


Figure 18: Asia/Pacific TLS compliance reported to APANPIRG/22

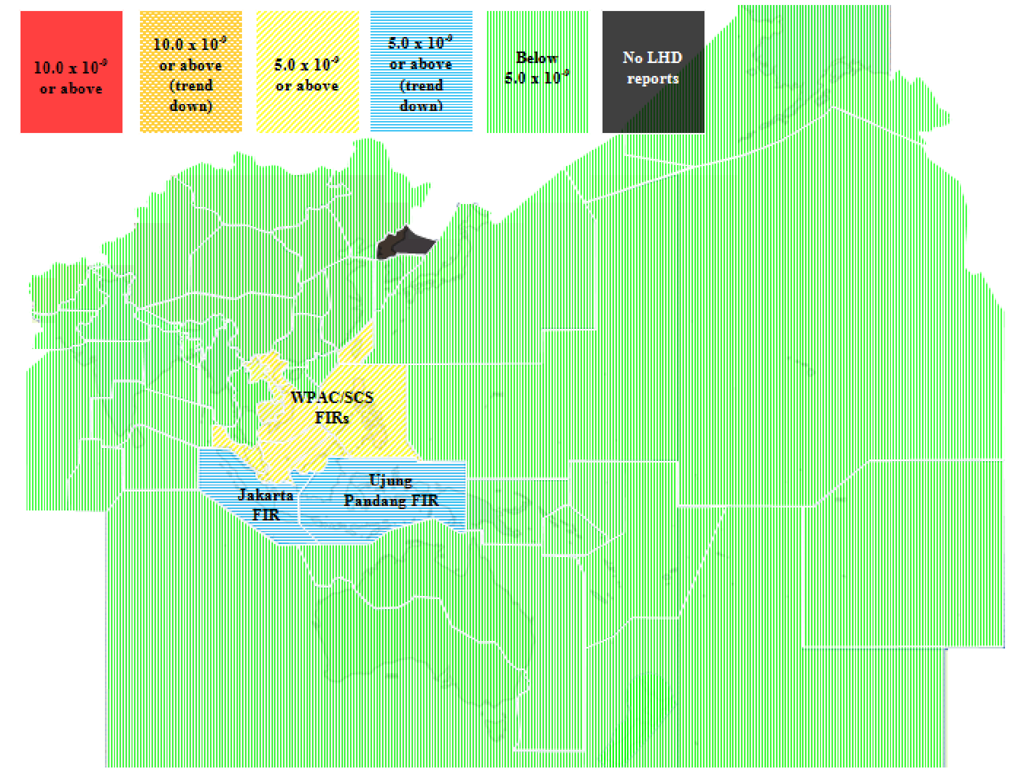


Figure 19: Asia/Pacific TLS compliance reported to RASMAG/16

Data-link Performance Monitoring

2.44 New Zealand presented information on Inmarsat Network Outages (**Figure 20**).

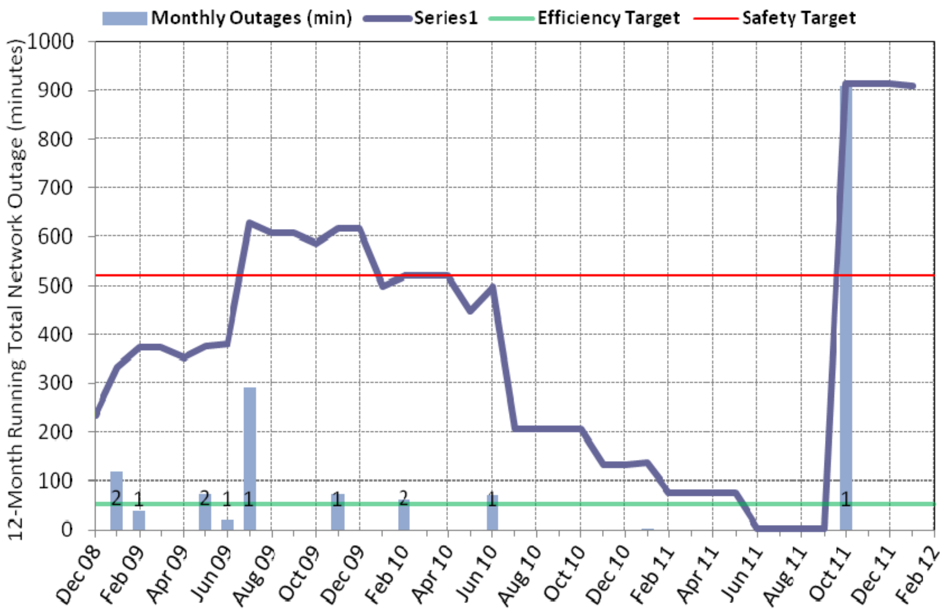


Figure 20: Inmarsat Network Outages within the NZZO FIR

2.45 The very large step change in the data was due to a single outage of over 15 hours (910 minutes) on 22 October 2011. This was caused by a Single Event Upset on the Inmarsat 3F3 satellite that caused a total payload outage. The recovery was slow because of a lack of telemetry on the satellite and included temporarily switching some services to two I2 satellites. Inmarsat and the Communication Service Providers (CSP) were analysing the event to improve contingency processes.

