



International Civil Aviation Organization

MIDANPIRG ATM/AIM/SAR Sub-Group

Thirteenth Meeting (ATM/AIM/SAR SG/13)
(Cairo, Egypt, 30 September – 3 October 2013)

Agenda Item 5: RVSM Operations and Monitoring Activities in the MID Region

RVSM OPERATIONS AND MONITORING ACTIVITIES IN THE MID REGION

(Presented by the Secretariat)

SUMMARY

This paper presents the latest developments related to RVSM operations and safety monitoring activities in the MID Region, based on the outcome of the MIDRMA Board/12 meeting.

Action by the meeting is at paragraph 3.

REFERENCES

- MIDANPIRG/13 Report
- MIDRMA Board/12 Report

1. INTRODUCTION

1.1 The MIDRMA Board/12 meeting was held in Kuwait, from 17 to 19 December 2012. The meeting was attended by a total of twenty nine (29) participants from nine (8) States (Bahrain, Egypt, Iran, Kuwait, Oman, Saudi Arabia, UAE and Yemen) and one (1) Agency (MIDRMA).

2. DISCUSSION

MID RVSM SMR 2013

2.1 The MIDRMA Board/12 meeting recalled that MIDANPIRG/13, through Conclusion 13/65, States were requested to provide required data on a regular basis and in a timely manner to the MIDRMA for the development of RVSM Safety Monitoring Reports, data includes mainly:

- i) approval of operators and aircraft for RVSM operations (on monthly basis);
- ii) Large Height Deviation report (LHD) for deviations exceeding 300ft (on monthly basis);
- iii) traffic data (as requested by the MIDRMA Board); and
- iv) radar data as, when and where required.

2.2 It was highlighted that the MIDRMA is still facing some difficulties related to the provision of required data by States, such as:

- late submission of the traffic data;
- corrupted traffic data; and
- missing items from the data submitted (e.g. no registrations or wrong type of aircraft, etc).

2.3 The meeting recalled that through MIDANPIRG/13 Conclusion 13/64 and Conclusion 13/65, States were requested to submit the data related to both Altitude Deviation Reports (ADRs) and Coordination Failure Reports (CFRs) using the Large Height Deviation (LHD) form to the MIDRMA on monthly basis.

2.4 The status of reporting of LHDs and RVSM Approval Lists to the MIDRMA is summarized in the following Table

States	LHDs		RVSM Approvals	
	Received	Regularity/ Timeliness	Received	Regularity/ Timeliness
Bahrain	Yes	Yes	Yes	Yes*
Egypt	Yes	Yes*	Yes	Yes*
Iran	Yes	Yes	No	No
Iraq	Yes	Yes	Yes	Yes
Jordan	Yes	Yes	Yes	Yes
Kuwait	Yes	Yes	Yes	Yes*
Lebanon	Yes	Yes*	Yes	Yes
Oman	Yes	Yes	Yes	No
Saudi Arabia	Yes	Yes	Yes	Yes*
Syria	Yes	Yes	Yes	Yes
UAE	Yes	Yes*	Yes	Yes*
Yemen	Yes	No	Yes	No

**Note: Irregularity in the provision of data has been observed intermittently.*

2.5 The meeting noted with concern that several FIRs with high volume of traffic continue to report NIL LHDs, which affects the accuracy of the computed Targets Level of Safety.

2.6 The meeting recognized that the non-compliance with the requirement for reporting of data to the MIDRMA is a longstanding shortcoming in the MID Region, which needs to be addressed seriously. In this respect, it was re-iterated that the lack of awareness about the requirements for RVSM safety assessment activity is a major contributing factor. Moreover, the meeting recalled that, in accordance with MIDANPIRG Conclusion 13/67, with a view to improve the knowledge of the ATC and Air Operators personnel, the MIDRMA was requested to include in its work programme regular missions to the Member States, during which briefings on the MIDRMA activities and RVSM safety assessment requirements be provided to concerned personnel. In the same vein, the meeting agreed that such briefings could be provided in the MIDRMA premises in Bahrain to the personnel involved in RVSM safety assessment activity (ATC, RVSM Approval Authority and Air Operators) designated by member States, in coordination with the MIDRMA, when and where appropriate. Accordingly, the meeting agreed to the following Draft Conclusion, which is proposed to replace and supersede the MIDANPIRG Conclusion 13/67:

DRAFT CONCLUSION 12/5: TRAINING ON RVSM SAFETY ASSESSMENT

That, with a view to raise the awareness related to the requirements for sustained RVSM safety assessment activity and improve the knowledge of the ATC, RVSM approval Authority and Air Operators personnel, the MIDRMA include in its work programme training activity/briefings on RVSM safety assessment requirements to be provided to concerned personnel either through missions to concerned States or through familiarization visits organized in the MIDRMA premises, when and where appropriate.

