



International Civil Aviation Organization

MIDANPIRG ATM/SAR/AIS Sub-Group

Twelfth Meeting (ATM/SAR/AIS SG/12)
(Cairo, Egypt, 21 – 24 November 2011)

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.

Action by the meeting is at paragraph 3.

REFERENCES

- MIDANPIRG/12 Report
- MIDRMA Board/11 Report

1. INTRODUCTION

1.1 The MIDRMA Board/11 meeting was held in Cairo, from 27 to 29 September 2011. The meeting was attended by a total of twenty five (25) participants from nine (9) States (Bahrain, Egypt, Iran, Jordan, Kuwait, Lebanon, Oman, Saudi Arabia, and UAE) and one (1) Agency (MIDRMA).

2. DISCUSSION

MID RVSM SMR 2012

2.1 The MIDRMA Board/11 meeting recalled that MIDANPIRG/12, through Conclusion 12/18, agreed that the MID RVSM SMR 2012 be ready before 30 September 2011 for review by the ATM/SAR/AIS SG/12 meeting.

2.2 It was highlighted that, although, this is the fourth SMR developed by the MIDRMA, 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 Table below reflects the traffic data collected from the MIDRMA member States for the period 1 – 31 January 2011:

SN	MID States FIR's	June 2009 SMR 2010	Jan 2011 SMR 2012	Increased or Decreased (%)
1	Bahrain	24285	30099	19.32
2	Muscat	22520	28224	20.21
3	Jeddah	22422	25499	12.07
4	Cairo	19228	14270	- 34.74
5	Emirates	15868	21076	24.71
6	Tehran	10479	10638	1.49
7	Damascus	9774	11719	16.60
8	Amman	8554	10689	19.97
9	Kuwait	3570	10364	65.55
10	Sana'a	3490	4305	18.93
11	Beirut	2949	3845	23.30
	Total =	143,139	170,728	+ 19.27%

Table A1: MID States RVSM Traffic Data used for SMRs 2010 & 2012

2.4 The meeting re-iterated the concern related to the reporting of Altitude Deviation Reports (ADRs), which is considered one of the most important elements for the development of the Safety Monitoring Reports. In this regard, it was recognized that it's unrealistic that a number of FIRs experiencing high volume of traffic continue to report NIL ADRs since 2007.

2.5 In connection with the above, the meeting recalled that MIDANPIRG/12 noted with concern that the reporting of Altitude Deviation Reports (ADRs) is far below expectations.

2.6 The status of reporting of ADRs and CFRs to the MIDRMA is summarized in the following Table:

States	Timeliness	Regularity	ADRs	CFRs	Concerned Adjacent Centres
Bahrain	Yes	Yes	Yes	Yes	RIY, JED, MCT, KUW, Tehran
Egypt	Yes	Yes	Yes	Yes	JED, Khartoum, TRIPOLI
Iran	Yes	Yes	Always NIL	Yes	KUW, UAE, BAH, MCT
Iraq	No	No	-	Stopped in 2011	KUW, Ankara
Jordan	Yes	Yes	Always NIL	Yes	Baghdad, Damascus, JED
Saudi Arabia	Yes	Yes	Always NIL	Yes	BAH, Khartoum, Amman, Cairo, KUW
Kuwait	No	No	-	Yes	Iraq
Lebanon	Yes	No	Always NIL	Always NIL	-
Oman	No	No	Always NIL	Stopped in 2011	Tehran, Mumbai, UAE, BAH, Karachi
Syria	Yes	Yes	Always NIL	Always NIL	-
UAE	Yes	Yes	Yes	Yes	BAH, MCT, Tehran
Yemen	No	No	Always NIL	Always NIL	-

2.7 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 agreed that the lack of awareness about the requirements for RVSM safety assessment activity is a major contributing factor. Accordingly, the meeting agreed that the ICAO MID Regional Office and the MIDRMA should consider organizing RVSM Safety Assessment training events for the benefit of the MID States' ATC and air operators personnel.

2.8 In the same vein, and in order to standardize and simplify the reporting of Altitude/Height Deviations and Coordination Failures, the meeting agreed to replace the monthly submission of ADRs and CFRs to the MIDRMA; by the monthly submission of LHDs using the Form at **Appendix A** to this working paper, in accordance with the ICAO Doc 9937 - *Operating Procedures and Practices for Regional Monitoring Agencies in Relation to the Use of a 300 m (1 000 ft.) Vertical Separation Minimum Between FL 290 and FL 410 Inclusive*.

