

MIDANPIRG/21 & RASG-MID/11-REPORT



INTERNATIONAL CIVIL AVIATION ORGANIZATION

**Report of the Twenty First Meeting of the
Middle East Air Navigation Planning and Implementation Regional Group
and Eleventh Meeting of the
Regional Aviation Safety Group-Middle East**

MIDANPIRG/21 & RASG-MID/11

(Abu Dhabi, UAE, 4 – 8 March 2024)

The views expressed in this Report should be taken as those of the Regional Planning and Implementation Group and not of the Organization. This Report will, however, be submitted to the ICAO Council and any formal action taken will be published in due course as a Supplement to the Report

Approved by the Meeting
and published by authority of the Secretary General

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PART I - HISTORY OF THE MEETING

1. PLACE AND DURATION

1.1 The Twenty First Meeting of the Middle East Air Navigation Planning and Implementation Regional Group and the Eleventh Meeting of the Regional Aviation Safety Group-Middle East (MIDANPIRG/21 & RASG-MID/11) were successfully held in Abu Dhabi, UAE from 4 to 8 March 2024.

2. OPENING

2.1 His Excellency Saif Mohammed Al Suwaidi, Director General of the General Civil Aviation Authority (GCAA) of Emirates, delivered an opening speech on behalf of the United Arab Emirates (UAE) and welcomed all the participants to Abu Dhabi to participate in the MIDANPIRG/21 & RASG-MID/11 Meeting. He emphasized that the UAE believes that strengthening collective efforts to overwhelm present and future challenges is crucial to ensure a thriving future for the aviation system in the region. In this respect, he wished the meeting a fruitful discussion to enhance cooperation among States and lead to the necessary recommendations and outcomes to drive progress, growth, and prosperity in the MID Region.

2.2 On behalf of ICAO, Eng. Mohamed Abubaker Farea, Regional Director of ICAO for the Middle East, expressed his sincere gratitude to the UAE and especially to H.E. Saif Al Suwaidi for hosting this important meeting in Abu Dhabi. Eng. Farea thanked GCAA for the warm welcome, outstanding hospitality, excellent organization, and decent premises provided for this important meeting. He added that hosting these meetings is evidence of the support offered by the UAE for the aviation industry and the ICAO's work program globally and regionally.

2.3 Eng. Farea announced that air traffic movements in the MID Region recorded another peak during the last period. Operations within the MID Region resumed stable growth in 2022 and 2023. To cope with this growth, the MID Office has spared no effort to support safe and efficient flight operations in effective coordination with all Stakeholders. The outcomes of these cooperative efforts, along with the strategic goals, will be discussed during the meeting.

2.4 Finally, Eng. Farea strongly encouraged all States and Stakeholders to keep up the excellent work and continue to prioritize aviation safety in the Middle East. He emphasized that by working together, we can ensure that air travel remains safe, reliable, and accessible to all.

3. ATTENDANCE

3.1 The meeting was attended by a total of One Hundred and Ninety-Six (196) participants from fifteen (15) States (Bahrain, Egypt, Iran, Iraq, Jordan, Kuwait, Lebanon, Libya, Oman, Qatar, Saudi Arabia, Sudan, Syria, UAE and USA) and seven (7) International Organizations/Industries (ACAO, BOEING, CANSO, ENAV, IATA, IFALPA and MIDRMA). The list of participants is at **Attachment A**.

OFFICERS AND SECRETARIAT

3.2 Mr. Ahmed Al Jallaf, Chairperson of MIDANPIRG, and Mr. Sulaiman Almuhaimeedi, Chairperson of RASG-MID, assisted by Mr. Mubarak Saleh Al-Ghelani, First-Vice Chairperson of RASG-MID chaired the meetings.

3.3 Mr. Mohamed Abubaker Farea, Regional Director, acted as the Secretary of the meetings, supported by the following Regional/Technical Officers:

From the ICAO MID Office, Cairo:

Mr. Mashhor Alblowi	Regional Officer, Flight Safety
Mr. Mohamed Chakib	Regional Officer, Safety Implementation
Mr. Mohamed Iheb Hamdi	Regional Officer, Aerodromes and Ground Aids
Mr. Radhouan Aissaoui	Regional Officer, Information Management
Mr. Ahmad Amireh	Regional Officer, Air Traffic Management and Search and Rescue
Mr. Ahmad Kaveh	Regional Officer, Air Traffic Management

The meeting was also supported by the following team from ICAO Headquarters:

Mr. Martin Maurino	Technical Officer, Global Aviation Safety Plan
Mr. Elie Elkhoury	Technical Officer, Airspace Management and Optimization
Mr. Javier Lopez Gonzalez	Chief, Field Operations Section - CDI
Mr. Mazen Ghattas	Field Operations Officer - CDI

4. LANGUAGE

4.1 The discussions were conducted in English. Documentation was issued in English.

5. AGENDA

5.1 The following Agenda was adopted:

Agenda Item 1: Adoption of the Provisional Agenda (*Plenary*)

Agenda Item 2: Global and Regional Developments (*Plenary*)

- 2.1 Review of the ANC report on MIDANPIRG/20 and RASG-MID/10 Meetings
- 2.2 ICAO Global and Regional Aviation Safety and Air Navigation developments
- 2.3 Update from States and International Organizations

Agenda Item 3: Coordination between MIDANPIRG and RASG-MID (*Plenary*)

- 3.1 Follow-up on the PIRG/RASG MID Conclusions and Decisions
- 3.2 Safety Subjects of interest to MIDANPIRG
- 3.3 Air Navigation Subjects of interest to RASG-MID
- 3.4 MID Region Aerodromes Priorities and Challenges

Agenda Item 4: RASG-MID Work Programme (*RASG-MID/11*)

- 4.1 Follow-up on the RASG-MID/10 Conclusions and Decisions
- 4.2 Outcomes of the RASG-MID Groups (ASRG, SEIG, SPIG and AIIG)

- 4.3 SSP Workshop
- 4.4 Future Work Programme

Agenda Item 5: MIDANPIRG Work Programme (**MIDANPIRG/21**)

- 5.1 Follow-up on MIDANPIRG/20 Conclusions and Decisions
- 5.2 MID Region Air Navigation priorities and targets
- 5.3 ANS (AIM, PBN, AGA-AOP, ATM-SAR, CNS and MET)
- 5.4 Air Navigation Deficiencies
- 5.5 States' bilateral coordination
- 5.6 Future Work Programme

Agenda Item 6: RASG-MID/ MIDANPIRG Working Arrangements (**Plenary**)

- 6.1 Working Arrangements
- 6.2 Dates and Venue of MIDANPIRG/22 & RASG-MID/12

Agenda Item 7: Any other business (**Plenary**)

6. CONCLUSIONS AND DECISIONS – DEFINITION

6.1 The MIDANPIRG and RASG-MID record their actions in the form of Conclusions and Decisions with the following significance:

- a) **Conclusions** deal with matters that, according to the Group's terms of reference, merit directly the attention of States, or on which further action will be initiated by the Secretary in accordance with established procedures; and
- b) **Decisions** relate solely to matters dealing with the internal working arrangements of the Group and its Sub-Groups.

7. LIST OF CONCLUSIONS AND DECISIONS

PIRG/RASG-MID CONCLUSION 1: PUBLISHING OF THE NASP

PIRG/RASG-MID CONCLUSION 2: MENA ACRM

PIRG/RASG-MID DECISION 3: ESTABLISHMENT OF THE MID REGION ACDM TASK FORRE (MID ACDM-TF)

PIRG/RASG-MID CONCLUSION 4: RISKS RELATED TO ALTIMETER SETTING ERRORS DURING APV BARO-VNAV AND NON-PRECISION APPROACH OPERATIONS

RASG-MID CONCLUSION 11/1: 12TH ASR

RASG-MID CONCLUSION 11/2: SHARING OF SAFETY DATA ANALYSIS

RASG-MID CONCLUSION 11/3: GNSS INTERFERENCE AND SPOOFING

RASG-MID CONCLUSION 11/4: IMPLEMENTATION PROGRESS ON THE SAFETY ENHANCEMENT INITIATIVES (SEIS)

