



International Civil Aviation Organization

The Twenty-First Meeting of the Regional Airspace Safety Monitoring Advisory Group (RASMAG/21)

Bangkok, Thailand, 14-17 June 2016

Agenda Item 2: Review Outcomes of Related Meetings

3RD RASMAG/MONITORING AGENCIES WORKING GROUP (MAWG/3) MEETING

(Presented by the MAWG Chairman)

SUMMARY

This paper provides information of the 3rd RASMAG/Monitoring Agencies Working Group (MAWG/3) meeting held in Canberra in November 2015.

1. INTRODUCTION

1.1 The Third Meeting of the Regional Airspace Safety Monitoring Advisory Group Monitoring Agencies Working Group (RASMAG/MAWG/3) was held from 30 November - 4 December 2015 at Canberra, Australia. The meeting was hosted by the Australian Airspace Monitoring Agency (AAMA). Participants from the 5 Asia/Pacific regional monitoring agencies (RMAs) and 4 enroute monitoring agencies (EMAs) attended the meeting.

2. DISCUSSION

2.1 During RASMAG/MAWG/3 the participants reviewed and discussed a number of papers covering a wide range of topics relevant to the work of the RMAs and EMAs within the region. In particular the meeting noted that there were a number of meetings by ICAO groups (RMACG/10, RASMAG/20, APANPIRG/26 and SASP/26 and 27) that had been completed prior to the MAWG/3 and briefly reviewed some of the output from those meetings. In particular the meeting reviewed the latest draft of the Manual on Monitoring the Application of Performance-Based Horizontal Separation Minima (PBHSM). The PBHSM Manual has been developed through the Separation and Airspace Safety Panel (SASP), and the most recent meeting of the SASP approved the final version of the manual and deadlines for the completion of the PBHSM manual. The manual will be published as ICAO document 10063 by November 2016. Further discussion related to whether Asia/Pac would adopt this manual or continue to work from the EMA Handbook. General view of the meeting was that for the time being, the Asia/Pac EMAs should continue to use the endorsed handbook.

2.2 The meeting was informed that some SASP members were keen to try to standardise the LLD value on a global basis, for example as two times the RNP value. However a general view was that varying separation minima applied regionally made this difficult. As a result the manual proposes to set a regionally agreed value by ANSPs, based on the smallest minima implemented in the airspace. This should relieve ATC from having to continually think what to apply as an LLD depending on aircraft capability.

2.3 In discussing this issue, the meeting agreed that it might be good for the MAWG to recommend various sub-regional LLD values for RASMAG endorsement. This work could be developed and possibly presented to RASMAG for consideration.

2.4 In relation to ADS-B height monitoring, the meeting was informed by China RMA that they have developed an internal system to support the calculation of ASE using ADS-B data. By the end of 2015, this system would be able to check every qualified flying segment and produce ASE results for the airframes automatically, and provide user interface for the following functions:

- Check of aberrant and non-compliant aircraft every month;
- Creation of report for the monitored fleet for responsible operators every three months;
- Creation of report for airframes on request; and
- Creation of alert report for aberrant and non-compliant aircraft

2.5 China RMA raised the question if the AHMS system needed to check the ADS-B operational approval status of aircraft before using the data for ASE estimate, noting this had been raised as an issue by operators in China as an approval is required to operate with ADS-B. The issue of requiring an operational approval for ADS-B was discussed at length by the meeting with the AAMA commenting that Australia has been operationally using ADS-B for aircraft separation for over 10 years. Airservices Australia removes data from the ATC system if it is known an aircraft is squitting bad data. Only 6 aircraft are currently on the Airservices' black list. Airservices assumes the aircraft transponder is working correctly unless information is present to suggest otherwise.

2.6 An operational approval is quite specific in terms of pilot training, maintenance requirements etc. However the general view is that ADS-B does not require anything special. The flight crew uses the transponder and GPS as normal. Approval for ADS-B is included in the overall Ops approval and is no different to operating with radar. Avionics maintenance (GPS/transponder) is already required and performed without Ops approval documentation. Additionally the meeting was reminded of the State Letter issued on 2 October 2015 reminding States of the APANPIRG Conclusion 26/41 that an operational approval is not required for the operational use of ADS-B OUT by ATC.

2.7 Further discussion resulted in China RMA proposing that the MAWG make a draft decision for RASMAG that endorses available ADS-B data for use in AHMS without the need for specific operational approvals for operators.

RASMAG Draft Conclusion: Use of available ADS-B data aircraft height-keeping monitoring

That, ADS-B data obtained by a Regional Monitoring Agency (RMA) for use in aircraft height-keeping monitoring by means of an ADS-B Height Monitoring System (AHMS), can be sourced from aircraft not subject to an ADS-B related operational approval.

2.8 Other actions/activities addressed by the meeting included:

- a) Reports of height-keeping monitoring outputs from different RMAs and systems;
- b) Development by MAAR and BOBASMA of guidance material for States that proposed a workflow to be used uniformly among APAC States to ensure that LHDs that involve neighboring ACCs are notified to the error-originating ACCs in a timely manner, and are managed through their safety system. This resulted in a trial to be conducted between MAAR and BOBASMA for specific States with the results to be reported to RASMAG;
- c) Review of a number of questions regarding the types of incidents that should be reported as LHDs. An action was accepted by MAAR to develop a Frequently Asked Question (FAQ) Page to be distributed to States (possibly with the cross-boundary LHD handling procedure) and to be published on RMA's websites;

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- d) Considered and agreed to the development of a new LHD reporting form that would include changes such as:
- Additional information such as route type and time parameters that are specific to Category E LHD, including sub-types in checkboxes
 - Rewording of some fields' names
 - Use of content controls such as drop-down lists, check boxes, and calendar
 - More textual explanation for each field to clarify what is being requested; and
 - Use of automatic page counter to count the total number of occurrences
- e) Review of a new reporting process for RVSM/PBN approvals. The proposal provided for a revised combined approvals form that includes RVSM and PBN approvals to be used by States in the APAC region. It also proposed a new reporting process for:
- the combined approval forms; and
 - the December Traffic Sample Data (TSD).

The meeting considered there may be some issues if States no longer provide approvals for specific PBN types and that this may need to be further reviewed in the future to ensure valid data capture. The meeting agreed a draft decision for RASMAG should be developed to have a new State letter sent out from ICAO Regional office that identified States should provide PBN approvals data for enroute operations if available, to the relevant EMA.

RASMAG Draft Decision: Provision of PBN approval data by States

That, when requested by an Enroute Monitoring Agency (EMA), Asia/Pac States provide PBN approval data where that data is available.

- f) Review of airspace safety assessments provided by RMAs and EMAs;
- g) Review of LHD hotspot data provided by China RMA and MAAR in relation to the AKARA area and the Manila interface. The meeting agreed that a more comprehensive assessment needs to be completed. As a result two actions were initiated:

Action: PARMO to coordinate with China RMA, MAAR and JASMA to develop a detailed safety assessment for the AKARA corridor and make the report available to RASMAG/21.

Action: MAAR and AAMA to lead development of a detailed safety assessment of the Manila interface detailed at WP/16 1.2 d) for presentation to RASMAG.

- h) Reviewed a number of papers in relation to non-approved airframes. The meeting was informed that no actions were taken for the long-term non-confirmed aircraft as there are only mechanisms put in place to handle non-compliant and long-term confirmed non-approved aircraft. MAAR asked the meeting to review or suggest some mechanism to handle these silent cases. Suggestions were made to give a certain timeframe for a State to respond to confirmation requests from RMAs before reporting the long-term unconfirmed rogue aircraft as non-approved or include the silent States in the deficiencies list. The meeting sought input from the

RASMAG Secretary that suggested the best way to handle the issue would be for the RMAs to bring the information on States who are not responding effectively to their requests for confirmation of approvals, to RASMAG. RASMAG would then highlight the issue and ask for the State to be placed on a deficiencies list if the matter is not resolved.

3. ACTION BY THE MEETING

3.1 The meeting is invited note the information provided in regards to the successful MAWG/3 meeting. The summary of Discussions is provided at Attachment 1.

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**REPORT OF THE
3rd MEETING OF THE
REGIONAL AIRSPACE SAFETY MONITORING ADVISORY GROUP
MONITORING AGENCY WORKING GROUP (RASMAG/MAWG/3)**

CANBERRA, AUSTRALIA, 30 NOVEMBER – 4 DECEMBER 2015

The views expressed in this Report should be taken as those of the
Meeting

RASMAG/MAWG/3
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INTRODUCTION

Meetings

1.1 The Third Meeting of the Regional Airspace Safety Monitoring Advisory Group Monitoring Agencies Working Group (RASMAG/MAWG/3) was held from 30 November-4 December 2015 at Canberra, Australia. The meeting was hosted by the Australian Airspace Monitoring Agency (AAMA) and Airservices Australia.

Attendance

2.1 Eighteen (18) participants attended the meetings from Australia, China, India, Japan, Singapore, Thailand, and the United States. The list of participants is at **Attachment 1** to this report.

Officer and Secretariat

3.1 Mr. Robert Butcher from the Australian Airspace Monitoring Agency (AAMA) chaired the meeting.

Opening of the Meeting

4.1 Mr Butcher, on behalf of AAMA and Airservices Australia welcomed the participants to the meeting. Mr Butcher acknowledged the monitoring agency representatives who had travelled significant distances to attend.

Documentation and Working Language

5.1 The working language of the meeting and the language for all documentation was English. 19 working papers (WPs) 11 information papers (IPs) and 9 Flimsy (FL) were reviewed by the meeting. The list of papers and presentations is shown at **Attachment 2** to this report.

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REPORT ON AGENDA ITEMS

Agenda Item 1: Adoption of Agenda

1.1 The provisional agenda (WP1) was adopted by the meeting.

Agenda Item 2: Review Outcomes of Related Meetings

Development of Global Guidance for Monitoring the Application of Performance-Based Horizontal Separation Minima (WP/11)

2.1 The AAMA and PARMO presented WP/11. The paper contained the latest draft of the Manual on Monitoring the Application of Performance-Based Horizontal Separation Minima (PBHSM). The PBHSM Manual has been developed through the Separation and Airspace Safety Panel (SASP), and the most recent meeting of the SASP approved the final version of the manual and deadlines for the completion of the PBHSM manual. The manual will be published as an ICAO document by November 2016.

2.2 In discussing the paper, Ms Falk commented that only one significant comment had been received and that additional wording had been included to resolve the issue in relation to collection of traffic sample data. The meeting acknowledged the significant work undertaken by Ms Falk, Mr Butcher and other members of the SASP in progressing the development of the manual to this stage. Further discussion related to whether Asia/Pac would adopt this manual or continue to work from the EMA Handbook. General view of the meeting was that for the time being, the Asia/Pac EMAs should continue to use the endorsed handbook.

2.3 Ms Falk also informed the meeting that some SASP members were keen to try to standardise the LLD value on a global basis, for example as two times the RNP value. However a general view was that varying separation minima applied regionally made this difficult. As a result the manual proposes to set a regionally agreed value by ANSPs, based on the smallest minima implemented in the airspace. This should relieve ATC from having to continually think what to apply as an LLD depending on aircraft capability.

2.4 In discussing this issue, the meeting agreed that it might be good for the MAWG to recommend various sub-regional LLD values for RASMAG endorsement. This work could be developed and possibly presented to RASMAG for consideration.

Action: EMAs to consider options for sub-regional LLD values and propose these to RASMAG/21 for endorsement.

2.5 Noting that the new Manual contained templates for the collection of a range of data from States, the meeting considered how to obtain PBN approval data from authorities going forward when changes are implemented that would result in a State not issuing specific operational approvals for individual PBN types. SEASMA advised that they have been having difficulty obtaining data as the regulator issues a fleet approval in some instances and so obtaining data for a specific airframe is proving difficult. Suggestions were made that one way to obtain airframe specific data in that case, would be to source the data from the flight plan and to verify the PBN capability. The meeting acknowledged there would be a level of reliance on the correct data being included on the flight plan for this to be fully effective. PARMO indicated that there is a possible issue with third party flight planning services that auto-populate the navigation approvals on flight plans and that incorrect data could be included as sometimes happens with the 'W' in some flight planning system defaults. The meeting agreed to further review the issue of accessing PBN approvals data from States.

2.6 Mr Butcher provided the meeting with an overview of outcomes from the recently concluded SASP/27 meeting, in relation to discussions regarding how the MMR was to be updated in the future. He indicated that the SASP was informed that the ICAO NAT Operations Group (Operations/Airworthiness Subgroup) had been disbanded in the reorganization of the NAT SPG, hence, it was no longer undertaking RVSM data validation tasks, and that as a result, the European region has lost its traditional way of validating aircraft in the different RVSM monitoring groups.