2.9 It was highlighted that the new LHD reporting form shall be used by all reporting units/operators for all large height deviations of 300 ft or more in magnitude. The main causes of large height deviation occurrences are as follows:

- a) an error in the altimetry or automatic altitude control system of an aircraft;
- b) turbulence and other weather-related phenomena;
- c) the crew not following established contingency procedures during an emergency descent by an aircraft;
- d) the response to airborne collision avoidance system (ACAS) resolution advisories;
- e) not following an ATC clearance, resulting in flight at an incorrect flight level;
- f) an error in issuing an ATC clearance, resulting in flight at an incorrect flight level; and
- g) coordination errors between adjacent ATC units in the transfer of control responsibility for an aircraft, resulting in flight at an incorrect flight level.

2.10 The meeting noted the examples of incidents/reports for each LHD taxonomy category provided at **Appendix B** to this working paper, and appreciated the offer made by the MIDRMA to develop a video-clip and post it on the MIDRMA website, as a support tool to be used for the reporting of altitude deviations and coordination failures using the new LHD Form.

2.11 The meeting recalled that as a mitigation measure to improve the reporting of required data to the MIDRMA, MIDANPIRG/11, through Conclusion 11/21, agreed to the inclusion of States that are not providing the required data to the MIDRMA, on a regular basis and in a timely manner, in the MIDANPIRG list of air navigation deficiencies. Accordingly, based on the status of provision of data by States provided by the MIDRMA, the meeting agreed that Iraq, Kuwait, Oman, Lebanon and Yemen are candidates for inclusion in the list of deficiencies, if the situation will not be improved before the ATM/SAR/AIS SG/12 meeting, which will take the final decision related to the States that should be included in the list of deficiencies.

2.12 The meeting reviewed the draft MID RVSM SMR 2012 developed by the MIDRMA. It was highlighted that the SMR 2012 presents evidence that, according to the data and methods used, the key safety objectives as set out by MIDANPIRG, through Conclusion 12/16, continue to be met. In this respect, it was noted with appreciation that the three safety objectives were met, as follows:

Safety Objective 1: The risk of collision in MID RVSM airspace due solely to technical height-keeping performance meets the ICAO target level of safety (TLS) of 2.5×10^{-9} fatal accidents per flight hour. The computed value for the technical height risk in the SMR 2012 is 5.08×10^{-14} . This meets RVSM Safety Objective 1.

2.13 The meeting recalled that the evidence concerning the risk of collision due to technical height-keeping performance is considered reliable if it can be shown, inter-alia, that the Pz(1000) – the probability of vertical overlap due to technical height-keeping performance, between aircraft flying 1000 ft separation in the MID RVSM airspace, is less than 1.7×10^{-8} . For the MID RVSM SMR 2012, the computed value of the Pz(1000) is 7.83×10^{-10} , which meets the ICAO requirement.

2.14 The meeting noted that radar data from three radars: Amman, Bahrain and Kuwait, was used for the determination of the Horizontal Frequency Overlap (HOF) using the RADAC System. It was highlighted that the actual measurements were captured for the period 1 to 31 January 2011 for Bahrain and Kuwait radars, and from 15 to 31 May 2011 for Amman radar. The computed value for the Horizontal Frequency Overlap is estimated to be 6.49×10^{-5} per flight hour.

2.15 Based, on the above, the meeting recalled that, in accordance with the recommendations of the SMR 2010, and considering the MID Region ATS route network and traffic data, it was agreed that the horizontal frequency overlap should be determined in Muscat in Oman, HIL in Saudi Arabia, and TAZ in Yemen. Accordingly, the meeting urged these States to take action, in coordination with the MIDRMA, for measuring the horizontal frequency overlap in their FIRs and to provide all necessary technical information for including their radar format in the RADAC system.

Safety Objective 2: The overall risk of collision due to all causes which includes the technical risk and all risk due to operational errors and in-flight contingencies in the MID RVSM airspace meets the ICAO overall TLS of 5×10^{-9} fatal accidents per flight hour. The computed value for the overall risk in the SMR 2012 is 1.04×10^{-11} . This meets RVSM Safety Objective 2.

