



*International Civil Aviation Organization*

**MIDANPIRG Air Traffic Management Sub-Group**

**Seventh Meeting (ATM SG/7)**  
*(Virtual, 15 – 18 November 2021)*

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**Agenda Item 3: Planning and Implementation issues related to ATM/SAR**

**DEVELOPMENT OF MID RVSM SMR 2021– INITIAL RESULTS**

*(Presented by MIDRMA)*

**SUMMARY**

The aim of this working paper is to provide airspace safety review of the MID RVSM airspace and to highlight the initial results calculated so far for the Safety Monitoring Report 2021.

Action by the meeting is at paragraph 3.

**REFERENCES**

- MIDANPIRG/18 and RASG-MID/8 Meetings Report  
(virtual, 15 - 22 February 2021)
- MID RVSM SMR 2020

**1. INTRODUCTION**

1.1 One of the most important duties performed by the MIDRMA is the development of the RVSM Safety Monitoring Report for the ICAO Middle East Region which demonstrate according to the data received from all MIDRMA Member States (except for Libya) , that the key safety objectives set out for the MIDRMA in accordance with ICAO Doc 9574 (2<sup>nd</sup> edition) are met in operational services. The initial results are constructed using an approach that claims the Middle East RVSM operations will be acceptably safe.

1.2 The MID RVSM Safety Monitoring Report seeks to demonstrate to MIDANPIRG that safety results of the RVSM operations within the ICAO Middle East Region meet the established target level of safety and its objectives, the MIDRMA must undertake data collection as required to investigate height-keeping performance of aircraft in the core of the distribution and monitor the level of risk of collision as a consequence of operational errors and inflight contingencies (Large Height Deviation – LHD) also assess the overall risk (technical combined with operational and in-flight contingencies) in the system against the overall safety objectives and initiate remedial action as required. The purpose of the monitoring activity is to ensure that operations in RVSM airspace do not induce an increase in the risk of collision and that the total vertical risk does not exceed the agreed overall safety objectives.

1.3 The meeting may wish to note the reporting period of the MID RVSM Safety Monitoring Report for 2021 is from 01<sup>st</sup> January until 31<sup>st</sup> December 2021 and the calculated results in this working paper not yet finalized because its reflecting only 10 months from the reporting period (01<sup>st</sup> January until 31<sup>st</sup> October 2021).

## 2. DISCUSSION

2.1 The meeting may wish to note that reference to MIDANPIRG Conclusion 18/7 concerning the development of the MID RVSM SMR 2021, the Traffic Data will be collected for the period 01 – 31 July 2021, and it was reiterated that the required data must be submitted in the right format and in the formulated excel sheet designed for this purpose which is the only sheet recognized by the MID Risk Analysis Software (MIDRAS). Any data received in a different format, or in an excel sheet different from the one available on the MIDRMA website ([www.midrma.com](http://www.midrma.com)) will not be acceptable.

*MIDANPIRG CONCLUSION 18/7: MID RVSM SMR 2021*

*That,*

- a) the FPL/traffic data for the period 1 – 31 July 2021 and LHD Reports for the period 1 January 2021 to 31 December 2021 be used for the development of the MID RVSM Safety Monitoring Report (SMR 2021);*
- b) only the appropriate Traffic Data as per MIDRMA requirements shall be submitted; any corrupted traffic data will be rejected; and*
- c) the final version of the MID RVSM SMR 2021 be ready for presentation to and endorsement by MIDANPIRG/19*