2.7 The MIDRMA Board/12 meeting was apprised of the outcome of the RVSM Scrutiny Group meeting held in Kuwait, 16 December 2012. It was noted with concern that only five States (Bahrain, Egypt, Iran, Kuwait and Saudi Arabia) attended the meeting. The meeting agreed that as a mitigation measure to simplify and improve the LHD reporting, a simplified LHD Template containing the minimum data necessary to trigger the process of reporting an ADR or CFR should be developed by the MIDRMA for use by the Air Traffic Controllers. It was also underlined that, further to the receipt of a simplified LHD report, the MIDRMA takes necessary action, in coordination with the concerned State to get the full LHD report. Moreover, the MIDRMA was requested to forward all the simplified LHD reports to the concerned States, upon receipt.

2.8 In connection with the above, the meeting agreed that the development of an Online Reporting Tool for the submission of LHD reports to the MIDRMA, would also improve the level of reporting by States.

2.9 The meeting recalled that in accordance with MIDANPIRG/13 Conclusion 13/71, States were requested to send their FPL/Traffic data for the period 01-31 October 2012 to the MIDRMA by 15 November 2012, for the development of the MID RVSM SMR 2012-2013.

2.10 The meeting reviewed and updated the Action Plan for the development of the MID RVSM SMR 2012-2013 as follows:

<i>No.</i>	<i>Start</i>	<i>Activity</i>	<i>End</i>	<i>Status</i>
1	01/10/2012	States to collect flight plan traffic data (SMR's Traffic Data Sample) for all traffic operating between FL290 and FL410 inclusive.	31/10/2012 31/01/2013	Ongoing
2	01/10/2012	Collect Bahrain and Kuwait SSR radar data for October 2012	31/10/2012	Completed
3	01/11/2012	Collect Amman SSR radar data	15/11/2012 31/01/2013	Pending – Waiting for Amman Response
4	16/11/2012	Collect Muscat SSR radar data	30/11/2012 31/01/2013	Pending – Waiting for Muscat Response
5	01/12/2012	Collect Jeddah* SSR radar data	15/12/2012 31/01/2013	Pending – Waiting for Jeddah Response
6	01/11/2012	Collect states TDS	31/01/2013	Ongoing
7	01/11/2012	Ensure MID RVSM approvals up to date and ensure the ICAO minimum monitoring requirements achieved based on the TDS received from States	31/01/2013	Ongoing
8	01/12/2012	Review and analyze all Large Height Deviation Reports.	Scrutiny Group meeting date	Scheduled for 16 December 2012 Completed (Only 5 States attended)
9	01/01/2013	Prepare New MID MMR for all MID Airline Operators.	31/01/2013	Completed
10	01/02/2013	MID RMA evaluation of technical risk	28/02/2013	
11	01/03/2013	Calculations of all risk parameters	31/03/2013	
12	01/04/2013	Production of draft SMR-2012/2013	30/04/2013	

2.11 The meeting noted with appreciation that Bahrain and Kuwait provided the requested radar data to the MIDRMA for the development of the MID RVSM SMR 2012-2013. In the same vein, it was confirmed that Jordan, Oman and Saudi Arabia will provide the requested radar data before end of January 2013.

2.12 The meeting recalled that it is important to measure the horizontal frequency overlap for the whole Baghdad FIR. In this respect it was highlighted that Kuwait radar data covers the southern part of the Baghdad FIR. However, the MIDRMA is to follow up with Iraq to get the radar data for the whole FIR, as appropriate.

2.13 As a follow-up action to MIDANPIRG/13 Conclusion 13/65 and the MIDRMA Board/12 Draft Conclusion 12/8, the ICAO MID Regional Office issued State Letter Ref.: AN 6/5.10.15A – 13/002 dated 6 January 2013, urging States to provide the MIDRMA with their data related to FIR Airway structure (above FL 290) and Waypoints before 15 January 2013, and to keep the MIDRMA apprised of any change thereafter, in order to expedite the development process of the MID RVSM SMR 2012-2013.

Height Keeping Monitoring Requirements

2.14 The MIDRMA Board/12 meeting recalled that further to the amendment of Annex 6 Part I and Part II concerning long term monitoring requirements for height keeping performance, and based on the MIDRMA Minimum Monitoring Requirements, States are required to ensure that a minimum of two aeroplanes of each aircraft type grouping of the operator have their height-keeping performance monitored, at least once every two years.