2.16 The effect of future traffic growth has also been assessed. The overall risk of collision will continue to meet the TLS of 2.5×10^{-9} fatal accidents per flight hour at least until 2015.

2.17 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 was informed that this Model is over conservative and sometimes over estimates the collision risk. The meeting recalled that the MID RVSM Safety Assessment Seminar held in Bahrain from 22 to 24 February 2010, addressed the subject. Accordingly, the meeting agreed that the MIDRMA initiate action for the development/purchase of suitable Vertical Collision Risk (VCR) software, for the MID Region, which should be presented to and validated by the Second MID RVSM Safety Assessment Seminar, to be organized by the MIDRMA in coordination with ICAO in the last quarter of 2012. In this respect, the meeting noted that the VCR software will cost about US\$ 50,000.

2.18 Considering that the MID RVSM airspace is a typical radar controlled airspace where aircraft are frequently vectored away from their routes by ATC on a tactical basis, resulting in a big number of different crossing tracks with different crossing angles and different relative speeds between the aircraft; the VCR software would be based on derivation of the collision risk model applicable to Radar controlled airspace as detailed in “*A method for the assessment of the vertical collision risk with RVSM in the London FIR, MDG/11-DP/1, November 1998*”. Such software must be capable of addressing limited data availability by simulating individual aircraft 4D trajectory from given information and be able to compute the key parameters needed for collision risk estimations as in a radar controlled airspace. It should generate individual aircraft 4D radar points by simulation of air traffic in the MID RVSM airspace based on their FIR entry and exit points. For this purpose, the software should use aerodynamic models to generate aircraft performance parameters and hence their 4D positions from point of activation in the airspace till the point of deactivation.

Safety Objective 3: address any safety-related issues raised in the SMR by recommending improved procedures and practices; and propose safety level improvements to ensure that any identified serious or risk-bearing situations do not increase and, where possible, that they decrease. This should set the basis for a continuous assurance that the operation of RVSM will not adversely affect the risk of en-route mid-air collision over the years.

2.19 The meeting noted that the analysis of operational error reports and coordination failure reports and the recommendations put forward in the SMR 2012 provide sufficient evidence that RVSM Safety Objective 3 is being met.

2.20 Considering all the foregoing, the meeting agreed to the following Draft Conclusions:

*DRAFT CONCLUSION 11/3: REVIEW OF THE DRAFT MID RVSM
SMR 2012*

That:

- a) the MIDRMA Board Members, in coordination with the appropriate experts within their States (including the RVSM Managers), further review the Draft MID RVSM SMR 2012 and provide their comments and suggestions to the MIDRMA before 31 October 2011; and*
- b) the MIDRMA consolidate the final version of the MID RVSM SMR 2012 based on the outcome of the Scrutiny Group meeting and the comments and suggestions received, in order to be presented to the ATM/SAR/AIS SG/12 meeting for final review.*

*DRAFT CONCLUSION 11/4: REPORTING OF LARGE HEIGHT DEVIATIONS
(LHD)*

That, in order to simplify and standardize the reporting of Altitude/Height Deviations and Coordination Failures, in accordance with the ICAO Doc 9937:

- a) as of 1 December 2011, the Form at Appendix 4A to the Report on Agenda Item 4 be used for the reporting of Altitude/Height Deviations and Coordination Failures; and*
- b) the monthly submission of LHD replaces the monthly submission of ADRs and CFRs.*

DRAFT CONCLUSION 11/5: PROVISION OF REQUIRED DATA TO THE MIDRMA

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

- a) States provide the required data to the MIDRMA on a regular basis and in a timely manner. The data includes, 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); and*
 - iv) radar data as, when and where required (as requested by the MIDRMA Board).**

- 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.*

Note: *the above Draft Conclusion is proposed to replace and supersede MIDANPIRG/11 Conclusion 11/21.*

DRAFT CONCLUSION 11/6: SECOND MID RVSM SAFETY ASSESSMENT SEMINAR

That, with a view to raise the awareness related to the requirements for sustained RVSM safety assessment activity and improve the knowledge of all involved parties, in particular with respect to the Vertical Collision Risk Methodology and Altimetry System Errors, the MIDRMA, in coordination with ICAO, organize a Second MID RVSM Safety Assessment Seminar, in the last quarter of 2012.