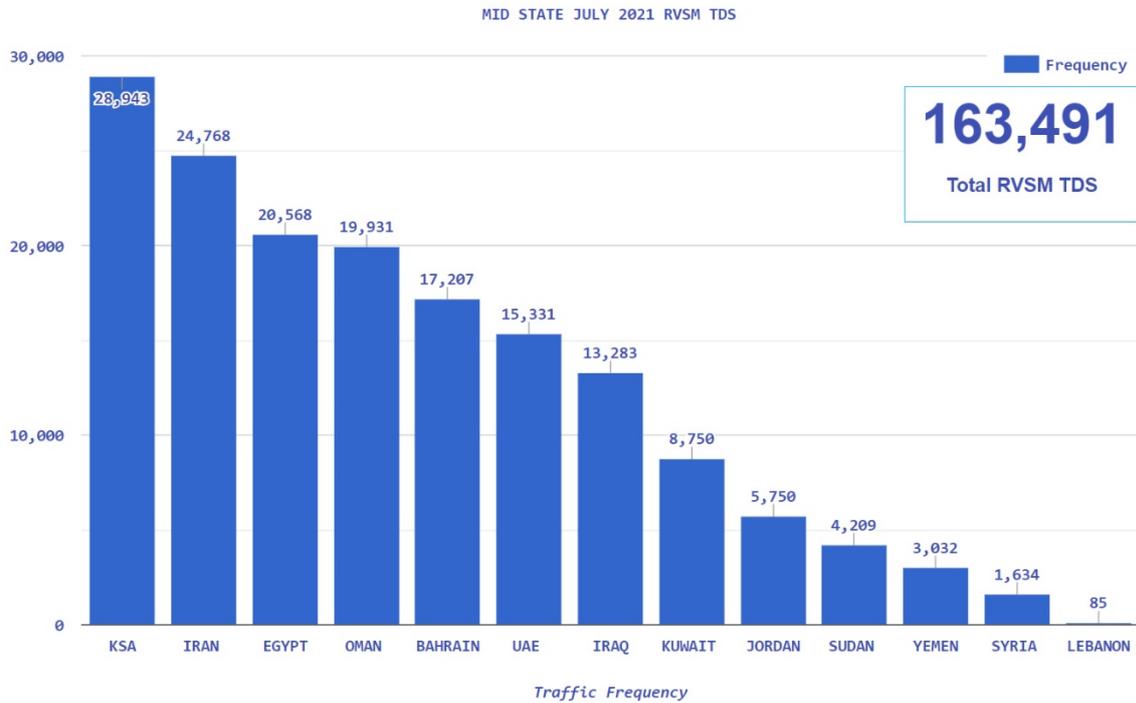
2.2 The MIDRMA circulated a reminder email on 07<sup>th</sup> July 2021 to all focal points concerning MIDANPIRG CONCLUSION 18/7 to submit the required traffic data sample to the MIDRMA not later than 30<sup>th</sup> August 2021,

The descriptions of the traffic data collected from each MIDRMA Member State are depicted in table below:

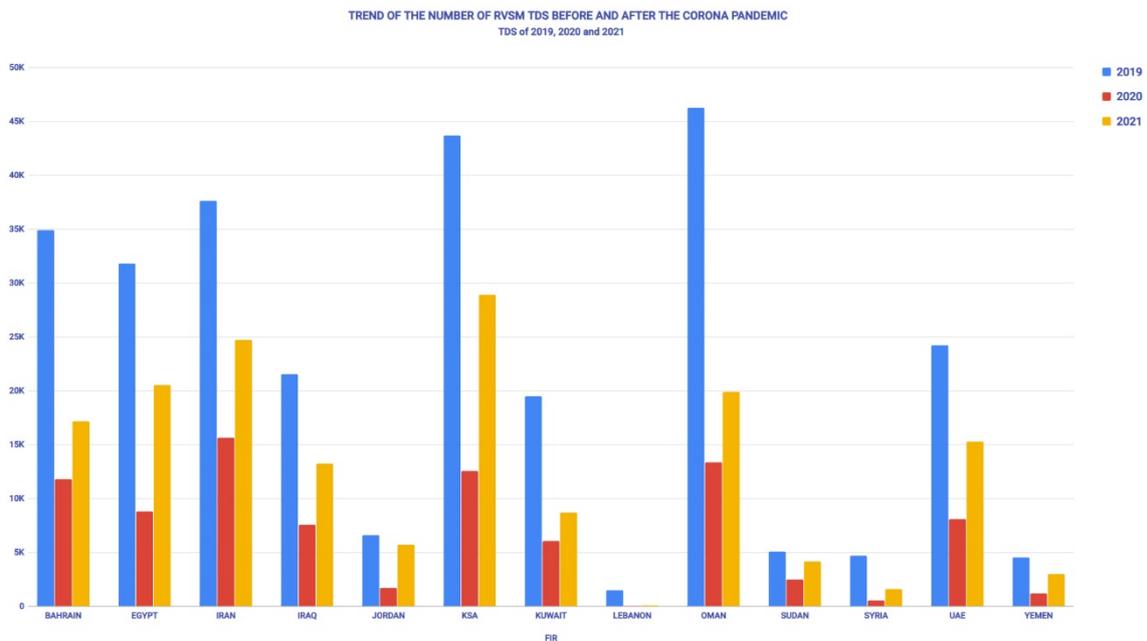
<b>MID States</b>	<b>No. of Flights</b>	<b>Received Dates</b>	<b>Status</b>
Bahrain FIR	17207	12/08/2021	Accepted
Cairo FIR	20568	26/08/2021	Accepted
Amman FIR	5750	28/08/2021	Accepted
Muscat FIR	19931	17/08/2021	Accepted
Tehran FIR	24768	12/09/2021	Accepted
Khartoum FIR	4209	30/08/2021	Accepted
Emirates FIR	15331	22/08/2021	Accepted
Damascus FIR	1634	12/09/2021	Accepted
Sana'a FIR	3032	23/08/2021	Accepted
Baghdad FIR	13283	25/08/2021	Accepted
Kuwait FIR	8750	01/08/2021	Accepted
Jeddah FIR	28943	19/08/2021	Accepted
Beirut FIR	85	04/09/2021	Accepted
Tripoli FIR	-	-	No Data Submitted
<b>Total</b>	<b>163491</b>		