2.15 Based on the latest RVSM approval lists received from MID States, the following Table has been consolidated by the MIDRMA to show the height-keeping Minimum Monitoring Requirements (MMR) for each of the MID States, as of 30 November 2012:

MID STATES – Height-keeping Minimum Monitoring Requirements (MMR)
(as of November 2012)

Seq. #	MID	RVSM	Compliant	Not	Not	To be	REMARKS
	STATES	Approvals		Covered	Covered in %	monitored	
1	BAHRAIN	61	54	7	11%	5	
2	EGYPT	128	116	12	9%	6	
3	IRAN	153	119	59	39%	30	Update received on 5/12/2012
4	IRAQ	14	0	14	100%	12	
5	JORDAN	58	41	17	29%	5	
6	KUWAIT	34	22	12	35%	4	
7	LEBANON	35	26	9	26%	9	
8	OMAN	32	30	2	6%	2	
9	QATAR	138	132	6	4%	6	
10	SAUDI ARABIA	262	232	30	11%	25	
11	SYRIA	9	7	2	22%	2	
12	UAE	392	369	23	6%	15	

13	YEMEN	10	5	7	70%	4	Update received on 15/12/2012
	TOTAL	1326	1153	200	15%	125	

2.16 The meeting noted with appreciation that the percentage of aircraft requiring height-keeping monitoring in the MID Region was reduced from 46% to 15% since the last MIDRMA Board/11 meeting in September 2011; although the total number of RVSM approved aircraft increased by 13%.

2.17 The meeting noted with concern that 200 aircraft have valid RVSM approvals without known height-keeping monitoring results, considering that the MIDRMA is continuously coordinating very closely with other RMAs to exchange all available height monitoring results, particularly with the Euro RMA that is providing the results of any MID RVSM approved aircraft flying over the European Height Monitoring Units (HMUs). In order to fully comply with the Annex 6 requirements and the MIDRMA MMR, it was highlighted that 125 from the identified 200 aircraft should be monitored, taking into consideration the ICAO grouping categories.

2.18 In connection with the above, the meeting agreed that Iraq, Lebanon, Syria and Yemen be included in the MIDANPIRG list of air navigation deficiencies, for granting RVSM approvals for aircraft without known height-keeping monitoring results.

2.19 The meeting urged States to enforce the implementation of the MMR Tables to ensure that minimum monitoring requirements for all MID RVSM approved aircraft are continuously met and agreed to the following Draft Conclusion which is proposed to replace and supersede the MIDANPIRG/13 Conclusion 13/69:

DRAFT CONCLUSION 12/6: RVSM MINIMUM MONITORING REQUIREMENTS
That,

- a) States be urged to take necessary measures to:
- i) ensure that, **before 30 June 2013**, their aircraft operators fully comply with Annex 6 provisions related to long term height monitoring requirements, based on the MIDRMA MMR Tables;
 - ii) withdraw the RVSM approvals for their registered aircraft that would not be compliant with Annex 6 provisions related to long term height monitoring requirements; and/or when notified by the MIDRMA;
 - iii) ban any aircraft without confirmed RVSM approval status from entering the RVSM airspace; and
 - iv) report any case of handover at an RVSM Flight Level of an aircraft without confirmed RVSM approval status from adjacent ACCs to the MIDRMA and the ICAO MID Regional Office.
- b) the MIDRMA Board Members in coordination with the MID RVSM Programme Managers monitor and follow up this subject at the national level, in order to ensure efficient implementation.

2.20 The meeting recalled that during the MIDRMA Board/11 meeting, it was agreed that effort should be made to reach the world average of 90% of RVSM approved aircraft having

monitoring results in the MID Region. Taking into consideration, the progress made since the last Board meeting and the MIDRMA plans for GMU monitoring missions, it was agreed that the performance target to be reached is 95% of RVSM approved aircraft having monitoring results, by the MIDRMA Board/13 meeting (2014).

2.21 The meeting noted that the subject of monitoring airframes that are RVSM compliant on delivery was addressed by the seventh meeting of RMA Coordination Group (RMACG/7) held in Beijing, China, 28 May – 1 June 2012. Accordingly, the meeting endorsed the MID Region RVSM Minimum Monitoring Requirements Conditions at **Appendix A** to this working paper, to be part of the Monitoring Requirements for the MID Region. In this respect, it was highlighted that, 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 must complete monitoring in accordance with the Tables 1 and 2 of **Appendix B** to this working paper.

2.22 The meeting agreed that the MID Region RVSM Minimum Monitoring Requirements Conditions at **Appendix A** to this working paper should be posted on the MIDRMA website and included in the MIDRMA Manual.

