



*International Civil Aviation Organization*

**Middle East Regional Monitoring Agency Board**

**Sixteenth Meeting (MIDRMA Board/16)**  
**(Amman, Jordan, 14 – 16 January 2020)**

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**Agenda Item 4:           RVSM Monitoring and related Technical Issues**

**LARGE HEIGHT DEVIATION (LHD)**

*(Presented by MIDRMA)*

**SUMMARY**

This working paper details the recent MIDRMA activities for collecting the Large Height Deviation (LHD) reports from all MIDRMA Member States through the LHD Online Reporting System.

Action by the meeting is at paragraph 3.

**REFERENCES**

- MID RVSM SMR 2018 –Version 0.2

**1.       INTRODUCTION**

1.1           The ICAO Doc 9574 - Manual on Implementation of a 300 m (1 000 ft) Vertical Separation Minimum Between FL 290 and FL 410 Inclusive requires that ATC Authorities are responsible for reporting Large Height Deviations (LHDs) to the responsible Regional Monitoring Agency (RMA).

1.2           The Large Height Deviation is defined as a vertical deviation from an ATC assigned or coordinated altitude that results in an error of 300 ft or more. The deviation may be the result of human error, equipment malfunction or environmental factors such as turbulence, and should be reported in accordance with the LHD types.

1.3           The level of collision risk resulting from errors in ATC instructions ,emergency and operational procedures in the MID RVSM airspace needs to be assessed in addition to that resulting from technical height-keeping deviations, the primary source of reporting Large Height Deviation are the ATC units providing air traffic control services in the airspace where RVSM is applied, all MIDRMA Member States are required to submit Large Height Deviation Reports which occurred in their FIRs on a monthly basis (preferably as soon as they occur) even if none was reported during the month of reporting.

**2.       DISCUSSION**

2.1           The meeting may wish to note that according to MIDANPIRG Conclusions 11/20, 13/56, 14/35 and 15/5 are all urging MIDRMA member states to submit their LHD reports and other required data on regular basis and in timely manner.

2.2 It was highlighted in all the previous SMRs that the level of reporting LHDs by the extreme majority of MIDRMA member states is far below expectation compared to the traffic volume, which mainly due to the reporting culture of the air traffic controllers and in this respect the MIDRMA urged States to take necessary measures to ensure effective reporting of LHDs and investigate all occurrences and find effective solutions to overcome these repeated LHDs. Accordingly, MIDANPIRG encouraged States to implement AIDC/OLDI, which would improve significantly the coordination process and would reduce the amount of coordination failures, thus enhancing safety.

2.3 The vertical risk estimation due to atypical errors has been demonstrated to be the major contributor in the overall vertical-risk estimation for the MID RVSM airspace, The final conclusions of the data processed in all the previous SMRs have been severely limited by the continued NIL reporting of Large Height Deviations (LHDs) or LHD reports of category **E** only from some member states which is not possible to calculate and estimate the overall vertical collision risk for the MID RVSM airspace, and in order to overcome this problem, the MIDRMA continued to enhance and modify the LHD online reporting system which is the first system ever developed by an RMA, the system developed to assess the increasing trend of the operational risk value and identify the factors and further investigate safety improvements to offset the effects, unfortunately the system is not fully utilized by some member states.

2.4 The estimation of total risk (Safety Objective 2) combines the results from Safety Objective 1 with the estimation of risk due to all other factors. This second component, often termed operational risk, is dependent on a large number of factors including, airspace configuration, traffic densities, ATC procedures, individual controller/pilot actions and specific sector operational characteristics. The operational risk is estimated by the evaluation of the magnitude and duration of events extracted from operational incident reports which transformed to Large Height Deviation reports.