2.7 The SASP Secretary had suggested that possibly an ICAO group such as the OPSP had the required level of expertise and would permit a global reviewing mechanism rather than a regional focus. The SASP supported this proposal and this view was to be communicated to the European RMA.

2.8 The MAWG discussed the issue at some length and concluded that the APAC RMAs acting through the MAWG could provide direct input into any discussion on proposed MMR changes through whichever body is agreed by the RMACG.

Agenda Item 3: ADS-B Height Monitoring

Introduction of China RMA's ADS-B Height Monitoring System (WP/15)

3.1 China RMA informed the meeting that with the help from the ADS-B data analysis team, China RMA developed an internal system to support the calculation of ASE using ADS-B data. By the end of 2015, this system will be able to check every qualified flying segment and produce ASE results for the airframes automatically, and provide user interface for the following functions:

- Check of aberrant and non-compliant aircraft every month;
- Creation of report for the monitored fleet for responsible operators every three months;
- Creation of report for airframes on request; and
- Creation of alert report for aberrant and non-compliant aircraft

3.2 China RMA informed the meeting that they have developed a means to use the system to check the data for aberrant and non-compliant aircraft and presented some illustrations of the system interface. China RMA raised the question if the AHMS system needed to check the ADS-B operational approval status of aircraft before using the data for ASE estimate. In particular they pointed out to the meeting that this had been raised as an issue by operators in China as an approval is required to operate with ADS-B.

3.3 The meeting thanked China RMA for the detailed presentation noting the high quality plots that they are now producing representing monitoring data. The meeting congratulated China RMA on their significant contribution to performance monitoring capability within the Asia/Pacific.

3.4 In relation to the question of operational approvals for ADS-B, Mr Butcher commented that he was under the impression that no approvals were required and that this was certainly the case for Australian registered operators. To provide additional context to this discussion, Mr Greg Dunstone from Airservices Australia, who has had a pivotal role in the Asia/Pac ADS-B Task force provided a short briefing to the meeting (see Flimsy 1).

3.5 Mr Dunstone informed the meeting that Australia has been operationally using ADS-B for

aircraft separation for over 10 years. He stated that Airservices Australia removes data from the ATC system if it is known an aircraft is squitting bad data. Only 6 aircraft are currently on the Airservices' black list. Airservices assumes the aircraft transponder is working correctly unless information is present to suggest otherwise. He indicated that an operational approval is quite specific in terms of pilot training, maintenance requirements etc. However the general view is that ADS-B does not require anything special. The flight crew uses the transponder and GPS as normal. Approval for ADS-B is included in the overall Ops approval and is no different to operating with radar. Avionics maintenance (GPS/transponder) is already required and performed without Ops approval documentation.

3.6 The meeting was further informed that disadvantages of providing a ADS-B Ops approval included: there being no assessed safety benefit provided to aircraft with ADS-B but that had no approval; excessive paper trail for operators; extensive work for ANSPs to manage who has/has not got an approval; the requirement for ANSP to treat received data differently; and how does an operator flight plan with or without ADS-B?

3.7 Mr Dunstone stated that the regulator processes already exist to give Airworthiness approval and to monitor compliance without the need for a separate operational approval. For Australia if the integrity values in the message are good we use it unless the aircraft is on a blacklist. Mr Dunstone also provided a copy of the State Letter issued on 2 October 2015 reminding States of the APANPIRG Conclusion 26/41 that an operational approval is not required for the operational use of ADS-B OUT by ATC. A copy of the letter is contained in Flimsy 2.

3.8 The meeting thanked Mr Dunstone for the briefing and further discussion resulted in China RMA proposing that the MAWG make a draft decision for RASMAG that endorses available ADS-B data for use in AHMS without the need for specific operational approvals for operators.

RASMAG Draft decision: Use of available ADS-B data aircraft height-keeping monitoring

That, ADS-B data obtained by a Regional Monitoring Agency (RMA) for use in aircraft height-keeping monitoring by means of an ADS-B Height Monitoring System (AHMS), can be sourced from aircraft not subject to an ADS-B related operational approval.

Update of AAMA Monitoring Burden (WP/17)

3.9 The AAMA presented WP/17 that identified that the AAMA has on an on-going basis reported on its anticipated monitoring burden following the implementation of long term height monitoring in November 2010. The data was based on a review of the current RVSM approvals data for the State airspaces that the AAMA is responsible for, taking into account completed successful monitoring activity.

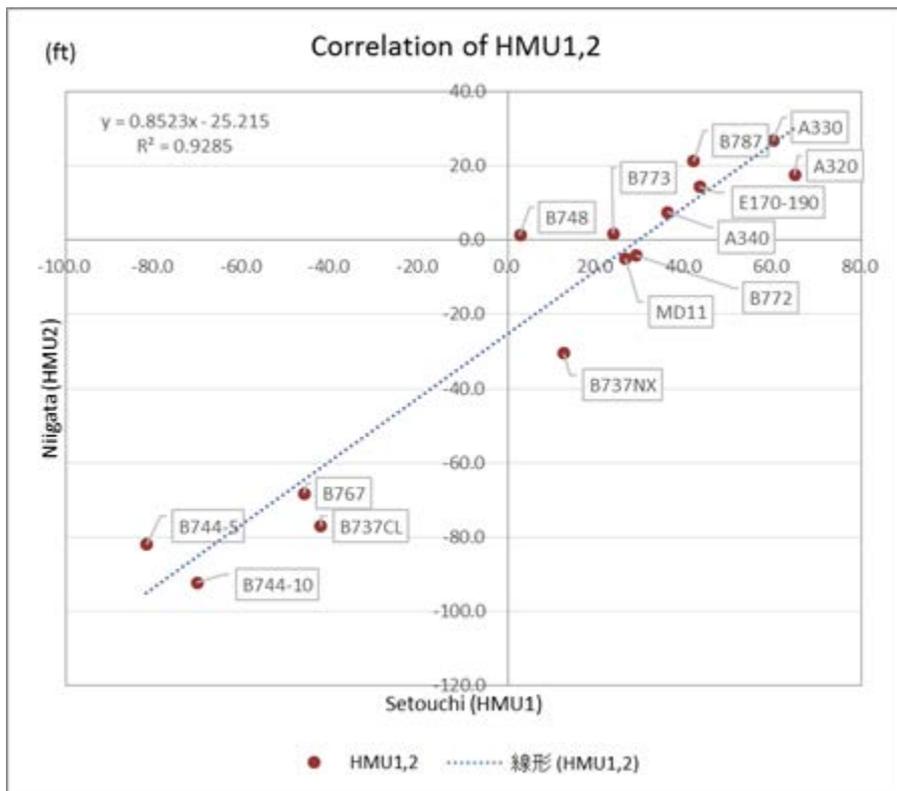
3.10 A review of the most recent RVSM approvals databases maintained by the AAMA on behalf of ICAO determined that the total number of RVSM approved aircraft totalled 1142 as at 25 November 2015. This represents an increase of 65 aircraft since the report by the AAMA to RASMAG MAWG/2 in 01-04 December 2014. Applying the MMR and taking into account the aircraft already successfully monitored, the current outstanding burden is 92 aircraft which represents a decrease of 11 airframes from that reported to RASMAG MAWG/2. The existing burden comprises 22 Australian registered, 69 Indonesian registered and 1 Papua New Guinea registered aircraft.

3.11 The meeting noted the positive improvement in the monitoring burden for the AAMA and the high number of aircraft being monitored using ADS-B data.

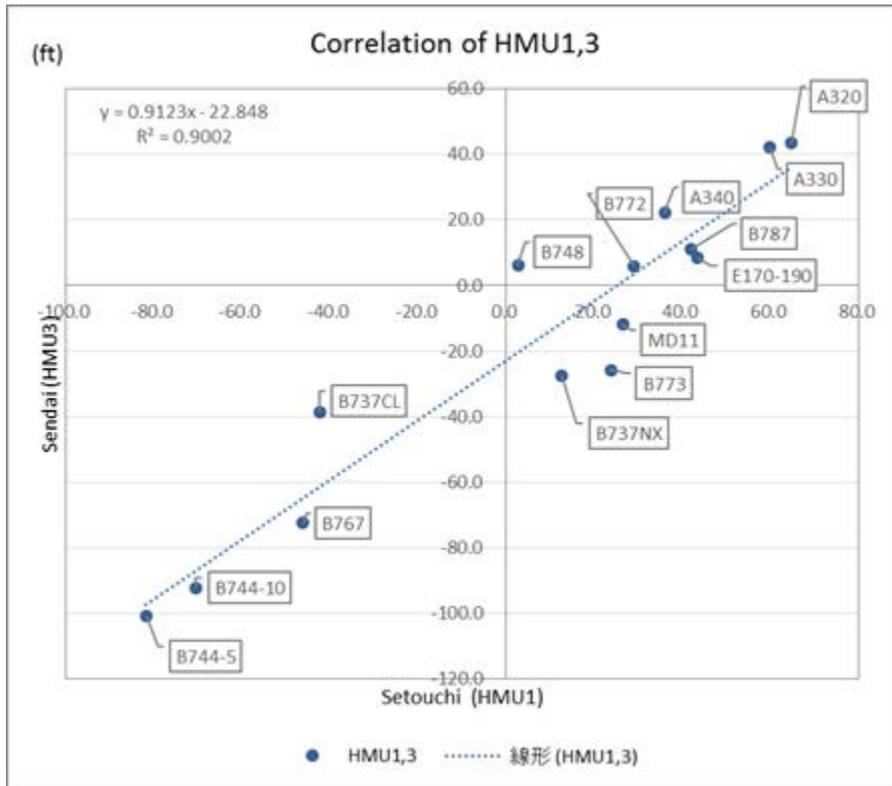
JASMA Comparison Results of 3 HMUs (IP/1)

3.12 The JASMA presented IP/1 which presented the mean ASE comparison results obtained from Setouchi, Niigata and Sendai height monitoring unit (HMU). The paper informed the meeting that the shape of Niigata and Sendai HMU coverage was distorted. As a result JASMA decided to reduce the radius of both HMU coverage from 40NM to 30NM to exclude the outliers of monitoring data in late February 2015.

3.13 The paper noted that Niigata HMU has a strong correlation with Setouchi HMU rather than Sendai HMU. The results obtained in Setouchi HMU tend biased to the positive side, while the results in Niigata and Sendai HMUs tend to biased to the negative side.



IP/1 Figure 3: Correlation of Setouchi (HMU1) and Niigata (HMU2) Mean ASE

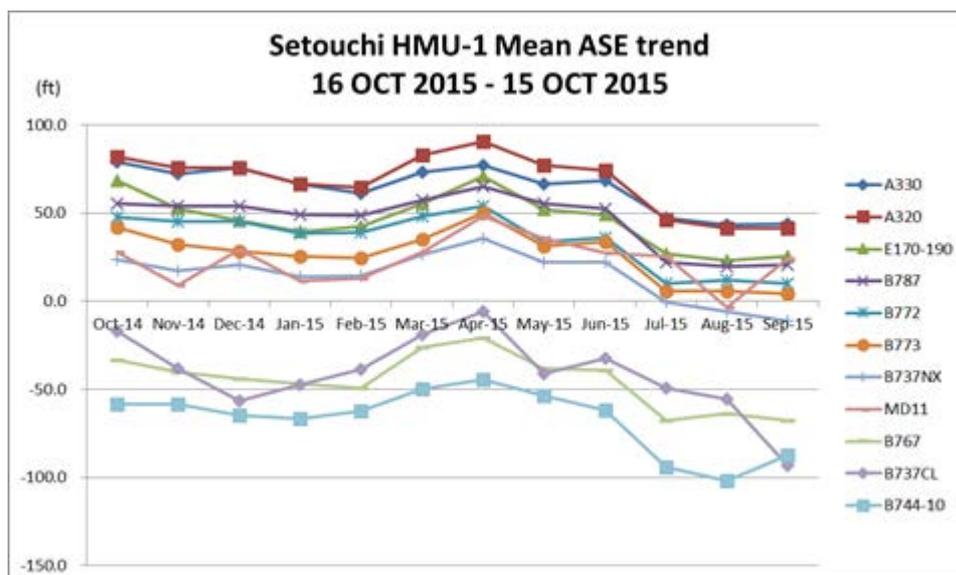


IP/1 Figure 4: Correlation of Setouchi (HMU1) and Sendai (HMU3) Mean ASE

3.14 The meeting thanked JASMA for the interesting data. Mr Perez commented that PARMO see the same sorts of correlations in AGHME data where different local or environmental issues can impact the results. In relation to the reporting of the JASMA data, China RMA asked if the KSN shared data will have 3 different values for an aircraft or would there be an averaged single value. JASMA stated that there will be 3 different ASE values provided. In that case, the meeting agreed that the most conservative value would be used.