2.23 The meeting was apprised of the MIDRMA GMU activities. In this respect, it was noted with appreciation that since January 2010, the MIDRMA conducted GMU height monitoring for 132 Aircraft and it's expected to conduct the GMU height monitoring for more than 97 aircraft in the near future.

2.24 In connection with the above, the meeting recalled that MIDANPIRG/13 noted the difficulties which hindered the MIDRMA to purchase 2 GMU Units from the CSSI Company, as agreed by the MIDRMA Board through Draft Conclusion 10/6. Therefore, it was noted that the MIDRMA has officially ordered 2 Enhanced GMU units (with the condition that the processing of recorded data is done by CSSI).

2.25 The meeting was apprised of the difficulties that faced the MIDRMA Team for the conduct of some GMU monitoring missions, especially with the carriage of the GMU Unit which necessitates special authorization from national authorities. In order to avoid that the MIDRMA faces similar difficulties in the future, the meeting agreed that prior to the conduct of any GMU monitoring mission, and upon notification by the MIDRMA, the concerned MIDRMA Board Member should undertake necessary arrangements at the national level with concerned authorities (CAA, Customs, Security, etc) to facilitate the MIDRMA Team mission. Accordingly, the meeting agreed to the following Draft Conclusion:

*DRAFT CONCLUSION 12/7: ARRANGEMENTS FOR THE CONDUCT OF GMU
MONITORING MISSIONS*

That, prior to the conduct of any GMU monitoring mission:

- a) the MIDRMA notify the concerned MIDRMA Board Member;*
- b) the MIDRMA Board member is to undertake necessary arrangements at the national level with concerned authorities (CAA, Customs, Security, etc) to facilitate the MIDRMA Team mission.*

2.26 The meeting recalled that MIDANPIRG/13 through Conclusion 13/70 endorsed the revised version of the MID Region height-keeping monitoring Strategy as at **Appendix C** to the Report on Agenda Item 4. The meeting reviewed the Strategy and agreed that no update is required.

MIDRMA Vertical Collision Risk Software (MID VCR)

2.27 With regard to the methodology used for the assessment of RVSM operations in the MID Region, the meeting recalled that the MIDRMA, since its establishment, has been using the Collision Risk Model provided by EUROCONTROL. The meeting noted that this Model is more suitable for the European airspace and is over conservative and sometimes over estimates the collision risk for the MID Region.

2.28 The meeting recalled that MIDANPIRG through Conclusion 13/68, agreed that the MIDRMA initiate action for the development/purchase of suitable VCR software for the MID Region; which should be presented to and validated by the Second MID RVSM Safety Assessment Seminar, planned to be held in Bahrain in October 2012. In this regard, the meeting noted with concern that due to very low level of confirmation of attendance, the Seminar was cancelled.

2.29 The meeting was apprised of the progress achieved for the development and validation of the MID VCR. In this respect, it was highlighted that the MIDRMA in close coordination with the Consultant/Vendor, checked and evaluated 3 versions of the software. The final version will include all the additional features requested by the MIDRMA and will be delivered by February 2013. It was highlighted in particular that, using the MID VCR, it would be possible to compute not only the regional Target Level of Safety (TLS) but also the TLS for each individual FIR.

2.30 The meeting noted that the MID VCR will be used for the development of the SMR 2012-2013. The meeting agreed that it is important to compare the computed TLS using the MID VCR with that computed using the EUROCONTROL Model. However, this should not delay the development of the SMR 2012-2013, and could be done at a later stage.

2.31 The meeting noted that the following steps were followed in the process of validation of the different MID VCR Modules:

1. **Airspace Modelling:** This Module has been validated using Bahrain and Kuwait data. This includes modelling of airspace, waypoints, airways and restrictions.
2. **Radar/Flight plan Data processing Module:** This Module has been validated and the software can process the flight plan information and the radar track data.
3. **Parameter Estimation Module:** This Module has been validated and the software can analyse and classify events, compute the frequency of overlap as well as time spent in overlap.
4. **The Collision Risk model** is under development and its validation requires the availability of up-to-date data related to Airway structure and waypoints from all MID States.