2.46 **Figure 21** provided information on CPDLC Actual Communications Performance (ACP, includes 60 second pilot operational response time) observed within the Auckland Oceanic FIR.

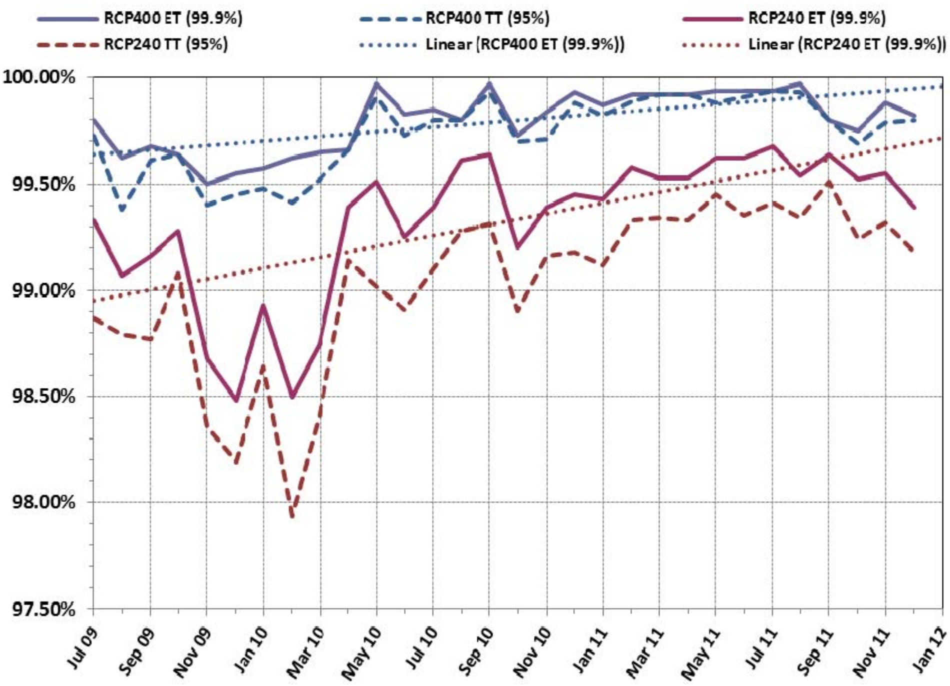


Figure 21: CPDLC Continuity Performance – ACP

5.1 **Figure 22** provides information on ADS-C Down-link Continuity Performance observed within the Auckland Oceanic FIR.