<i>RASG-MID CONCLUSION 11/5:</i>	<i>CARRIAGE AND TRANSPORT OF LITHIUM BATTERIES GUIDANCE MATERIAL</i>
<i>RASG-MID CONCLUSION 11/6:</i>	<i>DEVELOPMENT OF NATIONAL AVIATION SAFETY PLAN (NASP) IN MID STATES</i>
<i>RASG-MID CONCLUSION 11/7:</i>	<i>DEVELOPMENT OF SSP IN MID STATES</i>
<i>RASG-MID CONCLUSION 11/8:</i>	<i>ANONYMOUS DATASET COLLECTION FOR AERODROMES SAFETY</i>
<i>MIDANPIRG CONCLUSION 21/1:</i>	<i>RANP/NANP TASK FORCE TOR</i>
<i>MIDANPIRG CONCLUSION 21/2:</i>	<i>MID REGION AIR NAVIGATION STRATEGY, EDITION, FEBRUARY 2024</i>
<i>MIDANPIRG CONCLUSION 21/3:</i>	<i>NATIONAL AIR NAVIGATION PLAN (NANP)</i>
<i>MIDANPIRG CONCLUSION 21/4:</i>	<i>MID AIR NAVIGATION REPORT - 2023</i>
<i>MIDANPIRG CONCLUSION 21/5:</i>	<i>OPTIMIZATION OF MID REGION ATS ROUTE DESIGNATOR</i>
<i>MIDANPIRG CONCLUSION 21/6:</i>	<i>WEBINAR ON PERFORMANCE-BASED AERODROME OPERATING MINIMA (PBN-AOM)</i>
<i>MIDANPIRG CONCLUSION 21/7:</i>	<i>WORKSHOP ON PBN/GNSS</i>
<i>MIDANPIRG DECISION 21/8:</i>	<i>PBN SID AND STAR CHARTING AD HOC WORKING GROUP</i>
<i>MIDANPIRG CONCLUSION 21/9:</i>	<i>MID FPP FUTURE SUSTAINABILITY</i>
<i>MIDANPIRG DECISION 21/10:</i>	<i>MID AIRSPACE MANAGEMENT WORKING GROUP (ASM WG)</i>
<i>MIDANPIRG DECISION 21/11:</i>	<i>DISSOLUTION OF THE MID ROUTE DEVELOPMENT ACTION GROUP (RDWG)</i>
<i>MIDANPIRG CONCLUSION 21/12:</i>	<i>MID RVSM SMR 2023</i>
<i>MIDANPIRG CONCLUSION 21/13:</i>	<i>NON-SUBMISSION OF REQUIRED DATA FOR THE DEVELOPMENT OF SMR2023</i>
<i>MIDANPIRG CONCLUSION 21/14:</i>	<i>MID RVSM SMR 2024</i>
<i>MIDANPIRG CONCLUSION 21/15:</i>	<i>OFAC LICENCE APPLICATION</i>
<i>MIDANPIRG DECISION 21/16:</i>	<i>MID ADS-B HEIGHT MONITORING SYSTEM (MID AHMS)</i>

<i>MIDANPIRG CONCLUSION 21/17:</i>	<i>MID REGIONAL ATM CONTINGENCY PLAN (V5.0)</i>
<i>MIDANPIRG DECISION 21/18:</i>	<i>DISSOLUTION OF THE CONTINGENCY PLAN ACTION GROUP</i>
<i>MIDANPIRG CONCLUSION 21/19:</i>	<i>DEVELOPMENT OF MID STATES ATFM PLAN</i>
<i>MIDANPIRG CONCLUSION 21/20:</i>	<i>MID FF-ICE WORKSHOPS 2024-2025</i>
<i>MIDANPIRG DECISION 21/21:</i>	<i>DISSOLUTION OF THE CMC/FUA ACTION GROUP</i>
<i>MIDANPIRG CONCLUSION 21/22:</i>	<i>FREE ROUTE AIRSPACE (FRA) IMPLEMENTATION WORKSHOP</i>
<i>MIDANPIRG DECISION 21/23:</i>	<i>REVIEW OF THE MID REGION ALLOTMENT PLAN</i>
<i>MIDANPIRG CONCLUSION 21/24:</i>	<i>OPTIMIZATION OF FREQUENCY ASSIGNMENT IN THE MID REGION</i>
<i>MIDANPIRG CONCLUSION 21/25:</i>	<i>INTER-REGIONAL COMMUNICATION LINKS</i>
<i>MIDANPIRG CONCLUSION 21/26:</i>	<i>NAV MON PLAN TEMPLATE</i>
<i>MIDANPIRG CONCLUSION 21/27:</i>	<i>GNSS RFI MITIGATION</i>
<i>MIDANPIRG CONCLUSION 21/28:</i>	<i>CYBERSECURITY SYSTEMS RESILIENCE</i>
<i>MIDANPIRG DECISION 21/29:</i>	<i>AERONAUTICAL INFORMATION MANAGEMENT DIGITALIZATION & PLANNING TASK FORCE (AIMDP TF)</i>
<i>MIDANPIRG CONCLUSION 21/30:</i>	<i>REVISED NOTAM TEMPLATE FOR GNSS INTERFERENCE</i>
<i>MIDANPIRG CONCLUSION 21/31:</i>	<i>RISK COMMUNICATION MODEL TO DISSEMINATE INFORMATION RELATED TO RISKS TO CIVIL AVIATION OVER OR NEAR CONFLICT ZONES</i>
<i>MIDANPIRG CONCLUSION 21/32:</i>	<i>ABU DHABI DECLARATION ON CONTINUOUS IMPROVEMENT OF ANS PROVISION IN THE MID REGION</i>
<i>MIDANPIRG DECISION 21/33:</i>	<i>MIDANPIRG REVISED STRUCTURE</i>

PART II: REPORT ON AGENDA ITEMS

REPORT ON AGENDA ITEM 1: ADOPTION OF THE PROVISIONAL AGENDA

1.1 The meeting reviewed and adopted the Provisional Agenda as at paragraph 6 of the History of the Meeting.

REPORT ON AGENDA ITEM 2:**GLOBAL AND REGIONAL DEVELOPMENTS****2.1 *Review of the ANC Report on MIDANPIRG/20 and RASG-MID/10 Meetings***

2.1.1 The subject was addressed in WP/2 presented by the Secretariat.

2.1.2 The meeting noted that the Air Navigation Commission (ANC) reviewed the MIDANPIRG/20 and RASG-MID/10 Report during the fifth meeting of its 224th Session on 31 October 2023, based on the outcome of the ANC Working Group of the Whole for Strategic Review and Planning (WG/SRP) meeting as presented in AN-WP/9650.

2.1.3 The meeting noted with appreciation that the Commission commended the MID Region for the quality of the report, the progress made in the region and the coordination that took place between the MIDANPIRG and RASG-MID. The ANC noted that the region has shown stable progress and growth during the years 2022 and 2023, which is a positive sign toward full recovery from the COVID-19 pandemic, which caused a significant decline in air traffic volume. The ANC also appreciated the conduct of several coordination meetings and support missions to States as part of enhancing cooperation between States to enhance the aviation system in the MID Region.

2.1.4 The Commission recognized the need to harmonize the online mechanisms and tools for collecting information and data to monitor safety and air navigation performance in the region, taking into consideration the existing tools developed by the ICAO.

2.1.5 The meeting noted that the ANC valued the endorsement of the NOTAM templates on global navigation satellite system (GNSS) interference and on the information about risks to civil aviation over or near conflict zones. However, considering the latest anomalies with the GNSS, where aircraft were targeted with false GNSS signals that the onboard navigation systems might interpret as valid information, the ANC was of the view that the NOTAM template should be amended to cover the emerging situation. It was pointed out that the MIDANPIRG/20 report did not indicate any actions to be taken by ICAO, but the Commission agreed to observe and verify with other regions to see if GNSS interference was a considerable problem. Accordingly, the Commission invited the Secretariat to continue monitoring the issue of GNSS spoofing and interference and to provide an update at a suitable point in the future.

2.1.6 The Commission valued the role of the MID Region Safety Management Implementation Roadmap and the Safety Management Implementation Team (SMIT) in supporting the MID States in implementing SSP.

2.1.7 The Commission noted the emerging safety issues in the MID Region (GNSS interference, COVID-19 outbreak, UAS Safe Operations, Security Impact on Safety, and 5G interference), which were considered risks that might impact safety in the future.

2.1.8 The ANC noted the potential benefits that the States of Design (SoD) and States of Registry (SoR) could garner by sharing Continued Operational Safety (COS) information, including allowing for the development of relationships and establishing authority-to-authority contacts, providing infrastructure for rapid response to major disruptions, reducing the need for unilateral actions and allowing the SoD to assess the available data and the need to take necessary actions promptly.

2.1.9 The meeting was informed that the ANC valued the launching of the MIDANPIRG Award Competition among its subsidiary bodies to encourage engagement and improve productivity and implementation and noted the key activities and achievements in the MID Region.