DRAFT CONCLUSION 11/7: 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 and Air Operators personnel:

- a) *the MIDRMA 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; and*
- b) *for improved effectiveness, the MIDRMA visit to a State be conducted, to the extent possible, back-to-back with the GMU height monitoring mission related to the air operator(s) based in this State.*

DRAFT CONCLUSION 11/8: VERTICAL COLLISION RISK SOFTWARE

That,

- a) *the MIDRMA initiate action for the development/purchase of a suitable VCR software for the MID Region; and*
- b) *the VCR Software be presented to and validated by the Second MID RVSM Safety Assessment Seminar, to be held in the last quarter of 2012.*

Height Keeping Monitoring Requirements

2.21 The meeting recalled Annex 6 provisions related to long term monitoring requirements for height keeping performance, applicable since 18 November 2010.

2.22 Based on the latest RVSM approval lists received from MID States, the following Table has been consolidated by the MIDRMA to show the minimum monitoring requirements for each of the MID States, as of 31 August 2011:

**MID. STATES - RVSM ACFT MINIMUM MONITORING REQUIREMENTES
AS OF AUGUST 2011**

Seq. #	MID STATES	RVSM ACFTs	HAVE HMU OR GMU	NOT Covered	NOT Covered in %	ACFT MMR	Required MON in %	REMARKS
1	BAHRAIN	58	31	27	47%	9	16%	
2	EGYPT	128	89	39	30%	9	7%	
3	IRAN	123	42	81	66%	24	20%	11 added
4	IRAQ	14	0	14	100%	7	16%	
5	Jordan	60	31	29	48%	14	7%	
6	KUWAIT	36	22	14	39%	3	20%	
7	LEBANON	33	29	4	12%	3	9%	
8	OMAN	30	13	17	57%	3	16%	Revised
9	QATAR	107	10	97	91%	4	8%	
10	Saudi Arabia	260	109	151	58%	42	9%	
11	SYRIAN	9	8	1	11%	1	20%	
12	UAE	328	257	71	22%	14	4%	
13	YEMEN	12	5	7	58%	4	11%	
	TOTAL	1198	646	552	46%	137	11%	

2.23 The meeting noted with concern that 46% of the RVSM approved aircraft in the MID Region do not have known height monitoring results. It was recognized that big effort should be made to reach the world average of 90%. In this respect, 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. The meeting agreed also to propose to the ATM/SAR/AIS Sub-Group to include in the Regional Performance Framework Form (PFF) related to RVSM operations in the MID Region, a KPI on the percentage of the RVSM approved aircraft in the MID Region with known height-keeping monitoring results.

2.24 Based on the above, the meeting agreed to the following Draft Conclusion, which is proposed to replace and supersede the MIDANPIRG/12 Conclusion 12/15:

DRAFT CONCLUSION 11/9: RVSM APPROVALS

That,

- a) *States be urged to take necessary measures to:*
 - i) *ensure that, before 30 June 2012, 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; after 30 June 2012;*
 - 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.*

2.25 The meeting agreed that a follow-up State Letter is to be issued by the ICAO MID Regional Office on the above subject, as soon as possible.

2.26 In connection with the above, the meeting noted that the issue of aircraft not reporting their own RVSM approval status based on the real flight plan information is a recognized problem by all Regional Monitoring Agencies in the world. In this respect, the meeting was informed that the Sixth meeting of the Regional Monitoring Agencies Coordination Group (RMACG/6) held in Cronwall, Canada, 6-10 June 2011 agreed to coordinate a global check of flight plans for verification of RVSM approvals, for the month of December 2011. Accordingly, the meeting invited all MIDRMA member States to provide the flight plans requesting entry to the RVSM airspace received for their respective FIRs for the month of December 2011. These flight plans are required to be submitted to the MIDRMA in electronic format (excel sheet or notepad format) for the agreed period 01/12/2011 until 31/12/2011.

2.27 States were invited also to send their latest RVSM approval lists on 1 December 2011 and on 31 December 2011 to the MIDRMA, which will send a reminder to all member States for updating their list before these dates.

2.28 The meeting agreed that the results and findings concerning the MID Region and the results received from other RMAs should be presented to MIDANPIRG and concerned subsidiary bodies. It was agreed also that necessary measures should be taken against all “non-compliant” airline operators.