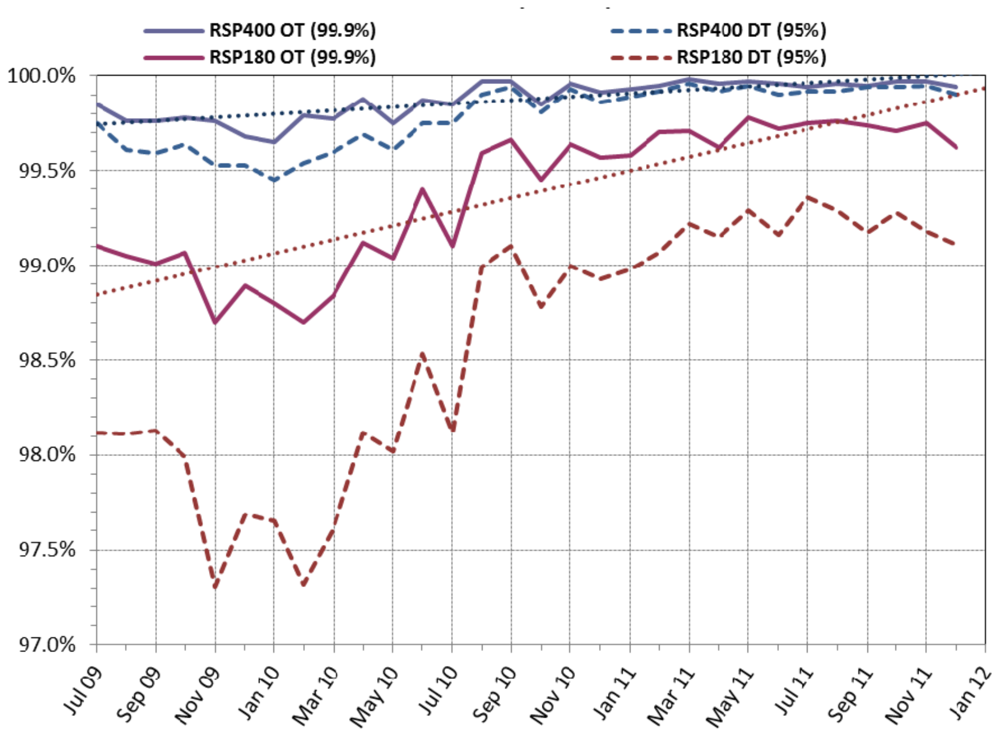


Figure 22: ADS-C Downlink Continuity Performance

2.47 As with CPDLC, the continuity easily met the target for Delivery Time – DT 95%; however, while it met the target for RSP400 Overdue Time – OT (achieving 99.94%), only 99.62% is achieved against the RSP180 OT.

2.48 The meeting encouraged all States to undertake the required system performance monitoring as detailed in the Global Operational Data-link Document (GOLD), and report outcomes to relevant forums including RASMAG. It should be noted that APANPIRG/22 agreed to the following Conclusion:

Conclusion 22/12 - Provision of Data-link Performance Data to CRA

Noting the pre- and post-implementation system performance monitoring required by Annex 112, the Global Operational Data Link Document (GOLD) and the Guidance Material for End-to-End Safety and Performance Monitoring of Air Traffic Service Data Link Systems in the Asia/Pacific Region, States are urged to ensure that the appropriate data link performance monitoring is undertaken and reported to CRAs/FITs, as required, in a timely manner.

Endorsement of Amended MMR

2.49 Australia presented a summary of the recent Sixth Meeting of the Regional Monitoring Agency Coordination Group (RMACG/6, June 2011) in which 11 of the 13 global RMAs attended. RASMAG was informed that RMACG/6 undertook extensive discussions on a range of issues related to RMA activity and procedures that included the endorsement of a revised globally standardised Minimum Monitoring Requirements (MMR) Table.

2.50 RASMAG responded to the actions identified in the paper by agreeing that information concerning the United States regulation in regards to the 1,000 hours period for long term height-keeping monitoring should be forwarded to APANPIRG, noting that States should be informed of the information and decide whether or not to adopt the United States procedure.

2.51 The meeting endorsed the new MMR, and agreed to forward the table for further endorsement by APANPIRG for Regional application in accordance with the following Draft Conclusion (subsequently approved by APANPIRG/22 as C22/11):

Draft Conclusion RASMAG 15/2 − Minimum Monitoring Requirements Amendment

That, the updated Minimum Monitoring Requirements (MMR) Table attached in **Appendix D** be endorsed for Regional application.

Asia Pacific Regional Long Term Height Monitoring

2.52 IATA recommended that the long term height-keeping monitoring programme should make provision for a combination of ground-based systems (Height Monitoring Unit – HMU, Aircraft Geometric Height Measurement Element – AGHME and potentially ADS-B) as well as the airborne Enhanced GPS Monitoring Unit (EGMU). IATA commented on the cost and administrative issues involving GMU, and the cost issues regarding installing and maintaining an HMU. IATA acknowledged the work of Australia and the FAA in developing the ADS-B system as an alternative, because it had the potential to monitor each airframe on a regular basis during normal operations without added cost.

2.53 The meeting agreed that the Chairman and Secretary would draft an update to the Asia/Pacific Regional Impact Statement - RVSM Global Long Term Height Monitoring Requirements document and circulate this to the RMAs and IATA prior to RASMAG/17 for their input.

Setouchi HMU

2.54 Japan presented a report detailing the progress of the first HMU implementation in Japan at Setouchi. The latest monitoring showed correlation with the data measured by other monitoring systems. The accuracy and precision of the monitoring have been improved after many adjustments and the data of Setouchi HMU was peer reviewed by other CMAs and RMAs.

2.55 The 11 March 2011 earthquake caused a crustal change in the Setouchi HMU area of approximately 4cm horizontally and 1cm vertically, thus the effect was negligible. JASMA intended to start using the Setouchi HMU for monitoring aircraft height-keeping performance in March 2012.

<u>Australian Height-Keeping Monitoring Program</u>

2.56 Australia provided details of foreign-registered aircraft seen in the ADS-B Altimetry System Error (ASE) program, and therefore identified which fleets may immediately benefit from height-keeping performance monitoring. December 2011 was used as the sample month for the study.