2.32 In connection with the above, the meeting urged all States to provide the MIDRMA with the data related to their Airway structure (above FL 290) and waypoints before **15 January 2013**, and to keep the MIDRMA apprised of any change thereafter. Accordingly, the meeting agreed to the following Draft Conclusion which is proposed to replace and supersede the MIDANPIRG Conclusion 13/65:

DRAFT CONCLUSION 12/8: PROVISION OF REQUIRED DATA TO THE MIDRMA

That, considering the on-going requirement for RVSM safety monitoring in the MID Region:

- a) *States provide the required data to the MIDRMA on a regular basis and in a timely manner. The data is to include, but is not necessarily limited to:*

- i) approval of operators and aircraft for RVSM operations (on monthly basis or whenever there's a change);*
 - ii) Large Height Deviations (LHD) (on monthly basis);*
 - iii) traffic data (as requested by the MIDRMA Board);*
 - iv) radar data as, when and where required; and*
 - v) airway structure (above FL 290) and waypoints.*
- b) States not providing the required data to the MIDRMA on a regular basis and in a timely manner:*
- i) be included in the MIDANPIRG list of air navigation deficiencies; and*
 - ii) might not be covered by the RVSM SMRs.*

RVSM Implementation within Baghdad FIR

2.33 The meeting recalled that MIDANPIRG/13 recognized that the continuous unresolved ATC coordination, communication and surveillance issues between Baghdad ACC and the neighbouring ACCs represent a safety risk and urged Iraq to take necessary measures to expedite the implementation of the Action Plan developed by the BFPRI-SCM. Accordingly, MIDANPIRG/13, through Conclusion 13/10, urged Iraq to implement the actions agreed by the BFPRI-SCM in an expeditious manner to solve the ATC coordination, communication and surveillance issues between Baghdad ACC and its neighbouring ACCs. In this respect, the meeting may wish to note that latest version of the Action Plan for the Normalization of the Baghdad FIR was received from Iraq on 10 September 2013.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

- a) note the information contained in this working paper;
 - b) review and update the status of provision of data by States and agree on the list of States to be included in the MIDANPIRG list of air navigation deficiencies for non-provision of required data to the MIDRMA, on a regular basis and in a timely manner;
 - c) review and update, as necessary, the Action Plan for the development of the MID RVSM SMR 2012-2013; and initiate discussion on the Action Plan for the development of the MID RVSM SMR 2014; and
 - d) review the MIDRMA Board/12 Draft Conclusions, which will be presented to MIDANPIRG/14 for endorsement.
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APPENDIX A

MID REGION RVSM MINIMUM MONITORING REQUIREMENTS - CONDITIONS

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, The MIDRMA will advise all State members. The updated table will be posted on the MIDRMA website.

2. **MONITORING PROGRAM.** All operators that operate or intend to operate in the Middle East Region airspace where RVSM is applied are required to participate in the regional RVSM monitoring programme. Table 1 addresses requirements for monitoring the height-keeping performance of aircraft in order to meet regional safety objectives. In their application to the appropriate State authority for RVSM approval, operators must show a plan for meeting the applicable monitoring requirements. Initial monitoring should be completed as soon as possible but not later than 6 months after the issue of RVSM approval, the State of Registry that had issued an RVSM approval to an operator would be required to establish a requirement which ensures that a minimum of two aeroplanes of each aircraft type grouping of the operator have their height-keeping performance monitored, at least once every two years or within intervals of 1000 flight hours per aeroplane, whichever period is longer.

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 programmes from other Regions can be used to meet regional monitoring requirements. The RMAs, which are responsible for administering the monitoring programme, 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 to the MIDRMA that show how they intend to meet the requirements specified in Table 1. Monitoring will be carried out in accordance with this table.

6. **AIRCRAFT GROUPS NOT LISTED IN TABLE 1.** Contact the MIDRMA 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 or Category 3 monitoring requirements.

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

8. **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.

9. 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 must complete monitoring in accordance with the attached table.