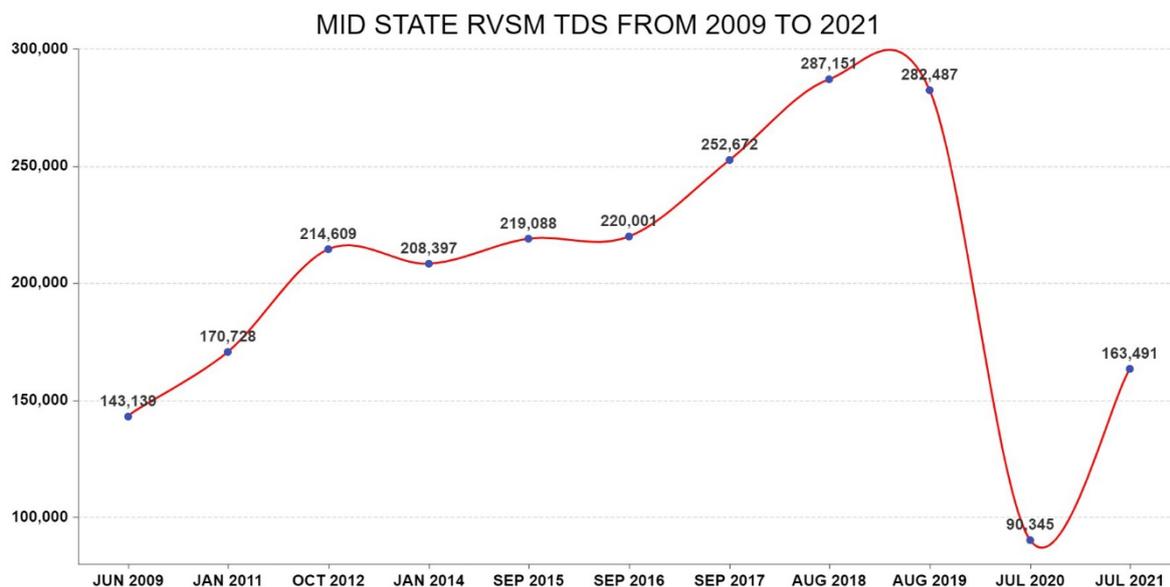
Note: No traffic data received from Libya which is excluded from the RVSM safety analysis for year 2021.

2.3 The total number of movements within the MID RVSM airspace for July 2021 was 163491.



2.4 The graph below reflects a noticeable increase in RVSM traffic movement compared to 2020 and 2021 but the ICAO Middle East region has not yet fully recovered from the effects of the COVID-19 pandemic that swept the whole world.





2.5 Compiling and correcting the traffic data and then analysing it require a lot of efforts and follow up with the focal points to ensure the highest quality results obtained are reliable to study the impact of RVSM implementation within the ICAO Middle East Region. the MIDRMA decided to arrange for an upgrade to the MIDRAS to overcome problems with the errors in the received TDS from the member States; the upgrade will include other necessary features which will facilitate calculating all the RVSM risk parameters and shall save a lot of time and avoid rejecting the TDS due to the errors which usually delays the production of the SMR.

2.6 The MID RVSM safety assessment task is accomplished through the collection of the TDS related to the operations in the RVSM airspace and by validating the Large Height Deviation Reports Categories A, B, C, D, H, and J (also including category E if there was serious impact in RVSM operations). The table below reflects the Large Height Deviation Reports received so far from all MIDRMA member states from 01<sup>st</sup> January until 31<sup>st</sup> Oct 2021.

STATE	Number of LHD Reports Cat. A, B, C, D, H and (E, if serious)
BAHRAIN	NIL
EGYPT	12
IRAN	2
IRAQ	NIL
JORDAN	2
LEBANON	NIL
KSA	NIL
LIBYA	NIL
KUWAIT	NIL
OMAN	1
QATAR	N/A
SUDAN	NIL
SYRIA	NIL
UAE	8
YEMEN	(839 Cat. E)

2.6.1 The safety protocol which was opened at Muscat/Mumbai FIRs boundaries more than two years ago still valid, it requires more attention to close it as soon as possible.

2.6.2 There has been no improvement from the previous SMR with regard to what Yemen continuous filing of LHD reports related to its adjacent FIRs. This issue must be discussed to explore ways and options to reduce the number of LHD reports to avoid the effects of these LHD reports to the overall risk of the MID RVSM airspace.