2.57 As well as enabling the monitoring of Australian registered aircraft, ADS-B data enabled ASE calculations, and hence the successful monitoring, of a large number of aircraft registered in other States. The significant outcome was that the AAMA had been able to complete a large proportion of the identified Annex 6 monitoring burden for operators other than those from Australia.

2.58 Australia provided examples of the height-keeping monitoring result reports that AAMA generated to inform other RMAs, State regulators and operators. A typical scatter result for a well-performing airframe was in the order of +/- 25 feet and the ASE average value of 8ft is shown in **Figure 24**. This can be compared to an abnormal performing airframe (which may be due to the airframe having split pilot/co-pilot pitot-static systems that give different ASE values) in **Figure 23**. Australia was happy to assist other RMAs in the generation of such reports and make the reports available to State regulators and aircraft operators on request.

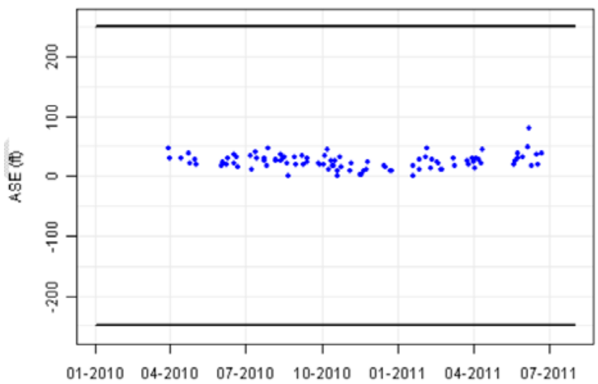


Figure 23: average scatter diagram

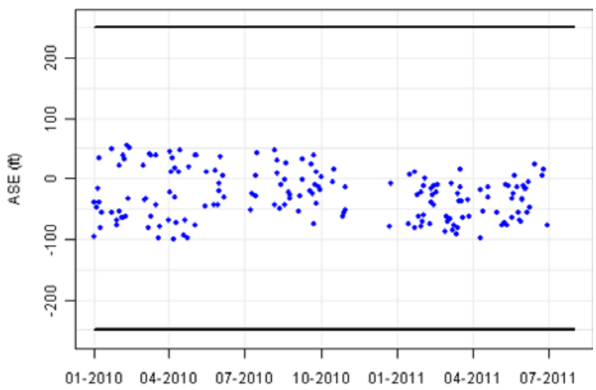


Figure 24: abnormal scatter diagram

2.59 The data identified a number of aircraft that were ADS-B equipped but not currently approved for ADS-B services in Australian airspace. Australia was moving to a system whereby these aircraft will be assumed to be compliant with international standards. Thus, ADS-B data would be assumed to be valid unless the aircraft was identified as transmitting improper data, in which case the aircraft could be prohibited from entering Australian continental upper airspace.

2.60 A review of the most recent RVSM approvals databases maintained by the AAMA determined that the total number of RVSM approved aircraft was 816 as at February 2012. The data shows that of this total, 297 (36%) of the aircraft have been successfully monitored since November 2010. Additionally, of the number successfully monitored, 247 (83%) of these have been monitored using ADS-B data.

2.61 Australia submitted information on the outcome of a recent check undertaken by the AAMA of flight plan data against the RVSM approval databases of all global RMAs using a flight plan sample of January 2012. A review of the data may identify one or two wrongly identified airframes or airframes that were approved but not currently reflected in global RMA databases.

2.62 In total, the comparison for January 2012 identified 148 individual airframes in the data set, with airframes from the Philippines showing the highest number of 22. Of major concern were several aircraft that had been identified as long ago as July 2010 from Fiji and India; and April 2011 from Australia and Brunei Darussalam.

Non-RVSM-Approved Aircraft

2.63 RASMAG/15 had noted that the RMACG had expressed significant concern about non-RVSM approved aircraft operating in RVSM airspace. Given the significance of the issue and the risk that such activity posed to the safety of RVSM operations, RASMAG had previously tasked the RMAs to continue with their work to identify so called 'rogue' operators so that State authorities could work to resolve the issue. As a result, a number of the RMAs provided reports of identified aircraft and operators that appeared to have been operating without the required RVSM approvals. The meeting recognised that a number of the identified aircraft may in fact have the appropriate approvals but processing of that information to RMAs by State authorities could be delayed.

2.64 RASMAG/15 noted that the AAMA comparison for June 2011 identified 250 individual airframes in the data set, with airframes from India showing the highest number of 56. The next highest State was the Philippines with 39 aircraft. China RMA and MAAR had also undertaken a comparison between the RVSM ability indicated in the flight plan and the RVSM approval registration.