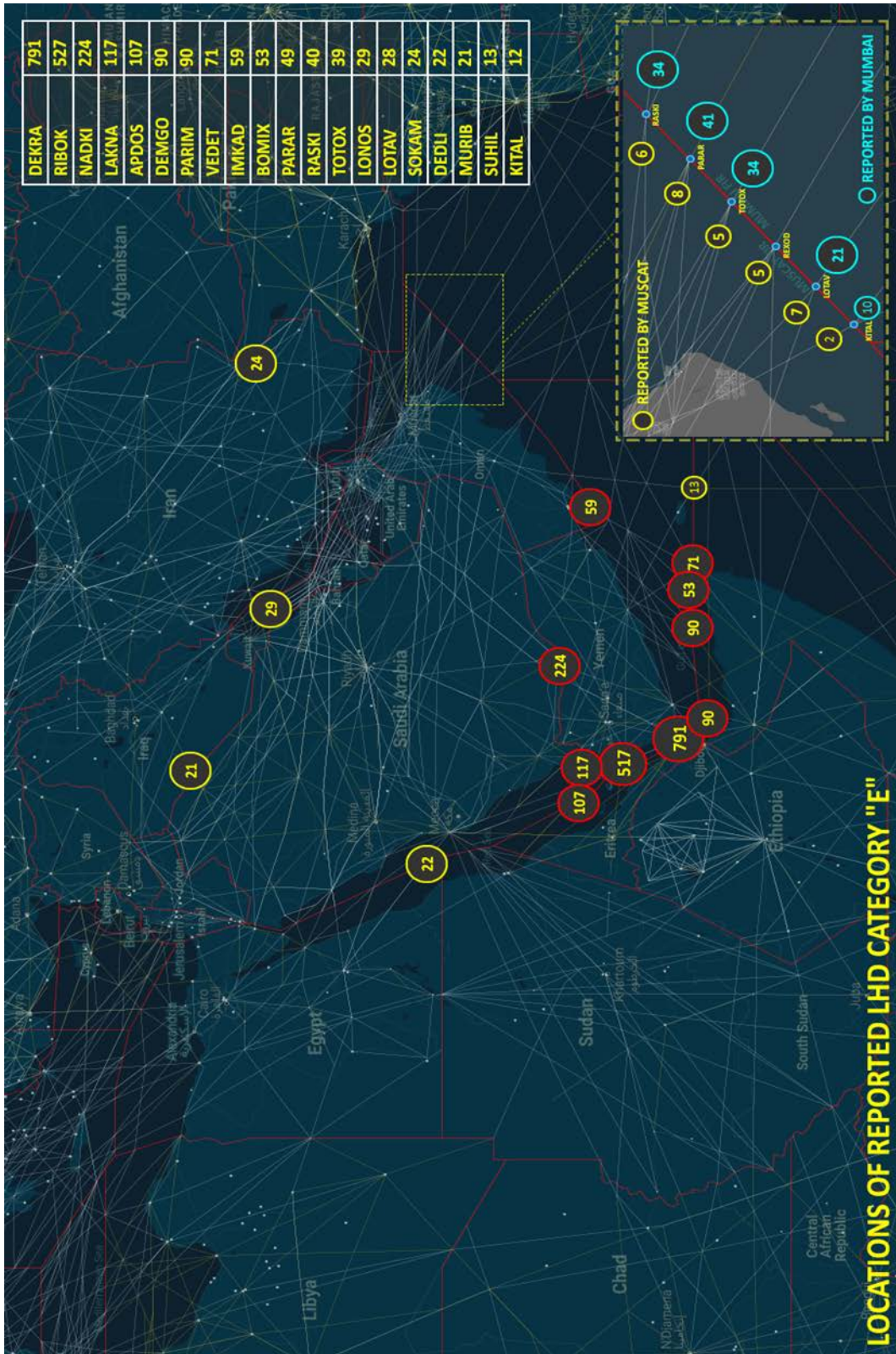
2.5 To estimate the total overall vertical collision risk with an acceptable degree of accuracy it is necessary to ensure that reports are received from all ATC sectors/units and FIRs, for the entire evaluation period. In the majority of cases it is not feasible to extrapolate operational incidents data from one or two FIRs ONLY in the Middle East region while other FIRs with high volume of traffic never reported LHDs other than category E for the past 13 years. The MIDRMA has examined the validity of continuing to produce safety monitoring reports with an estimate of overall vertical collision risk which is not representing the whole ICAO Middle East RVSM airspace is not practical and forced to issue the SMR for 2018 without safety objective No. 2 and decided to raise this issue to the MIDRMA Board and to MIDANPIRG.