Table 1: MONITORING REQUIREMENTS TABLE

MONITORING IS REQUIRED IN ACCORDANCE WITH THIS TABLE			
MONITORING PRIOR TO THE ISSUE OF RVSM APPROVAL IS <u>NOT</u> A REQUIREMENT			
CATEGORY		AIRCRAFT GROUP	MINIMUM OPERATOR MONITORING FOR EACH AIRCRAFT GROUP
1	GROUP APPROVED: DATA INDICATES COMPLIANCE WITH THE RVSM MASPS	A124, A300, A306, A310-GE, A310-PW, A318, A320, A330, A340, A345, A346, A3ST, AVRO, B712, B727, B737CL, B737C, B737NX, B747CL, B74S, B744-5, B744-10, B752, B753, B767, B764, B772, B773, BD100, CL600, CL604, CL605, C17, C525, C560, C56X, C650, C680, C750, CARJ, CRJ7, CRJ9, DC10, E135-145, E170-190, F100, F900, FA10, GALX, GLEX, GLF4, GLF5, H25B-800, J328, KC135, LJ40, LJ45, LJ60, MD10, MD11, MD80, MD90, PRM1, T154	Two airframes from each fleet* of an operator to be monitored
2	GROUP APPROVED: INSUFFICIENT DATA ON APPROVED AIRCRAFT	Other group aircraft other than those listed above including: A148, A158 , A380, A400 , AC90 , AC95, AN72, ASTR, ASTR-SPX, B701, B703, B703-E3, B731, B732, B787 , BD700, BE20, BE30, BE40, B744-LCF, B748, C130, C500, C25A, C25B, C25C, C441, C5, C510, C550-552, C550-B, C550-II, C550-SII, CRJ10 , D328, DC85, DC86-87, DC91 , DC93, DC94 DC95, E50P, E55P , EA50, F2TH, F70, FA20, FA50, FA7X, G150, G250 , GLF2, GLF2B, GLF3, GLF6 , H25B-700, H25B-750, H25C, HA4T, IL62, IL76, IL86, IL96, L101, LJ23 , LJ24 , LJ25 , LJ28 , L29B-2, L29B-731, LJ31, LJ35-36, LJ55, MU30, P180, PAY4 , PC12, SB20, SBR1, SBR2, T134, T204, T334, TBM, WW24, YK42	60% of airframes (round up if fractional) from each fleet of an operator or individual monitoring
3	Non-Group	Aircraft types for which no generic compliance method exists: BA11, R722, SJ30, STAR, B720, A225, GLEX-ASTOR, GLF5-AEW, VC-10, GSPN, B74S-SOFIA	100% of aircraft shall be monitored

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

Monitoring Group	A/C ICAO	A/C Type	A/C Series
A124	A124	AN-124 RUSLAN	ALL SERIES
A148	A148	AN-148	100
A158	A158	AN-158	
A300	A30B	A300	B2-100, B2-200, B4-100, B4-100F, B4-120, B4-200, B4-200F, B4-220, B4-220F, C4-200
A306	A306	A300	600, 600F, 600R, 620, 620R, 620RF
A310-GE	A310	A310	200, 200F, 300, 300F
A310-PW	A310	A310	220, 220F, 320
A318	A318	A318	ALL SERIES
A320	A319 A320 A321	A319 A320 A321	CJ , 110, 130 110, 210, 230 110, 130, 210, 230
A330	A332 A333	A330 A330	200, 220, 240 300, 320, 340
A340	A342 A343	A340 A340	210 310
A345	A345	A340	500, 540
A346	A346	A340	600, 640
A380	A388	A380	800, 840, 860
A3ST	A3ST	A300	600R ST BELUGA
A400	A400	A400M	
AC90	AC90	COMMANDER 690 COMMANDER 840 COMMANDER 900	
AC95	AC95	AERO COMMANDER 695	A
AN72	AN72	AN-72 AN-74	ALL SERIES
ASTR	ASTR	1125 ASTRA	ALL SERIES
ASTR-SPX	ASTR	1125 ASTR SPX, G100	ALL SERIES
AVRO	RJ1H RJ70 RJ85	AVRO AVRO AVRO	RJ100 RJ70 RJ85
B701	B701	B707	100, 120B
B703	B703	B707	320, 320B, 320C
B703-E3	E3TF	B707	E-3

Monitoring Group	A/C ICAO	A/C Type	A/C Series
B712	B712	B717	200
B727	B721 B722	B727 B727	100, 100C, 100F, 100QF 200, 200F
B731	B731	B737	100
B732	B732	B737	200, 200C
B737CL	B733 B734 B735	B737 B737 B737	300 400 500
B737NX	B736 B737 B738 B739	B737 B737 B737 B737	600 700, BBJ 800, BBJ2 900
B737C	B737	B737	700C
B747CL	B741 B742 B743	B747 B747 B747	100, 100B, 100F 200B, 200C, 200F, 200SF 300
B74S	B74S B74R	B747	SR, SP
B744-5	B744 B74D	B747	400, 400D, 400F (With 5 inch Probes up to SN 25350)
B744-10	B744 B74D	B747	400, 400D, 400F (With 10 inch Probes from SN 25351)
B744-LCF	B744	B747	LCF
B748	B748	B747	8F, 81
B752	B752	B757	200, 200PF, 200SF
B753	B753	B757	300
B767	B762 B763	B767 B767	200, 200EM, 200ER, 200ERM, 300, 300ER, 300ERF
B764	B764	B767	400ER
B772	B772 B77L	B777	200, 200ER, 200LR, 200LRF
B773	B773 B77W	B777	300, 300ER
B787	B788 B789	B787-8 B787-9	
BD100	CL30	CHALLENGER 300	ALL SERIES
BD700	GL5T	GLOBAL 5000	ALL SERIES
BE20	BE20	200 KINGAIR	ALL SERIES
BE30	BE30 B350	B300 SUPER KINGAIR B300 SUPER KINGAIR 350	ALL SERIES
BE40	BE40	BEECHJET 400 BEECHJET 400A BEECHJET 400XP HAWKER 400XP	ALL SERIES