2.1.10 The ANC noted the following challenges affecting the MID Region:

- a) lack of qualified technical personnel;
- b) many unrest situations and conflict zones have been necessitating multiple Contingency Coordination Teams (CCTs) to operate simultaneously, which is resource-intensive and requires advanced regional and national contingency planning to be addressed effectively;
- c) lag in the development and implementation of SSP and National Aviation Safety Plans (NASPs);
- d) deficiencies in sharing of safety information and safety data analysis;
- e) impact on the safety of international air transport due to the expiry of the Office of Foreign Assets Control (OFAC) license for using the GPS-based Monitoring Units (GMUs) to monitor the height-keeping performance of the Iranian registered aircraft.
- f) lack of effective civil-military cooperation; and
- g) need for alignment of the MID Region Air Navigation Strategy and the MID ANP, Volume III with the latest GANP edition and development of the National Air Navigation Plan (NANP).

2.1.11 The meeting considered the actions taken by the ANC on the reports of the MIDANPIRG/20 and RASG-MID/10 during the deliberations under the relevant agenda items of the meetings.

2.2 GLOBAL AVIATION SAFETY AND AIR NAVIGATION DEVELOPMENTS

Air Navigation

2.2.1 The subject was addressed in PPT/3 presented by the Secretariat.

2.2.2 The meeting was provided with an overview of traffic growth. The meeting recognized the need to address MID Region development plans to be ready to accommodate the traffic growth and cope with the rapid evolution in aviation operations and technologies with due consideration to aviation's global environmental challenges.

2.2.3 The meeting was apprised of the new ICAO Priority Focus Areas (PFAs). The meeting recalled that the 41st ICAO Assembly adopted a long-term global aspirational goal (LTAG) for international aviation of net-zero carbon emissions by 2050 in support of the UNFCCC Paris Agreement's temperature goal. The achievement of the LTAG will rely on the combined effect of multiple CO2 emissions reductions, including the accelerated adoption of new and innovative aircraft technologies, streamlined flight operations, and the increased production and deployment of sustainable aviation fuels (SAF). Accordingly, the meeting encouraged States to consider the PFAs and LTAG as part of their national planning and activities, as appropriate.

2.2.4 The meeting noted that the fourteenth Air Navigation Conference (AN-Conf/14) would be held in Montreal, Canada, from 26 August to 6 September 2024. The meeting was apprised of the AN-Conf/14 Agenda and the Guiding Principles for the preparation and conduct of AN-Conf/14 that should be followed. The meeting encouraged States to start the preparation for and participate in the AN-Conf/14, taking into consideration the Guiding Principles and the Agenda provided in the Invitation to AN-CONF/14 (ICAO State Letter ref. ST 15/1-24/12 dated 26 January 2024 refers).

2.2.5 The meeting was provided with an overview of the Air Navigation World 2023 events (Montreal, 28- 31 August 2023 and Singapore 23-27 October 2023) in preparation for the AN-Conf/14. The meeting noted the upcoming ICAO provisions that will be applicable in 2024-2026. The meeting invited States to consider the global developments and prepare for the implementation of the upcoming ICAO provisions as applicable. The meeting encouraged States to participate in the ICAO global events planned for 2024.

2.2.6 The meeting was apprised of iSTARS 4.0, a web-based Analytical Platform that provides a quick and convenient interface to a collection of datasets and web applications to conduct safety, capacity, efficiency, and risk analyses for a global level or specific region. The meeting noted that the platform could be customized for the MID Region based on the agreed regional metrics, targets, KPIs and analysis needed. The meeting agreed that workshops would help in the development of a regional dashboard for the MID Region on iSTARS 4.0. Accordingly, the meeting noted that the ICAO MID Office, in coordination with ICAO HQ, will arrange for a workshop on iSTARS in due course.

GASP 2023-2025, NASP, Safety Management, USOAP CMA

2.2.7 The meeting noted with appreciation the work underway to develop the 2026-2028 edition of the Global Aviation Safety Plan (GASP, Doc 10004), including the revision of targets, global high-risk categories of occurrences, and the global safety issues.

2.2.8 The meeting was informed that proposals for the revision of the GASP will be presented to the Fourteenth Air Navigation Conference (AN-Conf/14), to be Montréal, Canada, 26 August to 6 September 2024.

2.2.9 The meeting was informed on the status of national aviation safety plan (NASP) development at the global and regional levels. The meeting noted the low level of NASP development in the MID region, with only four States having provided their NASP for posting on the ICAO public website.

2.2.10 The meeting was also informed on the latest update on Safety Management activities, including the revision of guidance material to support the implementation of Annex 19 – *Safety Management*, the latest amendment of Annex 13 – *Aircraft Accident and Incident Investigation*, as well as developments in the Universal Safety Oversight Audit Programme (USOAP) Continuous Monitoring Approach (CMA), and upcoming ICAO safety events.

2.2.11 Based on the above, the meeting agreed to the following PIRG/RASG Conclusion:

PIRG/RASG CONCLUSION 1: PUBLISHING OF THE NASP

That States, be urged to publish their NASP and to provide it to ICAO HQ and ICAO MID Office for posting on the ICAO NASP Library website (www.icao.int/nasplibrary).

MENA-RSOO

2.2.12 The subject was addressed in PPT/5 presented by the Saudi Arabia. The meeting congratulated Saudi Arabia on the official establishment of MENA RSOO and encouraged States to support the MENA RSOO. The meeting also commended the ACAO and ICAO MID Office for the effective coordination and collaboration with Saudi Arabia. Details on the progress are in WP/82 under RASG-MID/11 report.

MENA ARCM

2.2.13 The subject was addressed in PPT/6 by the Secretariat. The meeting noted with

appreciation the updated progress on MENA ARCM activities and encouraged States to sign the MENA ARCM MoU if not yet done and urged all States to support MENA ARCM activities.

PIRG/RASG CONCLUSION 2: MENA ARCM

That States be encouraged to sign the MENA AIG Regional Cooperation Mechanism (MENA ARCM) MoU, if not yet done.

2.2.14 The meeting also noted that Egyptian Aircraft Accident Investigation Directorate signed the MENA ARCM MoU and joined the MENA ARCM to support its activities.

Oman Erteqaa program for State Safety Oversight System

2.2.15 The subject was addressed in PPT/84 presented by Oman. The meeting was apprised and thanked Oman for sharing the experience on Erteqaa program for State Safety Oversight System.

2.2.16 The meeting congratulated Oman for the successful result achieved following the conduct of ICAO ICVM; which resulted increased EI to 90.8% and the conduct of an USOAP audit in AIG area, which resulted in remarkable increase of Effective Implementation (EI). from 48% to 96.3%. (not officially announced yet).

CAPSCA MID Updates

2.2.17 The subject was addressed in PPT/7 presented by the Secretariat. The meeting was apprised of the CAPSCA Updates and agreed that encourage States to support the CAPSCA Programme to foster the achievement of CAPSCA Goals The meeting recalled that States should request ICAO MID Office for Technical Assistance Missions to Airports to measure the efficiency of their Airports Preparedness Plans in case of Public Health Events.

2.2.18 The meeting encouraged States actively participate to the CAPSCA EUR-MID/11 Meeting that will be hosted by EASA and planned to be held in Cologne, Germany from 25 to 26 April 2024.

ACDM Implementation in the MID Region

2.2.19 The subject was addressed in WP/8 presented by the Secretariat. The meeting noted the current level of the ACDM Implementation, and the challenges faced by the States to reach full deployment of the ACDM. The meeting noted with appreciation the effort made by Qatar and UAE as both Hamad International Airport and Zayed International Airport had fully implemented their ACDM.

2.2.20 The meeting agreed on the establishment of a Regional ACDM Task Force (ACDM-TF) to support and assist in the implementation of ACDM in the MID Region.

2.2.21 The meeting recognized that the Regional ACDM-TF main role is to assist Airports in enhancing their preparedness for the successful implementation of ACDM processes in coordination with relevant stakeholders. The meeting noted that the Task Force can take a variety of actions including but not limited to:

- Establishing clear goals and objectives: The task force should establish clear goals and objectives for the implementation of Airport Collaborative Decision Making (ACDM) processes. This can help ensure that all stakeholders are working towards the same goals and objectives.

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- Defining roles and responsibilities: The task force should define the roles and responsibilities of each stakeholder involved in the implementation of ACDM processes. This can help ensure that all stakeholders understand their responsibilities and are working together effectively.
 - Fostering collaboration: The task force should foster collaboration between stakeholders by providing opportunities for stakeholders to meet, exchange information, and share best practices. This can help build trust and cooperation between stakeholders and ensure that they are working together effectively.
 - Providing Capacity Building: The task force should provide training and education for airport stakeholders on ACDM processes and tools. This can help ensure that stakeholders understand how to use ACDM processes and tools effectively and can work together to implement them.
 - Monitoring progress: The task force should monitor the implementation of ACDM processes and tools to ensure that stakeholders are working together effectively. This can involve regular meetings, progress reports, and evaluations of the effectiveness of ACDM processes.

