International Civil Aviation Organization
Twenty-Sixth Meeting of the Regional Airspace Safety Monitoring Advisory Group (RASMAG/26)
Video Teleconference, 20 – 23 September 2021

Agenda Item 2: Review Outcomes of Related Meetings

RASMAG-MAWG AND RMACG REPORTS

(Presented by Chairperson)

SUMMARY

This paper presents a brief summary from the Eighth Meeting of the Monitoring Agencies Working Group (MAWG/8) in February 2021 and the Sixteenth Regional Monitoring Agencies Coordination Group (RMACG/16) virtual discussion in June - July 2021.

1. INTRODUCTION

1.1 The Eighth Monitoring Agencies Working Group (MAWG/8) meeting was held from 1 - 4 February 2021, hosted by the Monitoring Agency for Asia Region (MAAR) in Bangkok, Thailand. Thirty-six (36) participants attended the meeting representing AAMA, China RMA, JASMA, MAAR, PARMO, SEASMA, BOBASMA and an ICAO Regional Officer from the Bangkok Office.

1.2 The Sixteenth RMA Coordination Group Virtual Meeting (RMACG16/VM) was held using a combination of a routine papers review via MS Teams from 14 to 25 June 2021 and Live discussions (via the Zoom platform) form 28 June to 2 July 2021. All thirteen RMAs participated in the meeting.

2. DISCUSSION

2.1 **MAWG/8**. During the meeting, participants reviewed 11 working papers and 16 information papers covering a wide range of technical subjects relevant to the work of the Asia Pacific monitoring agencies. During its work activity, the MAWG discussed a number of key issues relevant to the Asia/Pacific region and produced additional 1 flimsy.

Altimetry System Error (ASE) & Height Monitoring Activities

2.2 PARMO presented their work on processing altimetry system error (ASE) by using Space-Based ADS-B (SBA) data. PARMO informed that the Federal Aviation Administration (FAA) initiated a one-year partnership with Aireon to investigate the benefits of SBA data. One of the benefits was that PARMO used SBA data to monitor several aircraft and could clear all unmonitored aircraft from the monitoring burden list. Other potential use cases of SBA data were the verification of large ASE reports from other RMAs, operational error analysis for LHDs and AADs, evidentiary proof of RVSM operations without RVSM approval, and verification of ASE characteristics within oceanic regions.

2.3 MAAR informed the meeting that travel restriction during the pandemic severely affect the availability of AEROTHAI's EGMU service, resulting in increasing monitoring burden for MAAR States.

2.4 China RMA's EGMU service was initially affected by the travel restrictions, but could later on continue their service domestically. Therefore, China RMA was able to cope with remaining monitoring burden within China.

EMA/RMA Safety Monitoring

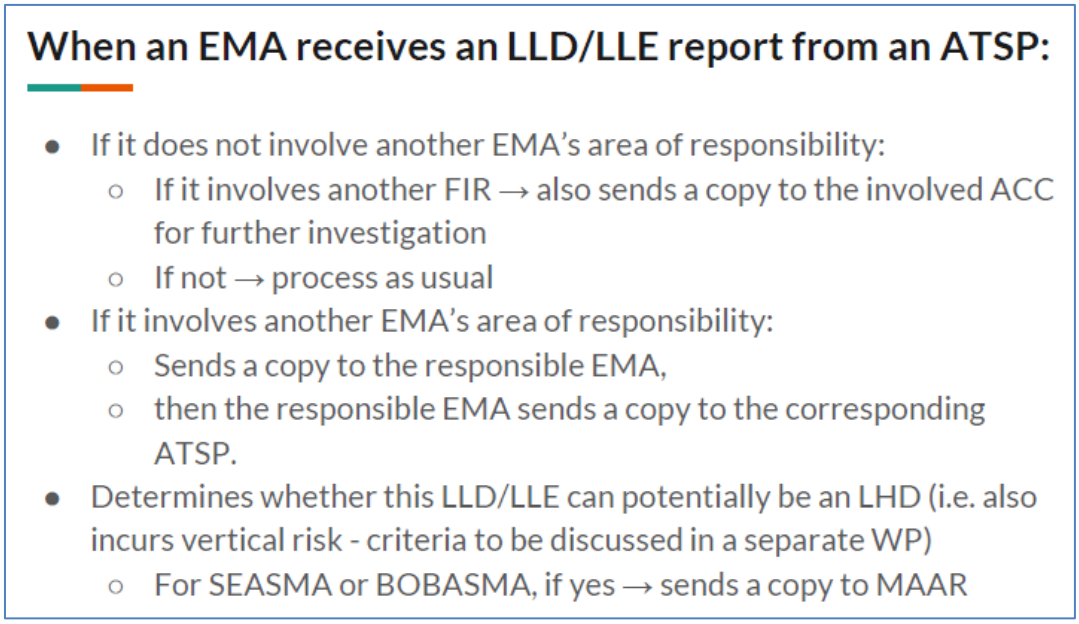
2.5 JASMA raised an issue regarding how an EMA should determine whether an LLE should be forwarded to an RMA as a potential LHD due to the minimum longitudinal separation standards being applied differently at various FIR boundaries. The meeting discussed the rationales and scenarios proposed by JASMA and agreed to use the applicable longitudinal separation minima at that specific boundary as the criteria to count an LLE as an LHD. Then, the EMA should forward the data to another related RMA.

2.6 The meeting reviewed each RMA's treatment of TCAS RA-related LHDs (Category J and K), aiming to standardize how each occurrence should be recorded and how to quantify its risk. The meeting could not come to a conclusion and agreed to continue the discussion later via e-mails. After the meeting, the Chair compiled a list of current practices and worked on a draft proposal which will be presented only as an Information Paper in RASMAG/26 meeting, but will be discussed in details in the next MAWG meeting.

2.7 Relating to RASMAG Task 25/4, MAAR raised an issue regarding inconsistent number of occurrences shown in the EMA/RMA safety reports and proposed a standardized process as follow:

When an RMA receives an LHD report from an ATSP:

- If it does not involve another RMA's area of responsibility:
  - If it involves another FIR → also sends a copy to the involved ACC for further investigation
  - If not → process as usual
- If it involves another RMA's area of responsibility:
  - Sends a copy to the responsible RMA,
  - then the responsible RMA sends a copy to the corresponding ATSP.
- Determines whether this LHD can potentially be an LLD and/or LLE
  - For MAAR, if yes → sends a copy to SEASMA or BOBASMA



2.8 The meeting agreed to follow the data sharing process among RMAs and EMAs as presented in the paper.

2.9 Please note that the above criteria is for monitoring agencies' use only. For States' airspace occurrence reporting, occurrences on the horizontal plane should be reported as LLD/LLE (for those applicable), and vertical occurrences should be reported as LHDs.