Monitoring Group	A/C ICAO	A/C Type	A/C Series
C130	C130	HERCULES	H, J
C17	C17	C-17 GLOBEMASTER 3	ALL SERIES
C441	C441	CONQUEST II	ALL SERIES
C5	C5	C5	ALL SERIES
C500	C500	500 CITATION 500 CITATION I 501 CITATION I SINGLE PILOT	ALL SERIES
C510	C510	MUSTANG	ALL SERIES
C525	C525	525 CITATIONJET 525 CITATIONJET I 525 CITATIONJET PLUS	ALL SERIES
C25A	C25A	525A CITATIONJET II	ALL SERIES
C25B	C25B	CITATIONJET III 525B CITATIONJET III	ALL SERIES
C25C	C25C	525C CITATIONJET IV	ALL SERIES
C550-552	C550	552 CITATION II (USN)	ALL SERIES
C550-B	C550	550 CITATION BRAVO	ALL SERIES
C550-II	C550	550 CITATION II 551 CITATION II SINGLE PILOT	ALL SERIES
C550-SII	C550	S550 CITATION SUPER II	ALL SERIES
C560	C560	560 CITATION V 560 CITATION V ULTRA 560 CITATION V ENCORE	ALL SERIES
C56X	C56X	560 CITATION EXCEL	ALL SERIES
C650	C650	650 CITATION III 650 CITATION VI 650 CITATION VII	ALL SERIES
C680	C680	680 CITATION SOVEREIGN	
C750	C750	750 CITATION X	ALL SERIES
CARJ	CRJ1 CRJ2 CRJ2 CRJ2	REGIONALJET REGIONALJET CHALLENGER 800 CHALLENGER 850	100, 100ER, 200, 200ER, 200LR ALL SERIES ALL SERIES
CRJ7	CRJ7	REGIONALJET	700, 700ER, 700LR
CRJ9	CRJ9	REGIONALJET	900, 900ER, 900LR
CRJ10	CRJ10	REGIONALJET	1000ER

Monitoring Group	A/C ICAO	A/C Type	A/C Series
CL600	CL60	CL-600 CL-601	CL-600-ALL SERIES CL-601- ALL SERIES,
CL604	CL60	CL-604	CL-604- ALL SERIES
CL605	CL60	CL-605	CL-605- ALL SERIES
DC10	DC10	DC-10	10, 10F, 15, 30, 30F, 40, 40F
D328	D328	328 TURBOPROP	100
DC85	DC85	DC-8	50, 50F
DC86-87	DC86 DC87	DC-8 DC-8	61, 62, 63 71, 72, 73
DC91	DC91	DC-9	10, 15
DC93	DC93	DC-9	30, 30F
DC94	DC94	DC-9	40
DC95	DC95	DC-9	51
E135-145	E135 E145	EMB-135 EMB-145	ALL SERIES
E170-190	E170 E170 E190 E190	EMB-170 EMB-175 EMB-190 EMB-195	ALL SERIES
E50P	E50P	PHENOM 100	ALL SERIES
E55P	E55P	PHENOM 300	E55P
EA50	EA50	ECLIPSE	ALL SERIES
F100	F100	FOKKER 100	ALL SERIES
F2TH	F2TH	FALCON 2000 FALCON 2000-EX FALSON 2000LX	ALL SERIES
F70	F70	FOKKER 70	ALL SERIES
F900	F900	FALCON 900 FALCON 900DX FALCON 900EX	ALL SERIES
FA10	FA10	FALCON 10	ALL SERIES
FA20	FA20	FALCON 20 FALCON 200	ALL SERIES
FA50	FA50	FALCON 50 FALCON 50EX	ALL SERIES
FA7X	FA7X	FALCON 7X	ALL SERIES
G150	G150	G150	ALL SERIES
G250	G250	G250	
GALX	GALX	1126 GALAXY G200	ALL SERIES
GLEX	GLEX	BD-700 GLOBAL EXPRESS	ALL SERIES
GLF2	GLF2	GULFSTREAM II (G-1159)	ALL SERIES
GLF2B	GLF2	GULFSTREAM IIB (G-	ALL SERIES