2.2.22 The meeting reviewed the Terms of Reference Draft of the ACDM Task Force available at **Appendix 2A** and agreed that the TORs be updated to include the potential coordination with the ATFM Task Force once the ACDM Task Force reach the maturity facilitating such coordination. Accordingly, the meeting may wish to agree on the following Decision:

PIRG/RASG DECISION 3: ESTABLISHMENT OF THE MID REGION ACDM TASK FORCE (MID ACDM-TF)

*That, the MID Region Airport Collaborative Decision-Making Task Force (MID ACDM-TF) be established, subject to review and confirmation of ASPG/6, in accordance with the Terms of Reference at **Appendix 2A**.*

Innovation Updates for the MID Region

2.2.23 The subject was addressed in PPT/9 presented by the Secretariat. The meeting was apprised of the ICAO Secretariat Strategy on Innovation and noted that the strategy aims to:

- Raise awareness of innovation among States, industry partners and the aviation community at large and promote its potential benefits;
- Encourage and support the timely deployment of sustainable innovative technologies, processes and capacity-building activities based on operational needs;
- Provide a framework that allows the industry to engage with ICAO at the appropriate level, and where appropriate within the existing frameworks, enabling ICAO to develop well-informed policies and carry out innovative implementation support initiatives; and
- Provide a framework that enables ICAO to engage academia in the development of innovative studies, training and projects, through the support of the States and the industry.

2.2.24 The meeting was apprised of the Industry Consultative Forum (ICF), Innovation Webinar Series launched since 2021 and, the ICAO Innovation Workshop conducted for the MID Region in January 2024. In this regard, the meeting encouraged States actively participate to the 2024 ICAO Innovation Fair "Digital Aviation: The Future is Now" to be held in Montreal from 12 to 14 March 2024.

REPORT ON AGENDA ITEM 3: COORDINATION BETWEEN MIDANPIRG AND RASG-MID
3.1 Follow-up on the PIRG/RASG MID Conclusions and Decisions

3.1.1 The subject was addressed in WP/16 presented by the Secretariat. The meeting reviewed the progress made for the implementation of the PIRG-RASG Conclusions and Decisions as at **Appendix 3A**.

3.2 Safety Subjects of interest to MIDANPIRG

3.2.1 The subject was addressed in PPT/11 presented by the Secretariat. The meeting was apprised of the MID Region safety priorities.

3.2.2 Based on the analysis of the reactive and proactive safety information for the period 2018-2022, the safety priorities defined for the MID Region are:

Regional Operational Safety Risks

- a. Runway Excursion (RE) and Abnormal Runway Contact (ARC) during landing;
- b. Loss of Control Inflight - (LOC-I);
- c. Mid Air Collision- (MAC);
- d. Controlled Flight Into Terrain- (CFIT); and
- e. Runway Incursion- (RI).

Organizational issues

- a. States' Safety Oversight Capabilities;
- b. Safety management;
- c. Human Factors & Human Performance;
- d. Competence of personnel; and
- e. Risk interdependencies.
 - Cybersecurity risks
 - GNSS Interference Risks
 - 5G interference with Radio Altimeter
 - aviation health safety (AHS) risks
 - Risks arising from conflict zones, and
 - Security risks with an impact on aviation safety.

Emerging Risks

- a. UAS, AAM, and manned VTOL-capable aircraft;
- b. Artificial intelligence (AI) in Aviation; and
- c. Digitalization in the aviation field.

3.2.3 The meeting also noted with appreciation the status of the MID region Safety performance.

3.3 Air Navigation Subjects of interest to RASG-MID**RVSM OPERATIONS AND MONITORING ACTIVITIES IN THE MID REGION (SMR2023)**

3.3.1 The subject was addressed in detail under Agenda item 5.3.

3.4 AGA-OPS Future Challenges for the MID Region

3.4.1 The subject was addressed in PPT/15 presented by the secretariat. The meeting was apprised of current Aerodromes Dashboards reflecting the Status of implementation levels of the major requirements that need to be implemented by Aerodromes in terms of Safety and, Capacity and Efficiency.

3.4.2 The meeting noted the Aerodromes challenges and priorities in the MID Region and encouraged States to take proactive actions, if not done yet, to ensure full implementation of the requirements related to the:

- Global Reporting Format (GRF) methodology which is currently applicable.
- Aircraft Classification Rating (ACR) - Pavement Classification Rating (PCR) method which is a standardized international airport pavement rating system that is scheduled to replace the ACN-PCN method as the official ICAO pavement rating system by November 28, 2024; and
- new Obstacles Limitation Surface (OLS) planned to replace the current ones that are currently stipulated in Annex 14 Chapter 4.

3.5 Safety Issues related to the Altimeter Setting Errors

3.5.1 The subject was addressed in WP/14 by the Secretariat.

3.5.2 The meeting recalled that ICAO has defined a specific strategy for approaches in Annex 10 Volume I: “(e) promote the use of Approach with Vertical Guidance (APV) operations, particularly those using Global Navigation Satellite System (GNSS) vertical guidance, to enhance safety and accessibility.”.

3.5.3 The meeting noted that for PBN approach the definition of a vertical path and guidance along that path should minimize the possibility of the loss of situational awareness (SA) on the approach path. Positioning on the lateral path is using augmented GPS and on the vertical path using either barometric altimetry (APV Baro) or geometric altimetry (APV SBAS).

3.5.4 It was highlighted that although, the instrument approach procedures relying on barometric altimetry have “considerably improved safety” by offering vertical guidance to runways, incorrect pressure settings can “severely affect” safety margins.

3.5.5 In this respect, the meeting noted that recent serious incidents have highlighted a concern on the effects of incorrect barometric altimeter settings when operating below the transition level. Operating with an incorrect altimeter setting could result in insufficient clearance with terrain and obstacles, or a loss of separation with other traffic, which may potentially lead to CFIT or mid-air collision.

3.5.6 It was pointed out that the subject has been brought forward to AIR NAVIGATION COMMISSION, at the 224TH SESSION, the ANC Commission requested the Secretary to promote existing material related to Baro-VNAV QNH setting error and current mitigations in order to raise awareness.

3.5.7 Based on the above and with a view to sensitizing the MID aviation community to the risks related to altimeter setting error, the meeting agreed to the following PIRG/RASG-MID Conclusion:

**PIRG/RASG CONCLUSION 4: RISKS RELATED TO ALTIMETER SETTING
ERRORS DURING APV BARO-VNAV AND
NON-PRECISION APPROACH OPERATIONS**

*That, ICAO MID promotes the EUR OPS BULLETIN at **Appendix 3B** on Risks related to altimeter setting errors during APV Baro-VNAV and non-precision approach operations and ensures the widespread dissemination of this bulletin among member States.*

REPORT ON AGENDA ITEM 4: RASG-MID WORK PROGRAMME**4.1 Follow-up on the RASG-MID/10 Conclusions and Decisions**

4.1.1 The subject was addressed in WP/16 presented by the Secretariat. The meeting was apprised of the progress achieved in the implementation of the RASG-MID/10 Conclusions and Decisions as at **Appendix 4A**.

4.2 Outcomes of the RASG-MID Groups (ASRG, SEIG, ASPIG and AIIG)**Progress Towards 2026-2028 GASP**

4.2.1 The subject was addressed in PPT/17 by the Secretariat.

4.2.2 The meeting noted the work being undertaken by the ICAO GASP Study Group (GASP-SG), which includes representation from MID States, to revise the GASP for the 2026-2028 edition.

4.2.3 The meeting also noted the process used to identify global safety issues, including common operational safety risks and organizational challenges.

4.2.4 The meeting was informed of the draft GASP goals and targets for the next edition of the Plan, other proposals that will be tabled at AN-Conf/14, as well as the subsequent steps to finalise the GASP for the 42nd Session of the ICAO Assembly in 2025.

ASRG Outcomes

4.2.5 The subject was addressed in WP/18 and PPT/19 presented by the secretariat. The meeting was apprised of the MID Region safety priorities.

4.2.6 Based on the analysis of the reactive and proactive safety information for the period 2018-2022, the safety priorities defined for the MID Region are:

Regional Operational Safety Risks

- a. Runway Excursion (RE) and Abnormal Runway Contact (ARC) during landing;
- b. Loss of Control Inflight - (LOC-I);
- c. Mid Air Collision- (MAC);
- d. Controlled Flight Into Terrain- (CFIT); and
- e. Runway Incursion- (RI).