2.10 PARMO presented the analysis methods to assess the implementation and monitoring of 23NM lateral and 20NM longitudinal separation standards with the use of Automatic Dependent Surveillance – Contract (ADS-C) data. For the 23NM lateral separation standard, the FAA chose to directly estimate the risk and make a comparison with the TLS for the fact that the FAA had extensive archives of oceanic LLD performance which reflected the use of ADS-C in their 3 oceanic FIRs. This approach was an open-loop process requiring only aircraft navigational performance and properly composed ATC clearances. For the 20 NM longitudinal separation standard, the risk modelling required a closed-loop process with specific requirements for controller/pilot intervention in order to meet the TLS. To support the safe use of the 20NM longitudinal separation standard, the monitoring agencies would have the duties to collect the information and verify that:

- the assumption for aircraft-size parameters remained valid;
- the aircraft, to which 20NM longitudinal separation standard were applied, were equipped with GPS;
- the distribution of initial inter-pair separation could be obtained; and
- ADS-C and CPDLC performance could be monitored and compiled, either directly or using information from the FANS Implementation Team (FIF) responsible for monitoring PBCS performance.

2.11 AAMA presented the analysis of Category A and B LHDs. The meeting was informed that there were 3 LHDs out of 7 Category B LHDs involving the incorrect aircraft changing levels without clearance as result of callsign confusion. A potential mitigation for these types of occurrences could arise from the Asia Pacific Alpha Numeric Call-Sign (ANCS) project. AAMA also added that Australia already allowed some operators (in particular Emirates) to implement alphanumeric callsign.

2.12 EMAs and RMAs then presented a summary of reported occurrences with the following highlights:

- MAAR – LHD POCs provided good corporation regarding LHD submission. However, there are still many States that only report NIL every month.
- JASMA
  - The most frequent LHD events in Fukuoka FIR are still Category I (Turbulence due to weather).
  - The implementation of Manila's new ATM system seems to have insignificant effect on the transfer errors at the Manila-Fukuoka interface (Hot Spot D).
  - Safety improvement plan to reconfigure the ATS route structure for AKARA-FUKUE Corridor is in progress.
- PARMO – would continue to work with China RMA, JASMA and MAAR to confirm the reported LHDs for the AKARA corridor for calendar year 2020.
- BOBASMA – there was no response till date from Muscat for commencing the AIDC implementation with Mumbai. The Chair asked MID RMA to follow up the issue with Muscat again, but has not yet received any response.
- AAMA
  - The majority of LHDs in Brisbane, Honiara, Melbourne, Nauru and Port Moresby FIRs were in the Pilot/Aircrew attribution group (category A, B, or C), of which 50% were category B (Flight crew climbing/descending without ATC clearance).
  - Of the 21 ATC-attributed reports received, 10 reports were made concerning internal coordination or system loop errors, which was a positive sign of very food reporting culture.
- SEASMA – Category E LHDs were no longer the majority since 2019. To further reduce such errors, CAAS recently introduced a 25NM/3min visual marker before the transfer boundary (outbound) as a new mitigation to address human factors issues.

2.13 Regarding airspace occurrence reporting, the Chair informed the meeting that MAAR had direct access to AEROTHAI safety database from which they would derive the LHD/LLE/LLD events for Bangkok FIR from various incident categories. AAMA also operated in a similar manner as there was no option to label an occurrence as LHD/LLE/LLD in the Airservices reporting system. In doing so, AAMA would extract the records which were labeled as Loss of Separation, Inadequate Separation Assurance, TCAS RA, Emergency Operations, Airspace Infringement, Information Error, Weather or Hazardous Conditions, Operational Deviation, and Other. PARMO and SEASMA also followed this similar process. The Chair noted that this process might be useful as an example for some States in identifying LHD/LLE/LLD occurrences.

2.14 APAC States may note this approach as it might be more effective to retrieve LHD/LLE/LLD occurrences from existing categories of incident reports in safety databases rather than requesting air traffic controllers to report LHD/LLE/LLD explicitly.

Performance-Based Communication and Surveillance Oversight

2.15 SEASMA presented an update to the PBCS monitoring programme, follow-up process for non-compliant cases, list of identified issues and mitigations and PBCS approvals update.

2.16 The meeting discussed the debate relating to whether the 'P2' and 'RSP180' check against the RSP/RCP approvals/authorization data from State CAAs is necessary since the risk environment for PBCS may be quite different from RVSM. These views were expressed during the meeting:

- SEASMA – The current audit process still focused mainly on non-compliant aircraft filing both 'P2' and 'RSP180' and SEASMA still working out a method to effectively implemented the monitoring of the approvals vs flight plan check as the process was not well established yet.

- JASMA – If the aircraft' equipment and PBCS performance were not authorized by its State CAA, the aircraft may perform undesirably. However, it is unknown whether or not that risk is acceptable, so JASMA decided to start the PBCS audit process.

- PARMO – Poor performance of aircraft that did not file P2/RSP180 still has an operational impact to ATC and introduced some risk, but those aircraft were not eligible for reduced separations and did not have a State requirement to meet RCP240 and RSP180. Significant performance issues observed for aircraft not filing P2/RSP180 can still be reported by the ATSPs to the FANS-CRA for further investigation and resolution. The worst case would be an aircraft that filed P2/RSP180 without a State authorization (detected through the flight plan audit) and also did not meet the performance requirements.

2.17 JASMA presented the observed performance for the data link operation in the Fukuoka FIR for the period from January to June 2020. The accumulated unplanned outage time over 30 minutes during January - June 2020 was experienced at some locations. The 95% criteria for RSP180 and RCP240 were satisfied where all the media types including SAT and VHF were combined.

2.18 PARMO provided the result of their December 2020 flight plan audit against the RCP240 (P2 in item 10) and RSP180 (RSP180 in field 18) authorization status. Approximately 20% of aircraft filing P2/RSP180 did not have a corresponding approval record in the global RMA approvals database. This list needs further investigation to determine whether the aircraft was authorized according to the PBCS policy of its State but the record of approval still remained to be provided to the relevant RMA, or it was not authorized and further action was needed.

2.19 AAMA clarified that CASA did not issue specific RSP/RCP approvals in the same manner as RVSM approvals. That meant an operator would be allowed to declare that an aircraft had RCP240 and RSP180 capabilities unless Airservices informed the operator that the aircraft had not met the required criteria.

2.20 PARMO suggested that it would be useful for the RMAs to have a list of States that allow operators to file PBCS unless they are informed they do not meet the criteria. Thus far, the NAARMO/PARMO efforts in PBCS flight plan audits have been only to identify which States have provided the PBCS approval information. It might be that the PBCS non-compliance reporting is a more effective PBCS audit from a monitoring agency perspective.

2.21 The Chair suggested that, for APAC, the list can be compiled by including this question in the annual PBCS survey managed by FIT-Asia, and will consult FIT-Asia's secretariat about it.

2.22 PARMO then presented an update from the FAA PBCS monitoring program for Oakland and Anchorage oceanic airspace. The summary of non-compliance reports received or transmitted by PARMO was also provided.

2.23 PARMO also added that they had seen some repeat offenders that continue to file P2/RSP180, indicating they had either not received their report or had not corrected it but continue to file as though eligible. PARMO also noted that they had seen specific aircraft exhibiting different performance across different airspace, which seemed to correlate with the number of VHF/SAT (offshore) transition areas in the airspace. As a result, PARMO had started looking back at multiple monitoring periods to determine repeat offenders and provide a note to that effect on the report.

2.24 States that receive non-compliance reports are urged to request the operator of the non-compliant aircraft to stop filing P2/RSP180 until the problem is resolved, and then update the status to their respective RMA/EMA.

