International Civil Aviation Organization

MIDANPIRG Air Traffic Management Sub-Group

Fifth Meeting (ATM SG/5)
(Aqaba, Jordan, 1 - 4 December 2019)

Agenda Item 6: ATM Safety Matters

MID RVSM SAFETY MONITORING REPORT 2018 – Draft Version 0.1

(Presented by MIDRMA)

SUMMARY

This working paper details the results of the MID RVSM Safety Monitoring Reports 2018 and tries to demonstrate according to the data used that the key safety objectives of the SMR in accordance with ICAO Doc 9574 were met in operational service.

Action by the meeting is at paragraph 3.

REFERENCES

- MIDANPIRG/17 Report
- MIDRMA Board/15 Report
- MID RVSM SMR 2017

1. INTRODUCTION

1.1. The MID RVSM Safety Monitoring Reports (SMR) 2018 covers the reporting period from 01st August 2018 till 31st July 2019 for the ongoing process of providing periodic updates of information relevant to the continued safe use of the RVSM in the ICAO Middle East Airspace.

1.2. The MID SMR 2018 report reflects the airspace safety review of the MID RVSM airspace conducted based on a one-month traffic data sample (TDS) collected for August 2018. The MIDRMA continued to encounter a lot of difficulties to process and analyze the TDS due to corrupted and wrong data format submitted by some member states which caused so much delay in developing this report. The MID SMR 2018 also includes the monthly Large Height Deviation (LHD) reports (Category E ONLY) for the same reporting period submitted by MIDRMA member States through the LHD online reporting system.

2. DISCUSSION

2.1 **Attachment A** of this working paper contains the MID RVSM Safety Monitoring Report.

3. ACTION BY THE MEETING

3.1 The meeting is invited to note and discuss the results of the MID RVSM SMR 2018.

MIDRMA
MIDDLE EAST REGIONAL MONITORING AGENCY
الوكالة الإقليمية لرصد الحركة الجوية للشرق الأوسط

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THE MID RVSM SAFETY MONITORING REPORT 2018
Prepared by the Middle East Regional Monitoring Agency (MIDRMA)

SUMMARY

The aim of the MID RVSM Safety Monitoring Report 2018 is to provide airspace safety review of the MID RVSM airspace and to highlight by means of arguments and supporting evidence that the implementation of RVSM in the Middle East is acceptably safe.

1. Introduction:

1.1 Executive Summary

The MID RVSM Safety Monitoring Report is issued by the Middle East Regional Monitoring Agency (MIDRMA) for endorsement by the Middle East Air Navigation Planning and Implementation Regional Group (MIDANPIRG).

The report presents evidence that according to the data and methods used, only safety objectives No 1 and 3 set out in the MID RVSM Safety Policy in accordance with ICAO Doc 9574 (2nd Edition) continue to be met in operational services in the Middle East RVSM airspace .

To conclude on the current safety of RVSM operations, the three key safety objectives endorsed by MIDANPIRG have to be met:

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 value computed for technical height risk is estimated **1.587×10^{-11}** this meets RVSM Safety Objective 1.

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.

This Report does not provide an estimate for the overall vertical-collision risk due to of the absence of suitable information on operational error reports therefore it is not possible to assess compliance with the ICAO overall TLS of 5 x 10-9 fatal accidents per flight hour.

Nevertheless, this Report provides recommendations to the MIDRMA for collecting that information for future assessments.

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.

1.2 Conclusions:

(i) The estimated risk of collision associated with aircraft height- keeping performance is **1.587×10^{-11}** and meets the ICAO TLS of **2.5×10^{-9}** fatal accidents per flight hour (RVSM Safety Objective1).

(ii) Subject to the limitations of data available and the collision risk model used, this SMR demonstrates that the Middle East RVSM operations met two safety objectives (safety objectives #1 and #3) out of the three principal safety objectives

(iii) Based on currently available information (including Tripoli, Damascus and Beirut FIRs), the MIDRMA cannot confirm that the continued operations of RVSM affects the overall vertical risk of collision.

1.3 Considerations on the RVSM Safety Objectives for MID RVSM SMRs

When considering the three safety objectives for RVSM, the following considerations should be borne in mind:

1. The assessment of risk against the TLS, both for technical and overall risk estimates, relies on height keeping performance data to assess the risk in the vertical plane and studies of traffic density to calculate the risk in the horizontal plane. There are numbers of assumptions that must be verified to satisfy the reliability of the risk assessment, the verification of these assumptions deals primarily with monitoring of aircraft performance issues.
2. The Aircraft performance is assessed by individual airframe and by monitoring group. A monitoring group consists of aircraft that are nominally of the same type with identical performance characteristics that are made technically RVSM compliant using a common compliance method. Monitoring group analysis is necessary to verify that the Minimum Aviation System Performance Standards (MASPS) for that group is valid. Aircraft that are made RVSM compliant on an individual basis are termed non-group.
3. The RVSM Safety Objective 2, dealing with overall risk, takes into account the technical risk together with the risk from all other causes. In practice, this relates to the human influence and assessment of this parameter relies on adequate reporting of Large Height Deviation (LHD) Reports, and the correct interpretation of events for input to the CRM.
4. RVSM Safety Objective 3 requires the RMA to monitor long-term trends and to identify potential future safety issues, this compare the level of risk bearing incidents for the current reporting period. It also highlights if there are issues that should be carried forward as recommendations to be adopted for future reports.

2.1 Discussion

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*

T-1: FIRs/UIRs of the Middle East RVSM Airspace

*Note: Beirut, Damascus and Tripoli FIRs were excluded from the safety analysis due to lack of data.

The Data Sampling periods covered by SMR 2018 are as displayed in the below table

Report Elements	Time Period
Traffic Data Sample	01/08/2018 - 31/08/2018
Operational & Technical Errors	01/08/2018 - 31/07/2019

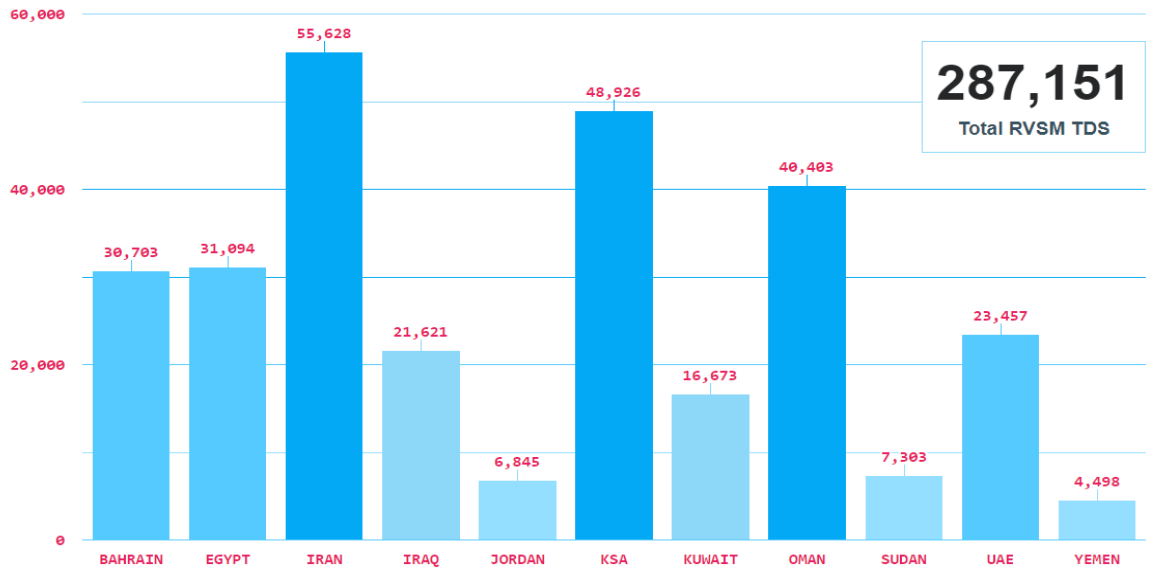
T-2: Time Period for the Reported Elements

MID States	**Status**	**Remarks**
Bahrain FIR	Accepted	Received on time (Corrupted)
Cairo FIR	Accepted	Received on time (Corrupted)
Amman FIR	Accepted	Received on time
Muscat FIR	Accepted	Received on time
Tehran FIR	Accepted	Received late (Corrupted)
Khartoum FIR	Accepted	Received on time
Emirates FIR	Accepted	Received on time
Damascus FIR	No TDS Submitted	Excluded
Sana'a FIR	Accepted	Received on time
Jeddah FIR	Accepted	Received late (Corrupted)
Beirut FIR	No TDS Submitted	Excluded
Baghdad FIR	Accepted	Received late (Corrupted)
Kuwait FIR	Accepted	Received late (Corrupted)
Tripoli FIR	No TDS Submitted	Excluded
Total	11 FIRs	