Organizational issues**States' Safety Oversight Capabilities**

4.2.7 USOAP-CMA audits had identified that State's inability to effectively oversee aviation operations remains a global concern. In respect of MID Region, the regional average overall Effective Implementation (EI) (13 out of 15 States have been audited) is approx. 74, 07 %, which is above the world average 68.81% % (as of 20 July 2023). Three (3) States are currently below EI 60%.

4.2.8 All eight areas have an EI above 60%. However, the areas of AIG and ANS still need more improvement. With respect to the Critical Elements (CEs), CE4 (Qualified technical personnel) is below 60% (58.8%) EI, whereas CE8 (resolution of safety issues) is also below EI 60% (54.32%) EI. 4 areas and 4 critical elements are above the target of 75% EI.

4.2.9 Moreover, the effective implementation in certification, surveillance, and resolution of Safety concerns need to be improved.

Safety Management

4.2.10 States should build upon fundamental safety oversight systems to fully implement SSPs according to Annex 19; States shall require that applicable service providers under their authority implement an SMS. The average EI for SSP foundation PQs for States in the MID Region is 76, 18%.

4.2.11 Implementation of SSP is one of the main challenges faced by the State in the MID Region. The RASG-MID addresses the improvement of SSP implementation in the MID Region as one of the top Safety Enhancement Initiatives (SEIs). In connection with this, the RSC/7 endorsed the MID Region Safety Management Implementation Roadmap and the establishment of the Safety Management Implementation Team (SMIT) to support MID States in the implementation of the SSP. The SMIT handbook endorsed by the RASG-MID/9 to guide the work of the SMIT team to support States in an effective way.

4.2.12 In addition, the development of National Aviation Safety plan (NASP) is one of the MID region safety priorities and four (4) States had developed and published their NASPs in ICAO website.

4.2.13 In line with the Safety Strategic Objective of the International Civil Aviation Organization (ICAO), the 2023-2025 edition of the Global Aviation Safety Plan (GASP, Doc 10004) presents the global strategy for the continuous improvement of aviation safety. It also provides a framework in which regional and national aviation safety plans (RASPs and NASPs) are developed and implemented.

4.2.14 The States NASP should be developed in alignment with the GASP and the MID-RASP. However, priority should be given to national safety issues. Moreover, the NASP should be also aligned and coordinated with the MID-RASP (as appropriate).

Human Factors and Human Personnel

4.2.15 As new technologies emerge on the market and the complexity of the system continues to increase, it is of key importance to have the right competencies and adapt training methods to cope with new challenges. CRM has been identified as most important human factors issue in the domain of commercial air transport and safety actions would be identified and developed.

Competence of Personnel

Manage Risk Interdependencies

4.2.16 The COVID-19 crisis demonstrated that safety, security, health safety and other risks can no longer be managed in isolation. The aviation community has realized that continuing to develop tools and specific guidance for each situation and for each domain affected by transversal risks may delay not only the implementation of mitigation measures, but also the development of an enabling framework to support integrated, collaborative risk management.

Cybersecurity Risks

4.2.17 The global civil aviation ecosystem is accelerating towards more digitalization. This implies that any exchange of information within any digital workflow of the aviation community needs to be resilient to information security threats which have consequences on the safety of flight or the availability of airspace and beyond. Aware of the complexity of the aviation system and of the need to manage the cybersecurity risk the MID Region needs to consider and address information security risks in a comprehensive and standardized manner across all aviation domains. In addition, it is essential that the aviation industry and civil aviation authorities share knowledge and learn from experience to ensure systems are secure from individuals/organizations with malicious intent.

Security Risks with an impact on Aviation Safety

4.2.18 The implementation of aviation security measures can have a direct impact on safety aspects of aerodrome or aircraft operations. Airport security, aircraft security or in-flight security are the areas where the interdependencies are highly visible and where any security requirements should also consider potential impacts on aviation safety. States should consider where interdependencies between civil aviation safety and security exist.

4.2.19 Therefore, an integrated approach to the management of safety and security risks across the spectrum of aviation activities would bring benefits such as a complete overview of risks, a better sharing of security information and the closure of gaps in the security system while focusing on increasing the overall level of safety. Consequently, this would allow ensuring synergies where security measures can have an impact on safety and vice versa; thereby avoiding incompatible actions and strengthening the overall safety and security of civil aviation.

Risks arising from conflict zones

4.2.20 Some fatal accidents on conflicted areas raised the question why the aircraft was flying over an area where there was an ongoing armed conflict. Similar events had occurred in the MID Region. Thus, military or unlawful interference conflicts may occur in any State at any time and pose risks to civil aviation. This is why it's important for states, aircraft operators, and other airspace users such as air navigation service providers (ANSPs), to work together to share the most up-to-date conflict zone risk-based information possible to assure the safety of civil flights.

Aviation Health Safety (AHS) Risks

4.2.21 The COVID-19 pandemic has shown that the harmonization of health policies affecting aviation, and in particular the CAT domain, has become an important topic to help overcome the pandemic. The objective is to minimize the impact of health safety threats in CAT. Health safety threats should be included in the management of risk interdependencies.

4.2.22 COVID-19 is unlikely to be the last pandemic we will be faced with. It is crucial to continue supporting the MID Region aviation industry competitiveness by offering the safest aircraft interior environment to reduce the risk of disease transmission between continents and States, restore public trust and facilitate future responses to events of similar nature.

GNSS Interference Risks

4.2.23 Satellite navigation signals are used both for aircraft navigation and for aggressive aircraft/drone in the region. Satellite navigation signals are weak and can easily be compromised by a range of growing threats, including intentional or unintentional signal interference, jamming, spoofing, and/or the manipulation of position and timing information. The effects of such threats vary greatly. Satellite signal jamming can have a serious effect on the accuracy of navigation systems and, in some cases, results in unusual system behavior.

4.2.24 IATA MENA presented the first version of GNSS/GPS interference analysis in November 2020. It identified two major areas of frequently reported GNSS/GPS interferences: Eastern Anatolia and Eastern Mediterranean. To continue the effort, an updated analysis is produced for the year 2023.

4.2.25 The analysis from the Flight Data Exchange (FDX) extracted a total of 37,770 ‘GPS signal loss’ events in the MID region from January 2023 to December 2023 with the monthly rate trends for the FDX ‘GPS Signal Loss’ event rate of 92.96 events per 1000 FDX flights compared to world rate of 29.83 events per 1000 FDX flights.

EUR – MENA routes exhibit significantly higher rates of ‘GPS Signal Loss’ events compared to other regions. The rate is approximately 329.40 per 1,000 flights, indicating 45% of FDX flights experienced ‘GPS Signal Loss’ events on these routes.

Interference with Radio Altimeter

4.2.26 There is a major risk that 5G telecommunications systems in the 3.7–3.98 GHz band will cause harmful interference to radar altimeters on all types of civil aircraft- including commercial transport airplanes; business, regional, and general aviation airplanes; and both transport and general aviation helicopters. If there is no proper mitigation, this risk has the potential for broad impacts to aviation operations in the United States as well as in other regions where the 5G network is being implemented next to the 4.2-4.4 GHz frequency band.

Emerging Safety Risks

4.2.27 Emerging safety issues are risks that might impact Safety in the future, these may include a possible new technology, a potential public policy, a new concept, business model or idea that, while perhaps an outlier today, could mature and develop into a critical mainstream issue in the future or become a major trend in its own right.

4.2.28 Emerging issues are risks that might impact Safety in the future, these may include a possible new technology, a potential public policy, a new concept, business model or idea that, while perhaps an outlier today, could mature and develop into a critical mainstream issue in the future or become a major trend in its own right.

- UAS, AAM, and manned VTOL-capable aircraft;
- Artificial intelligence (AI) in Aviation; and
- Digitalization in the aviation field.

4.2.29 The meeting reviewed and endorsed the 11th MID-ASR and agreed to the following RASG-MID Conclusion:

RASG-MID CONCLUSION 11/1: 12TH ASR

That, the Twelfth MID Annual Safety Report is endorsed and be posted on the ICAO MID Website.

4.2.30 The MID Annual safety reports (ASRs) are available at the following link:
[12TH MID ASR EDITION- VER\(2018-2022\).PDF \(ICAO.INT\)](#)

4.2.31 The meeting noted the main challenge facing the ASRG for the development of the ASRs, in particular:

- Limited sharing of safety information and safety data analysis by the States.