Monitoring Activity of Non-Approved Aircraft

2.25 The RMAs discussed a task from RMACG relating to how an RMA should handle State aircraft operators that incorrectly filed 'W' in their FPLs, as this matter was supposed to be raised to the APANPIRG in 2020. After consultation with the ICAO APAC Office, the Chair was informed that this matter would be more appropriate for discussion at the RASMAG rather than the APANPIRG. A separate working paper will address this topic.

Consolidated Reports for RASMAG

2.26 MAAR presented the outline of the Asia Pacific Consolidated Safety Report for RASMAG/26. The meeting then discussed improvements for this year's report section by section and agreed to some changes.

2.27 The meeting also discussed timelines to produce Asia Pacific Consolidated Safety Report and Asia Pacific Consolidated LTHM Compliance Status Report for RASMAG/26.

2.28 **RMACG virtual discussion**. During the virtual discussion participants reviewed 15 working papers, 31 information papers and 3 flimsies covering a wide range of technical subjects relevant to the work of the Regional Monitoring Agencies. During its work activity, the RMACG discussed a number of key issues relevant to the RASMAG as follows.

RVSM Approvals & PBCS Monitoring

2.29 NAT CMA presented a paper informing the meeting that NAT SOG24 had proposed changes to the PBCS monitoring and reporting process for the NAT, which would have an adverse effect on the RMA workload when dealing with reports of PBCS non-compliance. The NAT CMA requested that any RMAs receiving reports of 'Low Data' assess the additional workload burden and indicate whether the additional burden incurred is acceptable to them.

2.30 The meeting discussed in detail the content of the WP, and its implications with regard to priority of data passed on (low data vs the current >100 requirement) and what would be the expected response to receipt of the data by States/regulators. It was also noted that, although these low data reports had been requested and endorsed by the NATSOG, the ICAO Operational Data Link Working Group (OPDL WG) had provided feedback discouraging such data gathering.

2.31 The meeting was advised that, if States showed indication of uncertainty as to why they were receiving low data reports, this would be useful feedback for NAT CMA to pass on to the NAT SOG, as the PBCS monitoring activity was still fledgling, and additional confusion at this time (caused by unexpected reports) would not be useful. Concern was voiced that such low data reports may send the oversight authority on a "wild goose chase", and potentially request flight plan data from the RMAs.

2.32 As a result of the discussions, the meeting agreed to the following action.

Action RMACG/16:2: RMAs who receive PBCS 'Low Data' non-compliance reports are requested to assist the NAT CMA in performing the NAT SOG task (para 2.10 of WP13 refers) by:

a. assessing any additional workload burden incurred by processing the 'Low Data' into a format which will allow transmission to the relevant State Authorities over a 12-month data period (May 2021 – May 2022);

b. reporting to the NAT CMA whether the assessment of the additional workload burden means that this work can/cannot be done on a regular basis; and

c. forward any requests from the NAT CMA for State feedback to the relevant State Authority contact.

- ***If, at any time during the period, an RMA assesses that the additional workload burden cannot be sustained, they are requested to notify the NAT CMA at the earliest opportunity and this will be reported at the first available NAT SOG meeting.***
- ***If any RMAs can sustain the additional workload burden for a 12-month period data, it is requested that the information from 2.13 b) is forwarded to the NAT CMA no later than 31st October 2022.***

2.33 Based on April 2021 traffic data from NAT airspace, there were only:

- 10 aircraft from China (China RMA), and
- 7 aircraft from China, Hong Kong (MAAR)

that filed "RSP180" and "P2," which would be potential recipients of the non-compliance reports. Therefore, it is not expected that the additional workload burden will be overwhelming for associated RMAs. However, feedback from involved States and RMAs should be forwarded to NAT CMA as information for NAT SOG if their process needs to be revised.

2.34 The meeting noted AAMA's identification of aircraft that have been on the non-RVSM approved list for several years:

Table 1. Aircraft identified as repeat non-RVSM approved. Aircraft that were first seen six months ago or more are highlighted in yellow; those 12 months ago or more are highlighted in orange.

Registration	Number of Months	First as Rogue	Last as Rogue	ICAO Type	State
IN320	9	201607	202105	P8	India
P2ZMY	4	201706	202105	BE20	Papua New Guinea

2.35 IN320 is registered to the Indian Navy and is therefore a State aircraft. MAAR commented that this aircraft is likely to stay on the list and queried AAMA regarding Australian ATSP's current procedure dealing with such aircraft. AAMA responded that the Communications Centre will highlight Rogues and PBCS non-compliant aircraft to ATC. This allows ATC to question operators while in flight, which has sometime resulted in rejection from the airspace, or 2,000 ft separation being applied for that aircraft if the workload is low. (It was suggested that the latter scenario is not common and is not favored by controllers.)

Technical Height Monitoring Systems/Techniques

2.36 As an annual routine procedure, the meeting was presented with the new version of the RVSM Minimum Monitoring Requirements (MMR), which received concurrences from all RMAs. Copies of the latest MMR (see **attachment**) can be obtained from the RMA to which a State is accredited.

Aircraft technical height keeping performance

2.37 As an annual routine procedure, the meeting was presented with a high-level summary of each aircraft group performance in terms of average ASE across different height monitoring systems from eight RMAs:

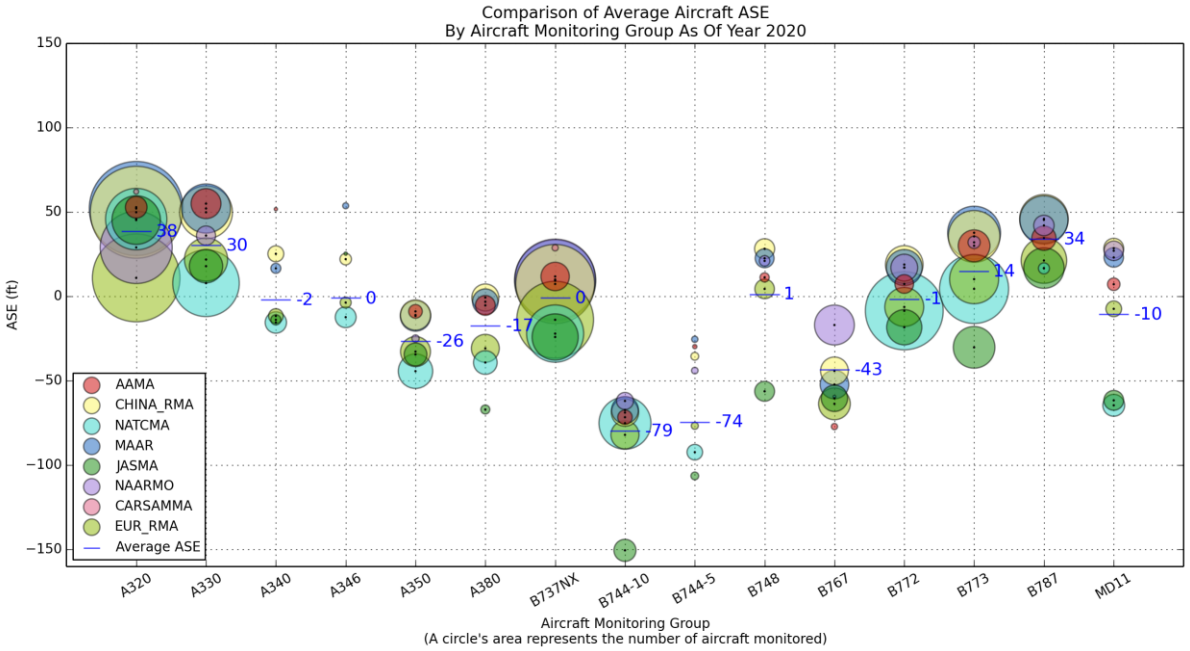


Figure 1: Comparison of aircraft group ASE by aircraft monitoring group as of year 2020 (Airbus, Boeing, and MD11)