2.65 PARMO provided the meeting with an assessment of non-State-approved operators using the RVSM airspace overseen by PARMO in the Pacific and a portion of North East Asia for the period of December 2010 that identified the operators who flight planned as having State RVSM approval in the December 2010 TSD collected by the PARMO, but for whom a record of RVSM approval was not found.

2.66 RASMAG/15 noted that a total of five unique airframes from the PARMO analysis required further follow up action. Some airframes identified by PARMO were also noted in the recent AAMA WP/56 to the RMA CG/6 meeting. One of these airframes (registration YJAV1 B738) was observed many times in both the Auckland and Nadi TSD and had also been identified by the AAMA analysis.

2.67 RASMAG discussed the need for airworthiness authorities to provide RVSM approval data to the appropriate RMA in a timely manner, so that RVSM approvals databases were complete and current. The meeting noted that some RMAs relied on the December TSD to identify non-compliant aircraft, and this may not be reliable enough to identify errant aircraft. However, the AAMA was able to obtain flight-plan data, on a monthly basis, allowing it to undertake more frequent assessments of non-compliant aircraft. The AAMA was therefore able to provide the Australian ANSP with current, validated lists of apparently non-compliant aircraft. Using an automated process, the ANSP was able to use this data to identify non-compliant aircraft and take appropriate action.

2.68 The meeting noted that the RMACG had been discussing the need to establish a Central Registry for RVSM approvals. The RMACG proposed to amend Annex 6 to ensure the effective analysis of RVSM data and ensure a current record was available to RMAs.

2.69 The meeting agreed that, wherever possible, ANSPs should provide details to their RMA on a monthly basis of all flight plans filed showing RVSM approval, in order to enhance the currency and quality of data available to the RMAs. On the basis of the validated data provided by their RMA, States were encouraged to take appropriate action.

2.70 It would take time for some RMAs to enable their systems to receive and process this enhanced data and it may require a degree of automation and good quality of data to reduce the workload of RMAs. The timeline for delivery of data was discussed, and it was suggested that data should be delivered by the 20th of each month if possible.

2.71 The meeting was informed that the intention was not to burden ANSPs and RMAs with a significant additional workload. The use of standard data formats should allow a degree of automation and quality assurance practices could be expected to reduce RMA workload, while the amount of data required for each aircraft was minimal (not the complete flight plan).

2.72 Noting that there is a significant number of flight plans submitted by operators indicating RVSM approval without such approval being evident, RASMAG/15 developed the following Draft Conclusion (subsequently approved by APANPIRG/22 as Conclusion 22/10 and 22/11), and a Decision.

Draft Conclusion RASMAG 15/1 – RVSM Approvals

That, the States are urged to:

a) ensure that they provide point of contact details and complete RVSM approval data to the appropriate RMA in a timely manner; and

b) encourage their ANSP to provide details to their RMA, on a monthly basis, of all flight plans filed showing RVSM approval; and

c) take appropriate action regarding non-compliant aircraft, on the basis of the data provided by their RMA.

Decision RASMAG 15/6 − Distribution of RVSM Approvals Data

That, the RMAs are urged to utilise monthly flight plan data to undertake frequent assessments of non-compliant aircraft and to provide this information to States for onward transmission to ANSPs.

2.73 China RMA coordinated with the Air Traffic Management Bureau of CAAC to obtain monthly flight plan data from the adjusted Flight Mission Entity (FME) database on a monthly basis. This FME database, which contained the raw flight plan data merged by AFTN message (including FPL, DEP and ARR messages), reflected real flight operations. Flight plan data from DPRK had a different format, containing only flight date, callsign, registration number and Item 10 information.

2.74 MAAR presented an assessment using the December 2010 TSD of aircraft operating in the WPAC/SCS and/or BOB RVSM airspace without proof of RVSM approval. All States accredited to MAAR provided a TSD, except Pakistan was not able to provide a TSD for the Lahore FIR. Those States that did not provide TSD with the aircraft registration were Bangladesh, India (Delhi, Mumbai FIRs), Nepal, Malaysia (Kuala Lumpur, Kota Kinabalu), and the Philippines. In considering the information in relation to potentially non-approved operations in RVSM airspace, RASMAG/16 agreed to the following Draft Conclusion for APANPIRG/23's approval:

Draft Conclusion 16/1: Long-Term Non- RVSM Approved Aircraft

That, States are urged in a timely manner to:

a) update Regional Monitoring Agency data on RVSM approved aircraft; and

b) respond to, and take action regarding RMA queries on long-term data indicating that aircraft were not approved.