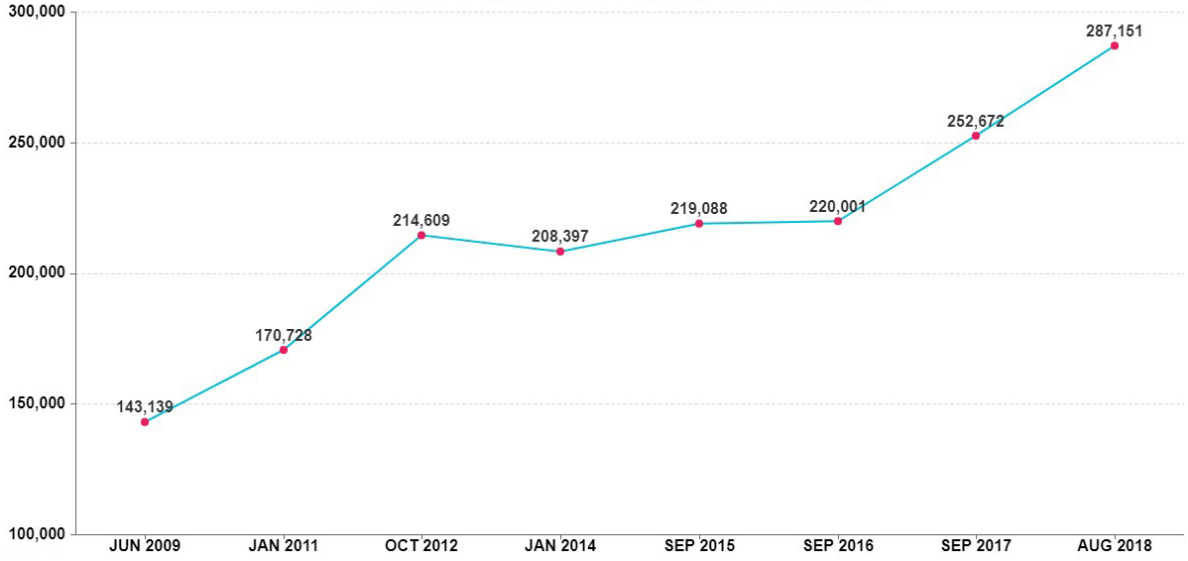
Table 1; Status of the MID States RVSM Traffic Data Sample (TDS) for August 2018

2.1.1 The description of the traffic data processed for each MIDRMA member state by the MID Risk Analysis Software (MIDRAS) is depicted in the graph below, a total of **287,151** flights were processed for the 11 FIRs, these flights were evaluated and processed very carefully to ensure accurate results according to the data submitted.

MID STATE AUGUST 2018 RVSM TDS



MID STATE RVSM TDS FROM 2009 TO 2018



SN	MID FIRs	No of TDS Sep 2017	No of TDS Aug 2018	Sep 2017 vs Aug 2018 (%)
1	Bahrain FIR	27736	30703	**10.7**
2	Cairo FIR	28225	31094	**10.16**
3	Amman FIR	6477	6845	**5.68**
4	Muscat FIR	40563	40403	**-0.39**
5	Tehran FIR	58331	55628	**-4.63**
6	Khartoum FIR	6717	7303	**8.72**
7	Emirates FIR	22125	23457	**6.02**
8	Damascus FIR	1671	No TDS	**-**
9	Sana'a FIR	4163	4498	**8.05**
10	Jeddah/Riyadh FIR	42378	48926	**15.45**
11	Beirut FIR	66	No TDS	**-**
12	Baghdad FIR	9732	21621	**122.16**
13	Kuwait FIR	4488	16673	**271.5**
14	Tripoli FIR	No TDS	No TDS	**-**
	Total	**252,672**	**287,151**	**+13.65%**

MID States RVSM TDS 2017 VS 2018

SN	Reporting Point	FIRs	No of Flights
1	**TASMI**	BAGHDAD / KUWAIT	**8841**
2	**SIDAD**	BAGHDAD / KUWAIT	**8666**
3	**NINVA**	BAGHDAD / ANKARA	**8332**
4	**RATVO**	BAGHDAD / ANKARA	**7754**
5	**DAVUS**	BAHRAIN / KUWAIT	**7537**
6	**TUMAK**	BAHRAIN / EMIRATES	**6314**
7	**MIDSI**	BAHRAIN / TEHRAN	**6265**
8	**GABKO**	EMIRATES / TEHRAN	**6215**
9	**BONAM**	TEHRAN / ANKARA	**5995**
10	**ORSAR**	EMIRATES / TEHRAN	**5370**
11	**ULADA**	BAHRAIN / JEDDAH	**4984**
12	**PASAM**	CAIRO / JEDDAH	**4883**
13	**TESVA**	TEHRAN / ANKARA	**4738**
14	**ALPOB**	EMIRATES / BAHRAIN	**4671**
15	**LONOS**	BAHRAIN / KUWAIT	**4594**
16	**ULINA**	CAIRO / AMMAN	**4500**
17	**ROTOX**	BAHRAIN / TEHRAN	4430
19	**PASOV**	EMIRATES / MUSCAT	4104
20	**DASIS**	TEHRAN / ANKARA	4097

TDS 2018 Top 20 Busiest FIR Entry / Exit Points

2.1.2 As usual practice for the preparation of every safety monitoring report to ensure that attention is drawn to the need of collecting the traffic data sample, the MIDRMA circulated a reminder email to all the focal points responsible for submitting the TDS on **29th July 2018** to ensure their readiness for this task before the effective date of MIDRMA Board DRAFT CONCLUSION 15/6, Unfortunately, the deadline for submitting the TDS to the MIDRMA passed and the same problems of corrupted data and late data submission still exist for this report

2.1.3 For the fourth consecutive Safety Monitoring Reports, Tripoli FIR excluded temporary from the RVSM safety analysis due to lack of TDS and LHD reports, taking into consideration the MIDRMA never done any risk analysis for Tripoli FIR RVSM airspace since Libya joint the MIDRMA, this issue require MIDANPIRG to decide what action should be taken if RVSM operations resume again within Tripoli FIR in the future.

2.1.4 The MIDRMA decided to exclude Damascus and Beirut FIRs from this risk analysis due to lack of traffic data for their RVSM airspace.

2.1.1 The Collision Risk Model (CRM)

2.2.1 The risk of collision to be modelled is that due to the loss of procedural vertical separation between aircraft flying above FL 290 in a given portion of an airspace. One collision between two aircraft is counted as the occurrence of two accidents. The risk of collision depends both on the total number and types of aircraft flying in the system and the system characteristics.

2.2.2 The CRM provides an estimate of the number of accidents within an airspace system that might occur per aircraft flight hour due to aircraft collisions resulting from the loss of procedural vertical separation in an RVSM environment analysis, is expressed in terms of quantifiable parameters. In the vertical dimension the CRM can be broken down in order to separately model a single route on which aircraft are flying in the same or opposite directions at adjacent flight levels, pairs of crossing routes and combinations of individual and intersecting routes, this model is applied equivalently to vertical, lateral and longitudinal separation.

2.2.3 Three parameters used within the CRM:

a. The Vertical Overlap Probability, denoted as Pz(1 000).

b. The Lateral Overlap Probability, denoted as Py(0).

c. The aircraft Passing Frequency are the most important quantities in determining the vertical collision risk. Of these, the vertical overlap probability is also an important parameter to calculate.

2.3 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 **2.5×10^{-9}** fatal accidents per flight hour.

2.3.1 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 **1.587×10^{-11}** fatal accidents per flight hour, which is less than the ICAO TLS **2.5×10^{-9}**.

2.3.2 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. Pz(1000) – the probability of vertical overlap due to technical height-keeping performance, between aircraft flying 1000 ft. separation in MID RVSM airspace is estimated **1.981×10^{-10}** valid and is less than the ICAO requirement of **1.7×10^{-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.

2.3.3 Calculating the Probability of Lateral Overlap (P_y (0))

The probability of lateral overlap $P_y(0)$ is the probability of two aircraft being in lateral overlap which are nominally flying on (adjacent flight levels of) the same route. The calculation of the Py (0) for the SMR 2018 has the following to consider:

a. The MIDRMA continued to calculate the probability of lateral overlap $\boldsymbol{P_y(0)}$ for all the MID RVSM airspace as per the ICAO methodology developed for this purpose and derived by the MID Risk Analysis Software (MIDRAS).

b. The MIDRMA calculated the average of the probability of lateral overlap $\boldsymbol{P_y(0)}$ for the whole MID RVSM airspace is estimated to be **1.248×10^{-11}**

c. Overall, the results are considered to be valid.