## 2.7 Development of SMR 2021 (Initial results):

### 2.7.1 Scope:

The geographic scope of the MID RVSM Safety Monitoring Report covers the MID RVSM airspace, which comprises the following FIRs/UIRs:

Amman	Bahrain	Beirut	Baghdad	Cairo	Damascus	Emirates
Jeddah	Kuwait	Khartoum	Muscat	Sana'a	Tehran	Tripoli*

FIRs/UIRs of the Middle East RVSM Airspace

\*Note: Tripoli FIR excluded from the safety analysis due to lack of data.

The Data Sampling periods covered by SMR 2021 are as displayed in the below table

Report Elements	Time Period
Traffic Data Sample	01/07/2021 - 31/07/2021
Operational & Technical Errors	01/01/2021- 31/10/2021*

Time Period for the Reported Elements

\*Refer to para. 1.3

### 2.7.2 Technical Height Keeping Performance Risk Assessment

#### 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  $2.5 \times 10^{-9}$  fatal accidents per flight hour.

#### Direct evidence of compliance with TLS for Technical Height-Keeping Error

The result shows the risk of collision due to technical height-keeping performance is estimated to be  $2.117 \times 10^{-12}$  fatal accidents per flight hour, which is less than the ICAO TLS  $2.5 \times 10^{-9}$ .

#### 2.7.2.1 Supporting evidence of compliance with TLS for technical height-keeping performance

To demonstrate that the result is reliable, it is necessary to demonstrate that the following assumptions are true:

- a. The estimated value of the frequency of horizontal overlap, used in the computations of vertical-collision risk, is valid;
- b.  $P_z(1000)$  – the probability of vertical overlap due to technical height-keeping performance, between aircraft flying 1000 ft. separation in MID RVSM airspace is estimated  $5.405 \times 10^{-10}$  valid and is less than the ICAO requirement of  $1.7 \times 10^{-8}$ .
- c. All aircraft flying with 1000ft vertical separation in MID RVSM airspace meet the ICAO Global Height Keeping Performance specifications for RVSM;
- d. All aircraft flying 1000ft separation in MID RVSM airspace meet the individual ICAO performance specification for the components of Total Vertical Error (TVE).
- e. The monitoring target for the MID RVSM height-monitoring programme is an on-going process.
- f. The input data used by the CRM is valid.
- g. An adequate process is in place to investigate and correct problems in aircraft technical height-keeping performance.

### 2.7.3 Assessment of overall risk due to all causes against the TLS of $5 \times 10^{-9}$ fatal accidents per flight hour

#### **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  $5 \times 10^{-9}$  fatal accidents per flight hour.

The value computed for the overall risk is estimated  $1.333 \times 10^{-10}$  (\*) this meets RVSM Safety Objective 2.

*\* This value is subject to change if MIDRMA member states submitted more LHD reports of the required categories.*

### 2.7.4 ASSESSMENT OF SAFETY-RELATED ISSUES RAISED IN THIS REPORT

#### **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.

- a. The MIDRMA improved its monitoring capabilities by conducting trial ADSB Height Keeping Performance for some RVSM approved aircraft registered by MIDRMA member states.
- b. The MIDRMA finished building its database for the RVSM approved aircraft registered by MIDRMA member states which are capable of ADS-B out to allow ADS-B height keeping performance.
- c. The MIDRMA started to address Performance-Based Communication and Surveillance (PBCS) approvals request from member states issuing PBCS approvals and forward reports received from other regions related none compliant of PBCS requirements.
- d. The MIDRMA will address the Hot Spots of each MID FIR generated by the (MIDRAS) Software (for information only).

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- e. Current risk-bearing situations have been identified by using the MIDRAS and the MID Visualization and Simulation of Air Traffic and action will be taken to ensure resolving all violations to RVSM airspace by non-approved aircraft.
- f. The MIDRMA continued to carry out scrutiny checks for aircraft filling W in their flight plans, for all aircraft flying within the ICAO Middle East RVSM airspace and address all violating aircraft to the concerned authorities.
- g. The MIDRMA arranged for an upgrade project to enhance the MIDRAS which will improve and facilitate the calculation of all RVSM risk parameters.

based on the above, it is concluded that Safety Objective 3 is currently met.

### **3. ACTION BY THE MEETING**

3.1 The meeting is invited to:

- a) review and discuss the SMR initial results;
- b) urge States in the table of para. 2.6 to send their LHD reports of categories A, B, C, D, H, J and K occurred within their RVSM Airspace;
- c) request Oman to update the meeting concerning the installation of the OLDI/AIDC with Mumbai to close the safety protocol mentioned in para 2.6.1; and
- d) discuss the increased number of LHD reports filed by Yemen related to its adjacent FIRs.

- END -