<u>Performance-Based Monitoring</u>

2.75 The United States presented information from the recent Second Satellite Data Link Operational Continuity Meeting (SOCM/2), which invited APANPIRG Sub-groups to consider including Required Communications Performance (RCP) and Required Surveillance Performance (RSP) in their work program and implementation initiatives. The meeting noted that Pacific ANSPs had been encouraged to implement GOLD system performance monitoring as an element of their respective Safety Management Systems (SMS).

2.76 New Zealand noted that although certification of aircraft systems was relatively straight-forward, it could be more difficult to determine an RSP or RCP because of the number of potential CSPs and Satellite Service Providers (SSP).

RASMAG Reporting Bodies

2.77 RASMAG updated the list of Airspace Safety Monitoring Organizations deemed to be competent, while cross-checking the responsibility diagrams provided as **Attachment A**.

2.78 The Thirteenth Meeting of the FANS Implementation Team for the Bay of Bengal (FIT-BOB/13, Bangkok, 07 to 08 February 2011) recognised that BOB and FIT-SEA (Southeast Asia) could be combined in order to include more experts that deal with similar issues, enable lessons learnt in one sub-region to assist other areas, and to reduce meeting costs. The ATM/AIS/SAR SG noted that there had been a lack of Problem Reports (PRs) provided to the FITs, which should be encouraged as these were a vital part of the safety oversight of data link operations. RASMAG itself had raised concerns in previous meetings about the piece-meal nature of data-link performance data that had been made available to RASMAG. RASMAG/15 agreed to the following Draft Decision (subsequently approved by APANPIRG/22 as Decision 22/13):

Draft Decision RASMAG 15/3 − Data-link Performance Monitoring Body

That, the FANS Implementation Team - Bay of Bengal (FIT-BOB) and Southeast Asia (FIT-SEA) be combined as a new body (FIT-Asia), reporting to RASMAG, in accordance with the Terms of Reference appended in **Appendix C**.

2.79 The United States asked how the relationship between the Future Air Navigation Interoperability Team (FIT) bodies already operating in the Pacific Region and the new FIT-Asia data-link monitoring agency that reported to RASMAG would be managed. It was noted that an experienced participant had already been invited from the Pacific FITs to the FIT-Asia in order to facilitate a cohesive Asia/Pacific approach and transfer of technical information.

2.80 In presenting a revised safety assessment for the 50NM implementation in the Bay of Bengal its work to RASMAG/15, India had requested endorsement for the BOBASMA as an EMA for the FIRs of Chennai, Colombo, Dhaka, Delhi, Kabul, Karachi, Kolkata, Lahore, Male, Mumbai, Yangon FIRs.

2.81 In relation to the assessment of BOBASMA, the meeting discussed the need for India to complete further training in the work of an EMA and that it needed to more adequately demonstrate that it meets the requirements for being endorsed as an EMA as detailed in the EMA Handbook. Subsequent to RASMAG/14, the FAA Technical Center had expressed some concerns such as the lack of State Letters of Agreement, the on-line BOBASMA database, and additional training.

2.82 The meeting agreed to endorse India as an EMA subject to a 12 month period of mentoring by SEASMA, with added assistance in peer review of safety assessments by the AAMA. India and the meeting agreed to this proposal; thus RASMAG agreed to the following Draft Decision (subsequently approved by APANPIRG/22 as Decision 22/14):

Draft Decision RASMAG 15/4 − Bay of Bengal Airspace Safety Monitoring Agency (BOBASMA) Endorsement

That, the Bay of Bengal Airspace Safety Monitoring Agency (BOBASMA) be endorsed as an En-Route Monitoring Agency (EMA).

2.83 On the basis on the fact that all requirements within the EMA Handbook having been fulfilled, Japan's role in ICAO technical panels, and the peer relationship with PARMO, Japan requested the meeting to endorse the monitoring agency as an EMA. RASMAG agreed to the following Draft Decision (subsequently approved by APANPIRG/22 as Decision 22/15):

Draft Decision RASMAG 15/5 − Japan Airspace Safety Monitoring Agency (JASMA) Endorsement

That, the Japan Airspace Safety Monitoring Agency (JASMA) be endorsed as an En-Route Monitoring Agency (EMA), which will also undertake the current Japan Regional Monitoring Agency (RMA) functions.

Vice Chairperson

2.84 Thailand nominated Mr. Peter Rabot of Singapore as an experienced and long serving RASMAG member as RASMAG Vice Chairman. This nomination was accepted by RASMAG/15.