JASMA Monitoring Results of SETOUCHI HMU (IP/3)

3.15 JASMA presented IP/3 that provided a summary of the latest height monitoring results obtained from Setouchi HMU for the period between 16 October 2014 and 15 October 2015. The report provided monthly mean ASE of each monitoring group, which indicated some degradation for B737CL, B767 and B744-10 aircraft.



IP/3 Figure 2: Monthly Mean ASE of each Monitoring Group

3.16 The meeting discussed outcomes for B737NX and noted the JASMA data that was acceptable but appeared higher than reported by other RMAs as presented in WP28 at RASMAG20. Additionally the meeting discussed work undertaken by the AAMA, PARMO and MAAR in relation to B744-10 degradation of ASE. MAAR raised the issue that given the current data in relation to B744-10 aircraft, should the aircraft be moved to Group 2 instead of Group 1 in the MMR.

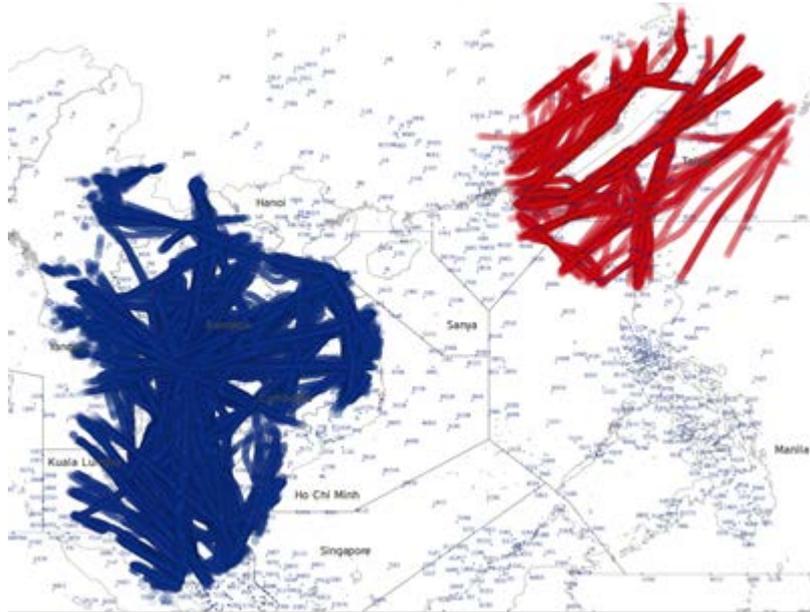
3.17 Ms Falk and Mr Perez provided the meeting with more detailed insight into the work NAARMO and PARMO are undertaking with FAA flight standards in relation to this issue. Mr Butcher suggested the MAWG could provide combined data on B744-10 performance to the RMACG as a consolidated Asia/Pac view. In relation to this issue, PARMO presented Flimsy 6 that provided an overview brief on data recently presented to FAA flight standards. Ms Falk stated there was a lot of discussion within the FAA on this issue and follow up action was to be undertaken. Boeing has not been directly included in the discussion to date but will be informed by the FAA. The meeting was informed that the European RMA has already consulted with Boeing on this topic.

3.18 The meeting expressed concern regarding the results and proposed that possibly the aircraft type should be considered for possible change from Group 1 to Group 2 of the MMR and that this issue should be further explored at the next RMACG meeting in May 2016.

Action: RMAs provide monitoring data of at least 2 years ASE values (Mar 2014-Feb 2016 inclusive) for B744-10 airframes to Mr Perez by end of March 2016 to consolidate into a paper for RMACG/11.

MAAR ADS-B AHMS Status (IP/4)

3.19 The MAAR presented IP/4 that reported the current coverage of their ADS-B Height Monitoring System (AHMS) and the work in progress with Singapore and Mongolia to obtain ADS-B data. The number and percentage of aircraft being height-monitored by MAAR's AHMS are also presented noting that 6,727 airframes have been monitored during the past two years (November 2013 - October 2015).



IP/4 Figure 1: ADS-B coverage of Thailand (blue) and Taiwan (red) for HKPM service provided by MAAR

3.20 The meeting congratulated MAAR on the expanding implementation of AHMS in the Asia region. Some discussion ensued noting the outstanding burden, and it was suggested that MAAR may consider providing data to RASMAG to highlight the number of aircraft still to be monitored and thereby encourage States to take action.

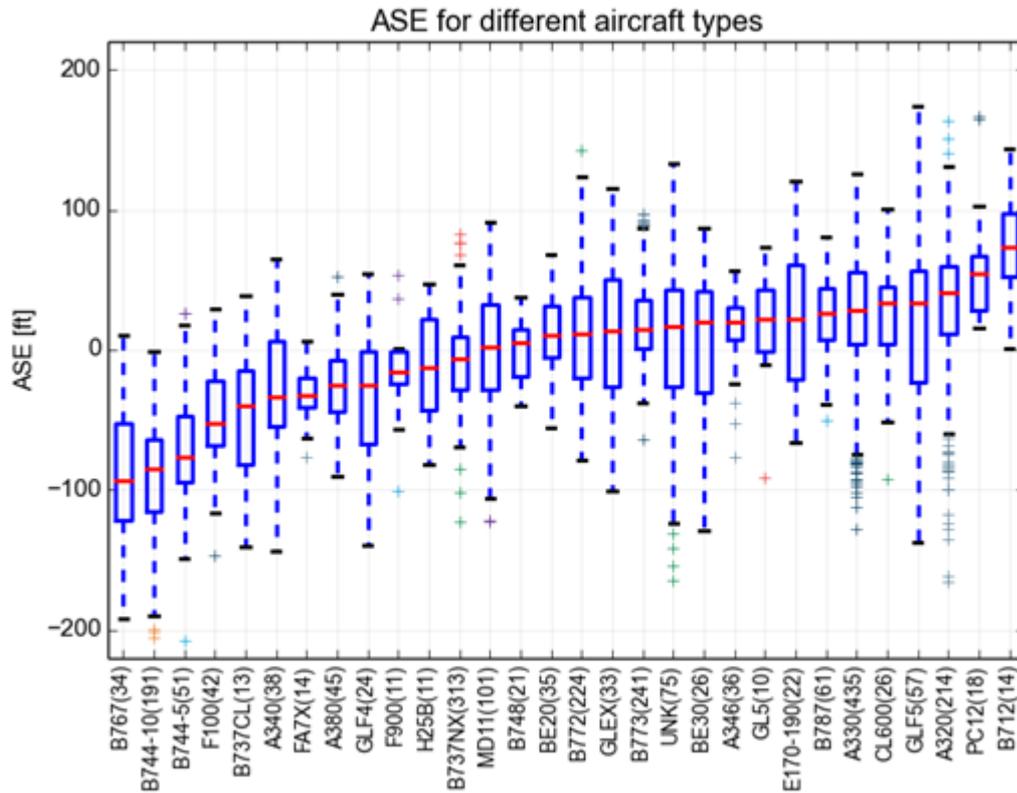
ASE Data for the Australian FIR (IP/7)

3.21 The AAMA presented IP/7 that reported on the use of ADS-B data for estimation of ASE using the FAA's AHMS code for the period from July 2014 to July 2015. The AAMA reported that results indicate:

- Non-approved aircraft have a wider possible range of ASE values than approved aircraft.
- B767 and B744 have relatively high ASE values with mean -100 ft. and values often in the range -175 to -200 ft.
- Several A320 and B767 aircraft are showing degraded performance
- China Eastern changed a number of their fleet to a Height Above Ellipsoid (HAE) reference frame this year.
- The proportion of the fleet using HAE rather than Height Above Mean Sea Level (MSL or HAMSL) has increased to 38 percent.
- Aircraft with old and non-approved ADS-B systems have high positional in-accuracy making obvious errors in estimation of ASE of 2000 to 5000 ft.

3.22 The paper provided a range of data including plots of comparisons between measured ASE's for approved and non-approved Australian registered airframes. Data was also presented

showing ASE performance by aircraft type that highlighted poor performance for B744-10 airframes.



IP/7 Figure 1: Box plots of aircraft ASE performance by aircraft type. Only types with more than 10 aircraft are shown. The number of aircraft in the sample is given in bracket.

3.23 The meeting thanked the AAMA for the detailed paper and discussed aspects of the data. The China RMA questioned if the data related to the non-approved airframes is for those aircraft in RVSM airspace. Dr Aldis responded in the affirmative as the software the AAMA uses only looks in that height band. China RMA commented that with reference to the plot for B767 aircraft in Figure 19, they also see similar degradation in data they produce.

3.24 The meeting discussed the criteria that would result in an RMA advising an operator of any observed degradation with general consensus that a trend of degrading performance should be brought to the attention of the operator when the trend is confirmed. MAAR showed some additional data (Flimsies 3, 4 and 5) where the A320 fleet of an operator had been degrading until a new Airbus maintenance program was issued and the ASE jumped significantly. RMAs agreed to look for similar changes in their data.

Action: RMAs review available monitoring data for A320 aircraft to assess if any appreciable change in ASE has occurred during 2015 that resulted in a significant step-change in ASE. Any identified data should be shared with other RMAs.

Agenda Item 4: EMA/RMA Safety Monitoring Reports for RASMAG

Cross-Boundary LHD Coordination Procedure (WP/3)

4.1 MAAR presented WP/3 that informed the meeting that Category E LHDs have been driving the risk estimates in most Asia Pacific (APAC) RVSM airspace. Currently, only some APAC States, who participated in Western Pacific/South China Sea RVSM Scrutiny Working Group (WPAC/SCS RSG), have a procedure to handle each LHD occurrence that involves a neighboring ACC. The rest of the APAC States do not have such a procedure and this results in some discrepancies in the reported occurrences, which are discovered much later, after MAAR relays the LHD reports to the error originating States.

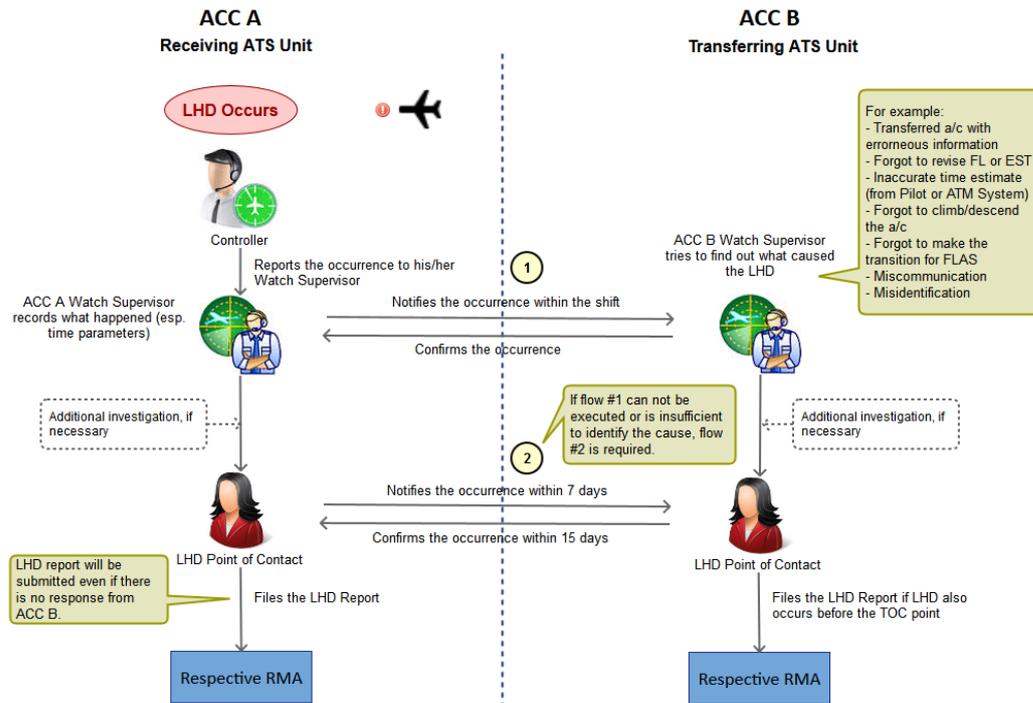
4.2 Therefore, MAAR proposed a workflow to be used uniformly among APAC States to ensure that LHDs that involve neighboring ACCs are notified to the error-originating ACCs in a timely manner and are managed through their safety system.