2.3.4 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 ASE and typical AAD data is estimated to be of **1.981×10^{-10}** . This value meets the Global System Performance Specification that the probability that two aircraft will lose procedural vertical separation of 1000ft should be no greater than **1.7×10^{-8}**.

According to the technical risk values as shown in the table below , the TLS value slightly and the MIDRMA continue to issue the minimum monitoring requirements (MMRs) for each MIDRMA member states according to the latest RVSM approvals received from all member states , the MMR table valid for SMR 2018 is available in **Appendix B**.

Note: The MIDRMA continuously update the MMR for all Member States; all members are required to check and comply with their MMR through the MIDRMA website (www.midrma.com).

Technical Risk Values				
Year 2006	**Year 2008**	**Year 2010**	**Year 2011**	**Year 2012/13**
2.17×10^{-14}	**1.93×10^{-13}**	**3.96×10^{-15}**	**5.08×10^{-14}**	**6.37×10^{-12}**
Year 2014	**Year 2015**	**Year 2016**	**Year 2017**	**Year 2018**
3.18×10^{-12}	**3.056×10^{-10}**	**6.347×10^{-11}**	**4.966×10^{-11}**	**1.587×10^{-11}**

According to the technical risk values as shown in the above graph the TLS values still, meet the ICAO TLS.

2.3.5 Conclusions on Technical Vertical Collision Risk:

a. The current computed vertical-collision risk due to technical height-keeping performance meets the ICAO TLS.

b. The probability of vertical-overlap estimate, Pz(1000), satisfies the global system performance specification.

c. Most monitoring groups are complying with ICAO TVE component requirements (also known as technical height-keeping group requirements).

2.3.6 Recommendations for Safety Objective 1:

a. The MIDRMA shall continue to review the content and structure of its aircraft monitoring groups.

b. The MIDRMA shall keep the methods of calculating the technical CRM parameters and the risk due to technical height keeping errors under review and explore more options to enhance the MID Risk Analysis Software (MIDRAS).

c. The MIDRMA shall carry out continuous survey and investigation on the number and causes of non-approved aircraft operating in RVSM airspace.

2.4 ASSESSMENT OF OVERALL RISK DUE TO ALL CAUSES AGAINST THE TLS OF 5 X 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 x 10^{-9}** fatal accidents per flight hour.

It was not possible to assess its compliance as no suitable information was available to provide an estimate for the overall vertical-collision risk.

Overall Risk Values				
Year 2006	**Year 2008**	**Year 2010**	**Year 2011**	**Year 2012/13**
Not calculated	**$4.19x10^{-13}$**	**$6.92x10^{-12}$**	**$1.04x10^{-11}$**	**3.63x10-11**
Year 2014	**Year 2015**	**Year 2016**	**Year 2017**	**Year 2018**
$4.91x10^{-11}$	**$7.351x10^{-10}$**	**$5.691x10^{-10}$**	**$4.518 x10^{-11}$**	**Not Calculated**

2.4.1 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 have been severely influenced by NIL reporting of Large Height Deviations (LHDs) of categories A, B, C, D and J as without these data (especially from FIRs with high volume of traffic) it would be impossible to assess compliance with the ICAO overall TLS of **5 x 10^{-9}** fatal accidents per flight hour.

2.4.2 The MIDRMA highlighted the limited numbers of LHD reports in all previous SMRs and noted the final results of Safety Objective No 2 does not support high confidence, although the online LHD reporting system was developed and the reminders to all member states sent on a monthly basis with the monthly statistics distributed to all focal points concerned, the MIDRMA did not succeed in receiving the required reports from the vast majority of MIDRMA Member States.

2.4.3 Out of 15 member states only UAE continue to send their LHD reports of all categories as they always used to do for all the previous SMRs, while only a few member states sent NIL LHD reports or LHD reports category E which have no influence in calculating the overall vertical collision risk within the Middle East RVSM airspace.

MID FIRs	No. of Reported LHDs - CAT "A, B,C, D & J" and "B"
Bahrain	**0**
Baghdad	**0**
Amman	**0**
Tehran	**0**
Cairo	**0**
Damascus	**0**
Khartoum	**0**
Kuwait	**0**
Muscat	**0**
Jeddah	**0**
Riyadh	**0**
Tripoli	**0**
Emirates	**4**
Sanaa	**0**

MID FIRs	No. of Reported LHDs - CAT "E"	No. of Related LHDs - CAT "E"
Bahrain	**54**	**9**
Baghdad	**12**	**18**
Amman	**5**	**0**
Tehran	**63**	**4**
Cairo	**5**	**35**
Damascus	**0**	**0**
Khartoum	**1**	**1**
Kuwait	**0**	**69**
Muscat	**44**	**91**
Jeddah	**52**	**991**
Riyadh	**19**	**16**
Tripoli	**0**	**0**
Emirates	**5**	**7**
Sanaa	**2181**	**1**

MID States LHD Reports Received for SMR 2018 Reporting Period

2.4.4 The MIDRMA continued to monitor the LHD reports at the eastern FIR boundary 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.

2.4.5 However, the MIDRMA can't see much improvement during the reporting period of SMR 2018 and the level of reporting LHDs between Mumbai and Muscat remain high and the safety concern still exist at the common FIR boundary between the two FIRs while the level of reporting LHDs between Karachi and Muscat reduced and its back again to its normal reporting level.

Note: A Safety Protocol is a critical safety issue effecting the implementation of RVSM operations which require the concerned authority an immediate action to rectify/resolve the problem in a certain period of time under the supervision of MIDRMA and ICAO MID Office.

2.4.6 The MIDRMA Board/15 meeting agreed that a Special Coordination Meeting between Iran, India, Oman and Pakistan with the presence of MAAR, MIDRMA and ICAO APAC and MID Regional Offices, to meet during the ATM SG/4 on 02nd May 2018 to agree on clear action plan to mitigate the risk associated with the high level of coordination failures at the interfaces between the above mentioned States.

2.4.7 The special coordination meeting successfully held in Amman – Jordan during the ATM SG/4 but without the presence of Pakistan, the meeting adopted fruitful and effective short and long term solutions to be implemented by the concerned authorities to close the Safety Protocol.

2.4.8 The Safety Protocol is under continuous review by MIDRMA and MAAR and the LHD reports filed by all concerned ATC Units are investigated and evaluated through the MIDRMA online LHD system and further update will be addressed to the next MIDRMA Board meeting.