Frequency of RASMAG Meetings

2.85 RASMAG/15 had briefly discussed the matter of whether it was necessary to hold one or two RASMAG meetings per year, given the need to be efficient in terms of time and the cost of the meeting attendance. APANPIRG/22 had noted the discussion regarding RASMAG meeting frequency, given the context that APANPIRG expected the meetings of subordinate bodies to be efficient in terms the time and cost burden for administrations. It was suggested that the August RASMAG meeting was most important, as this allowed the assessment of safety reports up until the month of April, and reporting to APANPIRG one month later.

2.86 The United States noted that regular meetings were important to maintain momentum for improvements, but acknowledged that the RMAs had an annual coordination meeting to supplement RASMAG's work. There was general agreement by the meeting to reduce the RASMAG schedule to one meeting a year. The meeting agreed that informal meetings were possible to address in-between meeting issues, especially for the RMAs. The meeting agreed to the following Decision:

Decision 16/2 – RASMAG Meetings Schedule

That, RASMAG meetings would normally be scheduled once a year, between 4-8 weeks before APANPIRG meetings in Bangkok, Thailand.

That RASMAG sponsored coordination meetings between RMAs and EMAs should be scheduled as required by the Chairman. A venue for the meeting would be determined by the hosting monitoring agency.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

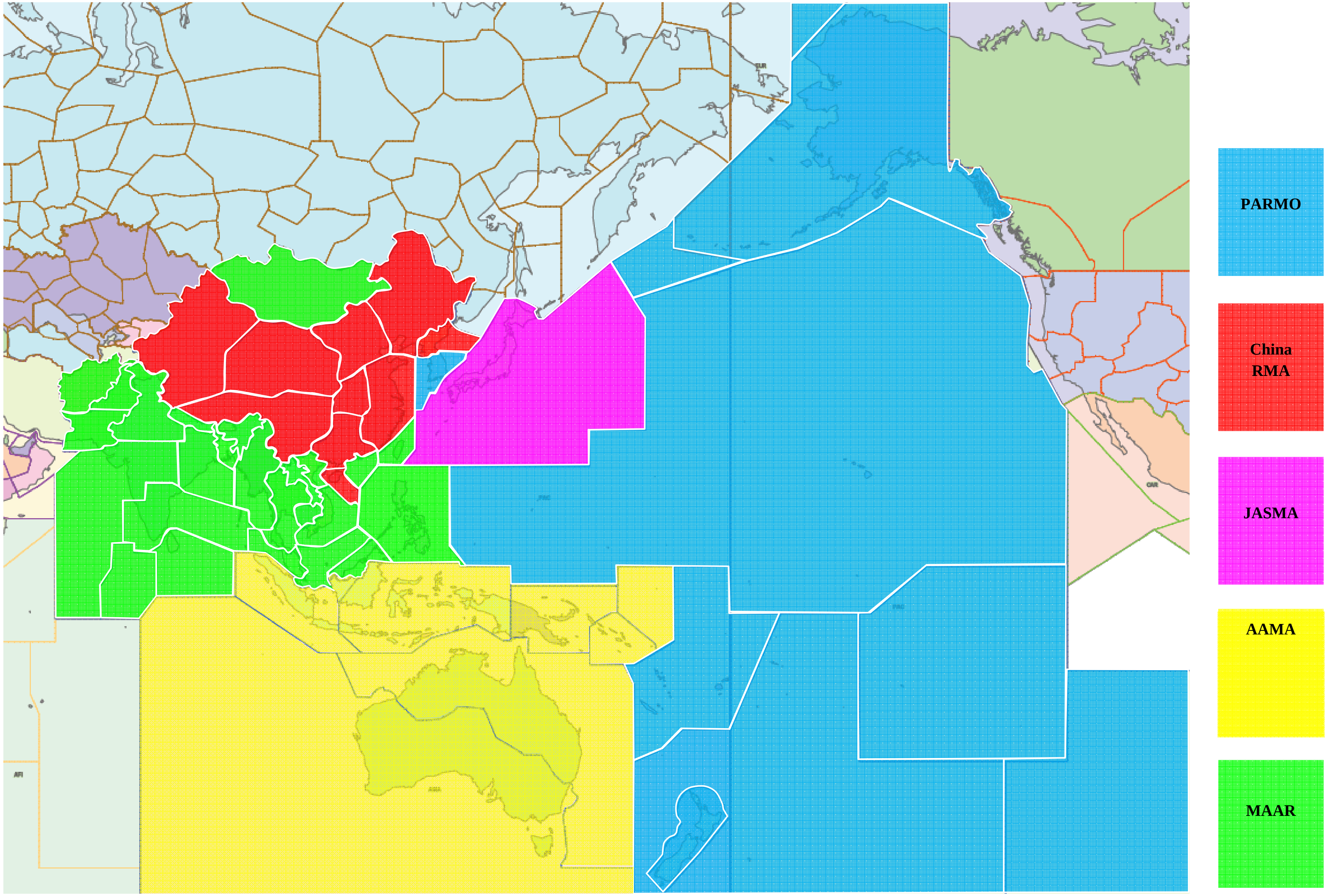
a) note the information contained in this paper; and

b) discuss any relevant matters as appropriate.