Monitoring Group	A/C ICAO	A/C Type	A/C Series
		1159B)	
GLF3	GLF3	GULFSTREAM III (G-1159A)	ALL SERIES
GLF4	GLF4	GULFSTREAM IV (G-1159C) G300 G350 G400 G450	ALL SERIES
GLF5	GLF5	GULFSTREAM V (G-1159D) G500 G550	ALL SERIES
GLF6	GLF6	G650	
H25B-700	H25B	BAE 125 / HS125	700A, 700B
H25B-750	H25B	HAWKER 750	ALL SERIES
H25B-800	H25B	BAE 125 / HS125 HAWKER 800XP HAWKER 800XPI HAWKER 800 HAWKER 850XP HAWKER 900XP HAWKER 950XP	800A, 800B ALL SERIES
H25C	H25C	HAWKER 1000	ALL SERIES
HA4T	HA4T	HAWKER 4000	ALL SERIES
IL62	IL62	ILYUSHIN-62	ALL SERIES
IL76	IL76	ILYUSHU-76	ALL SERIES
IL86	IL86	ILYUSHIN-86	ALL SERIES
IL96	IL96	ILYUSHIN-96	ALL SERIES
J328	J328	328JET	ALL SERIES
KC135	B703	KC-135	ALL SERIES
L101	L101	L-1011 TRISTAR	ALL SERIES
L29B-2	L29B	L-1329 JETSTAR 2	ALL SERIES
L29B-731	L29B	L-1329 JETSTAR 731	ALL SERIES
LJ23	LJ23	LEARJET 23	
LJ24	LJ24	LEARJET 24	
LJ25	LJ25	LEARJET 25	
LJ28	LJ28	LEARJET 28 LEARJET 29	
LJ31	LJ31	LEARJET 31	ALL SERIES
LJ35-36	LJ35	LEARJET 35 LEARJET 36	ALL SERIES ALL SERIES
LJ40	LJ40	LEARJET 40	ALL SERIES
LJ45	LJ45	LEARJET 45	ALL SERIES

Monitoring Group	A/C ICAO	A/C Type	A/C Series
LJ55	LJ55	LEARJET 55	ALL SERIES
LJ60	LJ60	LEARJET 60	ALL SERIES
MD10	MD10	MD-10	ALL SERIES
MD11	MD11	MD-11	COMBI, ER, FREIGHTER, PASSENGER
MD80	MD81 MD82 MD83 MD87 MD88	MD-80 MD-80 MD-80 MD-80 MD-80	81 82 83 87 88
MD90	MD90	MD-90	30, 30ER
MU30	MU30	MU-300 DIAMOND	1A
P180	P180	P-180 AVANTI	ALL SERIES
PAY4	PAY4	PA-42	1000 CHEYENNE
PC12	PC12	PC-12	ALL SERIES
PRM1	PRM1	PREMIER 1	ALL SERIES
SB20	SB20	SAAB 2000	ALL SERIES
SBR1	SBR1	SABRELINER 40 SABRELINER 60 SABRELINER 65	ALL SERIES
SBR2	SBR2	SABRELINER 80	ALL SERIES
T134	T134	TU-134	A, B
T154	T154	TU-154	A, B, M, S
T204	T204	TU-204 TU-224 TU-234	100, 100C, 120RR 200, 214, C
T334	T334	TU-334	ALL SERIES
TBM	TBM7 TBM8	TBM-700 TBM-850	ALL SERIES
WW24	WW24	1124 WESTWIND	ALL SERIES
YK42	YK42	YAK-42	ALL SERIES

APPENDIX C

MID REGION HEIGHT-KEEPING MONITORING STRATEGY

Considering:

- a) The status of implementation of RVSM in the MID Region;
- b) the ICAO requirements for height-keeping monitoring contained in Annex 6, Annex 11, Doc 9574 (RVSM Manual) and Doc 9937;
- c) the duties and responsibilities of the MIDRMA; and
- d) the sustained need for height-keeping monitoring of aircraft operating within the MID RVSM airspace;

Recognizing:

- i) that an important number of Middle East region aircraft do not have known monitoring results; and
- ii) the necessity to develop a MID Region Height monitoring infrastructure;

Agreed:

That the MID Region height-keeping monitoring Strategy is as described below:

1) Short Term (2011-2014):

- States to follow up with concerned aircraft operators to carry out necessary height keeping monitoring for the aircraft identified by the MIDRMA; and
- States encountering difficulties to get the necessary height monitoring results to coordinate with the MIDRMA for the conduct of GPS Monitoring Unit (GMU) monitoring for the identified operators' aircraft.

2) Medium and Long Term (2014 – 2020) :

- MIDRMA continue to conduct GMU monitoring for identified operators' aircraft, as required.
- the use of the Bahraini and Omani Multi-lateration-based Height Monitoring Units (HMUs), or any other HMU that becomes available in the MID Region, as a means of conducting height-keeping monitoring; and
- the use of a MID Region HMU infrastructure as the main mean of height-keeping monitoring in the Region.