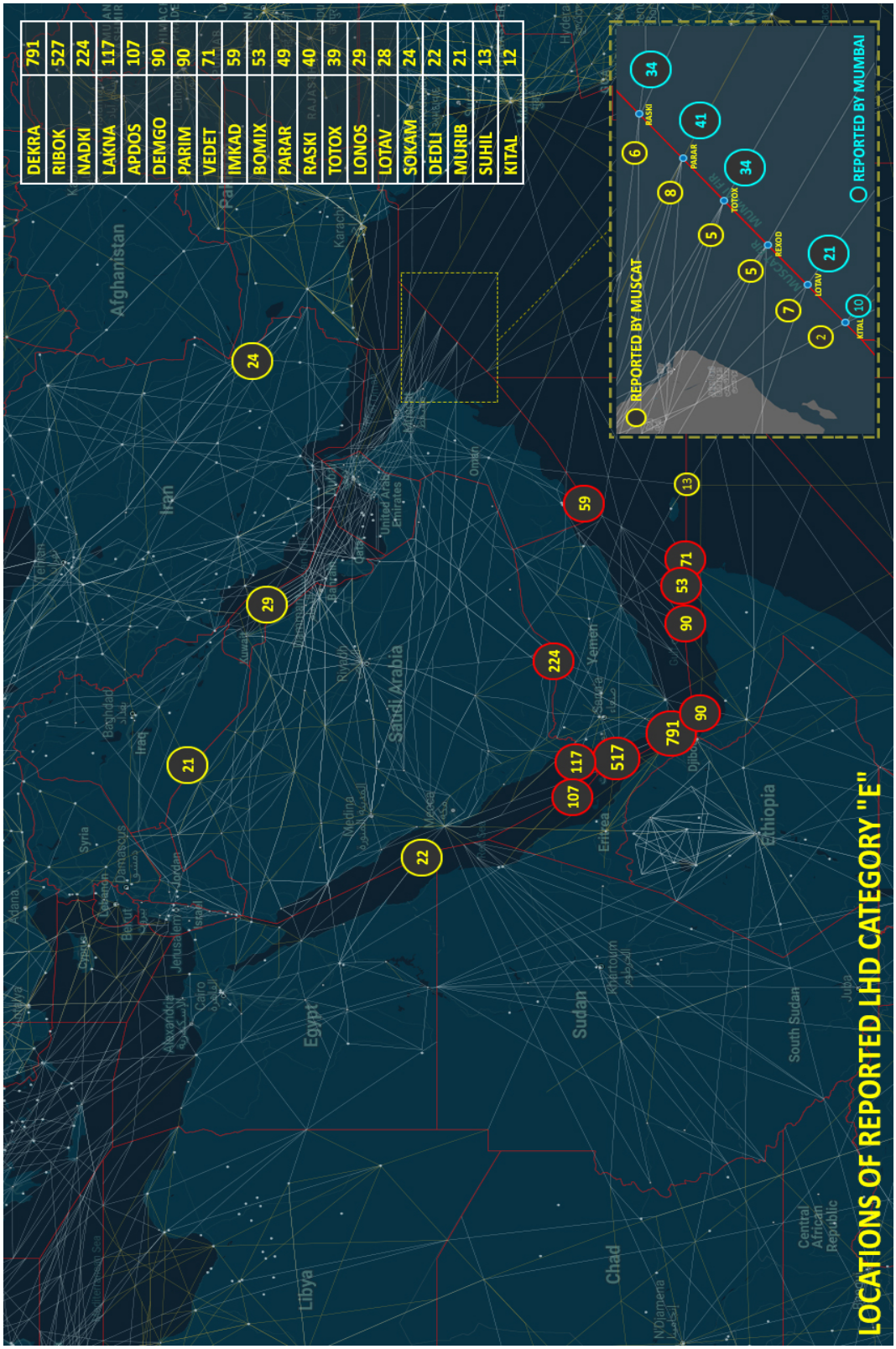
2.4.9 Table A below presents a summary of operational risk associated with Large Height Deviation (LHD) reports by LHD category, these reports are not enough to calculate the overall vertical collision risk for the MID RVSM airspace.

Code	Large Height Deviation (LHD) Category	No. of LHDs	Duration (Sec.)
A	Flight crew fails to climb or descend the aircraft as cleared	**1**	**15**
B	Flight crew climbing or descending without ATC clearance	**2**	**80**
C	Incorrect operation or interpretation of airborne equipment	**0**	**0**
D	ATC system loop error	**0**	**0**
E	ATC transfer of control coordination errors due to human factors	**2437**	**0**
F	ATC transfer of control coordination errors due to technical issues	**0**	**0**
G	Aircraft contingency leading to sudden inability to maintain level	**0**	**0**
H	Airborne equip. failure and unintentional or undetected FL change	**1**	**60**
I	Turbulence or other weather related cause	**0**	**0**
J	TCAS resolution advisory and flight crew correctly responds	**0**	**0**
K	TCAS resolution advisory and flight crew incorrectly responds	**0**	**0**
L	An aircraft being provided with RVSM separation is not RVSM approved	**0**	**0**
M	Other	**0**	**0**
	Total	**2441**	**145**

Table A: Summary of Operational Risk associated with Large Height Deviation

2.4.10 Table A reflects all the LHD categories received for SMR 2018 reporting period which represents nearly 3.5 million RVSM movements in one year, the number of LHD categories which have direct influence in calculating the overall vertical risk in the Middle East RVSM airspace does not support confidence to calculate the overall risk result, therefore the MIDRMA decided not calculate the overall TLS because it will be very close to the technical risk value.

2.4.11 The Map in the next page shows the approximate locations of the top 20 positions of reported LHD events category “E” received by the MIDRMA for SMR2018 reporting period.



2.4.12 Effects of Future Traffic Growth

The effect of future traffic growth on the vertical collision risk can be evaluated on the assumption of a linear relationship between traffic growth and frequency of horizontal overlap, which will directly affect the two components of the risk: the risk due to technical height-keeping performance and due to atypical operational errors.

This Report does not provide an estimate for the overall vertical-collision risk due to the absence of suitable information on operational error reports therefore it was not possible to assess the effects of future traffic growth for this SMR.

2.4.13 Conclusions on the overall vertical risk:

a. 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, estimated from the operational and technical vertical risks was not calculated due to lack of operational error reports.

b. The effect of future traffic growth was not assessed.

2.4.14 Recommendations Applicable to Safety Objective 2:

a. MIDRMA to present the issue of lack of LHD reports other than category E to the next MIDRMA board meeting and propose of including member states not submitting their reports in the ICAO MID Air Navigation Deficiencies Database (MANDD).

b. The MIDRMA shall continue to encourage States to provide Large Height Deviation Reports (LHD) of all categories and not only related handover issues.

c. The MIDRMA, in coordination with concerned States, assure that incidents and violations which have direct impact on the implementation of RVSM within the MID Region are reported in a continuous basis through the MIDRMA LHD online reporting system in due time for operational safety assessment analysis.

2.5 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.

2.5.1 The identified safety-related issues are:

a. Confirmation of the approval status of aircraft filling RVSM flight plan (W in field 10), this is done through Bahrain and Emirates TDS received on a monthly basis.

b. Identification of operators requiring monitoring and address the minimum monitoring requirements to all MIDRMA member states.

2.5.2 Conclusions for Safety Objective 3

a. The MIDRMA improved its monitoring capabilities with the new Enhanced GMUs which gave the ability to respond for more height monitoring requests even from outside the Middle East Region.

b. The MIDRMA started to conduct studies and researches for implementing height monitoring using ADSB data.

c. The MIDRMA address the Hot Spots of each MID FIR generated by the (MIDRAS) Software (for information only).

d. Current risk-bearing situations have been identified by using the MIDRAS and the MID Visualization and Simulation of Air Traffic and actions will be taken to ensure resolving all violations to RVSM airspace by non-approved aircraft.

2.5.3 Recommendations for Safety Objective 3

a. The MIDRMA will start coordinating with Member States, which have ADSB to provide the ADSB archived data for RVSM height monitoring.

b. MIDRMA will continue to enhance the (MIDRAS) Software and shall include new features to overcome the issue of corrupted TDS (Traffic Data Sample).

c. The MIDRMA will continue to include in its work program briefings to the focal points appointed for airworthiness issues to ensure their follow up with their monitoring targets and to resolve any non-compliant RVSM approved aircraft. At the same time the MIDRMA will coordinate with the focal points appointed for ATC issues to deliver RVSM safety assessment briefing as necessary or when requested.

d. The MIDRMA shall continue to carry out continuous survey and investigation on the number and causes of non-approved aircraft operating in the MID RVSM airspace.

e. The MIDRMA will continue to encourage States to submit their Large Height Deviation Reports using the MIDRMA online reporting tool which has been upgraded to improve the level of reporting.