2.29 The meeting was apprised of the MIDRMA GMU activities. In this respect, it was noted with appreciation that from January 2010 to May 2011, the MIDRMA conducted GMU height monitoring for 48 Aircraft and it's expected to conduct the GMU height monitoring for more than 130 aircraft in the near future.

2.30 In connection with the above, the meeting noted that based on the MIDRMA Board/10 Draft Conclusion 10/6, the MIDRMA ordered 2 GMU Units from the CSSI Company. However, the CSSI put a number of conditions that are not acceptable to the MIDRMA and its member States. Alternatively, after intensive coordination, CSSI agreed to lend the MIDRMA one GMU unit only to conduct GMU monitoring for the region, provided that CSSI processes the recorded data in their labs under the supervision of the FAA.

2.31 The meeting noted that the MIDRMA Team was provided the necessary training and was certified to conduct GMU height monitoring.

2.32 The meeting agreed, that as an alternate solution, the MIDRMA should sign the Service Agreement with CSSI for the use of 2 GMUs for height-keeping monitoring in the MID Region (with the condition that the processing of recorded data is done by CSSI). In addition, the meeting agreed that it became necessary to plan for the implementation of HMUs in the Region in order to be used for height-keeping monitoring. In this respect, the meeting recalled that MIDANPIRG/12, through Conclusion 12/17, endorsed the MID Region height-keeping monitoring Strategy. The meeting further reviewed and updated the Strategy as at **Appendix C** to this working paper. Accordingly, the meeting agreed to the following Draft Conclusion:

DRAFT CONCLUSION 11/10: MID REGION HEIGHT-KEEPING MONITORING STRATEGY

That, the MID Region height-keeping monitoring strategy is updated as at Appendix 4C to the Report on Agenda Item 4.

Action Plan for the development of the MID RVSM SMR 2013

2.33 Considering that a new VCR Model/Software will be used for the development of the SMR 2013, the meeting noted with appreciation that the Traffic Data Sample (TDS) which will be used will not require the provision of the aircraft registrations. Nevertheless, it was underlined that the TDS should be prepared using a special excel sheet Format and that any data received in a different format, or in an excel sheet different from the one available on the MIDRMA website, www.midrma.com, would not be acceptable.

2.34 Taking into consideration that MIDANPIRG/14 is tentatively scheduled for the fourth quarter of 2013, the meeting agreed that for the development of the SMR 2013, the TDS will be collected for the month of October 2012, which coincides with the Hajj season.

2.35 Therefore, the meeting agreed to the following Action Plan for the development of the MID RVSM SMR 2013:

No.	Start	Activity	End
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
2	01/10/2012	Collect Bahrain and Kuwait SSR radar data for October 2012	31/10/2012
3	01/11/2012	Collect Amman SSR radar data for November 2012	15/11/2012
4	16/11/2012	Collect Muscat SSR radar data for November 2012	30/11/2012
5	01/12/2012	Collect Jeddah* SSR radar data for November 2012	15/12/2012
6	01/11/2012	Collect states TDS	31/01/2013
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
8	01/12/2012	Review and analyze all Large Height Deviation Reports.	Scrutiny Group meeting date
9	01/01/2013	Prepare New MID MMR for all MID Airline Operators.	31/01/2013
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-2013/2014	30/04/2013

**Subject to Saudi Arabia approval and necessary coordination with the MIDRMA*

2.36 Based on the above, the meeting agreed to the following Draft Conclusion:

DRAFT CONCLUSION 11/11: MID RVSM SMR 2013

That,

- a) the FPL/traffic data for the period 1-31 October 2012 be used for the development of the MID RVSM Safety Monitoring Report (SMR 2013);*

- b) only the appropriate Flight Data form available on the MIDRMA website (www.midrma.com) should be used for the provision of FPL/traffic data to the MIDRMA; and*
- c) the draft version of the MID RVSM SMR 2013 be ready before 30 April 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 MID Region height-keeping monitoring Strategy at **Appendix C** to this paper and the Action Plan for the development of the SMR 2013 at para. 2.35; and
- d) agree that the MIDRMA Board/11 Draft Conclusions be presented to MIDANPIRG/13 for endorsement.