4.3 The meeting thanked MAAR for taking the initiative with BOBASMA to develop the proposed procedure. In discussing the proposal in detail, Mr Butcher explained how the process works in Australia and suggested that some of the proposed timelines may not fit all ANSP established procedures. He did confirm however that occurrence reports are sent directly to relevant ANSPs. MAAR asked if the procedure would need to go to APANPIRG for endorsement or could it just be endorsed through RASMAG? BOBASMA commented that the origin of the procedure was because the current process had MAAR sending them reports sometime after the occurrence took place, which meant no information was available in ATC such as voice tapes, to enable an effective investigation.

4.4 PARMO commented they were concerned that the proposal may clash with existing ATC LOAs in the way they interact. The AAMA suggested if the issue is sub regional currently then maybe a trial between India and Myanmar could be a good way forward. China RMA agreed that it is important to get the initial early advice between the ANSPs that an event has taken place and for the feedback loop to occur. They suggested that MAWG or RASMAG could ask the RMAs/EMAs to take the issue back to discuss with the respective ANSP to consider how they could put these proposals in place.

4.5 Both MAAR and BOBASMA suggested that as they have been given this task by BOBASIO they could implement it within BOBASIO States to start with. RASMAG could at its next meeting discuss and endorse it for implementation in other Asia/Pacific States. The meeting agreed to this proposal. Further discussion resulted in an amended procedure detailed in Flimsy 8 and shown below:

RASMAG/MAWG/3
Report of the Meeting



Action: MAAR and BOBASMA to implement a limited trial of the procedure outlined in WP/3 and Flimsy 8 and to report outcomes to RASMAG/21.

LHD Clarification (WP/4)

4.6 MAAR presented WP/4 commenting that they have received many queries regarding what type of incidents should be reported as an LHD. This paper summarizes all such queries and MAAR sought clarification from the meeting of whether such incidents should be reported.

4.7 These incidents are:

- The incoming traffic violates the flow restriction (but complies with the separation agreed in the LOA).
- Transfer information in a surveillance area is incorrect or there is no revision of traffic information until very late.
- The transferred SSR code does not match the incoming traffic; and
- The incoming traffic arrives later than the transferred time, and the accepting unit calls back to verify the time.

4.8 After these queries have been answered, MAAR plans to develop a Frequently Asked Question (FAQ) Page to be distributed to States (possibly with the cross-boundary LHD handling procedure) and to be published on MAAR's website.

4.9 The meeting thanked MAAR for raising the questions in the paper and provided answers as below:

4.10 Question 1: The meeting agreed that this is not an LHD report. The increased risk through additional workload would be hard to assess. It was suggested what may result in a LHD would be any negative outcome that resulted from the increased workload but not the fact of the additional workload itself that may arise from the flow restriction.

4.11 Question 2: The meeting agreed it is up to the ANSP to decide if reporting is required to capture the errors even though no or low risk for receiving and transferring airspace.

4.12 Question 3: The meeting agreed it is driven on a scenario basis, that it should be reported and determined at the time if an LHD Cat E is applicable or not.

4.13 Question 4: The meeting agreed this is still an error and should be reported although no apparent risk unless also at incorrect level.

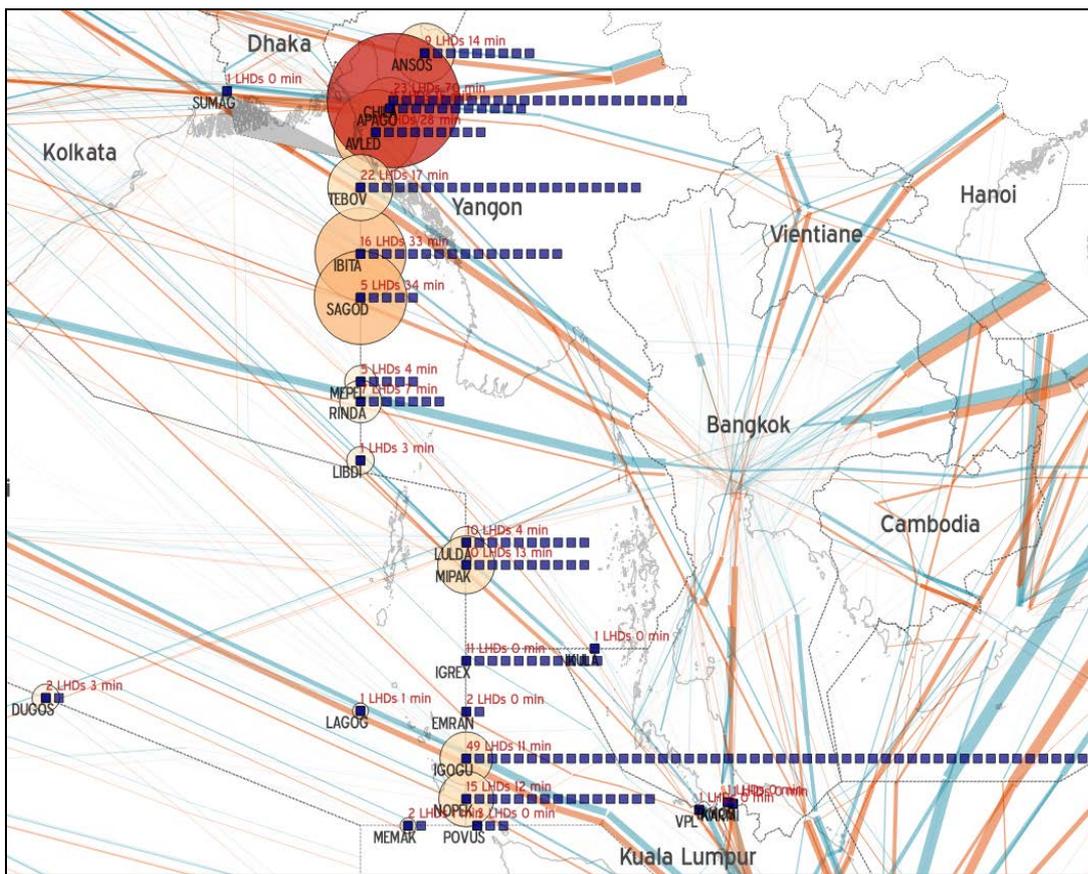
Preliminary Safety Assessment BOB, WPAC/SCS and Mongolia (WP/5)

4.14 The paper presents a preliminary safety assessment of the operational risk in the BOB, WPAC/SCS, and Mongolian RVSM airspace, based on LHD occurrences received by MAAR since the beginning of calendar year 2015. The areas of interest consist of the high-risk areas along the eastern and western boundaries of Indian FIRs, and the high-frequency area on the northern and eastern boundary of Manila FIR. The following table summarizes the estimated risk in each region:

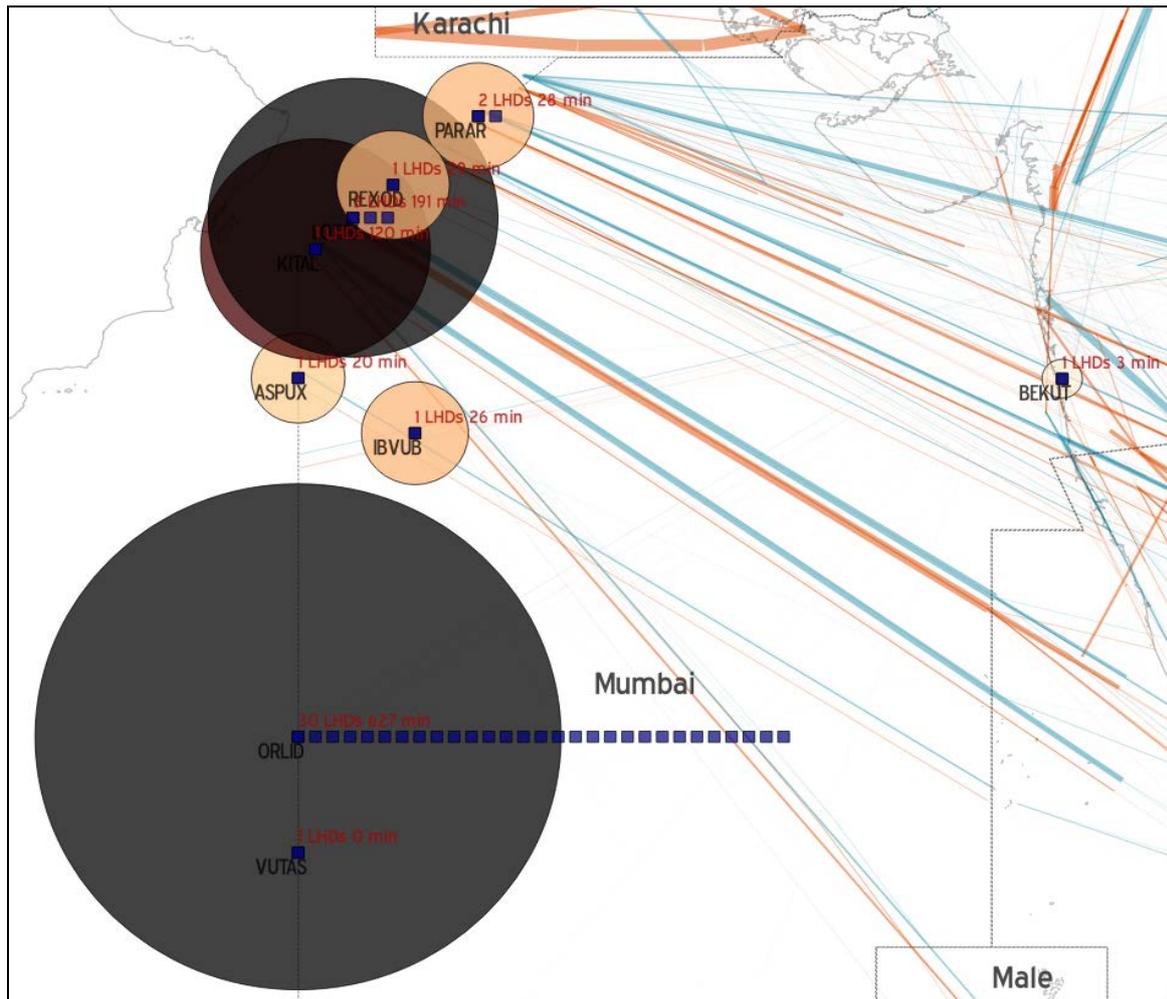
BOB Airspace (January – October 2015)			
Source of Risk	Risk Estimation (FAPFH)	TLS	Remarks
Technical Risk	0.95×10^{-9}	2.5×10^{-9}	Below Technical TLS Estimated based on 2014 TSD
Operational Risk	37.09×10^{-9}		Increases from 2014 operational risk of 17.78×10^{-9}
Total Risk	38.04×10^{-9}	5.0×10^{-9}	Increases from 2014 total risk of 18.73×10^{-9} Above TLS
SCS Airspace (January – October 2015)			
Source of Risk	Risk Estimation (FAPFH)	TLS	Remarks
Technical Risk	1.16×10^{-9}	2.5×10^{-9}	Below Technical TLS Estimated based on 2014 TSD
Operational Risk	3.17×10^{-9}		Increases slightly from 2014 operational risk of 2.98×10^{-9}
Total Risk	4.33×10^{-9}	5.0×10^{-9}	Increases slightly from 2014 total risk of 4.14×10^{-9} Below TLS

Mongolian Airspace (January – October 2015)			
Source of Risk	Risk Estimation (FAPFH)	TLS	Remarks
Technical Risk	0.96×10^{-9}	2.5×10^{-9}	Below Technical TLS Estimated based on 2014 TSD
Operational Risk	0.50×10^{-9}		Decreases from 2014 operational risk of 2.02×10^{-9}
Total Risk	1.46×10^{-9}	5.0×10^{-9}	Decreases from 2014 total risk of 2.98×10^{-9} Below TLS

4.15 The unprecedented high risk in the BOB (BOBASIO) airspace is a result from 2 hot spot areas as shown in the figures below.



WP/5 Figure 4: Geographical Location of LHDs near the eastern boundaries of the Chennai and Kolkata FIRs



WP/5 Figure 5: Geographical Location* of LHDs near the western boundary of the Mumbai FIR
* The color black represents hot spots with total LHD duration exceeding 127.5 minutes

4.16 The last area of interest concerns the area to be addressed for the scrutiny group conclusion from RASMAG/20. The LHDs on the northern and eastern boundary of Manila FIR are high in number, but have relatively low risk due to relatively good surveillance and VHF coverage in the South China Sea.