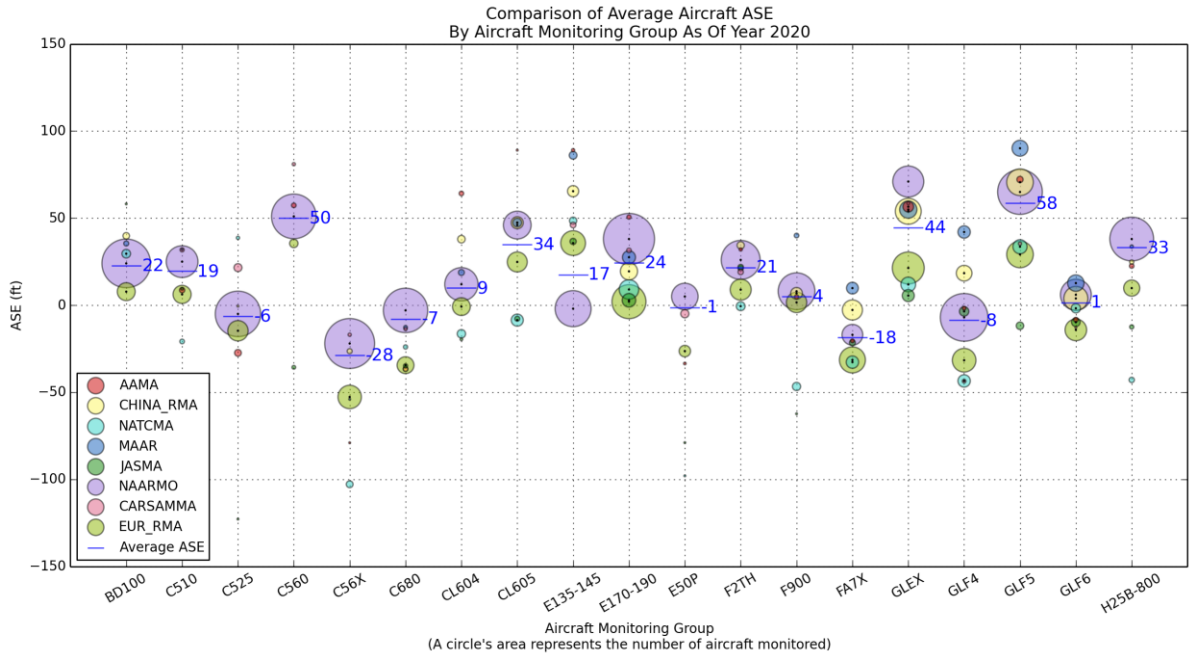


Figure 2: Comparison of aircraft group ASE by aircraft monitoring group as of year 2020 (other major groups)

2.38 It was noted that, based on 2020 data, the global average ASE measurements of B744-10 is close to the MASPS limit of 25 m (80 ft). Furthermore, a difference in measurement values between the ADS-B Height Monitoring System (AHMS) and Height Monitoring Unit (HMU) could also be observed in 2020. The meeting agreed to closely and continually monitor B744-10 and B744-5 groups.

2.39 NAARMO informed the meeting that they are closely monitoring the reintroduction of Boeing 737MAX aircraft, which were grounded by the FAA on 13th March 2019 and now lifted.

2.40 In the previous RMACG meetings, NAARMO made a proposal to remove the 1,000-hour portion of the recurrent Reduced Vertical Separation Minimum (RVSM) height monitoring requirement specified in ICAO Annex 6 to the Convention on International Civil Aviation. In RMACG16 meeting, NAARMO recalled the history of the development of long-term height monitoring requirements and included references that support discussion on the need to reassess the frequency with which operators are required to conduct height monitoring.

2.41 The RMACG16 meeting noted that, with the effect of the COVID pandemic, for some operators, aircraft could remain on the ground for years at a time, resulting in an unquantified effect on the ASE. It also noted that RMAs do not track the 1000 hours, as this could only be practically left up to the State regulator.

2.42 The RMACG16 meeting agreed, in principle with the proposal to remove the 1000-hour requirement from Annex 6 — Operation of Aircraft but noted that it would require a robust documented justification, and such a proposal would then go to the SASP for formal endorsement. Consequently, with regard to the justification, the following action was agreed:

ACTION RMACG/16:6: All RMAs to provide data on operators who are taking advantage of the 1000 hours monitoring requirement.

2.43 This action was designed to preliminary assess an impact on operators. The meeting was noted that timeframe of this change to be in effect would take many years from now and the proposal would need to be reviewed by several bodies. An action to address this task will be presented in a separate working paper to this meeting.

2.44 To address an action item from RMACG14, which requested all RMAs to request clarification on responsibility of the RMA with regards to verification on approval status of state aircraft, NAT CMA detailed the NAT CMA proposal to NAT SOG24 with regard to the RVSM monitoring of State aircraft. NAT CMA contacted the NAT SOG State representatives regarding their positions whether RMAs should include State Aircraft in their routine flight plan audit process. The NAT SOG decision was that:

NAT SOG Decision 24/_1 – RVSM Monitoring of State Aircraft

That the NAT SOG:

a) Recommend to NAT SPG/57-1 that States are encouraged to liaise with their military authorities to: ensure that RVSM approval data for State aircraft is regularly passed to the relevant RMA and; agree a process for handling reports of RVSM non-approved State aircraft detected operating within RVSM airspace and, where applicable, forward RVSM approval confirmation to the requesting RMA within the notified timeframe.

2.45 For APAC States, there will be a separate working paper addressing this topic presented to this meeting (also in 2.25).

RMA coordination and data exchange

2.46 The meeting recalled that the topic of the Global RMA Bulletin (GRB) had been considered by the RMACG for some time. A survey was conducted as part of the virtual discussions of the RMACG15 regarding the GRB project trial. The summary indicated that, for approximately 8 out of 13 RMAs, the information in the GRB did not provide enough benefit to outweigh the additional workload. After some discussions, decided that the GRB trial should cease while still agreeing that the concept may be re-visited if a suitable tool that can reduce the overall workload, becomes available.

2.47 EUR RMA updated the meeting on the status of EUR RVSM region's flight plan rejection by the EUROCONTROL IFPS to address non-RVSM approved aircraft that have been listed on the EUR RMA Bulletin for a long time. The Programme Coordination Group (PCG) of the European Aviation System Planning Group (EASPG) - EASPG PCG agreed to the following draft conclusions to further expand and fine-tune the implementation:

EASPG PCG Conclusion 2/2 - Automated Flight Plan Evaluation and Rejection Scheme for RVSM Airspace

That the ICAO Regional Director, Europe and North Atlantic, on behalf of the EASPG:

a) Invite Germany and EUROCONTROL/NM to further mature the automated flight plan evaluation and rejection scheme for operational use in RVSM airspace;

b) Invite States within the service area of EUROCONTROL/NM to join the initiative;

c) Invite States within the service area of EUROCONTROL/NM to consider the targeted use, as an additional solution, of the SAFA/SACA – Safety List Alarming Function to follow up on aircraft included on the RMA bulletin.