APPENDIX A



The information contained in this form is confidential and will be used for statistical safety analysis purposes only.

**MIDRMA F4
 LARGE HEIGHT DEVIATION FORM (LHD)**

Report to the MIDRMA of an altitude deviation of 300ft or more, including those due to TCAS, Turbulence and Contingency Events			
1. Today's date:	2. Reporting Unit:		
DEVIATION DETAILS			
3. Operator Name:	4. Call Sign: ACFT Registration Number:	5. Aircraft Type:	6. Mode C Displayed: <input type="checkbox"/> Yes. Which FL? _____ <input type="checkbox"/> No.
7. Date of Occurrence:	8. Time UTC:	9. Occurrence Position (lat/long or Fix):	
10. Cleared Route of Flight:			
11. Cleared Flight Level:	12. Estimated Duration at Incorrect Flight Level (seconds):	13. Observed Deviation (+/- ft):	
14. Other Traffic Involved:			
15. Cause of Deviation (<i>brief title</i>): (Examples: ATC Loop Error, Turbulence, Weather, Equipment Failure)			
AFTER DEVIATION IS RESTORED			
16. Observed/Reported Final Flight Level*: *Please indicate the source of information: <input type="checkbox"/> Mode C <input type="checkbox"/> Pilot	Mark the appropriate Box 17. Is the FL above the cleared level: <input type="checkbox"/> 18. Is the FL below the cleared level: <input type="checkbox"/>	19. Did this FL comply with the ICAO Annex 2 Tables of Cruising Levels? <input type="checkbox"/> Yes <input type="checkbox"/> No	
NARRATIVE			
20. Detailed Description of Deviation (Please give your assessment of the actual track flown by the aircraft and the cause of the deviation.)			
21 - CREW COMMENTS (IF ANY)			

When complete please forward the report(s) to:
 MIDRMA
 Tel: +973 17 329054
 Fax: +973 17 329956
 Email – midrma@midrma.com
 P.O.BOX 50468

APPENDIX B

HEIGHT DEVIATION TAXONOMY

Code	LHD Cause
<i>Operational Errors</i>	
A	<p>Flight crew failing to climb/descend the aircraft as cleared</p> <p><i>Example: Aircraft A was at FL300 and assigned FL360. A CLAM alert was seen as the aircraft passed FL364. The Mode C level reached FL365 before descending back to FL360.</i></p>
B	<p>Flight crew climbing/descending without ATC Clearance</p> <p><i>Example: At 0648, Aircraft A reported leaving cruise level FL340. The last level clearance was coincident with STAR issue at 0623, when the flight was instructed to maintain FL340. ATC was applying vertical separation between Aircraft A and two other flights. The timing of the descent was such that Aircraft A had become clear of the first conflicting aircraft and there was sufficient time to apply positive separation with the other.</i></p>
C	<p>Incorrect operation or interpretation of airborne equipment (e.g. incorrect operation of fully functional FMS, incorrect transcription of ATC clearance or re-clearance, flight plan followed rather than ATC clearance, original clearance followed instead of re-clearance etc)</p> <p><i>Example: The aircraft was maintaining a flight level below the assigned altitude. The altimeters had not been reset at transition. The FL assigned was 350. The aircraft was maintaining FL346 for in excess of 4 minutes.</i></p>
D	<p>ATC system loop error; (e.g. ATC issues incorrect clearance or flight crew misunderstands clearance message. Includes situations where ATC delivery of operational information, including as the result of hear back and/or read back errors, is absent, delayed, incorrect or incomplete, and may result in a loss of separation.)</p> <p><i>Example: All communications between ATC and aircraft are by HF third party voice relay. Aircraft 1 was maintaining FL360 and requested FL380. A clearance to FL370 was issued, with an expectation for higher levels at a later point. A clearance was then issued to Aircraft 2 to climb to FL390, this was correctly read back by the HF operator, but was issued to Aircraft 1. The error was detected when Aircraft 1 reported maintaining FL390.</i></p>
E	<p>Coordination errors in the ATC to ATC transfer or control responsibility as a result of human factors issues (e.g. late or non-existent coordination, incorrect time estimate/actual, flight level, ATS route etc not in accordance with agreed parameters)</p> <p><i>Example 1: Sector A coordinated Aircraft 1 to Sector B at FL380. The aircraft was actually at FL400.</i></p>

