International Civil Aviation Organization

MIDANPIRG ATM Sub Group

First Meeting (ATM SG/1)
(Cairo, Egypt, 9 - 12 June 2014)

Agenda Item 6: RVSM Operations and Monitoring Activities in the MID Region

MID RVSM SMR 2014 INITIAL RESULTS

(Presented by MIDRMA)

SUMMARY

This working paper details the initial results of the MID RVSM Safety Monitoring Report 2014 and tries to demonstrate according to the data received that the key safety objectives of the SMR in accordance with ICAO Doc 9574 were met in operational service in all the Middle East RVSM airspace except for Cairo Baghdad and Tripoli FIRs.

Action by the meeting is at paragraph 3.

REFERENCES

- MIDANPIRG/14 Report
- MIDRMA Board/13 Report.
- MID RVSM SMR 2012/2013

1. INTRODUCTION

1.1 The Middle East Regional Monitoring Agency (MIDRMA) presents the MID RVSM Safety Monitoring Report (SMR) 2014 to the Middle East Air Navigation Planning and Implementation Regional Group (MIDANPIRG) for their endorsement.

1.2 The initial results for the SMR 2014 were calculated for 11 FIRs only in the Middle East Region. Egypt, Iraq and Libya did not provide the required FPL/Traffic data in due time, in accordance with the SMR 2014 working schedule, accordingly, Cairo, Baghdad and Tripoli FIRs were excluded from the analysis.

1.3 The results presents evidence that the key safety objectives, as set out by MIDANPIRG, continue to be met in the Middle East RVSM airspace except for Baghdad, Cairo and Tripoli FIRs.

2. DISCUSSION

2.1 Further to the outcome of MIDANPIRG/14 meeting and according to CONCLUSION 14/38 concerning the action plan for the development of the MID RVSM SMR 2014 it was decided that "the flight plan traffic data for the period 15th January – 15th February 2014 be used for the development of the MID RVSM SMR 2014 and the initial results be ready before 15th May 2014 for the review by the ATM SG/1 meeting.

2.2 Although, this is the sixth Safety Monitoring Report developed for the Region, the MIDRMA continued to face problems due to corrupted and late receipt of traffic data by some MIDRMA Member States. These types of problems caused the initial results to be presented for the meeting as incomplete and the MIDRMA was forced to exclude three of the FIRs from the safety analysis.

2.3 Only Bahrain, Jordan, Oman, Sudan, Syria, Saudi Arabia and Yemen sent their traffic data before the deadline, while Kuwait Iran, Lebanon and UAE sent their data so late and well after the agreed deadline set for this purpose, the remaining States (Egypt, Iraq and Libya) failed to send the required data for conducting the safety analysis.

Note 1: Egypt sent corrupted and missing traffic data which was rejected by the MIDRMA.
Note 2: Iraq sent their traffic data so late and the MIDRMA could not analyze it due time constraint.
Note 3: Libya did not send any data at all.

2.4 The descriptions of the total traffic data collected from each States is depicted in table below, a total of **183217** flights were gathered for all aircraft operated in the 11 FIRs, all these flights were evaluated and processed very carefully to ensure accurate results according to the data submitted.

SN	MID FIRs	Jun. 2009	Jan. 2011	Oct. 2012	15 Jan-15 Feb 2014
1	Bahrain FIR	24285	30099	39345	**25472** ↓
2	Muscat FIR	22520	28224	30357	↑ **31735**
3	Jeddah FIR	22422	25499	30944	↑ **44971**
4	Emirates FIR	15868	21076	24676	**24375** ↓
5	Tehran FIR	10479	10638	17523	↑ **24742**
6	Damascus FIR	9774	11719	8027	**4105** ↓
7	Amman FIR	8554	10689	6857	**4550** ↓
8	Kuwait FIR	3570	10364	13596	**12767** ↓
9	Sana'a FIR	3490	4305	5170	↑ **5626**
10	Beirut FIR	2949	3845	1286	**98** ↓
11	Khartoum FIR	0	0	0	**4776**
12	Baghdad FIR	0	0	10496	**0**
13	Cairo FIR	19228	14270	26332	**0**
14	Tripoli FIR	0	0	0	**0**
Total		**143,139**	**170,728**	**214,609**	**183217** ↓

MID States RVSM Traffic Data

2.4 The MIDRMA decided to go ahead with the calculations of the SMR safety parameters without the States mentioned in 2.3 and estimated the risk of collision associated with RVSM and compare this risk to the agreed RVSM safety goal, the Target Level Safety (TLS) taking into consideration that the key issue for the assessment of RVSM safety is the satisfaction of the three Safety Objectives defined for the MIDRMA, the remaining member States which were excluded from the initial results will be included in the first draft of the SMR 2014 which will be presented for review before its endorsed by MIDANPIRG/15 , hoping the data required for the remaining FIRs will be received on time.