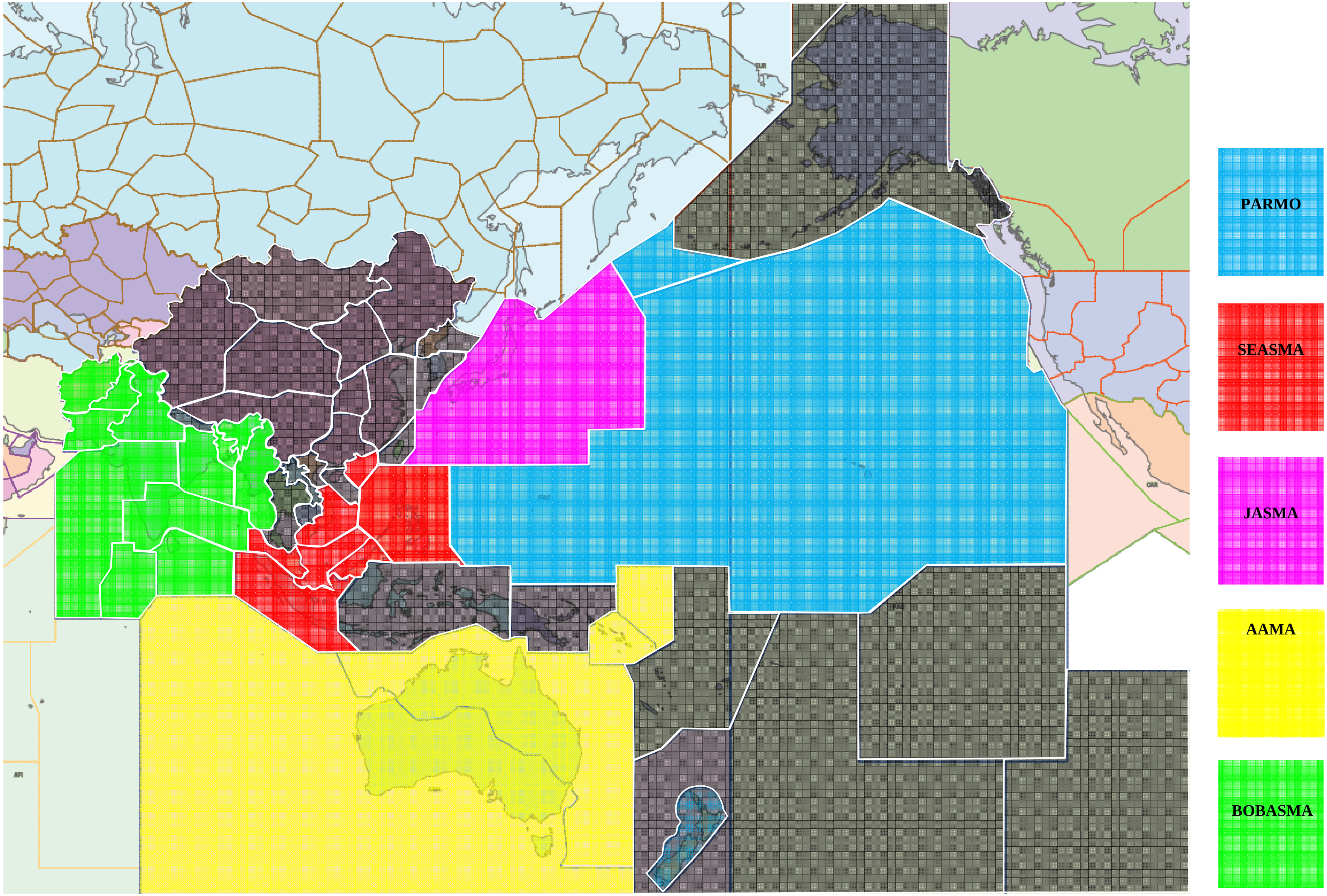
…………………………….

Competent Monitoring Agencies - Areas of Responsibility

Regional Monitoring Agencies (Vertical)



En-route Monitoring Agencies (Horizontal)



Central Reporting Agencies and FITs (Data-link)