EASPG PCG Conclusion 2/3 - Establishment of an RVSM Project Team

That, the ICAO Regional Director, Europe and North Atlantic, take appropriate measure to:

a) Establish an RVSM Project Team to promote automation and data driven decision making for a flight plan evaluation and rejection scheme in the region or parts thereof with the ToR to be determined; and

b) Invite States to nominate participants to support the work of the RVSM Project Team.

2.48 The meeting was also informed that even when a flight plan is initially rejected, the NMOC will accept the flight based on a verbal confirmation and a subsequent re-file. The aircraft will be removed from the list for a period of one month. After one month, if such confirmation of approval has not been established, the aircraft will re-enter the list. It was noted that this cycle, in theory, could continue ad-infinitum.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) note the information contained in this paper;

b) endorse the new MMR provided in the **attachment** for applicability in Asia/Pacific region;

c) consider to have State CAAs liaise with State Aircraft operators (e.g. military units) regarding the verification process and status of RVSM approvals in order to prevent their flight plans from being rejected by EUROCONTROL IFPS:

i) For States that have RVSM approval processes for State Aircraft equivalent to civil aircraft's, State CAAs are encouraged to share State Aircraft's approval data or confirming the approval status upon queried by the designated RMA.

ii) For all aircraft and operators with no RVSM approvals, State CAAs should communicate with the operators to not file 'W' in item 10 of the ICAO Flight Plan; and

d) discuss any other relevant matters as appropriate.

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RVSM MONITORING GROUPS AND MINIMUM MONITORING REQUIREMENTS

AS OF: 25 June 2021

Version: 2021.0

1. UPDATE OF MONITORING REQUIREMENTS TABLE AND WEBSITE. As significant data is obtained, monitoring requirements for specific aircraft types may change. When Table 1 below, is updated, a letter will be distributed by the Regional Monitoring Agencies (RMAs) to the States concerned. The updated table will be posted on the RMA website being maintained by the International Civil Aviation Organization (ICAO). The secure website address is: http://portal.icao.int

2. INITIAL MONITORING. All operators that operate or intend to operate in airspace where RVSM is applied are required to participate in the RVSM monitoring program. Table 1 establishes requirements for initial monitoring associated with the RVSM approval process. In their application to the appropriate State authority for RVSM approval, operators must show a plan for meeting the applicable initial monitoring requirements.

3. AIRCRAFT STATUS FOR MONITORING. Aircraft engineering work that is required for the aircraft to receive RVSM airworthiness approval must be completed prior to the aircraft being monitored. Any exception to this rule will be coordinated with the State authority.

4. APPLICABILITY OF MONITORING FROM OTHER REGIONS. Monitoring data obtained in conjunction with RVSM monitoring programs from other regions can be used to meet regional monitoring requirements. The RMAs, which are responsible for administering the monitoring program, have access to monitoring data from other regions and will coordinate with States and operators to inform them on the status of individual operator monitoring requirements.

5. MONITORING PRIOR TO THE ISSUE OF RVSM OPERATIONAL APPROVAL IS NOT A REQUIREMENT. Operators should submit monitoring plans to the responsible civil aviation authority and the RMA that show how they intend to meet the requirements specified in Table1. Monitoring will be carried out in accordance with this table.

6. AIRCRAFT GROUPS NOT LISTED IN TABLE 1. Contact the RMA for clarification if an aircraft group is not listed in Table 1 or for clarification of other monitoring related issues. An aircraft group not listed in Table 1 will probably be subject to Category 2 monitoring requirements.

7. TABLE OF MONITORING GROUPS. Table 2 shows the aircraft types and series that are grouped together for operator monitoring purposes.

8. TABLE OF NON-GROUP AIRCRAFT: Table 3 shows the aircraft types and series that are Non-Group aircraft (i.e., Not certified under group approval requirements) for monitoring purposes.

9. TRAILING CONE DATA. Altimetry System Error estimations developed using Trailing Cone data collected during RVSM certification flights can be used to fulfill monitoring requirements. It must be documented, however, that aircraft RVSM systems were in the approved RVSM configuration for the flight.

10. MONITORING OF AIRFRAMES THAT ARE RVSM COMPLIANT ON DELIVERY. If an operator adds new RVSM compliant airframes of a type for which it already has RVSM operational approval and has completed monitoring requirements for the type in accordance with the attached table, the new airframes are not required to be monitored. If an operator adds new RVSM compliant airframes of an aircraft type for which it has NOT previously received RVSM operational approval, then the operator should complete monitoring in accordance with the attached table.

11. FOLLOW-ON MONITORING. Monitoring is an on-going program that will continue after the RVSM approval process. Long term minimum monitoring requirements are established in the Annex 6 to the Convention on International Civil Aviation. On a regional basis, a programme shall be instituted for monitoring the height-keeping performance of aircraft operating in RVSM airspace in order to ensure that continued application of this vertical separation minimum meets regional safety objectives.

Table 1: MONITORING REQUIREMENTS TABLE (Civilian)

MONITORING IS REQUIRED IN ACCORDANCE WITH THIS TABLE

MONITORING PRIOR TO THE ISSUE OF RVSM APPROVAL IS **NOT** A REQUIREMENT

CATEGORY		GROUP DESCRIPTOR	MINIMUM MONITORING REQUIREMENTS
1	GROUP APPROVED: DATA INDICATES COMPLIANCE WITH THE RVSM MASPS	A124, A30B, A306, A310-GE, A310-PW, A318, A320, A330, A340, A345, A346, A380, A3ST, AVRO, B712, B727, B737C, B737CL, B737NX, B747CL, B74S, B744-5, B744-10, B748, B752, B753, B764, B767, B772, B773, B787, BD100, BE40, C25A, C25B, C510, C525, C560, C56X, C650, C680, C750, CARJ, CL600, CL604, CL605, CRJ7, CRJ9, DC10, E135-145, E170-190, E50P, E55P, F100, F900, FA7X, GALX, GLEX, GL5T, GLF4, GLF5, H25B-800, J328, LJ40, LJ45, LJ60, MD10, MD11, MD80, MD90, PC12, PRM1, T154	Operators of aircraft types contained in this category shall have a minimum of 2 airframes monitored every 2 years or 1,000 flight hours, whichever is longer calculated from the date of the last successful height monitoring. Operators with fleets consisting of aircraft from more than one Monitoring Group shall meet this requirement for each group in the fleet. In the event that an operator has a single airframe from a Group, then that aircraft shall be monitored every 2 years or 1,000 flight hours, whichever is longer calculated from the date of the last successful height monitoring.
2	GROUP APPROVED: INSUFFICIENT DATA ON APPROVED AIRCRAFT	Other group aircraft other than those listed above including: A148, A158, A20N, A337, A339, A350, A35K, AC90, AC95, AJ27, AN72, ASTR, ASTR-SPX, B701, B703, B731, B732, B37M, B38M, B39M, B744-LCF, B779, B78X, BCS1, BE20, BE30, C25C, C441, C500, C550-B, C550-II, C550-SII, C700, CRJ10, D328, DC85, DC86-87, DC91, DC93, DC94, DC95, EPIC, E120, E45X, EA50, E545-550, E290, E295, F2TH, F70, FA10, FA20, FA50, G150, G280, GL7T, GLF2, GLF2B, GLF3, GLF6, GLF7, H25B-700, H25B-750, H25C, HA4T, HDJT, IL62, IL76, IL86, IL96, L101, L29B-2, L29B-731, LJ23, LJ24, LJ25, LJ28, LJ31, LJ35-36, LJ55, MC21, MU30, P180, P180-II, PAY4, PC24, SB20, SBR1, SBR2, SF50, SU95, T134, T204, T334, TBM, WW24, YK42	Operators of aircraft types contained in this category shall have a minimum of 60% of airframes monitored every 2 years or 1,000 flight hours, whichever is longer calculated from the date of the last successful height monitoring, (the number of airframes to be monitored shall be rounded up to the nearest whole integer). Operators with fleets consisting of aircraft from more than one Monitoring Group shall meet this requirement for each Group in the fleet.
3	NON-GROUP	Aircraft types for which no generic compliance method exists: A225, AN12, AN26, B190, B462, B463, B74S-SOFIA, BA11, BE9L, FA6X, GSPN, H25A, L29A, PAY3, R721, R722, SJ30, STAR	Operators of aircraft types contained in this category shall have 100% of airframes monitored every 2 years or 1,000 flight hours., whichever is longer calculated from the date of the last successful height monitoring.