4.2.32 In connection with the above, the meeting reiterated the importance of sharing of safety data analysis and safety information for improved ASRs development and urged States to provide the ICAO MID Office by end of May 2024 the safety data analysis and their associated safety recommendations for the period (2019 –2023). Accordingly, the meeting agreed to the following RASG-MID Conclusion:

RASG-MID CONCLUSION 11/2: SHARING OF SAFETY DATA ANALYSIS

*In respect of the next MID ASR edition, States are encouraged to provide necessary safety information and safety data analysis to the ICAO MID Office, by May 2024 related to each occurrence category in **Appendix 4B** for the past 5 years (2019– 2023) and using the templates in **Appendix 4C** and **Appendix 4D**. The Draft of the 13th edition of the MID ASR will be presented to the ASRG/6 meeting for review.*

Establishing a Data & Artificial Intelligence Group- UAE

4.2.33 The subject was addressed in WP/63 presented by UAE. The meeting was apprised and thanked UAE for proposing the establishment of the data & artificial intelligence group.

4.2.34 The meeting agreed that at this stage the data & artificial intelligence to be considered as a SEI/safety action in the MID-RASP 2023 -2025 Edition and to be led by UAE.

4.2.35 The meeting was informed that the FAA developed a roadmap on Artificial Intelligence (AI) and proposed to share it.

Collaborative Safety Team (UAE CST)- UAE and FAA

4.2.36 The subject was addressed in IP/14 and IP/ 17 presented by UAE and FAA.

4.2.37 The meeting was apprised and thanked UAE and FAA for sharing their experiences on the collaborative Safety Teams (CSTs) to promote a platform for sharing and exchange of safety data and safety information so that to drive safety improvements at the regional level.

4.2.38 The meeting noted that continually improving safety across the aviation system requires not only building on established approaches to risk identification and mitigation, but also adopting new tools and mechanisms that can further drive safety improvements.

Bird strike safety study – Oman

4.2.39 The subject was addressed in PPT/72 presented by Oman. The meeting was apprised and thanked Oman OTSB for sharing the bird strikes analysis study.

Advancing safety through information exchange- FAA

4.2.40 The subject was addressed in IP/8 presented by FAA.

4.2.41 The meeting noted with appreciation that the sharing of safety data and intelligence between States can help to better identify existing and emerging risks in the aviation system, allowing for a more holistic analysis and aligned safety outcomes.

4.2.42 The meeting also noted that by establishing a safety information exchange, States can effectively comply with their obligations under the Convention on International Civil Aviation and improve the overall level of aviation safety worldwide.

4.2.43 The meeting was informed on how the United States (U.S.) Federal Aviation Administration (FAA) is building capabilities in this area and exploring opportunities for global engagement.

GNSS Interference and spoofing-IATA

4.2.44 The subject was addressed in WP/69 and PPT/85 presented by IATA.

4.2.45 The meeting was apprised and thanked IATA for sharing the update of GNSS interference and spoofing statistics for the year 2023.

4.2.46 The meeting noted that the GNSS RFI has become a significant safety risk, particularly in geographical areas surrounding conflict zones and in the eastern Mediterranean and Middle East where RFI can increase pilots' and air traffic controllers' workload.

4.2.47 The meeting noted that IATA continues to monitor the issue GNSS interference and implement recommendations within its Safety Risk Assessment (SRA) at **Appendix 4E**.

4.2.48 The meeting also noted with concern the issue of GNSS interference and spoofing and tasked the CNS SG to manage the GNSS interference and spoofing and provide an update to the RASG-MID. Accordingly, the meeting agreed to the following RASG-MID Conclusion:

RASG-MID CONCLUSION 11/3: GNSS INTERFERENCE AND SPOOFING

That,

- a) ICAO with the support of states and IATA to establish a regionally determined minimum operational network (MON) of conventional navigation aids for use in case of GNSS interference /Spoofing;*
- b) States be urged to develop mitigation measures to be used in case of GNSS interference;*

- c) States to maintain adequate infrastructure to enable aircraft operators use of conventional navigation aids as appropriate during GNSS RFI or Spoofing;
- d) Original Equipment Manufacturers (OEMs) to provide further guidance and information on the effects and mitigations of GNSS RFI (including interference, jamming and spoofing) from the perspective of aircraft equipment;
- e) States to foster Civil-military coordination and cooperation; and
- f) ICAO with the support of States, ACAO, IATA and IFALPA to amend RASG-MID Safety Advisory – 14 including the update of the GNSS RFI statistics and to include GNSS spoofing effect and mitigation measures.

SEIG Outcomes

Update on the implementation Progress of the Safety Enhancement Initiatives (SEIs)

4.2.49 The subject was addressed in PPT/20 presented by the secretariat. The Middle East Regional Aviation Safety Plan (MID-RASP) 2023-2025 Edition at **Appendix 4F** presents the strategic direction for the management of aviation safety in the MID Region, to strengthen Member States Safety Oversight System, and risk-based approach to managing safety and support effective implementation of States' Safety Programmes (SSP) and Safety Management System (SMS) including the development of NASPs.

4.2.50 The MID-RASP 2023-2025 Edition identifies MID Region Safety Performance Measurement and Monitoring (SPMM) with specific safety targets in line with GASP and the RASG-MID would continuously monitor the implementation of the Safety Enhancement Initiatives (SEIs) and measure safety performance of regional civil aviation, to ensure the intended targets are achieved using the MID Region SPMM.

4.2.51 The meeting recalled that the tenth meeting of the Regional Aviation Safety Group – Middle East (RASG-MID/10) was held in Muscat, Oman, 14-17 May 2023; endorsed the MID-RASP 2023-2025 Edition including 24 Safety Enhancement Initiatives (SEIs) and 61 safety actions through RASG-MID Conclusion 10/7.

4.2.52 The meeting was apprised with appreciation on the updated progress on SEIs and their respective safety actions and noted that 26 Safety actions (43%) out of 61 have been implemented and completed. Accordingly, the meeting endorsed the updated implementation progress of SEIs and safety actions and agree to the following RASG-MID Conclusion:

RASG-MID CONCLUSION 11/4: IMPLEMENTATION PROGRESS ON THE SAFETY ENHANCEMENT INITIATIVES (SEIs)

That,

- a) *the implementation progress of the Safety Enhancement Initiatives (SEIs) and safety actions included in the MID-RASP 2023-2025 Edition at **Appendix 4G** is endorsed; and*
- b) *States, international organizations and industry are urged to support the MID-RASP 2023-2025 Edition activities including SEIs and safety actions.*

SEIs Guidance material development

4.2.53 The meeting noted with appreciation the guidance material developed by IATA on the carriage of Lithium batteries (LB). To address these regional operational safety risks IATA developed Guidance Material document. The purpose of the document is to provide guidance for complying with provisions applicable to the transport by air of lithium batteries as set out in the DGR manual.

4.2.54 The meeting was informed that LB are classified as dangerous goods and are subject to regulations that prescribe specific design type, testing, packaging, quantity limits, labelling and documentations requirements for carriage as a cargo by air.

4.2.55 The meeting also noted that it is designed to outline potential strategies operators which may wish to consider for addressing and mitigating the risks associated with the transport of lithium batteries, in cargo and mail as well as in passenger and crew baggage. Accordingly, the meeting endorsed the carriage and transport of Lithium batteries guidance material and agree to the following RASG-MID Conclusion:

RASG-MID CONCLUSION 11/5: CARRIAGE AND TRANSPORT OF LITHIUM BATTERIES GUIDANCE MATERIAL

*That, the guidance material document on the carriage and transport of lithium batteries at **Appendices 4H & 4I** is endorsed.*

MID Region Safety Priorities and Targets.

4.2.56 **Covered under Agenda item 3.2 “Safety Subjects of Interest to MIDANPIRG”.**

MID States Progress on NASPs Development

4.2.57 In line with the Safety Strategic Objective of the International Civil Aviation Organization (ICAO), the 2023-2025 edition of the Global Aviation Safety Plan (GASP, Doc 10004) presents the global strategy for the continuous improvement of aviation safety. It also provides a framework in which regional and national aviation safety plans (RASPs and NASPs) are developed and implemented.

4.2.58 The States NASP should be developed in alignment with the GASP and the MID-RASP. However, priority should be given to national safety issues. Moreover, the NASP should be also aligned and coordinated with the MID-RASP (as appropriate).

4.2.59 The meeting also recalled that the GASP 2023-2025 Target 3.2 calls for all States to publish a NASP by 2024.

4.2.60 The meeting noted that States of Iraq, Kuwait, Lebanon, Oman, Saudi Arabia, completed and shared their NASPs with ICAO MID office. Four out of five NASP s have been published in ICAO NASP website.