4.17 The meeting thanked MAAR for a very detailed report and noted the new hot spot in the Mumbai FIR as a result of non-coordinated aircraft from the adjacent sector in an area of poor communication capability. The meeting acknowledged that aircraft were operating in a poor HF coverage area so controllers had no knowledge of the aircraft in the FIR. Mr Butcher suggested this was a good candidate region for issues that could be resolved with Space-based ADS-B in the future.

Revised LHD Reporting Form (WP/7)

4.18 MAAR informed the meeting that they had experienced some difficulties analyzing LHD reports due to lack of/ambiguous data submitted by States. To facilitate the LHD form completion process, MAAR decided to re-design the current LHD form, and would like to propose the new form to be reviewed by the meeting as shown in the Attachment to WP/7. The changes include:

- Additional information such as route type and time parameters that are specific to Category E LHD, including sub-types in checkboxes

- Rewording of some fields' names
- Use of content controls such as drop-down lists, check boxes, and calendar
- More textual explanation for each field to clarify what is being requested; and
- Use of automatic page counter to count the total number of occurrences

4.19 After the review from the meeting, MAAR plans to ask States to adopt the new form when they wish to. Other Asia Pacific RMAs are also welcomed to use the form.

4.20 The meeting thanked MAAR for bringing these issues to the MAWG's attention. There was general agreement a new LHD form is timely. One suggestion made was to include the number of levels crossed in the data capture and this was agreed. Further discussion focused on the need to ensure completion of the additional description as a priority item. China RMA asked if this template was to be provided to the ANSP or State and highlight that the controller attempting to complete it would need some other form of assistance to capture the requested data. The meeting agreed for monitoring agencies to discuss the changes with relevant ANSPs and provide comments to MAAR by end of February. MAAR would then provide final copy to monitoring agencies for distribution to States as the preferred LHD form.

Action: RMAs to provide feedback on the proposed LHD form to MAAR by the end of February 2016

Action: MAAR on the basis of feedback from RMAs to finalise a new form template and provide to RMAs for distribution to States.

New Reporting Process for RVSM/PBN Approvals (WP/8)

4.21 SEASMA presented WP/8 that was a joint paper by SEASMA and MAAR. It proposed a revised combined approvals form that includes RVSM and PBN approvals to be used by States in the APAC region. It also proposed a new reporting process for:

- a) the combined approval forms; and
- b) the December Traffic Sample Data (TSD).

4.22 The meeting was informed the new reporting process will require APAC's States to submit (a) and (b) to both the Monitoring Agency for Asia Region (MAAR) and South East Asia Safety Monitoring Agency (SEASMA) concurrently.

4.23 The revised approvals form could also be considered for global usage. The paper also proposed to draft an ICAO state letter to inform all APAC States of the new combined approvals form and the new reporting process of approvals and December TSD.

4.24 The meeting reviewed the proposals in WP/8 in some detail and agreed on a final template detailed at Flimsy 9. The meeting considered there may be some issues if States no longer provide approvals for specific PBN types and that this may need to be further reviewed in the future to ensure valid data capture. The meeting agreed a draft decision for RASMAG should be developed to have a new State letter sent out from ICAO Regional office that identified States should provide PBN approvals data for enroute operations if available, to the relevant EMA.

RASMAG Draft decision: Provision of PBN approval data by States

That, when requested by an Enroute Monitoring Agency (EMA), Asia/Pac States provide PBN approval data where that data is available.

JASMA Horizontal Safety Assessment (WP/10)

4.25 WP/10 was presented by JASMA and provided the horizontal risk assessment results of Fukuoka FIR oceanic airspace. The meeting was informed that the paper was a resubmit of the JASMA report for RASMAG/20-WP20. The paper showed the calculation results are unchanged except “Longitudinal 10 minutes risk”. The original value was 9.33×10^{-9} fapfh and it was “Above TLS”. JASMA recalculated using the amended data and got 2.76×10^{-9} fapfh which was “Below TLS”.

NOPAC Routes – estimated annual flying hours = 81057 hours (note: estimated hours based on 2014 traffic sample data)			
Risk	Risk Estimation	TLS	Remarks
<i>MAWG 3 Longitudinal Risk</i>	2.76×10^{-9}	5.0×10^{-9}	<i>Below TLS</i>
<i>RASMAG 20 Longitudinal Time Risk</i>	9.33×10^{-9}	5.0×10^{-9}	<i>Below TLS</i>

WP/10 Table 1: NOPAC time separation Risk Estimates

NOPAC Routes ADS-C aircraft – estimated annual flying hours = 81057 hours (note: estimated hours based on 2014 traffic sample data)			
Risk	Risk Estimation	TLS	Remarks
<i>RASMAG 20 Longitudinal 30NM Risk</i>	5.7×10^{-13}	5.0×10^{-9}	<i>Below TLS</i>
<i>RASMAG 19 Longitudinal 30NM Risk</i>	1.28×10^{-10}	5.0×10^{-9}	<i>Below TLS</i>

WP/10 Table 2: Risk Estimates for RNP4 aircraft with 30NM distance based separation

NOPAC Routes(EXCEPT G344) – estimated annual flying hours = 81057hours (note: estimated hours based on 2014 traffic sample data)			
Risk	Risk Estimation	TLS	Remarks
<i>RASMAG 20 Lateral Risk</i>	0.75×10^{-9}	2.5×10^{-9}	<i>Below TLS</i>
<i>MAWG 2 Lateral Risk</i>	0.80×10^{-9}	2.5×10^{-9}	<i>Below TLS</i>

WP/10 Table 3: Lateral separation Risk Estimates for NOPAC.

China RMA Coordination for LHD Reporting (WP/13)

4.26 WP/13 highlights the effort of China RMA in improving Large Height Deviation reporting in response to draft conclusion RASMAG/20-4:

1. South China Sea (SCS) Hong Kong FIR interface with Guangzhou/Sanya FIRs: MAAR and China RMA took the opportunity of the Second Meeting of South China Sea Major Traffic Flow Review Group (SCS-MTFRG/2) to conduct SCS area’s LHD coordination in Haikou, China in July 2015. The ATC delegation from Hong Kong, Guangzhou, Zhan Jiang, Sanya and Shanghai were invited and discussed the possible reasons leading to Category E/F LHDs, and remedial actions to be taken. The mechanism of direct point of contact among RMAs and ATS units have been established since then,

and the internal reporting procedure and data exchange in this area were refined. It was also suggested that supervisors of both ATCs related should confirm the event before reporting.

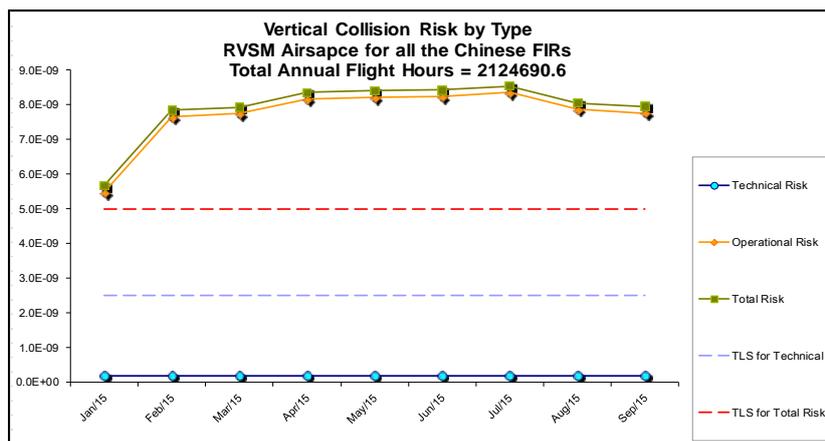
2. Incheon FIR AKARA Corridor interface with Shanghai/Fukuoka/Taipei FIRs: China RMA established quick contact with JASMA for LHDs reporting along AKARA corridor and shared TSD data concerning AKARA Corridor with neighboring RMAs. Shanghai ATC took remedial actions to refine their LHD reporting workflow. As for the coordination between Shanghai FIR and Taipei FIR, China RMA also suggested to establish direct contact and timely data exchange.
3. Urumqi FIR interface with Lahore FIR: the CNS division of ATMB, CAAC is working with Pakistan CAA to improve the communication and surveillance in this area, and China RMA will keep tracking the update in this area and provide further updates to RASMAG.
4. Ulaanbaatar interface with Beijing: Beijing ACC provided training to all the controllers in September 2015 and refined the workflow. From the data received, the number of LHDs reported in this area was reducing. China RMA also suggested a quick LHD data exchange with Mongolia ATC during the China-Mongolia ATM Coordination Meeting.
5. Pyongyang FIR: China RMA presented the regional safety monitoring assessment of RASMAG/20 and highlighted the continuous non-LHD reporting in Pyongyang FIR during a technical exchange in August, and shared some experience in LHD data collection. DPR Korea expressed that they would review and refine their LHD reporting procedure after this meeting. China RMA began to receive LHD reporting in September.

4.27 WP/13 also suggested the MAWG discuss the questions in APPENDIX D of attachment one. However on reviewing the questions, the meeting acknowledged they were already resolved as part of the discussion on WP/4 presented by MAAR.

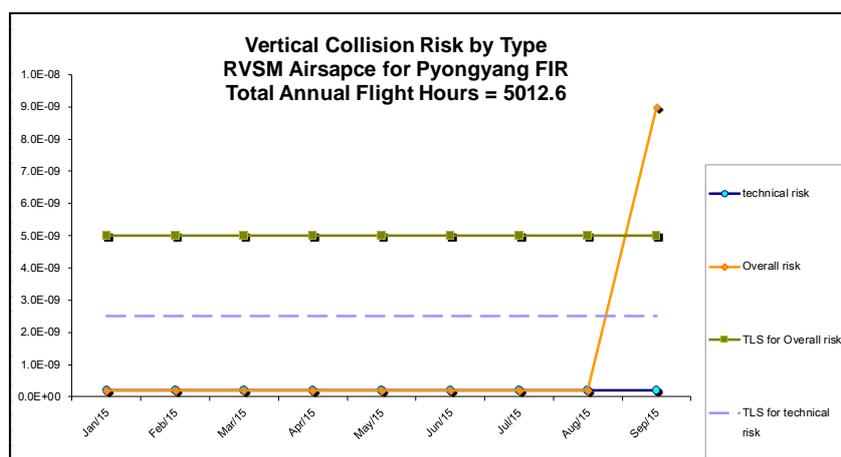
4.28 The meeting thanked China RMA for the paper and congratulated them for their significant efforts to resolving interface hotspots.

China RMA Safety Report (WP/14)

4.29 China RMA informed the meeting that for the period from January 2015 to September 2015 the overall risk for the airspace of Chinese FIRs of 7.95×10^{-9} fapfh is above the target level of safety (TLS), and the overall risk for the airspace of Pyongyang FIR of 8.98×10^{-9} fapfh is above the target level of safety (TLS). WP/14 also provides details and analysis for LHDs during the reporting period.



WP/14 Figure 4: Airspace of Chinese FIRs RVSM Risk Estimate Trends



WP/14 Figure 6: Airspace of Pyongyang FIR RVSM Risk Estimate Trends

4.30 Considering the high risk of Pyongyang FIR estimated from a small number of flying hours and one short duration of LHD, China RMA discussed with the RMAs the question that if there was any requirement for the total number of flying hours when the CRM is applied to estimate the risk for an area.

4.31 In discussing the paper the AAMA asked for more detail on the high risk occurrences in February 2015 and was advised these related to communications issues between ATC and the pilot, and that the duration of flight in the Sanya FIR was low. MAAR commented that it was interesting that some operators were reporting LHDs. China RMA said that operators will report some LHDs and these might not be reflected in ATC reporting. The AAMA stated this was a similar situation in Australia where there is an AIP requirement to report.

4.32 PARMO raised concerns with Figure 12 in the paper, commenting they had trouble reconciling this hot spot when it was identified by the RASMAG Secretary and it considered there needs to be more complete assessment for this AKARA area. The meeting agreed and PARMO will take on the task with assistance from China RMA, MAAR and JASMA.

Action: PARMO to coordinate with China RMA, MAAR and JASMA to develop a detailed safety assessment for the AKARA corridor and make the report available to RASMAG/21.