Code	LHD Cause
<i>Operational Errors</i>	
	<i>Example 2: The Sector A controller received coordination on Aircraft 1 for Waypoint X at FL370 from Sector B. At 0504 Aircraft 1 was at Waypoint X at FL350 requesting FL370.</i>
F	<p>Coordination errors in the ATC to ATC transfer or control responsibility as a result of equipment outage or technical issues</p> <p><i>Example: Controller in FIR A attempts to send AIDC message to coordinate transfer of aircraft at FL320. Messaging unsuccessful and attempts to contact adjacent FIR by telephone fail. Aircraft contacts adjacent FIR without coordination being completed.</i></p>
<i>Aircraft Contingency Events</i>	
G	<p>Deviation due to aircraft contingency event leading to sudden inability to maintain assigned flight level (e.g. pressurization failure, engine failure)</p> <p><i>Example: Aircraft 1 descended from F400 to F300 with a pressurisation issue.</i></p>
H	<p>Deviation due to airborne equipment failure leading to unintentional or undetected change of flight level</p> <p><i>Example: Aircraft 1 cruising at FL380. ATC receives alert indicating aircraft climbing through FL383. Flight crew advises attempting to regain cleared level with autopilot and navigation system failure.</i></p>
<i>Deviation due to Meteorological Condition</i>	
I	<p>Deviation due to turbulence or other weather related cause</p> <p><i>Example: During the cruise at F400, the aircraft encountered severe turbulence, resulting the aircraft descending 1,000 ft without a clearance.</i></p>
<i>Deviation due to TCAS RA</i>	
J	<p>Deviation due to TCAS resolution advisory, flight crew correctly following the resolution advisory</p> <p><i>Example: Aircraft 1 was cruising at FL350. Flight crew received "Traffic Alert" from TCAS and almost immediately after an "RA Climb" instruction. Flight crew responded and climbed Aircraft 1 to approx FL353 to comply with TCAS instruction. TCAS display indicated that opposite direction Aircraft 2 descended to approx FL345 and passed below Aircraft 1.</i></p>
K	<p>Deviation due to TCAS resolution advisory, flight crew incorrectly following the resolution advisory.</p>
<i>Other</i>	
L	<p>An aircraft being provided with RVSM separation is not RVSM approved (e.g. flight plan indicating RVSM approval but aircraft not approved, ATC misinterpretation of flight plan)</p>

Code	LHD Cause
<i>Operational Errors</i>	
	<p><i>Example 1: Original flight plan details submitted by FIR A for outbound leg showed Aircraft 1 as negative RVSM. Subsequent flight plan submitted by FIR B showed Aircraft 1 as RVSM approved. FIR A controller checked with aircraft shortly after entering FIR A and pilot confirmed negative RVSM.</i></p> <p><i>Example 2: Aircraft 2 cruising FL310 was handed off to the Sector X controller who noticed the label of Aircraft 2 indicated RVSM approval. The Sector X controller had controlled the aircraft the day before. It was then a non-RVSM aircraft. The controller queried the status of Aircraft 2 with the pilot who advised the aircraft was negative RVSM.</i></p>
M	<p><i>Other – this includes situations where:</i></p> <ul style="list-style-type: none"> <i>i) There has been a failure to establish or maintain a separation standard between aircraft; or</i> <i>ii) Where flights are operating (including climbing/descending) in airspace where flight crews are unable to establish normal air-ground communications with the responsible ATS unit.</i> <p><i>Example 1: Aircraft 1 cruising at FL350. At time xxxx Aircraft 1 advised “Negative RVSM” due equipment failure. At that time Aircraft 2 on converging reciprocal track FL360 less than 10 minutes prior to time of passing.</i></p>

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, ~~and~~ 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) :

- ~~— the MIDRMA to conduct GMU Monitoring in the MID Region with self sufficiency capability (acquisition of necessary hardware, software, training, etc);~~
- ~~— 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 ~~possible~~ means of conducting height-keeping monitoring; and
- the ~~possibility of use of ing~~ a MID Region HMU infrastructure as the main mean of height-keeping monitoring in the Region, ~~if supported by a feasibility study and business case and when decided by the MIDRMA Board to go ahead with such an important project.~~