4.2.61 The meeting was informed that States of Iran, Kuwait, Qatar, Saudi Arabia, and UAE for shared their experiences and challenges related to the development of NASP.

4.2.62 The meeting was also informed about the NASP workshop delivered by ICAO MID Office

including the GASP and MID-RASP, the Global Aviation Safety Roadmap and the Use of Roadmap to develop NASP, and the process for developing NASP.

4.2.63 The meeting noted the challenges faced by States in developing their NASPs; which came in line with the identified organizational issues at the global level.

- Capacity building and training;
- Senior management commitment
- Limited resources including financial
- Limited qualified personnel;
- Safety data and safety information collection and analysis;
- Emerging of new technologies;
- Limited collaboration, coordination, and communication amongst stakeholders; and
- Limited guidance to develop a robust safety risk management framework and processes.

4.2.64 The meeting recognized the challenges facing the States in the development of their NASPs. In this respect, the meeting was apprised about the MID Regional Office to conduct dedicated Assistance Missions so that to support States with NASP development and implementation. Accordingly, the meeting agreed to the following RASG-MID Conclusion:

***RASG-MID CONCLUSION 11/6: DEVELOPMENT OF NATIONAL AVIATION
SAFETY PLAN (NASP) IN MID STATES***

That, States be:

- a) urged to develop and implement the NASP in line with the GASP and MID-RASP, if not yet done so;*
- b) encouraged to share the latest version of their NASPs with ICAO HQ and ICAO Regional MID office for posting on the GASP public website;*
- c) encouraged to continue to use existing ICAO guidance material and tools to implement their NASPs;*
- d) encouraged to request assistance from the ICAO MID Regional Office related to the development of their NASPs including the conduct of assistance missions and/or customized NASP Workshop for each State; and*
- e) encouraged to share their experiences related to the development of their NASPs during the SEIG meetings and/or Regional NASP Workshop to be organized by the ICAO MID Regional Office in 2025.*

State Safety Programme (SSP)

4.2.65 The meeting recalled the Regional Roadmap for Safety Management Implementation and the Safety Management Implementation Team (SMIT) Handbook endorsed by through RSC Conclusion 7/10 and Conclusion RASG-MID 9/4 respectively. States should build upon fundamental safety oversight systems to implement effective SSPs. As per Annex 19, States shall require that applicable service providers under their authority implement an SMS. The SMS enables service providers to capture and transmit safety

information, which contributes to safety risk management. An SSP requires the implementation of a risk-based approach to measure and monitor the safety performance of the State's civil aviation system and the progress towards achieving the State's safety objectives. In this context, the role of the State evolves to include the establishment and achievement of safety performance targets, as well as effective oversight of its service providers' SMS.

4.2.66 The meeting also recalled that the GASP 2023-2025 Edition Goal 3 Target 3.1 calls for all States to implement the foundation of an SSP by 2023.

4.2.67 2.24 The meeting was informed that the template on the development of State Safety Programme (SSP) in MID States was sent to States through State Letter Ref.: ME 4/1.7 & FS 7/3- 22/252 dated 9th November 2022. As a result, ten (10) states replied to the SL namely Bahrain, Egypt, Iran, Iraq, Jordan, Kuwait, Lebanon, Libya, Sudan, and UAE.

Proposals for the amendment of Annex 19

4.2.68 The meeting was informed about MID Office presentation on the Proposals for the amendment of Annex 19 including and consequential amendments to Annexes 1; 6 Parts I and III; and 13.

4.2.69 The meeting noted that states of Iran, Kuwait, Libya, Qatar, Saudi Arabia, and UAE for shared their experiences and challenges related to the development of SSP.

4.2.70 The meeting noted the challenges faced by States in developing their SSP:

- Legislation amendments;
- Capacity building and training;
- Limited qualified personnel;
- Limited guidance to establish and develop a Safety data and safety information collection and analysis;
- Limited collaboration, coordination, and communication amongst SSP stakeholders;
- Limited guidance to develop a robust safety risk management framework and processes; and
- Transition from a prescriptive approach to a more risk-based and performance-based approach.

4.2.71 The meeting recognized the challenges facing the States on the development of SSP. In this respect, the meeting was apprised about MID Regional Office to conduct dedicated Assistance Missions so that to support States with SSP development and implementation. Accordingly, the meeting agreed to the following RASG-MID Conclusion:

RASG-MID CONCLUSION 11/7: DEVELOPMENT OF SSP IN MID STATES

That, States be:

- a) *encouraged to effectively implement their State Safety Programme in a timely manner, and to strengthen the implementation of safety management systems in their aviation industry;*
- b) *encouraged to request assistance from the ICAO MID Regional Office related to*

the development and implementation of their SSPs including the conduct of assistance missions and/or customized SSP implementation and Safety Risk Management Workshops for each State;

- c) encouraged to support the SMIT activities;*
- d) share their experiences on the development of their SSPs during the SEIG meetings; and*
- e) encouraged to share their latest version of SSP manuals with ICAO MID Office.*

NCMCs Meeting

4.2.72 The National Continuous Monitoring Coordinators (NCMCs) meeting was held on 17 October 2023 during SEIG/5 meeting. The meeting was a great opportunity to share experiences, challenges and best practices, which were appreciated by all participants. Egypt, Iran, Iraq, Jordan, Kuwait, Libya, Qatar, Saudi Arabia, UAE and Yemen presented the status of their safety oversight systems, challenges faced and best practices.

4.2.73 The meeting noted the following common challenges/difficulties:

- 1) lack of sufficient human resources (qualified technical personnel) to meet the State's obligations and carry out oversight functions and mandate;
- 2) Insufficient financial resources in some States;
- 3) Inability to attract, recruit and retain sufficiently qualified/experienced technical personnel;
- 4) Providing sufficient training;
- 5) Inadequate separation of regulatory/oversight functions and service providers/operators in some States;
- 6) Independent AIG Authority; and
- 7) Political/Security situation/stability in some States.

4.2.74 The meeting noted with appreciation the sharing of experience in the preparation, conduct and follow-up of ICAO USOAP-CMA activities and identified the following as best practices and actions:

- 1) update all CAPs to fully address the PQ findings and report the progress made on the CAPs implementation through OLF, which is a vital factor for the planning and conduct of the USOAP-CMA validation activities including ICVM to enhance the EI;
- 2) address the PPQs first (Breakdown of PQs and PPQs);
- 3) continuously update the self-assessment to conduct internal audits, prepare for ICAO USOAP CMA activities; and monitor the civil aviation safety oversight system;
- 4) high level commitment and engagement (regular briefings and meetings);

- 5) assignment of focal point(s) for each audit area;
- 6) training of personnel (USOAP-CMA CBT, Workshop, participation in ICVMs and Audits), including the conduct of a USOAP-CMA Workshop (cost-recovery basis) at National level;
- 7) take advantage of other States experiences; and
- 8) regular update of the required information such as the State Aviation Activities Questionnaire (SAAQ) and Compliance Checklist/Electronic Filing of Differences (CC/EFOD).

4.2.75 Accordingly, the meeting is invited to urge States to take necessary actions to overwhelm the challenges related to USOAP CMA, and take advantage of the experience in the preparation, conduct and follow-up of ICAO USOAP-CMA activities as best practices and actions review.

Psychoactive substances management programme (PSMP) regulation - UAE

4.2.76 The subject was addressed in the WP/64 presented by the UAE.

4.2.77 The meeting was apprised and thanked UAE for sharing their experience on the establishment and implementation of psychoactive substances management programme (PSMP) regulation.

4.2.78 The meeting noted that the use of psychoactive substances within the aviation industry poses a significant risk to safety and operational integrity. Therefore, the objective of the PSMP regulation is to establish guidelines that ensure an effective management of psychoactive substances within the aviation industry, safeguarding the well-being of aviation personnel and promoting a safe operating environment.

4.2.79 The meeting noted that the FAA showed their willingness to share their regulations on drug and alcohol.

4.2.80 The meeting agreed that the UAE will provide statics and preliminary analysis on the psychoactive substances to the ASRG so that to be managed under Human Factor SEI and then to share the experience on the global level.

States Safety Programme (SSP) enablers - KSA

4.2.81 The subject was addressed in the IP/13 presented by the KSA.

4.2.82 The meeting was apprised and thanked KSA for sharing their experience in the development and implementation of State Safety Programme (SSP).

4.2.83 The meeting noted that an effective implementation of an SSP is crucial for ensuring the highest level of safety in aviation operations. To achieve this, various tools and mechanisms are employed to identify, mitigate, and manage risks. Among these tools, performance-based oversight, risk register, and risk profile are integral components that play a significant role in ensuring robust and proactive safety management.