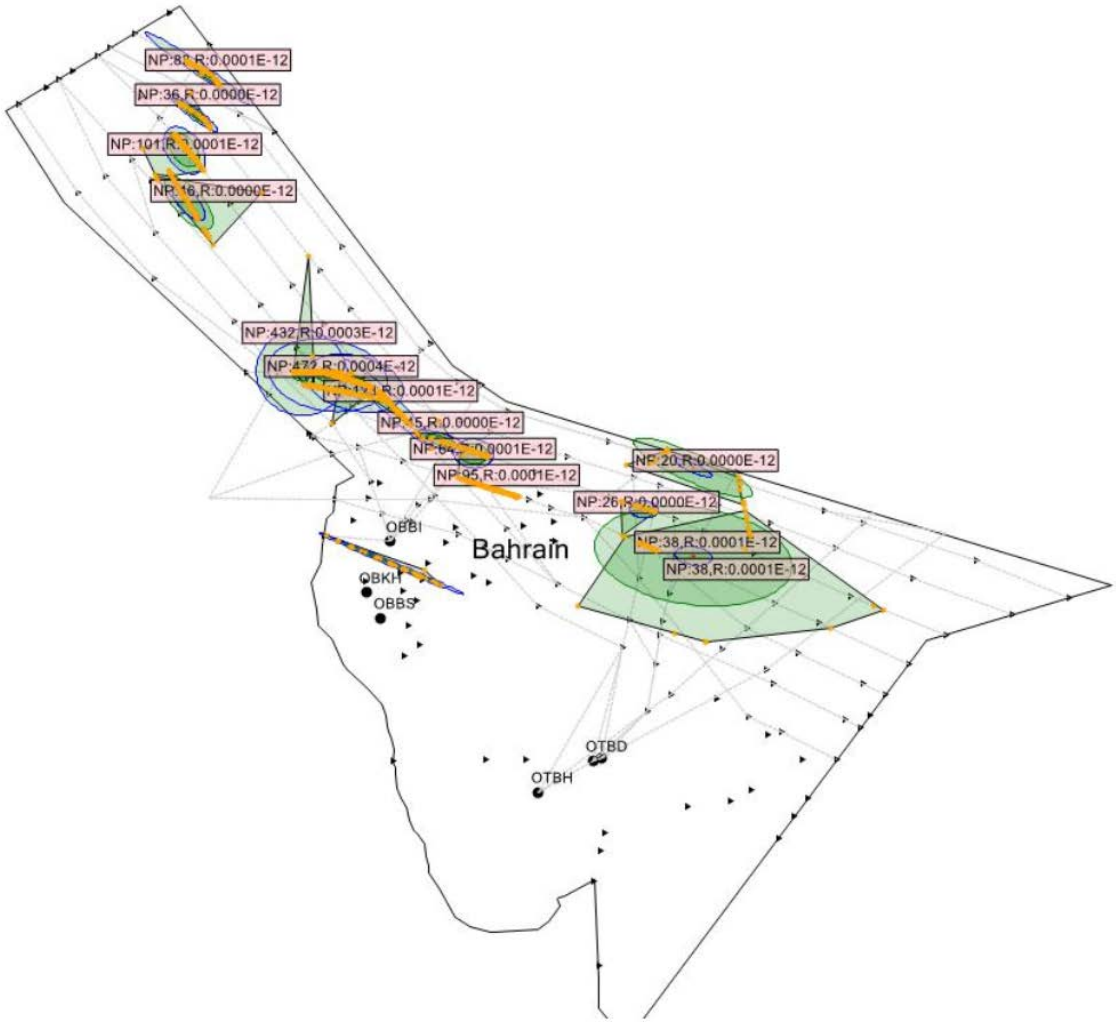
Therefore, it is concluded that this Safety Objective is currently met.

APPENDIX B

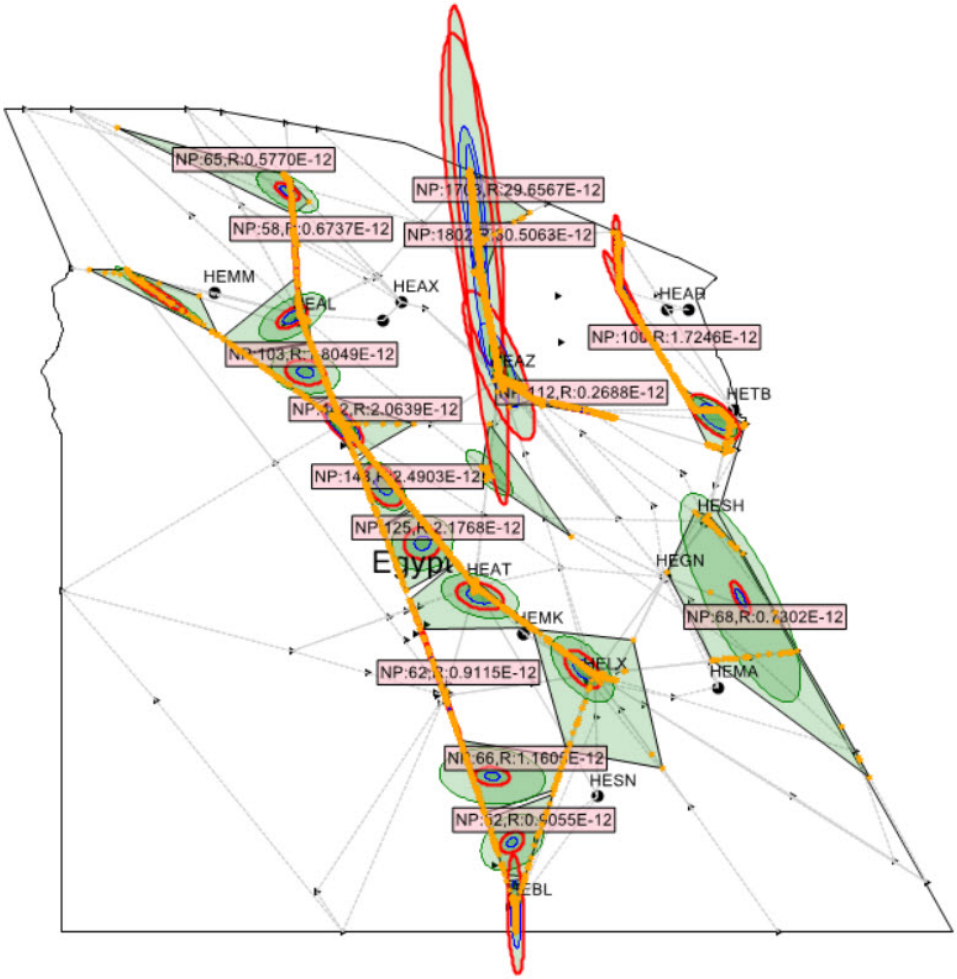
THE MID MMR as of October 2019

STATE	RVSM APPROVED A/C	RESULTS OR COVERED	NOT COVERED
BAHRAIN	57	57	0
EGYPT	149	127	22
IRAN	212	209	3
IRAQ	39	39	0
JORDAN	44	40	4
KSA	265	252	13
KUWAIT	60	51	9
LEBANON	28	28	0
LIBYA	27	26	1
OMAN	75	73	2
QATAR	272	272	0
SUDAN	21	17	4
SYRIA	14	11	3
UAE	593	584	9
YEMEN	6	0	6

<u>APPENDIX C</u> –MIDRMA Member States Hot Spots Generated from September 2018 TDS (for information ONLY)