2.5 The MID RVSM safety assessment work is accomplished through collection of data related to the operations in the RVSM airspace and, with the help of the MID RVSM Scrutiny Group which convened during the MIDRMA Board/13, Bahrain 9 – 12 March 2014, the meeting reviewed, analyzed and validated the Large Height Deviation (LHD) reports provided to the MIDRMA for the period 1 September 2013 until 8 March 2014. The reported operational errors were carefully evaluated and

assessed by the attended member States (Bahrain, Egypt, Iran, Oman, Sudan, Saudi Arabia and Yemen) to include them in the safety assessment , however the final conclusions of the data processed have been severely limited by the continued NIL reporting of Large Height Deviations (LHDs) by some members.

Note: Some of the LHD reports could not be reviewed due to the absence of concerned Sates.

2.6 The meeting may wish to note that the low level of reporting LHD by some Member States especially those with high volume of traffic still exist in the Middle East Region which reflect negative effect on the computed Targets Level of Safety and does not reveal the actual situation of RVSM implementation.

2.7 As a mitigation measure for improving the reporting of LHD in the region, the MIDRMA simplified the LHD form which contains the minimum data necessary for the safety analysis and developed an online LHD reporting tool, which includes many features that would improve the LHD reporting process. All the accepted reports through this tool will be automatically addressed to the States concerned who shall be requested to provide comments on the reported LHD within 15 days from the time of notification.

2.8 MID States Minimum Monitoring Requirement (MMR)

2.8.1 The MIDRMA addressed the last MMR table issued for the SMR 2012-2013 to the ATM/AIM/SAR SG/13 and to MIDANPIRG/14 meetings and requested from all concerned Civil Aviation Authorities to take all necessary measures to ensure their enforcement of this table on all their RVSM approved aircraft to meet their minimum monitoring requirements according to ICAO Annex 6. The MIDRMA noticed that Yemen and Lebanon failed to comply with this table since the implementation of this requirement and despite several attempts from the MIDRMA to provide any kind of support to the concerned authorities to achieve their monitoring targets these two State Members remain as the only States in the ICAO Middle East Region that never met their minimum monitoring requirements.

No	MID STATES	RVSM ACFT	MMR ACFT
1	Bahrain	51	**2**
2	Egypt	121	**3**
3	Iran	200	**57**
4	Iraq	21	**3**
5	Jordan	56	**3**
6	Kuwait	31	0
7	Lebanon	30	**6**
8	Libya	**No Approvals Received**	-
9	Oman	34	0
10	Qatar	156	0
11	Saudi Arabia	283	**17**
12	Sudan	**Under Process**	**-**
13	Syria	6	**6**
14	UAE	480	**8**
15	Yemen	10	**1**
Total		1479	**106**

MID States Minimum Monitoring Requirements (MMR)

2.9 Safety Monitoring Report 2014 Initial Results

2.9.1 RVSM 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 x 10^{-9} fatal accidents per flight hour.

The 2014 value computed for technical height risk is **$2.56x10^{-15}$**. This meets RVSM Safety Objective 1.

2.9.1.1 According to the technical risk values as shown in the table below from the previous SMRs, the TLS value decreased from the last SMR which is safe comparing to the ICAO TLS **2.5×10^{-9}**.

**Note: The calculated result measured without Baghdad, Cairo and Tripoli FIRS*

Technical Risk Values					
Year 2006	Year 2008	Year 2010	Year 2012	Year 2013	**Year 2014**
$2.17x10^{-14}$	$1.93x10^{-13}$	$3.96x10^{-15}$	5.08×10^{-14}	$6.37x10^{-12}$	**$2.56x10^{-15}$ ***

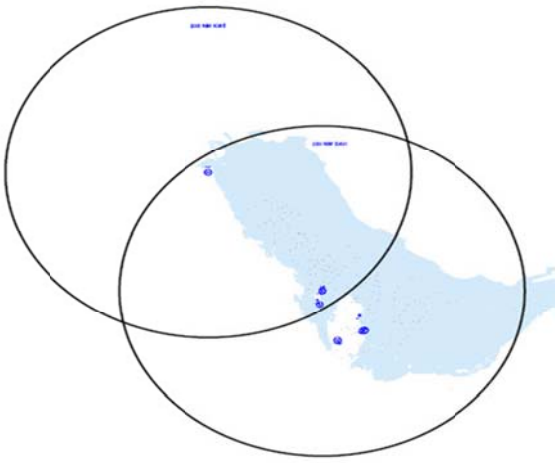
2.9.1.2 Pz(1000) Compliance:

The Pz(1000) is the probability that two aircraft at adjacent RVSM flight levels will lose vertical separation due to technical height keeping errors. The value of the probability of vertical overlap Pz(1000), based on the actual observed Altimetry System Error (ASE) and typical Assigned Altitude Deviation (AAD) data is estimated to be of **4.07×10^{-10}** . This value meets the Global System Performance Specification that the probability of two aircraft will lose procedural vertical separation of 1000ft should be no greater than **$1.7x10^{-8}$**.

2.9.1.3 Middle East RVSM Airspace Horizontal Overlap Frequency (HOF):

2.9.1.4 The MIDRMA did not receive radar data from Oman and Saudi Arabia, instead the HOF was measured for the airspace to the northern part of Bahrain FIR which continued to be busy and complex airspace, however the northern and eastern part of Muscat FIR is also very complex and so is the airspace around HIL in Jeddah FIR which needs to be measured.

2.9.1.5 The MIDRMA processed the data through the RADAC system and included Kuwait radar data in the measurement to cover Kuwait FIR, Eastern part of Jeddah FIR and the Southern part of Baghdad.



Measured HOF Area

a. The calculated horizontal overlap frequency from the two radars was estimated to be **3.69×10^{-6}** per flight hour.

Horizontal Overlap Frequency (HOF)					
Year 2006	Year 2008	Year 2010	Year 2012	Year 2013	**Year 2014**
6.99×10^{-3}	5.1×10^{-11}	2.88×10^{-6}	6.49×10^{-5}	4.34×10^{-8}	**3.69×10^{-6}**

b. It should be noted that the radar data available may not be totally representative of the traffic patterns for the whole MID region, the MIDRMA decided to explore for another methods to measure the HOF without the radar data and to be as accurate as possible to the RADAC system.

Overall though as the airspace monitored in the MID region is considered to be both busy and complex, the results are considered to be **NOT** valid until the MIDRMA measure the HOF in Muscat FIR and around HIL in Jeddah FIR.

2.9.2 **RVSM 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 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 is **3.99×10^{-13}** which meets the ICAO overall TLS of **5×10^{-9}** fatal accidents per flight hour, the table below reflects a comparison with the overall risk values calculated for the previous SMRs.

**Note: The calculated result measured without Baghdad, Cairo and Tripoli FIRS*

Overall Risk Values					
Year 2006	Year 2008	Year 2010	Year 2012	Year 2013	**Year 2014**
Not calculated due to the absence of suitable information on atypical errors	4.19×10^{-13}	6.92×10^{-12}	1.04×10^{-11}	3.63×10^{-11}	**3.99×10^{-13}***

2.9.3 **RVSM 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.

2.9.3.1 Conclusions for RVSM Safety Objective 3:

a. The MIDRMA shall carry out continuous survey and investigation with the Member States and the RMA Global on the number and causes of non-approved aircraft operating in the MID RVSM airspace and shall issue immediate warning of any observed airspace violation.

b. The MIDRMA continue to identify all the MID Region RVSM approved aircraft required to be monitored by issuing the Minimum Monitoring Requirement (MMR) tables twice a year or whenever requested by any Member States to ensure the implementation of height monitoring requirements is conducted according to ICAO Annex 6.

c. The MIDRMA will continue to enhance the MIDRAS (Middle East Risk Analysis Software) and shall include other visualization features to identify airways bottlenecks and hotspots in phase 2 of the software project.

d. Ensure resolving all violations and information collected during the MID RVSM Scrutiny Group meeting in order to identify operational issues and potential mitigations.

e. The MIDRMA will continue to include in its work program briefings on RVSM safety assessment requirements to raise the awareness of ATC, RVSM approval Authorities and Air Operators personnel.

Therefore, it is concluded that this Safety Objective is currently met.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a. to note and discuss the contents of this working paper;

b. Urge Egypt to send the traffic data according to the required format; and

c. Request Libya to send the following:

i. Tripoli FIR intermediate waypoints.
ii. MIDRMA Monthly data.
iii. Tripoli FIR traffic data from 15/01 – 15/02/2014

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