Table 2: MONITORING GROUPS FOR AIRCRAFT CERTIFIED UNDER GROUP APPROVAL REQUIREMENTS

Monitoring Group	A/C ICAO	Manufacturer Type	Additional Defining Criteria
A124	A124	AN-124 RUSLAN	
A148	A148	AN-148	
A158	A158	AN-158	
A30B	A30B	A300	
A306	A306	A300	
A310-GE	A310	A310	Series: 200, 200F, 300, 300F
A310-PW	A310	A310	Series: 220, 220F, 320, 320F
A318	A318	A318	
A320	A319	A319	
	A320	A320	
	A321	A321	
A20N	A19N	A319neo	
	A20N	A320neo	
	A21N	A321neo	
	A21N	A321LR	
	A21N	A321XLR	
A330	A332	A330	
	A333	A330	
A337	A337	AIRBUS BELUGA XL (A330-743L)	
A339	A339	A330-900neo	
	A338	A330-800neo	
A340	A342	A340	
	A343	A340	
A345	A345	A340	
A346	A346	A340	
A350	A359	A350-900	
		A350-900 ULR	

Monitoring Group	A/C ICAO	Manufacturer Type	Additional Defining Criteria
A35K	A35K	A350-1000	
A380	A388	A380	
A3ST	A3ST	A300	600R ST BELUGA
AC90	AC90	COMMANDER 690 COMMANDER 840 COMMANDER 900	
AC95	AC95	AERO COMMANDER 695	
AN72	AN72 AN74	ANTONOV AN-72 ANTONOV AN-74	
ASTR	ASTR	1125 ASTRA	S/n 1-78, except 73
ASTR-SPX	ASTR	1125 ASTR SPX, G100	S/n 73, 79-145 S/n > 145
AVRO	RJ1H RJ70 RJ85	RJ100 Avroliner RJ70 Avroliner RJ85 Avroliner	
B37M	B37M	Boeing 737 MAX 7	
B38M	B38M	Boeing 737 MAX 8	
B39M	B39M	Boeing 737 MAX 9	
B701	B701	B707	
B703	B703	B707	Series 320, 320B, 320C
B712	B712	B717	
B727	B721 B722	B727 B727	
B731	B731	B737	
B732	B732	B737	
B737CL	B733 B734 B735	B737-300 B737-400 B737-500	

Monitoring Group	A/C ICAO	Manufacturer Type	Additional Defining Criteria
B737NX	B736	B737-600	
	B737	B737-700	B737-700 including the BBJ
	B738	B737-800	B737-800 including the BBJ2
	B739	B737-900	
	B739	B737-900ER	
B737C	B737	B737-700	Series: 700C
B747CL	B741	B747-100	
	B742	B747-200	
	B743	B747-300	
B74S	B74S	B747SP	
	B74R	B747SR	
B744-5	B744	B747-400	5 inch Probes up to s/n 25350
	B74D		
B744-10	B744	B747-400	10 inch Probes from s/n 25351
	B74D		
B744-LCF	BLCF	B747-400	
B748	B748	B747-8	
B752	B752	B757-200	
B753	B753	B757-300	
B767	B762	B767-200	
	B763	B767-300	
B764	B764	B767-400	
B772	B772	B777-200	
	B772	B777-200ER	
	B77L	B777-F	
	B77L	B777-200LR	
B773	B773	B777-300	
	B77W	B777-300ER	
B779	B779	B777-9	

Monitoring Group	A/C ICAO	Manufacturer Type	Additional Defining Criteria
B787	B788	B787-8	
	B789	B787-9	
B78X	B78X	B787-10	
BCS1	BCS1	BOMBARDIER CS100	
	BCS1	AIRBUS A220-100	
	BCS3	BOMBARDIER CS300	
	BCS3	AIRBUS A220-300	
BD100	CL30	CHALLENGER 300	
	CL35	CHALLENGER 350	Begins at s/n 20501
BE20	BE20	200 KINGAIR	
BE30	BE30	B300 SUPER KINGAIR	
	B350	B300 SUPER KINGAIR 350	
BE40	BE40	BEECHJET 400	
		BEECHJET 400A	
		BEECHJET 400XP	
		HAWKER 400XP	
C441	C441	CONQUEST II	
C500	C500	500 CITATION	
	C500	500 CITATION I	
	C501	501 CITATION I SINGLE PILOT	
C510	C510	MUSTANG	
C525	C525	525 CITATIONJET	
		525 CITATIONJET 1	
		525 CITATIONJET PLUS	
	C25M	C525-M2	S/n 800 and on
C25A	C25A	525A CITATIONJET II	
C25B	C25B	CITATIONJET III	
		525B CITATIONJET III	
C25C	C25C	525C CITATIONJET IV	

Monitoring Group	A/C ICAO	Manufacturer Type	Additional Defining Criteria
C550-B	C55B	550 CITATION BRAVO	S/n 550-0801 and on
C550-II	C550	550 CITATION II	S/n 550-0001 to 550-0800
	C551	551 CITATION II SINGLE PILOT	
C550-SII	C550	S550 CITATION SUPER II	S/n starts with “S”
C560	C560	560 CITATION V	
		560 CITATION V ULTRA	
		560 CITATION V ENCORE	
		560 CITATION V ENCORE PLUS	
C56X	C56X	560 CITATION EXCEL	
		560 CITATION XLS	
		560 CITATION XLS PLUS	
C650	C650	650 CITATION III	
		650 CITATION VI	
		650 CITATION VII	
C680	C680	680 CITATION SOVEREIGN	
	C68A	680-A LATITUDE	“A” in s/n
C700	C700	700 CITATION LONGITUDE	
C750	C750	750 CITATION X	
CARJ	CRJ1	CRJ-100	
	CRJ2	CRJ-200	
	CRJ2	CRJ-440	
	CRJ2	CHALLENGER 800	
	CRJ2	CHALLENGER 850	
CRJ7	CRJ7	CRJ-700	
	CRJ7	CRJ-550	
CRJ9	CRJ9	CRJ-705	
	CRJ9	CRJ-900	
CRJ10	CRJX	CRJ-1000	