Bahrain FIR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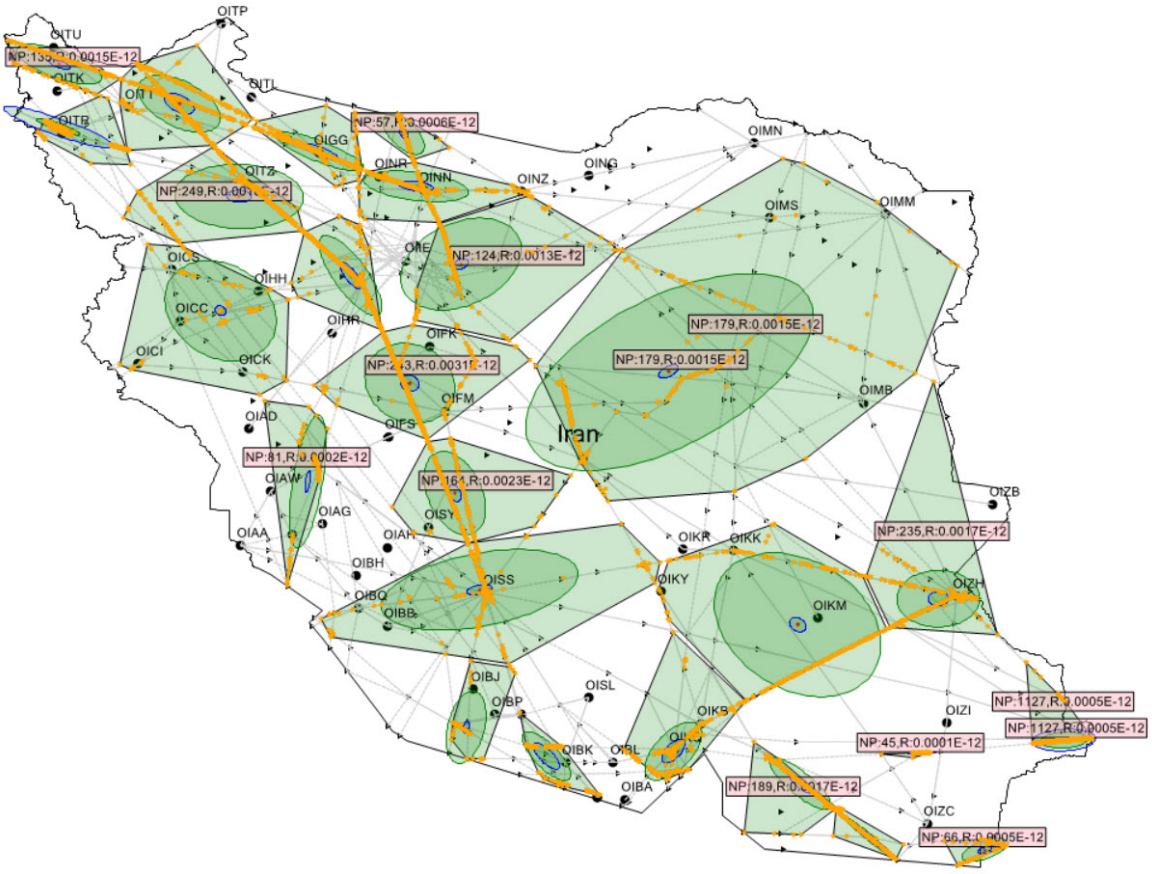
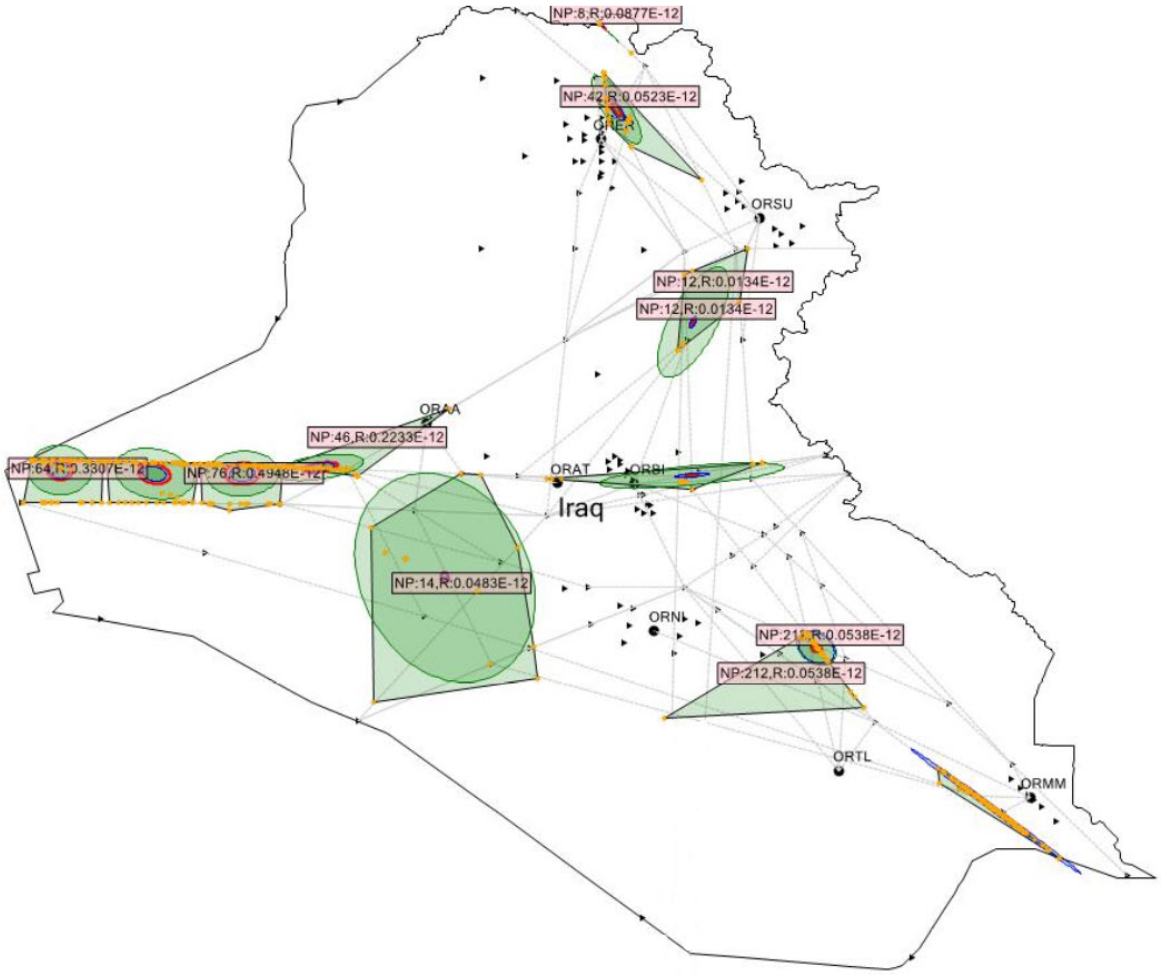
NP:58,R:0.6737E-12
HEMM
HEAX
HEAB
HETB
HESH
HEGN
HEAT
HEMK
HELX
HEMA
HESN
HEBL

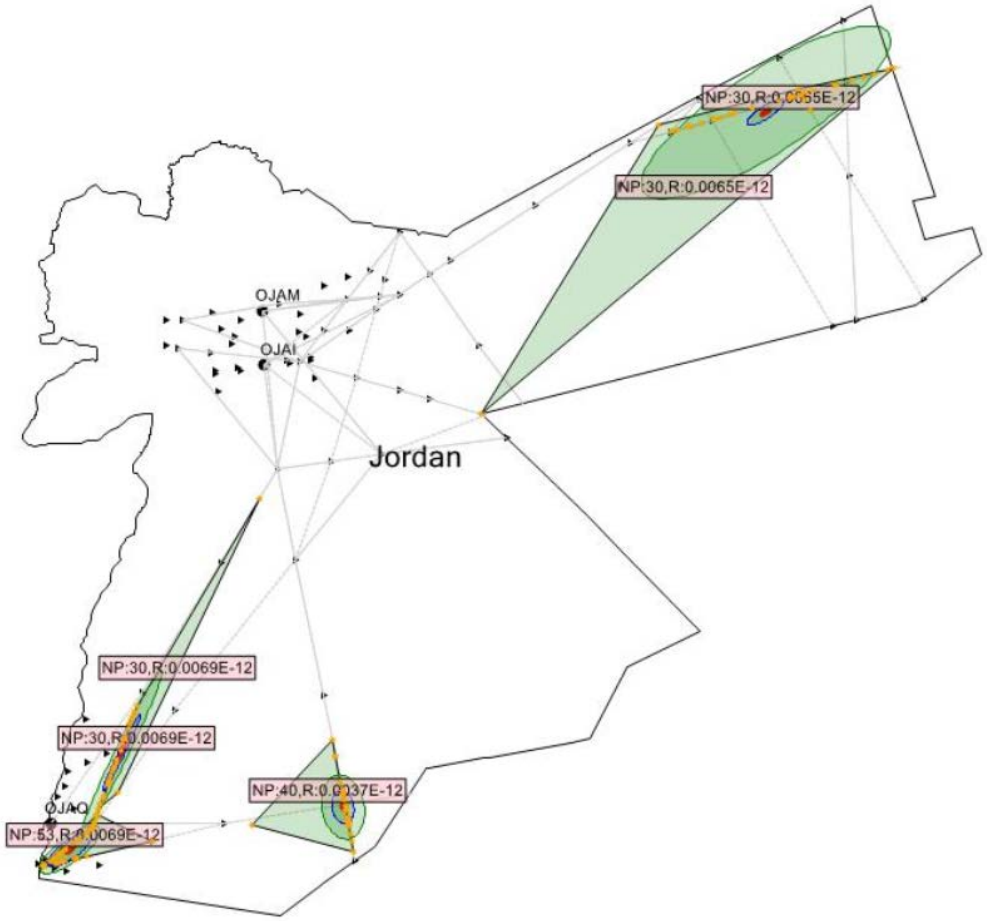
Cairo FIR


OITP
OITU
OITK
OITT
OITR
OITL
OIGG
OINR
OINN
OINZ
OING
OIMN
OIMS
OIMM
OITZ
OIE
OICS
OIHH
OICC
OIHR
OIFK
OICI
OICK
OIFM
OIFS
OIAD
OIAW
OIAG
OISY
OIAA
OIAH
OIBH
OISS
OIBQ
OIBB
OIBJ
OIBP
OISL
OIBK
OIBA
OIKR
OIKK
OIKY
OIKM
OIZB
OIZH
OIZI
OIZC
Iran
NP:179,R:0.0015E-12
NP:124,R:0.0013E-12
NP:161,R:0.0023E-12
NP:235,R:0.0017E-12
NP:1127,R:0.0005E-12
NP:45,R:0.0001E-12
NP:66,R:0.0005E-12