4.33 The meeting discussed the questions from WP/14 section 5.1, and in relation to the first

question agreed that given the low flying hours the model is very sensitive to any opposite direction occupancy, which is shown in the model detailed in the paper. The same direction occupancy is low, but the opposite is high. A low duration occurrence such as recorded in the paper should not impact the risk to the extent that it has been shown. Dr Aldis commented the low flight hours were problematic, he would expect high same direction occupancy and low opposite. China RMA agreed to circulate occupancy data to Ms Falk and Dr Aldis for further comment and advice to assist with the modelling. China RMA stated that Question 2 will probably be resolved in the planned discussion for Question 1.

Action: China RMA to circulate occupancy data related to WP/14 to Ms Falk and Dr Aldis in an effort to resolve issues related to the modelling for Pyongyang airspace.

APAC LHD Hot Spot Action Plan (WP/16)

4.34 The PARMO presented WP/16, “Asia/Pacific LHD Hot Spot Action Plan – Incheon FIR AKARA Corridor Interface with Shanghai/Fukuoka/Taipei FIRs”. This paper contains the initial work for one of the Large Height Deviation (LHD) hot spot areas identified at the RASMAG/20 meeting. The Incheon FIR AKARA Corridor interface with Shanghai/Fukuoka/Taipei FIRs was identified at RASMAG/20 as one of the LHD Hot Spot Areas with the PARMO, China RMA, JASMA, MAAR listed as the participating RMAs for the task.

4.35 The PARMO collected relevant traffic sample data (TSD) from China RMA, JASMA, and MAAR providing an initial comparison of the number of flights within each FIR. Further work will be completed prior to RASMAG/21 to compile a complete TSD for the AKARA Corridor airspace.

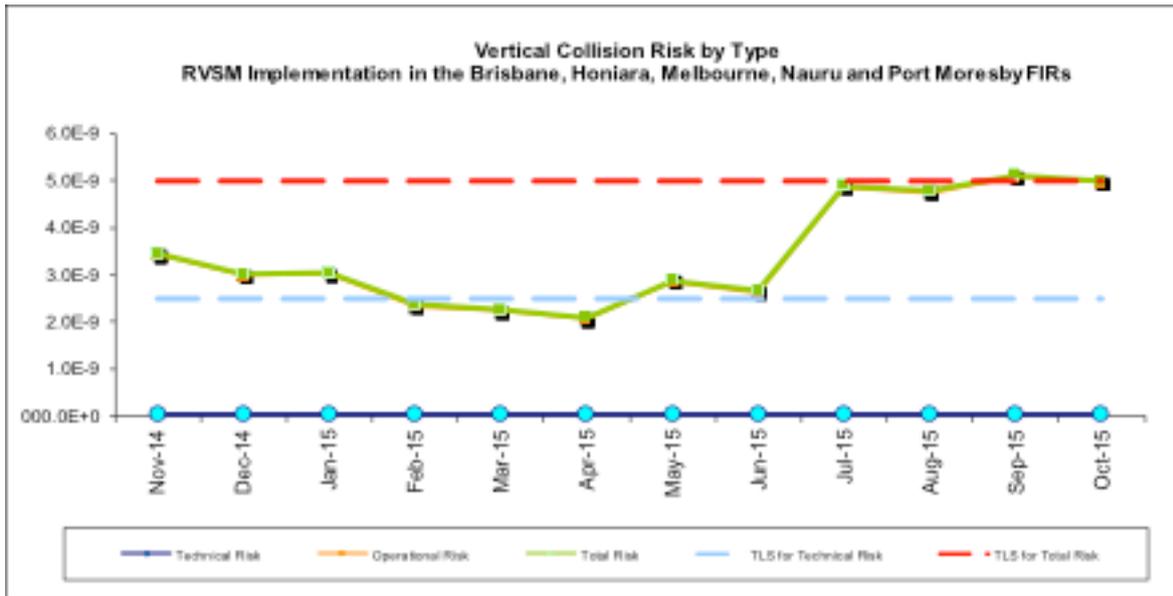
4.36 The meeting thanked PARMO for the paper and acknowledged that the action identified in relation to AKARA corridor in WP/14 will resolve the issue raised in this paper. The meeting also discussed the other RASMAG/20-4 draft conclusion d), and agreed that to progress this item, MAAR and AAMA are to lead development of a similar assessment of airspace specifically focusing on the Manila interface for presentation to RASMAG.

Action: MAAR and AAMA to lead development of a detailed safety assessment of the Manila interface detailed at WP/16 1.2 d) for presentation to RASMAG.

AAMA Safety Report (WP/18)

4.37 The AAMA highlighted that for the period ending October 2015 the overall risk for the Australian, Nauru, Papua New Guinea (PNG) and Solomon Islands airspace of 4.98×10^{-9} fapfh meet the target level of safety (TLS). The AAMA also reports a monthly risk value in an attempt to provide real-time information on actual risk without reliance on historical high-time errors resident within the 12-month data sample. The monthly risk for October 2015 was assessed as well below the average monthly risk based on an annual risk of 5.0×10^{-9} fapfh.

4.38 The figure below shows the collision risk estimate trends for Australian, Nauru, PNG and Solomon Islands Airspace.



WP/18 Figure 1: Australian, Nauru, PNG and Solomon Islands Airspace Risk Estimate Trends

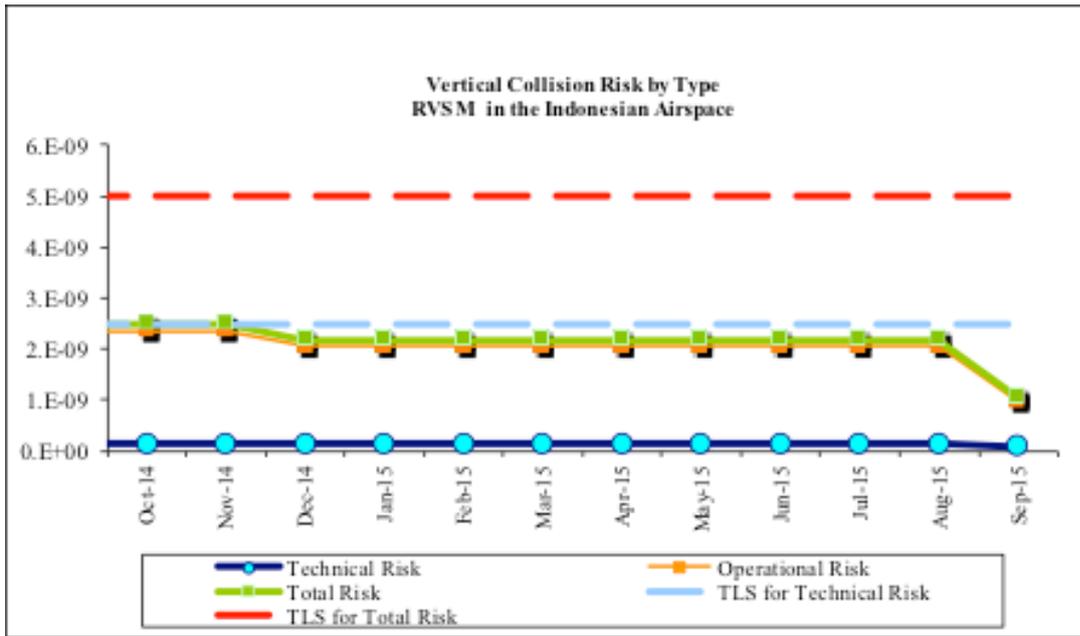
4.39 The meeting noted the risk value for the Australian, Nauru, PNG and Solomon Islands airspace and thanked the AAMA for the continuing work in monitoring the airspace safety.

AAMA Safety Report for Indonesia (WP/19)

4.40 The AAMA highlighted that for the period ending September 2015 the overall risk for the Indonesian airspace of 1.05×10^{-9} fapfh meet the target level of safety (TLS).

4.41 The AAMA informed the meeting that it experienced significant issues when trying to validate and use the traffic sample provided by Indonesia for December 2014. The MATSC TSD for the Ujung Pandang FIR had less tracks and significantly less RVSM flight hours than in previous years. To date the AAMA has not been able to determine if the 2014 TSD is missing a large number of flights or if multiple copies of flights were processed previously. There is no evidence yet for missing flights. The AAMA also noted that many flights passed within 2 NM of a named fix but gave their position as a lat-long. Since the current processing is based on the sequence of arrivals at named fixes the mapping of lat-longs to named fixes was also required. A transition to processing based on surveillance tracks and aircraft crossings will eventually avoid these two problems.

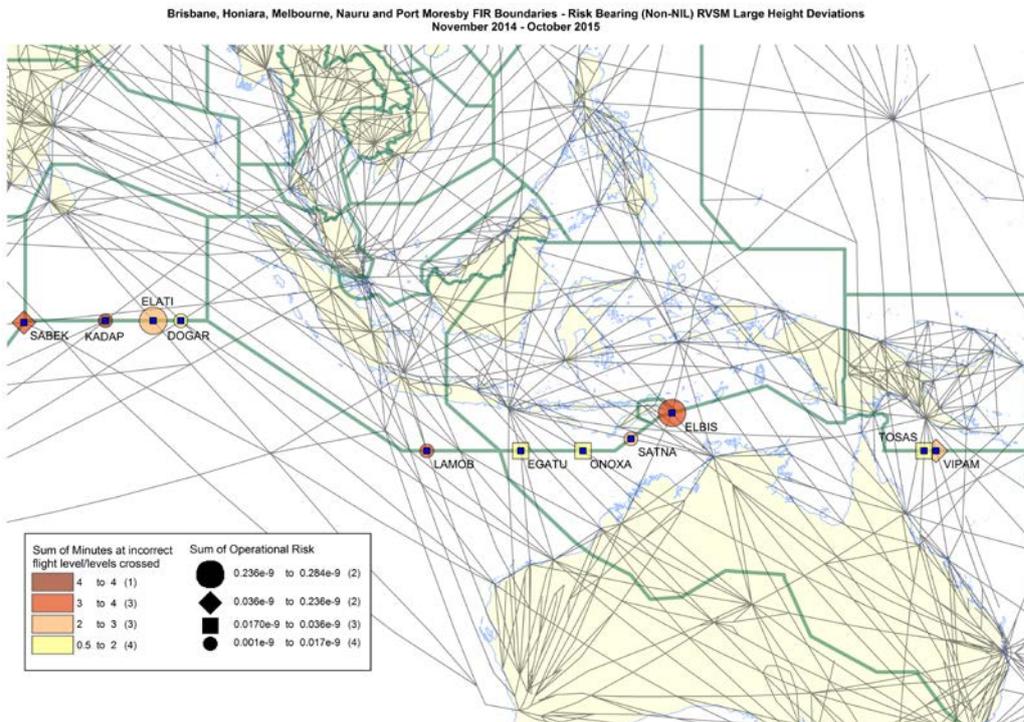
4.42 The figure below shows the collision risk estimate trends for Indonesian Airspace.



WP/19 Figure 1: Indonesian Airspace Risk Estimate Trends

AAMA Safety Report – LHD Analysis (WP/20)

4.43 The AAMA presented WP/20 that provides a summary of LHD occurrences recorded at the FIR boundaries between Australia and Indonesia (Melbourne-Jakarta and Brisbane-Ujung), Australia and Papua New Guinea (Brisbane-Moresby) and between Australia and Sri Lanka (Melbourne-Colombo) over the 1 November 2014 – 31 October 2015 reporting period.



WP/20 Figure 1: Risk Bearing RVSM Large Height Deviations on Australian FIR boundaries.

4.44 Of the eleven occurrences shown two were attributed to ATS – Airservices, five were attributed to ATS – Foreign and four were attributed to pilot. The occurrence over SATNA, which was a LHD Category D, and the occurrence over VIPAM, which was a LHD Category E, were attributed to ATS – Airservices. Of the ATS – Foreign attributed occurrences four were a LHD Category E and one occurrence at ELATI was a LHD Category D. Of the four pilot attributed occurrences, two were a LHD Category A and there was one report each of a LHD Category B and LHD Category I.

4.45 In addition to the occurrences shown, one occurrence within the Melbourne FIR at PIBED was identified as a high-risk occurrence and involved an overflying military aircraft that had entered the Melbourne FIR prior to coordination being received and at a position some significant distance away from the expected entry point. The occurrence was attributed to the pilot and the risk was assessed as the time to detect and resolve (29 min). The LHD Category was recorded as M and the operational risk was calculated to be $3.418e-9$ fapfh. This is the highest risk occurrence over the twelve-month reporting period within the Australian FIRs.