Monitoring Group	A/C ICAO	Manufacturer Type	Additional Defining Criteria
CL600	CL60	CL-600	S/n < 5000
		CL-601	
CL604	CL60	CL-604	S/n 5000-5700
		CL-601-3A	S/n 5001-5134
		CL-601-3R	S/n 5135-5300
CL605	CL60	CL-605	S/n > 5700
	CL60	CL-650	
DC10	DC10	DC-10	
D328	D328	328 TURBOPROP	
DC85	DC85	DC-8	
DC86-87	DC86	DC-8	
	DC87	DC-8	
DC91	DC91	DC-9	
DC93	DC93	DC-9	
DC94	DC94	DC-9	
DC95	DC95	DC-9	
EPIC	EPIC	Epic E1000	
E120	E120	EMB-120 Brasilia	
E135-145	E135	EMB-135	
	E145	EMB-145	
	E35L	EMB-135BJ Legacy 600/650	
E45X	E45X	EMB-145 XR	
E170-190	E170	E170	
	E170	E175	
	E75S	E170-200 short wing	
	E75L	E175 long wing	
	E190	E190	
	E190	E195	
E290	E290	E190-E2	

Monitoring Group	A/C ICAO	Manufacturer Type	Additional Defining Criteria
E295	E295	E195-E2	
	E295	E190-400	
E50P	E50P	PHENOM 100	
E545-550	E545	EMB-545 LEGACY 450	
	E545	EMB-545 PRAETOR 500	
	E550	EMB-550 LEGACY 500	
	E550	EMB-550 PRAETOR 600	
E55P	E55P	PHENOM 300	
EA50	EA50	ECLIPSE	
F100	F100	FOKKER 100	
F2TH	F2TH	FALCON 2000	
		FALCON 2000-EX	
		FALCON 2000LX	
		FALCON 2000-LXS	
		FALCON 2000-S	
F70	F70	FOKKER 70	
F900	F900	FALCON 900	
		FALCON 900DX	
		FALCON 900EX	
		FALCON 900LX	
FA10	FA10	FALCON 10	
FA20	FA20	FALCON 20	
		FALCON 200	
FA50	FA50	FALCON 50	
		FALCON 50EX	
FA7X	FA7X	FALCON 7X	
	FA8X	FALCON 8X	
G150	G150	G150	

Monitoring Group	A/C ICAO	Manufacturer Type	Additional Defining Criteria
G280	G250	G250	
	G280	G280	
GALX	GALX	1126 GALAXY	
		G200	
GLEX	GLEX	GLOBAL EXPRESS CLASSIC GLEX	EXPRESS
		GLOBAL XRS	S/n > 9158
		GLOBAL 6000	S/n > 9431, and 9313 and 9381
		GLOBAL 6500	S/n > 60001
GL5T	GL5T	GLOBAL 5000	
		GLOBAL 5000-GVFD	S/n > 9434, and 9386 and 9401
		GLOBAL 5500	S/n > 60001
GL7T	GL7T	GLOBAL 7500	
GLF2	GLF2	GULFSTREAM II (G-1159)	
GLF2B	GLF2	GULFSTREAM IIB (G-1159B)	
GLF3	GLF3	GULFSTREAM III (G-1159A)	
GLF4	GLF4	GULFSTREAM IV (G-1159C)	
		G300	
		G350	
		G400	
		G450	
GLF5	GLF5	GULFSTREAM V (G-1159D)	
		G500	
		G550	
GLF6	GLF6	G650	
GLF7	GA5C	G500 GVII	
	GA6C	G600 GVII	
H25B-700	H25B	BAE 125 / HS125	Series: 700A, 700B
H25B-750	H25B	HAWKER 750	

Monitoring Group	A/C ICAO	Manufacturer Type	Additional Defining Criteria
H25B-800	H25B	BAE 125 / HS125	Series: 800A, 800B
		HAWKER 800XP	
		HAWKER 800XPI	
		HAWKER 800	
		HAWKER 850XP	
		HAWKER 900XP	
		HAWKER 950XP	
H25C	H25C	HAWKER 1000	
HA4T	HA4T	HAWKER 4000	
HDJT	HDJT	HONDAJET HA-420	
IL62	IL62	ILYUSHIN-62	
IL76	IL76	ILYUSHIN-76	
IL86	IL86	ILYUSHIN-86	
IL96	IL96	ILYUSHIN-96	
J328	J328	328JET	
L101	L101	L-1011 TRISTAR	
L29B-2	L29B	L-1329 JETSTAR II	
L29B-731	L29B	L-1329 JETSTAR 731	
LJ23	LJ23	LEARJET 23	
LJ24	LJ24	LEARJET 24	
LJ25	LJ25	LEARJET 25	
LJ28	LJ28	LEARJET 28	
		LEARJET 29	
LJ31	LJ31	LEARJET 31	
LJ35-36	LJ35	LEARJET 35, 35A	
		LEARJET 36, 36A	
LJ40	LJ40	LEARJET 40	Begins at s/n 2001
	LJ70	LEARJET 70	Begins at s/n 2134

Monitoring Group	A/C ICAO	Manufacturer Type	Additional Defining Criteria
LJ45	LJ45	LEARJET 45	
	LJ75	LEARJET 75	Begins at s/n 456
LJ55	LJ55	LEARJET 55	
LJ60	LJ60	LEARJET 60	
MC21	MC21	IRKUT MC21-300	
MD10	MD10	MD-10	
MD11	MD11	MD-11	
MD80	MD81	MD-80	
	MD82	MD-80	
	MD83	MD-80	
	MD87	MD-80	
	MD88	MD-80	
MD90	MD90	MD-90	
MU30	MU30	MU-300 DIAMOND	1A
P180	P180	P-180 AVANTI	S/n < 1105 but not 1002
P180-II	P180	P-180 AVANTI II	S/n > 1104 and also 1002
	P180	P-180 AVANTI EVO	
PAY4	PAY4	PA-42 Cheyenne 400	Series: 1000 CHEYENNE
PC12	PC12	Pilatus PC-12	
PC24	PC24	Pilatus PC-24	
PRM1	PRM1	PREMIER 1	
SB20	SB20	SAAB 2000	
SBR1	SBR1	SABRELINER 40	
		SABRELINER 60	
		SABRELINER 65	
SBR2	SBR2	SABRELINER 80	
SF50	SF50	CIRRUS SF50	RVSM-capable s/n 8, 89, and 94 or above
SU95	SU95	SUKHOI SUPERJET 100-95	
T134	T134	TU-134	

Monitoring Group	A/C ICAO	Manufacturer Type	Additional Defining Criteria
T154	T154	TU-154	
T204	T204	TU-204 TU-214 TU-224 TU-234	
T334	T334	TU-334	
TBM	TBM7 TBM8 TBM9	TBM-700 TBM-850 TBM-900	 TBM8 with winglets, begins at s/n 1000
WW24	WW24	1124 WESTWIND	
YK42	YK42	Yakovlev YAK-42 Yakovlev YAK-40	

Table 3: Non-GROUP AIRCRAFT (i.e., Not certified under group approval requirements) (Civilian)