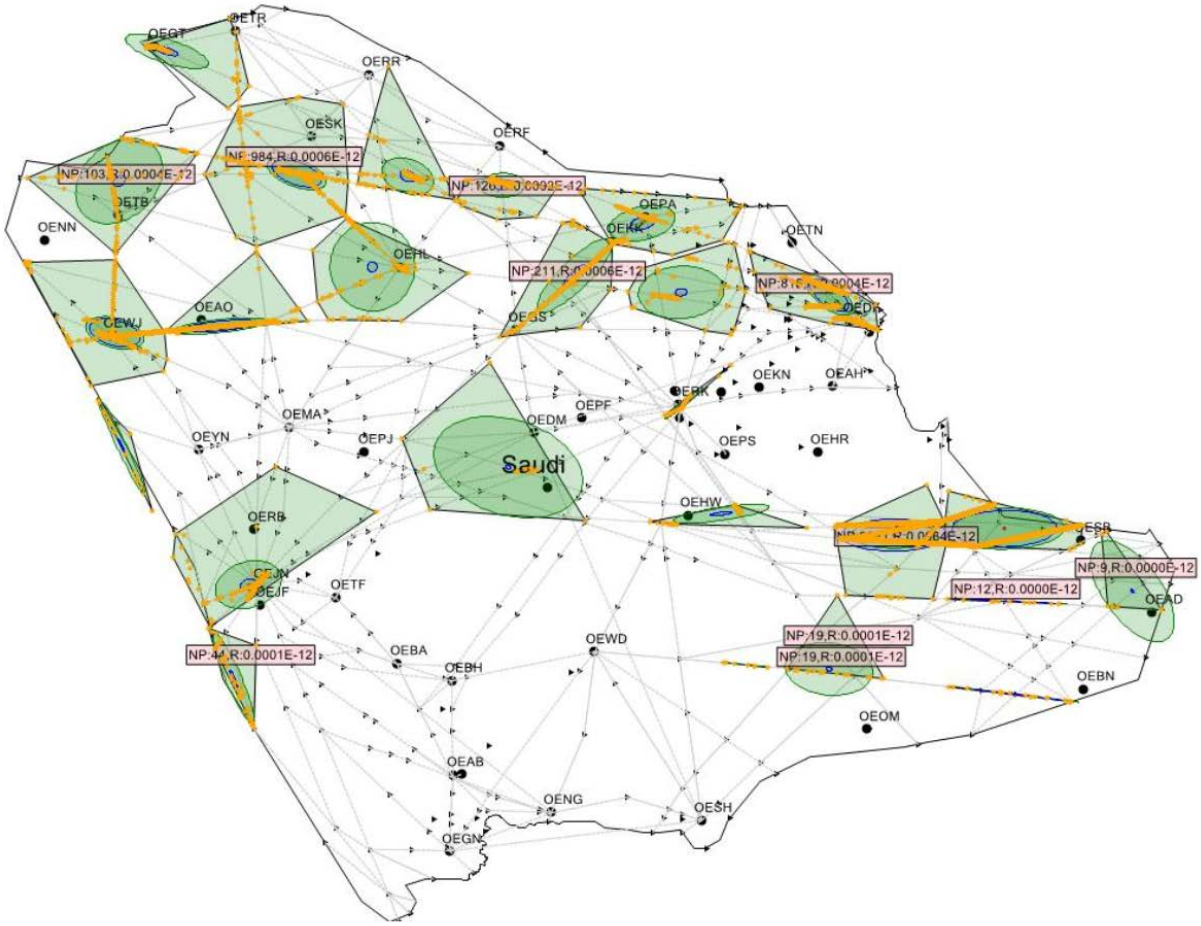
Tehran FIR


NP:8,R:0.0877E-12
NP:42,R:0.0523E-12
ORSU
NP:12,R:0.0134E-12
NP:12,R:0.0134E-12
ORAA
NP:46,R:0.2233E-12
NP:64,R:0.3307E-12
NP:76,R:0.4948E-12
ORAT
ORBI
Iraq
NP:14,R:0.0483E-12
ORNI
NP:212,R:0.0538E-12
NP:212,R:0.0538E-12
ORTL
ORMM

Baghdad FIR


NP:30,R:0.0065E-12
NP:30,R:0.0065E-12
OJAM
OJAI
Jordan
NP:30,R:0.0069E-12
NP:30,R:0.0069E-12
NP:40,R:0.0037E-12
OJAQ
NP:53,R:0.0069E-12

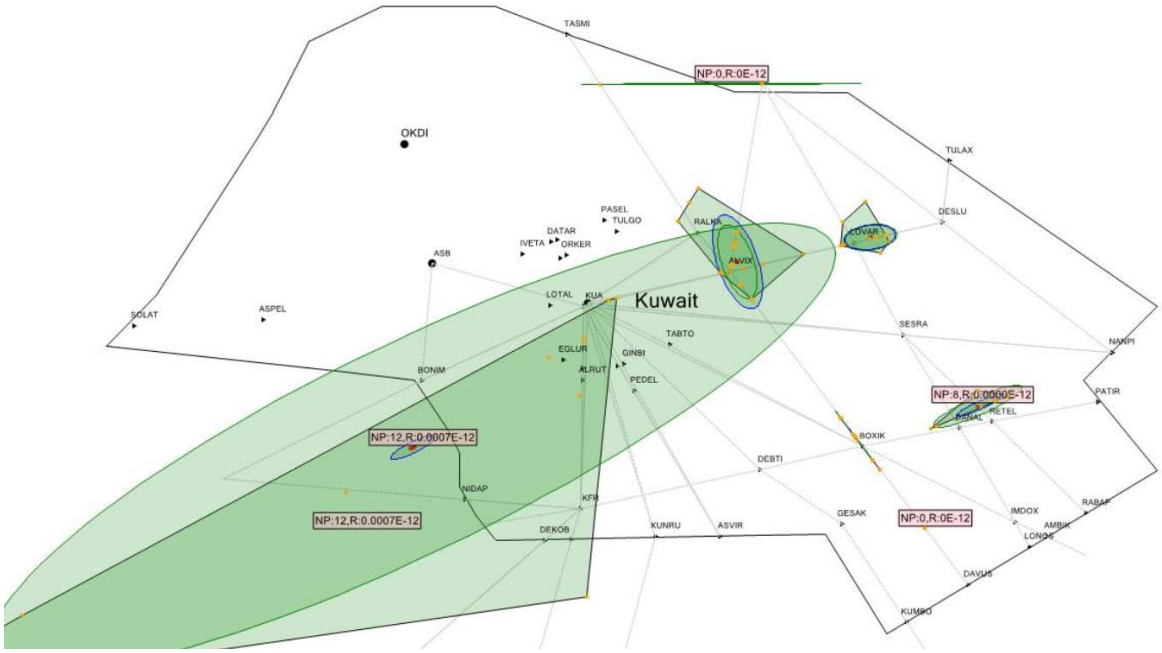
Amman FIR


OETR
OEGT
OERR
OESK
OERF
NP:984,R:0.0006E-12
NP:103,R:0.0004E-12
OETB
OENN
OEHL
OEPA
OEKK
OETN
NP:211,R:0.0006E-12
OEDR
OEAO
OEWJ
OEGS
OEKN
OEAH
OERK
OEMA
OEPF
OEDM
OEYN
OEPJ
OEPS
OEHR
Saudi
OEHW
OERB
OETF
OEJF
OEBA
OEWD
NP:44,R:0.0001E-12
OEBH
NP:19,R:0.0001E-12
NP:19,R:0.0001E-12
NP:12,R:0.0000E-12
NP:9,R:0.0000E-12
OEAD
OEBN
OEOM
OEAB
OENG
OESH
OEGN