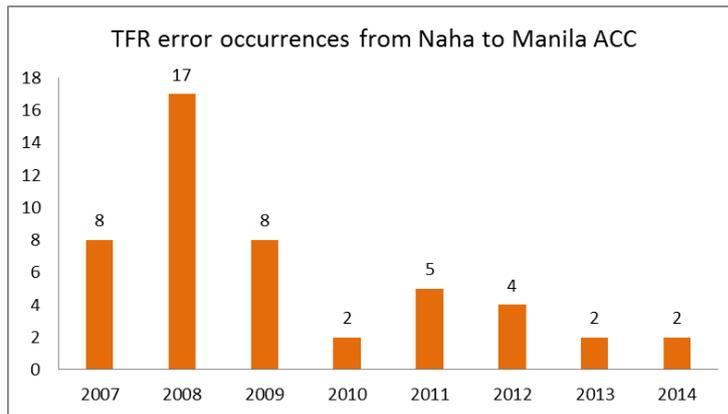
4.46 The meeting thanked the AAMA for the informative paper and hoped future such analyses would be provided to the MAWG and RASMAG. One RMA asked how the chart was produced. The AAMA advised that they used MapInfo. The meeting also considered Skyvector or DAFIF may be useful tools for the RMA/EMAs to generate airspace charts.

Summary of Error Reports Received by JASMA (IP/2)

4.47 IP/2 provides a summary information for the Large Height Deviations (LHDs), Large Lateral Deviations (LLDs) and Large Longitudinal Errors (LLEs) reports received by JASMA which serves as the Regional Monitoring Agency (RMA) and En-route Monitoring Agency (EMA) for Fukuoka FIR between October 2014 and September 2015.

4.48 JASMA reported a total of 45 LHD and 3 LLD reports between October 2014 and September 2015. JASMA informed the meeting they had reviewed the LHD reports caused by transfer error between 2010 and 2015. Waypoint AKARA on Akara corridor is located within the radar coverage so that the air traffic controller recognizes the difference between transfer information and the actual inbound flight level. Between Manila FIR, there is no radar coverage and ATS Inter-facility Data Communications (AIDC) so that LHD tend to occur.

4.49 As a mitigation of transfer error, a procedure has been introduced since 2010 where an air traffic controller reconfirms that if the transfer has been completed at every 45 minutes interval an alarm rings, and then a report would be made to deputy officer at Naha ACC. It should be noted that no transfer error has reported after January 2015 caused by Naha ACC.



IP/2 Figure 6: TFR error occurrences from Naha ACC to Manila ACC

Summary of LHD Reports Received Sent to MAAR (IP/9)

4.50 BOBASMA informed the meeting that as part of its airspace safety monitoring activities it collects data on occurrences of Large Height Deviations (LHDs) from all the twelve Area Control Centres in India and after initial investigation to confirm the occurrence, duly submits the same to the Regional Monitoring Agency, MAAR. BOBASMA had to date submitted to MAAR 157 LHD reports from the different Indian ACCs/OCCs for the period January to October 2015.

4.51 The meeting thanked BOBASMA for the detailed report and their ongoing support of MAAR and Regional safety.

EMA/RMA Safety Monitoring Reports (IP/10)

4.52 The PARMO presented IP/10, “Summary of Error Reports Received by PARMO to Date for Calendar Year 2015”. The paper provided a summary of 25 error reports received by the PARMO thus far in 2015. There were 11 category E LHD reports received, 4 of which were provided from the Incheon FIR. There were 9 LHD reports classified as category A, flight crew failing to climb/descend the aircraft as cleared. In addition, there were 4 LLD reports provided for the Oakland and Anchorage FIRs.

4.53 The meeting acknowledged the good work that continues to be undertaken by PARMO in analysing LHD and LLD occurrence reports.

Agenda Item 5: Data Link Performance Monitoring

PARMO PBCS Monitoring (IP/11)

5.1 The PARMO presented IP/11, “PBCS Monitoring in US Oceanic Airspace”. This briefing was originally delivered to the Performance-based Operations Aviation Rulemaking Committee (PARC) Communications Working Group (CWG) in August 2015. The briefing provides a summary of the observed data link performance in the Anchorage, New York and Oakland FIRs for the January – June 2015 time period. Observed data link performance is summarized for the airspace, by media type, and by operator. Data related to current Problem Reports (PRs) are also provided.

5.2 The meeting thanked PARMO for making the very detailed report available to the MAWG. The meeting commented on the robust analysis undertaken by the FAA in relation to data-

link performance monitoring and encouraged future briefings to be made available to RASMAG and the FIT-ASIA.

Agenda Item 6: Monitoring activity of non-approved aircraft in RVSM airspace

NON-RVSM Approved Flights (WP/2)

6.1 JASMA informed the meeting that it has continued studies of RVSM non-approved flights operating in RVSM airspace of Fukuoka FIR. Experience had shown that the primary systematic reason for failure to match RVSM operations and RVSM approvals was a delay in State notification of the approval status of some operators to the appropriate RMA.

6.2 The meeting noted that JASMA had identified 23 airframes operating in the Fukuoka FIR with 'W' in the flight plan but for which no valid approval could be identified.

6.3 In reviewing the identified airframes, the AAMA indicated one of the Garuda aircraft was approved. MAAR and PARMO will provide data to JASMA directly on other identified airframes.

Unconfirmed Status of Airframes (WP/6)

6.4 MAAR presented the traffic scrutiny for the reporting period of July-August 2015. The exercise showed a total of 39 rogue airframes, a decrease from 128 airframes for the same period in 2014. The large decrease in the total of rogue aircraft is due to updates of the Thai expired approvals. Despite the large decrease in the number of rogue registrations, the number of repeated rogue aircraft is still of concerns. 17 out of the 39 rogue registrations have been previously reported, but never confirmed as non-RVSM approvals. Of these repeated rogues, 9 registrations have been reported for over 6 months to a year.

6.5 The meeting was informed that no actions were taken for the long-term non-confirmed aircraft as there are only mechanisms put in place to handle non-compliant and long-term confirmed non-approved aircraft. MAAR asked the meeting to review or suggest some mechanism to handle these silent cases. Suggestions were made to give a certain timeframe for a State to respond to confirmation requests from RMAs before reporting the long-term unconfirmed rogue aircraft as non-approved or include the silent States in the deficiencies list.

6.6 The meeting discussed the paper at some length and Mr Butcher obtained advice from the RASMAG Secretary that suggested the best way to handle the issue would be for the RMAs to bring the information on States who are not responding effectively to their requests for confirmation of approvals, to RASMAG. RASMAG would then highlight the issue and ask for the State to be placed on a deficiencies list if the matter is not resolved.

Identification of Non-Approved Airframes (WP/9)

6.7 The AAMA provided the outcome of the October 2015 check to identify non-RVSM aircraft. The meeting was informed that the assessment identified 11 individual airframes in the data set, with airframes from Malaysia showing the highest number (3). In undertaking the comparison process, the AAMA was reliant on the quality of the data contained in the approvals databases provided by other RMAs. While the AAMA comparison identified a large number of airframes for some States of registry, it is recognised that delays in processing approval information between the State

authorities and RMAs could be a factor.

6.8 Discussions between the RMAs in regard to some of the data in the AAMA report managed to resolve some identified rogues.

Identification of Non-Approved Airframes (IP/5)

6.9 The China RMA provided the results of once-a-month comparison between RMAs' approval databases and flight plans operated within the RVSM airspace of Chinese FIRs and Pyongyang FIR using the flight plan data up to September 2015.

6.10 IP/5 provided a list of suspected non-approved aircraft through monthly comparison between approval databases and flight plans in the Asia Pacific area, and also provides a list of the number of suspected aircraft group by RMA.

6.11 The meeting thanked China RMA for the report and in reviewing the data, the AAMA advised some of the aircraft were approved. Additionally, MAAR indicated all the Malaysian aircraft were now approved and some of the others. Further consultation will take place between the RMAs to resolve the identified aircraft.

Agenda Item 7: Updates on MMR groups

7.1 No papers were presented for this agenda item.

Agenda Item 8: Any other business

Airservices Australia Neighboring ANSP Safety Reports (IP/6)

8.1 The AAMA informed the meeting that it assists Airservices Australia to regularly undertake analysis of safety occurrences involving neighboring ANSPs. Typically, these reports are presented and discussed either as part of formal bilateral meetings as is the case with Indonesia and Papua New Guinea or as part of organised Safety Forums involving ANSPs such as the South-West Pacific Safety Forum. The AAMA provided a number of examples of the reports that the meeting reviewed.

8.2 The meeting acknowledged the excellent work undertaken by Airservices and noted some of the positive outcomes that directly interfacing with adjacent ANSPs can produce in terms of resolving operational errors.

NAARMO AGHME Issues (IP/8)

8.3 PARMO presented IP/8 that presents a status update of NAARMO's relocation plan for some of the elements of three AGHME constellations that provide monitoring coverage for part of the North American Region.

8.4 The meeting was informed that out of the 6 AGHME constellations from the NAARMO ground-based monitoring system, there will be some site relocations at the Wichita, Cleveland and Phoenix AGHME constellations due to the closing of several FAA RCL sites. Data will still be recorded and processed for the Wichita AGHME, after which the AGHME QC team will determine when the data is usable. Also, once funding is available the relocation of the AGHME constellations will begin starting by Wichita, followed by Cleveland and finalized by Phoenix. This relocation plan is

projected to begin in 2016. NAARMO will be using and maintaining the AGHME ground-based monitoring system until 2020/2021, which by then the FAA's ADS-B Height Monitoring System (AHMS) should be fully developed and operational.

8.5 The meeting thanked the PARMO for the information and discussed the impact of the relocation program on the NAARMO monitoring activity. One suggestion was to broaden the use of Do260 and 260A ADS-B data to enable any likely monitoring gaps to be reduced in the medium term. However PARMO advised that to do that agreement would need to be reached within the FAA that would be opposed to the current 2020 mandate for using Do260B data only.

8.6 An additional item was raised by China RMA that identified an issue with new EGMUs they had purchased from CSSI. When purchased China RMA believed there was no restriction on onboard battery capacity. Now there are strict requirements regarding Lithium batteries and what limits are placed on them being used on aircraft. CSSI suggested that the EGMUs be sent back so that they can resolve the battery issue but China RMA is unable to ship them due to the limit of 100 watt/hours. The EGMU has over 180 watt/hours battery life. To have a dangerous goods test completed to enable shipment would require one EGMU to be broken open and effectively destroyed. China RMA advised they are still negotiating with CSSI to resolve the issue. As a result other RMAs will check with their support providers to see if they have similar problems. Mr Perez confirmed he will discuss with CSSI and provide advice back to the RMAs.

Next meeting

8.7 The meeting noted that the RMACG/11 meeting was now planned to be held 9-13 May 2016 at Montreal, Canada and RASMAG/21 will be held in June 2016.

8.8 The meeting discussed possible venues for the next meeting of the MAWG. It was agreed to make a decision on this at the next RASMAG meeting. However for planning purposes, EMAs and RMAs should plan on a late November/early December time frame.

Closing of the Meeting

8.9 In closing, the Chairman thanked the meeting participants for their contributions to the work of the MAWG. Additionally the meeting expressed its sincere thanks to the AAMA and Airservices Australia for graciously hosting the meeting.

8.10 The meeting was also informed that Mr Takashi Imuta would be moving to a new position in JCAB and would no longer be participating in RASMAG or MAWG. The meeting thanked Mr Imuta for his valued contributions over a number of years and wished him all the best for the future.