Non-Group Descriptor	A/C ICAO	Manufacturer Type	Additional Defining Criteria
A225	A225	ANTONOV AN-225	Non-Group
AN12	AN12	ANTONOV AN-12	Non-Group
AN26	AN26	ANTONOV AN-26	Non-Group
B190	B190	BEECH 1900	Non-Group
B462	B462	BAe-146-200	Non-Group
B463	B463	BAe-146-300	Non-Group
B74S-SOFIA	B74S	NASA B74SP with Sofia telescope	Non-Group: N747NA (s/n 21441)
BA11	BA11	BAC-111	Non-Group
BE9L	BE9L	Beechcraft King Air C90GT Beechcraft King Air C90GTI King Air Model 90 except F90 and F90-1	Non-Group

Non-Group Descriptor	A/C ICAO	Manufacturer Type	Additional Defining Criteria
FA6X	FA6X	Falcon 6X	Non-Group
GSPN	GSPN	GROB G-180 SPn Utility Jet	Non-Group
H25A	H25A	HS125-400, -600	Non-Group
L29A	L29A	L-1329 JETSTAR 6/8	Non-Group
PAY3	PAY3	PIPER Cheyenne 3	Non-Group
R721	R721	B-727-100: Re-engined	Non-Group
R722	R722	B-727-200: Re-engined	Non-Group
SJ30	SJ30	SWEARINGEN SJ-30	Non-Group
STAR	STAR	BEECH 2000 STARSHIP	Non-Group

Table 1: MONITORING REQUIREMENTS TABLE (Military)

MONITORING IS REQUIRED IN ACCORDANCE WITH THIS TABLE

MONITORING PRIOR TO THE ISSUE OF RVSM APPROVAL IS **NOT** A REQUIREMENT

CATEGORY		GROUP DESCRIPTOR	MINIMUM MONITORING REQUIREMENTS
1	GROUP APPROVED: DATA INDICATES COMPLIANCE WITH THE RVSM MASPS	C17, C130, KC135	Operators of aircraft types contained in this category shall have a minimum of 2 airframes monitored every 2 years or 1,000 flight hours, whichever is longer calculated from the date of the last successful height monitoring. Operators with fleets consisting of aircraft from more than one Monitoring Group shall meet this requirement for each group in the fleet. In the event that an operator has a single airframe from a Group, then that aircraft shall be monitored every 2 years or 1,000 flight hours, whichever is longer calculated from the date of the last successful height monitoring.
2	GROUP APPROVED: INSUFFICIENT DATA ON APPROVED AIRCRAFT	Other group aircraft other than those listed above including: A178, A400, C5, C550-552, E3, F18, KC2, KC46, KC39, P1, P8	Operators of aircraft types contained in this category shall have a minimum of 60% of airframes monitored every 2 years or 1,000 flight hours, whichever is longer calculated from the date of the last successful height monitoring, (the number of airframes to be monitored shall be rounded up to the nearest whole integer). Operators with fleets consisting of aircraft from more than one Monitoring Group shall meet this requirement for each Group in the fleet.
3	NON-GROUP	**Aircraft types for which no generic compliance method exists:** GLF5-AEW, GLEX-ASTOR **Aircraft types for which the compliance method is not known:** A30B-M, A310-M, A332-M, ASTR-M, B737-AWACS, C12, C21, C32, C35, C37, C40, C550-B-M, C9, CL60-M, E135-M, E4, E6, E8, E530, FA10-M, FA20-M, FA50-M, GLF3-M, GLF4-M, IL76-M, KC10, KC-390, KC46, P180-M, R135, VC25	Operators of aircraft types contained in this category shall have 100% of airframes monitored every 2 years or 1,000 flight hours., whichever is longer calculated from the date of the last successful height monitoring.

Table 2: MONITORING GROUPS FOR AIRCRAFT CERTIFIED UNDER GROUP APPROVAL REQUIREMENTS (Military)

Monitoring Group	A/C ICAO	Manufacturer Type	Additional Defining Criteria
A178	A178	Antonov A178	
A30B-M	A30B	A300	B2-100 (Zero-G)
A310-M	A310	A310	MRT, MRTT
A332-M	A332	KC30-A KC45-A Voyager KC2, KC3	MRTT
A400	A400	A400M	
ASTR-M	ASTR	1125 ASTRA	NAV&COM
C12	BE20	C-12	
C130	C130	C-130 Hercules	Series: H only
	C30J	C-130J Hercules	
C17	C17	C-17 Globemaster III	
C21	LJ35	C-21	
C32	B752	C-32	Series: A, B
C40	B737	C-40 Clipper	
C5	C5	C5 Galaxy	
C550-552	C550	552 CITATION II (USN)	
C550-B-M	C550	550 CITATION BRAVO	
C550-M	C550	550 CITATION II	
C35	C560	560 CITATION V UC-35	
C37	GLF5	C-37 TP102D	Series: A, B Series: C
CL60-M	CL60	CL604	MPA
E135-M	E135	EMB-135	MRT
E3	E3TF	E-3 Sentry	

Monitoring Group	A/C ICAO	Manufacturer Type	Additional Defining Criteria
	E3CF		
E4	B742	E-4	
E6	E6	E-6 Mercury	
B737-AWACS	E7A	B737	B737 AEW&C
E8	B703	E-8 J-Stars	
E530	E530	TEXTRON AIRLAND SCORPION	
FA10-M	FA10	FALCON 10	MRT
FA20-M	FA20	FALCON 20	EW/ELINT, MRT, EXP
FA50-M	FA50	FALCON 50	MPA/SAR
F18H	F18H	McDonnell-Douglas F/A 18 F/A-18 Hornet	
GLF3-M	GLF3	C-20	Series: A, B, C, D, E
GLF4-M	GLF4	C-20 S102B TP102	Series: F, G, H
IL76-M	IL76	IL-76	MRT, T
KC2	KC2	KAWASAKI KC2 C-2 RC-2 XC-2	
KC10	DC10	KC-10 Extender KDC-10 DC-10	
KC46	KC46	Boeing KC46 Boeing KC-46 Pegasus Boeing KC46A or B767-2C	
KC135	B703 K35E K35R	KC-135 Stratotanker KC-135 Stratotanker C-135 Stratotanker	

Monitoring Group	A/C ICAO	Manufacturer Type	Additional Defining Criteria
KC39	KC39	Embraer KC390	
P1	P1	Kawasaki P-1	
P180-M	P180	P-180 AVANTI	
P8	P8	B738-ERX	BOEING P8 POSEIDON
R135	R135	RC-135	
VC25	B742	VC-25	

Abbreviations:

EW/ELINT	Electronic Warfare/Electronic Intelligence
EXP	Experimental
MPA	Maritime Patrol Aircraft
MRT	Multi Role Transporter
MRTT	Multi Role Transporter and Tanker
SAR	Search and Rescue
T	Transporter

Table 3: Non-GROUP AIRCRAFT (i.e., Not certified under group approval requirements) (Military)

Non-Group Descriptor	A/C ICAO	Manufacturer Type	Additional Defining Criteria
GLEX-ASTOR	GLEX	Raytheon Sentinel aka RAF's ASTOR (Airborne Stand-Off Radar)	Non-Group
GLF5-AEW	GLF5	GULFSTREAM G550	Non-Group : AEW

Abbreviations:

AEW	Airborne Early Warning