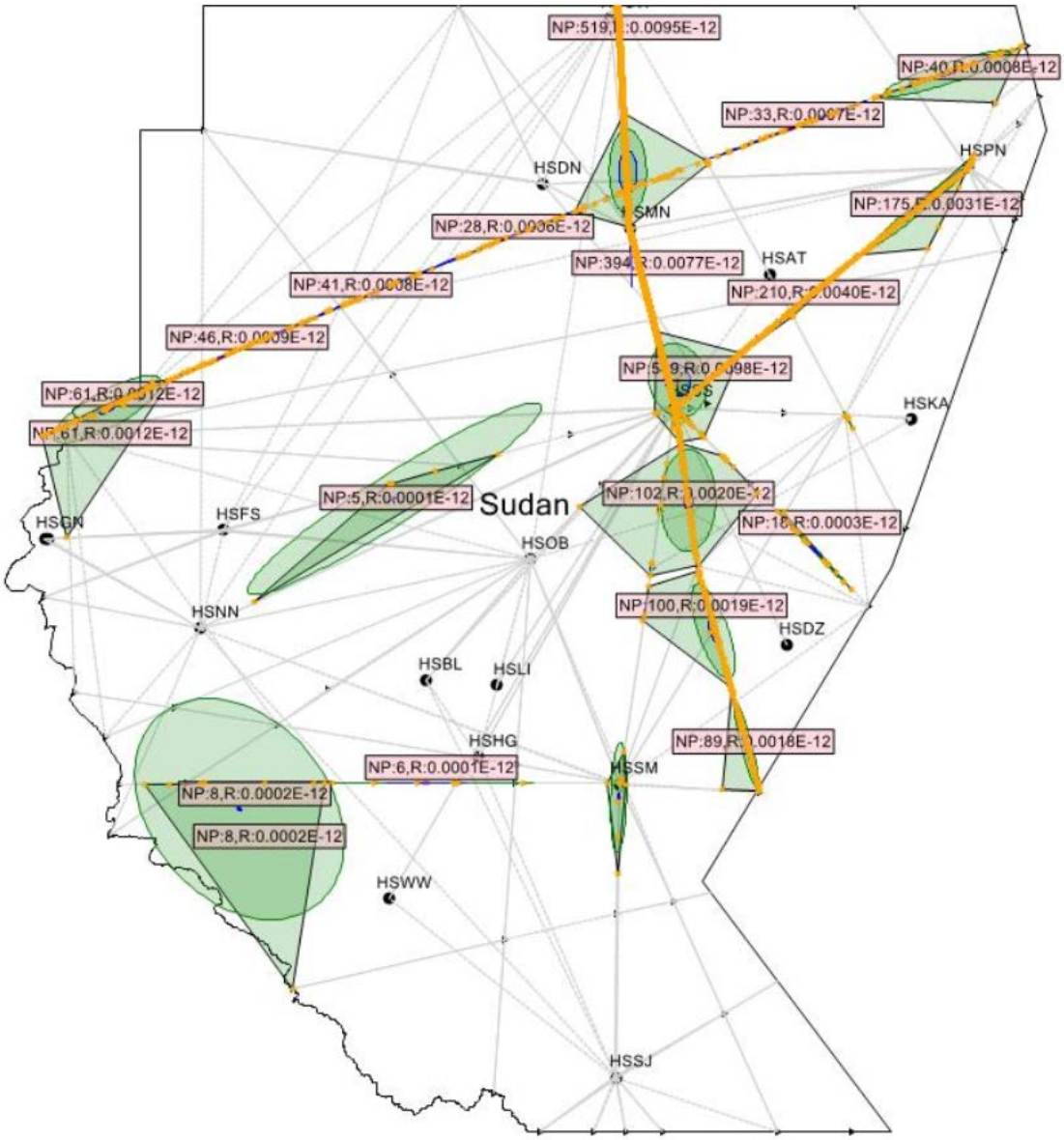
Jeddah FIR


OOSH
NP:634,R:0.0026E-12
OOMN
OOMS
NP:921,R:0.0065E-12
NP:1004,R:0.0045E-12
NP:710,R:0.0053E-12
NP:764,R:0.0069E-12
OOPD
NP:895,R:0.0018E-12
NP:734,R:0.0086E-12
OOGB
Oman
NP:776,R:0.0082E-12
OOMA
OOMK
OODQ
NP:776,R:0.0082E-12
OOTH
OOSA

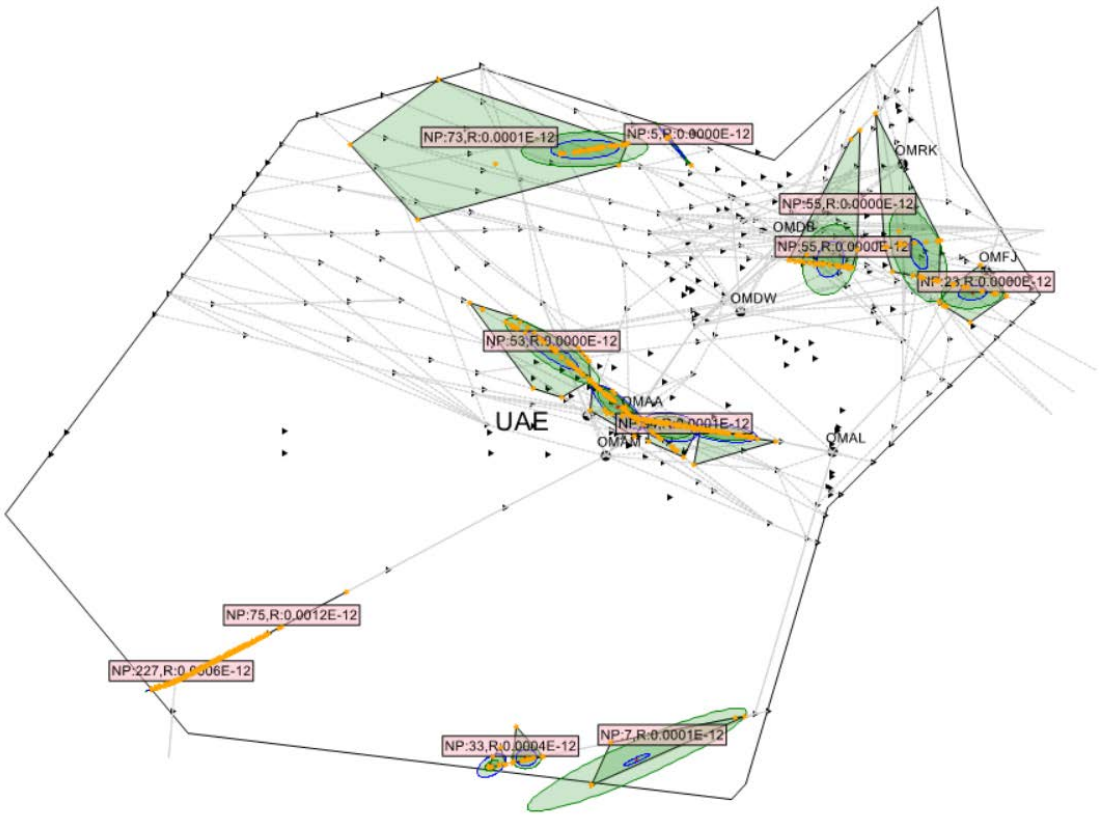
Muscat FIR


TASMI
NP:0,R:0E-12
OKDI
TULAX
PASEL
TULGO
DATAR
IVETA
ORKER
ASB
RALNA
COVAR
DESLU
ASVIX
LOTAL
KUA
Kuwait
SOLAT
ASPEL
TABTO
SESRA
NAKPI
EGLUR
GINBI
ALRUT
PEDEL
BONIM
NP:8,R:0.0000E-12
PATIR
RETEL
BOXIK
NP:12,R:0.0007E-12
DEBTI
NIDAP
KFR
NP:12,R:0.0007E-12
GESAK
NP:0,R:0E-12
IMDOX
RABAP
AMBIK
LONOS
DEKOB
KUNRU
ASVIR
DAVUS
KUMRO

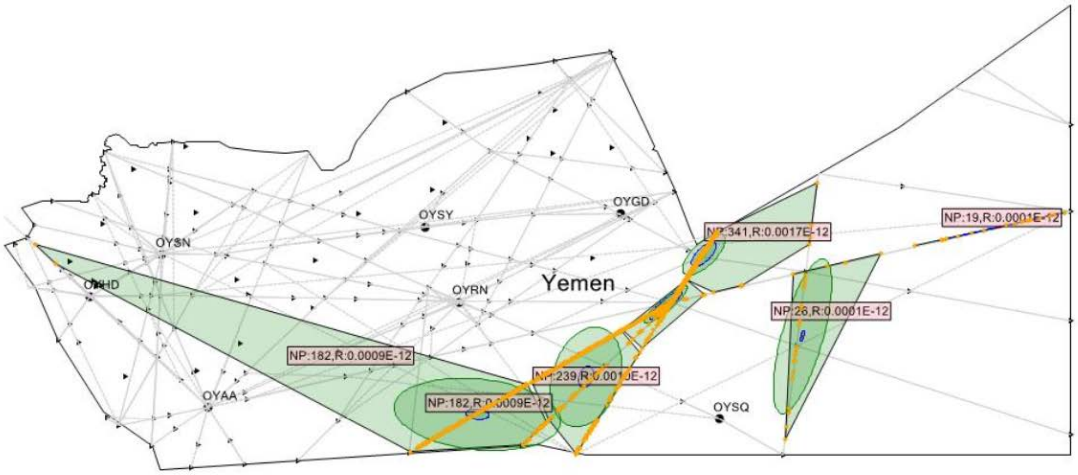
Kuwait FIR



Khartoum FIR



Emirates FIR



Sana’a FIR

- END -