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ATTACHMENT 1 - LIST OF ACTIONS

Action number	By Whom	By When	Action Required	Deliverable	Status
1/1	All EMAs	RASMAG/19	Review and work towards standardisation on Hsu model as presented by PARMO and the AAMA and identify compliance or implementation issues. RASMAG/19.	Info to RASMAG	Closed
1/2	PARMO	RASMAG19	research the issue related to the geometric height reference for DO260B aircraft	Report	Closed
1/3	AAMA	RASMAG/19	undertake research into identifying the reference for aircraft altitude	Report	Closed
1/4	All RMAs	RASMAG/20	PARMO coordinate with other RMAs a paper for presentation to RASMAG/19 that provides comparative ASE data sourced from the various monitoring systems in Asia/Pac	Paper	Closed
1/5	JASMA	RASMAG/20	In conjunction with meteorological services in Japan research the reasons for highest values of ASE trend during summer and lowest in winter	Report	Closed
1/6	All RMAs/EMAs	RASMAG/20	Provide analyses to the next RASMAG on SLOP use and any subsequent decrease in airspace risk as a result. This analysis should be included in the safety assessment reports to RASMAG. Account for new SLOP procedures.	Report	Open
1/7	MAAR	RASMAG/19	Develop the illustrations at paragraph 5.7 of MAWG/1 report into a poster type format and present to RASMAG for distribution to States and ANSPs.	Formatted poster draft	Closed
1/8	All RMAs/EMAs	RASMAG/19	Provide additional information in report that identifies hotspot areas for LHD/LLE/LLD reports including the category of errors reported in the hotspot.	Report	Closed
1/9	Chairman	RASMAG/20	Draft paper for RASMAG/19 to highlight the discussion and outcomes regarding non-approved ('rogue') operations and process agreed by RMAs to State authorities and ANSPs	Paper	Open

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Action number	By Whom	By When	Action Required	Deliverable	Status
1/10	PARMO	RASMAG/19	Review category E LHD definition to account for time error and provided proposed new wording	New definition	Closed
1/11	AAMA/MAAR	RASMAG/19	Incorporate individual risk plots in RVSM risk assessments and demonstrate their effectiveness	Report/Paper	Closed
1/12	All RMAs	RASMAG/21	ASE data from non-approved airframes	Report	Open
1/13	RMAs/EMAs	RASMAG/19	Identify from analysis of operational and technical error reports, 2 or 3 significant safety issues as part of their RASMAG safety assessment reports	Report inclusion	Closed
1/14	RASMAG	RASMAG/21 and RMACG/11	RASMAG to collate and review safety issues identified by the RMAs and EMAs and report these to APANPIRG as Asia/Pacific top airspace safety issues	Report	Open
1/15	All RMAs	RASMAG/19	RMAs to consider these issues further and to provide to RASMAG/19 data on aircraft/operators that have not met the Annex 6 monitoring requirements in regards to compliance with monitoring time frames. This information can then be developed into a draft conclusion for APANPIRG, encouraging States and operators to comply with the Annex provisions	Data report	Closed
1/16	AAMA	RASMAG/19	Draft a standard letter for RMAs to use to notify State regulators and operators of non-compliance with Annex 6 monitoring provisions	Standard letter	Closed
2/1	Chair	RASMAG/20	Mr Butcher to advise Mr Lewis at European RMA of the decision not to participate in a centrally published list of operators that incorrectly use 'W' on a continuing basis. (SD para ref 2.3)	Email advice	Closed

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Action number	By Whom	By When	Action Required	Deliverable	Status
2/2	All RMAs	MAWG/3	RMAs to coordinate with State authorities under their jurisdiction to seek standardisation in the use of HAE as a reference for geo-altitude in ADS-B data. (SD para ref 3.5)	Coordination	Ongoing
2/3	AAMA	RASMAG/20	AAMA to make B787 monitoring data available to other RMAs. (SD para ref 3.5)	Data report	Closed
2/4	Chair	RASMAG/20	Mr Butcher to amend the LHD table in WP/5 from RASMAG/15, to include Cat G under Operational Error and provide updated example to RASMAG/20. Ensure that: 1) the example shows that if an aircraft offsets before descending in accordance with published procedures relevant to an airspace, then no occurrence would be reported; and 2) the wording of Cat F is amended to remove the word 'technical' from the definition. Should reflect ATC ground system failure or such like. (SD para ref 4.3)	Report with amendment proposal	Open
2/5	All RMAs/EMAs	April 2015	RMAs/EMAs to further review the guidance material at Figure 4 to this report and provide feedback to C. Falk by April 2015. (SD para ref 4.9)	Review and comment	Closed
2/6	PARMO/MAAR	RASMAG/21	PARMO and MAAR to review LHD report form and provide a paper to RASMAG/20 presenting any changes to the form and the amended guidance material from Figure 4. (SD para ref 4.9)	Report with revised poster	Open
2/7	All RMAs	1 April 2015	RMAs to provide 12 months monitoring data for the identified aircraft types to MAAR by 1 April 2015 for incorporation into a report to RASMAG/20. (SD para ref 4.13)	Report with Data	Closed
2/8	MAAR	RASMAG/20	MAAR develop automated report for presentation of the aircraft monitoring data to RASMAG/20. (SD para ref 4.13)	Automated report proposal	Closed

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Action number	By Whom	By When	Action Required	Deliverable	Status
2/9	PARMO/AAMA	31 Jan 2015	Ms Falk and Mr Butcher to review the revised F2 formats proposed previously by Mr Farmer and draft revised forms. (SD para ref 5.5)	Review for inclusion in SASP EMA documentation	Closed
2/10	PARMO	RASMAG/20	Ms Falk to make updated version of GPAT available to monitoring agencies. (SD para ref 5.9)	Software coordination	Closed
2/11	MAAR/AAMA	RASMAG/20	MAAR supported by Mr Butcher to draft standardised forms and letters along the lines of those used by MAAR for consideration at RASMAG/20. (SD para ref 6.4)	Standardised letters	Closed
2/12	AAMA	1 Feb 2015	Mr Butcher to provide C130 monitoring results data to FAA/European RMA. (SD para ref 7.4)	Data report	Closed
2/13	China RMA	RASMAG/20	China RMA to provide proposal at RASMAG/20 to formalise RMAs collecting RNP approval data where an EMA is not established for a State. (SD para ref 8.4)	Proposal	Closed
2/14	All EMAs	31 Dec 2014	All EMAs to review the draft global Manual on Monitoring the Application of Performance-Based Horizontal Separation Minima document and provide comment to Ms Falk by 31 December 2014. (SD para ref 8.7)	Review and comment	Closed
2/15	SEASMA	31 Dec 2014	SEASMA to provide updated example of the safety assessment used in the document to Ms Falk by 31 December 2014. (SD para ref 8.7)	Updated safety assessment	Closed
3/1	All RMAs	RASMAG	RMAs to provide 12 months monitoring data to end of December each year for all available aircraft types to MAAR by 1 April for incorporation into a report to each RASMAG. Data to include number and type of airframes as well as average ASE.	Report with Data	Ongoing

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Action number	By Whom	By When	Action Required	Deliverable	Status
3/2	All EMAs	RASMAG/21	EMAs to consider options for sub-regional LLD values and propose these to RASMAG/21 for endorsement. (Ref MAWG/3 SD 2.4)	Paper	Open
3/3	All RMAs	End of Mar 2016	RMAs provide monitoring data of at least 2 years ASE values (Mar 2014 – Feb 2016 inclusive) for B744-10 airframes to Mr Perez by end of March 2016 to consolidate into a paper for RMACG/11.	Data report	Open
3/4	All RMAs	April 2016	RMAs review available monitoring data for A320 aircraft to assess if any appreciable change in ASE has occurred during 2015 that resulted in a significant step-change in ASE. Any identified data should be shared with other RMAs	Data report	Open
3/5	MAAR/BOBASMA	RASMAG/21	MAAR and BOBASMA to implement a limited trial of the procedure outlined in WP/3 and Flimsy 8 and to report outcomes to RASMAG/21	Report	Open
3/6	All RMAs	29 Feb 2016	RMAs to provide feedback on the proposed LHD form to MAAR by the end of February 2016 (Ref MAWG/3 SD 4.20)	Feedback report	Open
3/7	MAAR	RASMAG/21	MAAR on the basis of feedback from RMAs to finalise a new form template and provide to RMAs for distribution to States. (Ref MAWG/3 SD 4.20)	New LHD template	Open
3/8	PARMO	RASMAG/21	PARMO to coordinate with China RMA, MAAR and JASMA to develop a detailed safety assessment for the AKARA corridor and make the report available to RASMAG/21. (Ref MAWG/3 SD 4.32)	Safety assessment	Open
3/9	China RMA	29 Feb 2016	China RMA to circulate occupancy data related to WP/14 to Ms Falk and Dr Aldis in an effort to resolve issues related to the modelling for Pyongyang airspace.	Data	Open

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Action number	By Whom	By When	Action Required	Deliverable	Status
3/10	MAAR/AAMA	RASMAG/21	MAAR and AAMA to lead development of a detailed safety assessment of the Manila interface detailed at WP/16 1.2 d) for presentation to RASMAG.	Report	Open

ATTACHMENT 2 – LIST OF PARTICIPANTS

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ATTACHMENT 3- LIST OF PAPERS

Number	Agenda Item	Title	Prepared by
Agenda Item 1 – Adoption of Agenda			
WP/1	1	AGENDA, TIMETABLE AND WORKING ARRANGEMENTS	Chairperson
Agenda Item 2 – Review outcomes of related meetings			
WP/11	2	DEVELOPMENT OF GLOBAL GUIDANCE FOR MONITORING THE APPLICATION OF PERFORMANCE-BASED HORIZONTAL SEPARATION MINIMA - See also attachment	AAMA/NAARMO/ PARMO
Agenda Item 3 – ADS-B Height Monitoring			
WP/15	3	INTRODUCTION OF CHINA RMA'S ADS-B HEIGHT MONITORING SYSTEM	China RMA
WP/17	3	UPDATED ESTIMATE OF RVSM LONG TERM HEIGHT MONITORING BURDEN FOR THE AUSTRALIAN AIRSPACE MONITORING AGENCY (AAMA)	AAMA
IP/1	3	JASMA COMPARISON RESULTS OF 3HMUs	JASMA
IP/3	3	JASMA THE LATEST MONITORING RESULTS OF SETOUCHI HMU	JASMA
IP/4	3	MAAR'S ADS-B HEIGHT MONITORING SYSTEM (AHMS) STATUS UPDATE	MAAR
IP/7	3	SUMMARY OF ALTIMETRY SYSTEM ERROR DATA FOR THE AUSTRALIAN FIR	AAMA
Agenda Item 4 – EMA/RMA Safety Monitoring Reports for RASMAG			
WP/3	4	CROSS-BOUNDARY LHD COORDINATION PROCEDURE	MAAR
WP/4	4	LHD CLARIFICATION	MAAR
WP/5	4	PRELIMINARY SAFETY ASSESSMENT OF BOB, WPAC/SCS, AND MONGOLIAN RVSM AIRSPACE	MAAR
WP/7	4	REVISED LHD REPORTING FORM	MAAR
WP/8	4	NEW REPORTING PROCESS FOR COMBINED RVSM AND PBN APPROVALS FORM AND TRAFFIC SAMPLE DATA	SEASMA
WP/10	4	JASMA HORIZONTAL SAFETY ASSESSMENT	JASMA

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WP/13	4	CHINA RMA'S COORDINATION FOR LARGE HEIGHT DEVIATION REPORTING	China RMA
WP/14	4/5	CHINA RMA SAFETY REPORT	China RMA
WP/16	4	ASIA/PACIFIC LHD HOT SPOT ACTION PLAN – INCHEON FIR AKARA CORRIDOR INTERFACE WITH SHANGHAI/ FUKUOKA/ TAIBEI FIRS	PARMO
WP/18	4	AAMA RVSM SAFETY ASSESSMENT REPORT AUSTRALIAN, PAPUA NEW GUINEA, NAURU and SOLOMON ISLANDS	AAMA
WP/19	4	AAMA RVSM SAFETY ASSESSMENT REPORT INDONESIAN AIRSPACE	AAMA
WP/20	4	AAMA SAFETY REPORT – LHD ANALYSIS	AAMA
IP/2	4	SUMMARY OF ERROR REPORTS RECEIVED BY JASMA	JASMA
IP/9	4/5	SUMMARY OF LHD REPORTS SENT TO MAAR 2015	BOBASMA
IP/10	4	EMA/RMA SAFETY MONITORING REPORTS FOR RASMAG	PARMO
Agenda Item 5 – Data Link Performance Monitoring			
IP/11	5	PARMO PBCS MONITORING IN US OCEANIC AIRSPACE	PARMO
Agenda Item 6 – Monitoring activity of non-approved aircraft in RVSM airspace			
WP/2	6	NON-RVSM APPROVED FLIGHTS IN RMA DATABASE	JASMA
WP/6	6	UNCONFIRMED STATUS OF AIRFRAMES CLAIMED RVSM APPROVED	MAAR
WP/9	6	IDENTIFICATION OF NON-APPROVED AIRFRAMES OPERATING WITH RVSM APPROVAL STATUS	AAMA
WP/12	6	NOT ASSIGNED	
IP/5	6	IDENTIFICATION OF NON-APPROVED AIRFRAMES OPERATING WITH RVSM APPROVAL STATUS	China RMA
Agenda Item 7 – Updates on MMR groups			
	7		
Agenda Item 8 – Any other business			
IP/6	8	AIRSERVICES AUSTRALIA NEIGHBOURING ANSP SAFETY REPORTS	AAMA

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IP/08	8	NAARMO GROUND-BASED MONITORING SYSTEM UPDATES AIRCRAFT GEOMETRIC HEIGHT MEASUREMENT ELEMENT (AGHME)	NAARMO