2.6 RVSM Safety Protocol at the Eastern Boundaries of Muscat FIR:

2.6.1 The MIDRMA continued to monitor the LHD reports at the eastern boundaries of Muscat FIR filed by Mumbai, the MIDRMA indicated in SMR 2017 the level of LHD reports filed by Muscat, Mumbai and Karachi ATCUs related to each other's at their transfer of control points reached to a dangerous level and started to effect the ICAO TLS of RVSM implementation in the MID and APAC regions, therefore the MIDRMA requested from MIDRMA Board/15 meeting (Muscat – Oman 29 – 31 January 2018) to open a Safety Protocol for the purpose of resolving this issue as soon as possible.

2.6.2 However, the MIDRMA can't see much improvement since the RVSM safety protocol opened two years ago and the level of reporting LHDs between Mumbai and Muscat remain high and the safety concern still exist at the common FIR boundary while the level of reporting LHDs between Karachi and Muscat reduced and its back again to its normal reporting level.

2.7 The picture below reflects the locations of the top 20 reported LHDs category E and the reported LHDs at the Eastern Boundaries of Muscat FIR by Muscat and Mumbai STCUs for 2018.



2.8 Through the evaluation review for the LHD reports valid for SMRs 2017 and 2018, the MIDRMA noticed very few Member States are investigating the reported LHDs related to their FIRs and reply with their outcomes/corrective actions. The meeting may wish to note that the Online LHD System has the feature to allow all Member States to forward their reports directly to the

concerned focal points responsible to receive the LHD reports and allow them to reply with their outcomes in the same report which will be archived for future analysis, however the MIDRMA can't see much Member States making use of this feature and don't bother to reply their related LHDs.

2.9 The MIDRMA noticed a very large increase in the number of LHD reports issued from Sana'a ATCU related to Jeddah, Mogadishu and Djibouti ATCUs, these reported LHDs were all category E and filed through the online reporting system which is addressing all these reports to the right concerned persons in the related ATCUs, these reports were never replied or investigated.

2.9.1 Sana'a LHD reports were also addressed to the AFI RMA as they are responsible to follow-up these reports with the concerned focal points in Mogadishu and Djibouti ATCUs, however the MIDRMA didn't receive any reply from these two ATCUs to all the reported LHDs from Sana'a and decided to address this issue to the AFI RMA to be aware of the potential risk concerning the implementation of RVSM due to the large number of LHD reports.

2.10 The table below reflects all the LHD reports received during the reporting period of SMRS 2017 and 2018:

<b>MID FIRs</b>	<b>No. of Reported LHDs</b>	<b>No. of Related LHDs</b>
Bahrain	<b>54</b>	<b>9</b>
Baghdad	<b>12</b>	<b>18</b>
Amman	<b>5</b>	<b>0</b>
Tehran	<b>63</b>	<b>4</b>
Cairo	<b>5</b>	<b>35</b>
Damascus	<b>0</b>	<b>0</b>
Khartoum	<b>1</b>	<b>1</b>
Kuwait	<b>0</b>	<b>69</b>
Muscat	<b>44</b>	<b>91</b>
Jeddah	<b>52</b>	<b>991</b>
Riyadh	<b>19</b>	<b>16</b>
Tripoli	<b>0</b>	<b>0</b>
Emirates	<b>4</b>	<b>7</b>
Sana'a	<b>2181</b>	<b>1</b>

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

3.1 The meeting is invited to:

- a) discuss the lack of LHD reports category A, B, C, D, H , J and K;
- b) discuss the RVSM Protocol opened two years ago at the eastern boundaries of Muscat FIR;
- c) discuss the increase number of LHDs related to Jeddah, Mogadishu and Djibouti ATCUs reported by Sana'a ATCU; and
- d) urge Member States to investigate their related LHDs and reply back with their findings/corrective actions by using the reply feature in the LHD online system.

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