Establishment of MENA RSOO - KSA

4.2.84 The subject was addressed in WP/82 presented by the KSA.

4.2.85 The meeting was apprised and thanked KSA for sharing their experience on the establishment of establishment of the Middle East & North Africa Regional Safety Oversight Organization (MENA RSOO).

4.2.86 The meeting noted that the primary objective of the MENA RSOO is to assist its Member States to develop and implement their State Safety Programme (SSP), and to provide assistance to enhance the safety oversight capabilities of States.

4.2.87 The meeting also noted that the MENA RSOO was formally established in Riyadh – Saudi Arabia in December 2023 following an official signing ceremony by eight (8) countries on the sideline of the 15th ICAO Air Services Negotiation Event.

Oman CAA Experience in addressing common ORG findings-Oman.

4.2.88 The subject was addressed in the WP/80 presented by Oman.

4.2.89 The meeting was apprised and thanked Oman for sharing their experience in enhancing its guidance materials and procedures to address ORG findings identified by the ICAO USOAP audit and their willingness to provide guidance and share expertise with member states in addressing their safety deficiencies identified in ORG Area.

4.2.90 The meeting noted the measures taken by Oman CAA to allocate sufficient financial resources to meet national and international obligations as well as the improvements in credential management and the methodology for calculating staffing needs.

4.2.91 The meeting commended the State-to-State coordination conducted between Oman and Jordan. The meeting also encouraged all states to consider the same successful practice between Oman and Jordan as collaboration mechanism to enhance effective implementation of MID Region State safety oversight.

Oman Erteqaa program for State Safety Oversight System

4.2.92 The subject was addressed in the WP/75 presented by Oman.

Indicated in the Agenda item 2.2 report.

ASPIG Outcomes

4.2.93 The subject was address in WP/22, presented by the secretariat.

Aerodromes Safety Dashboard Updates

4.2.94 The meeting reviewed. and updated the Aerodromes Safety Dashboard as at the **Appendix 4J** and agreed that the list of International Airport to be monitored should be updated as per the individual AIP of each State.

Follow-up of the Aerodromes SEIs included in the MID Regional Aviation Safety Plan (MID RASP) 2023-2025 Edition.

4.2.95 The meeting noted the implementation progress of AGA related to Safety Enhancement Initiatives (SEIs) included on the MID Regional Aviation Safety Plan (MID RASP) 2023-2025 Edition.

Anonymous Dataset for Aerodromes Safety

4.2.96 The meeting noted the fact that not efficiently addressing identified non-compliances at individual aerodromes, could lead to decreased public confidence in the safety of the aviation industry within the region. The meeting highlighted that this could have a negative impact on the industry as a whole and might lead to decreased demand for air travel within the region.

4.2.97 In this regard, the meeting highlighted that an anonymous dataset could help to identify regional trends in safety deficiencies and related corrective action plans. The meeting indicated that by collecting data from a large number of aerodromes within a region, it is possible to identify patterns and trends that may not be apparent at the individual aerodrome level.

4.2.98 In addition, the meeting noted that an anonymous dataset can be used to share best practices across aerodromes within a region. Consequently, by capturing successful corrective action plans, aerodrome operators and Civil aviation authorities within the MID Region can learn from each other and implement effective solutions to safety deficiencies.

4.2.99 Moreover, the meeting noted that an anonymous dataset can help to harmonize safety standards across aerodromes within a region. Therefore, by identifying common safety deficiencies and implementing similar corrective action plans, it is possible to ensure that safety standards are consistent and effective across the MID Region.

4.2.100 The meeting underlined that an anonymous dataset could serve as an early warning system for potential safety hazards related Aerodromes Design and Operations within the MID Region. Consequently, by collecting data from a large number of aerodromes within the region, it is possible to identify emerging safety issues before they become widespread.

4.2.101 In conclusion, the meeting agreed that establishing an anonymous dataset could be a useful tool for promoting safety and improving the effectiveness of the corrective action process at the regional level. By identifying trends, sharing best practices, harmonizing safety standards, serving as an early warning system, and improving the safety culture, aerodrome operators and aviation authorities within a region can work together to create a safer and more efficient system.

4.2.102 The meeting noted that the envisaged benefits of the proposed Anonymous Dataset Collection for Aerodrome Safety include the following:

- a) Consistency in reporting across all MID States with respect to the listed Sub-areas;
- b) Ability to derive trends and propose common solutions;
- c) Facilitation of reporting by States and Organizations.
- d) Consistency in the prioritization of follow-up actions to be planned by the ICAO MID Regional Office and other concerned parties.

4.2.103 Based on the above, the meeting endorsed to the following Conclusion:

RASG-MID CONCLUSION 11/8: ANONYMOUS DATASET COLLECTION FOR AERODROMES SAFETY

That, in order to promote safety and improve the effectiveness of the corrective action process at the regional level, MID States and concerned Stakeholders are urged to:

- a) endorse the Template listing of Minimum Reporting Areas of non-compliance to be reported, as presented at **Appendix 4K**, to ICAO MID Office for consolidation and follow-up actions, and*
- b) nominate a Main/National Focal Point responsible for the anonymous communication of these datasets using the Template.*

Solar Lighting and Sustainable Technologies

4.2.104 The meeting notes that the UAE GCAA has taken proactive measures to promote adoption of solar lighting technology in aerodromes. To this end, the UAE GCAA launched a National Sustainable Lighting initiative in January 2023 and UAE GCAA organized a series of industry workshops, creating a platform for industry experts to exchange ideas, share best practices, and discuss the challenges and opportunities of solar lighting systems. The meeting noted that the workshops brought together stakeholders from the aviation industry and government entities to explore the latest innovations and advancements in sustainable lighting technologies.

4.2.105 The meeting highlighted that UAE emphasized on the need to have international provisions about Solar Lighting and Sustainable Technologies. Therefore, the meeting noted that an Action Group, been championed by UAE and supported by IFALPA and Libya, was tasked by the ASPIG to explore more about the subject and work on the rationale behind the need to have international provisions/guidance using Data Driven approach.

Air Cargo Safety Management Guidelines

4.2.106 The meeting may wish to recall that the RASG/10 Meeting agreed that this initiative will be considered as safety action in the MID-RASP 2023-2025 Edition and the Aerodromes Safety Planning and Implementation Group (ASPIG) will be coordinating the development of the related guidelines. Therefore, the meeting noted that an Action Group, been championed by Oman and supported by Bahrain, IFALPA and IATA, was tasked by the ASPIG to develop the Regional Guidelines on Air Cargo Safety Management

Ground Damage: Aircraft Ground Incidents

4.2.107 The meeting noted that the ASPIG was apprised of the IATA charts indicating the Aircrafts Ground Incidents rate in the MID Region. The meeting noted the IATA concern about the accumulated rate of incidents and encouraged States to report ground damage incidents/serious incidents to feed the IATA IDX Database. The meeting agreed that IATA and ICAO MID coordinate a Webinar on the IDX Database with a focus on ground damage.

ICAO Bird Strike Information System (IBIS) Focal Points

4.2.108 The meeting noted the importance of reporting Bird Strike events to ICAO for data processing through the ICAO Bird Strike Information System (IBIS).

4.2.109 The meeting noted the following main challenges related to data Bird Strike Information processing of bird strikes events are:

- Lack of data qualification due to uniformity (different parameter ranks, languages, file format etc),
- Lack of contact point/responsible person,
- COVID-19 pandemic period (2019-2021),
- Data from ECCAIRS consists only 14% of total data,
- Insufficient capabilities of ECCAIRS.
- Majority of data is gathered by requesting from contact point personally.

4.2.110 The meeting noted with concern the very low reporting rate of bird strike events emanating from the MID Region. Therefore, the meeting encouraged States to feed the ICAO IBIS after registering the bird strike events by systematically conveying these records to ICAO HQ.

4.2.111 The meeting agreed that all MID State should update, if not done yet and without delay, their States Focal Points Contacts to them by replying to the ICAO MID Office State Letter Ref.: AN 5/1.1-23/121 dated 1 June 2023.

Aerodrome Certification vs Proposal of Amendment of the Regional ANP

4.2.112 The meeting indicated that the list of international Airport should be reflected on the Regional ANP Vol I, Table I-I. In this regard, the meeting noted the following general principles:

- The plan does not list all the facilities and services existing in the region but only those required as approved by the ICAO Council for international civil aviation operations.
- Air navigation facilities, services and procedures recommended for the area under consideration should form an integrated system designed to meet the requirements of all international civil aircraft operations.
- The plan should meet the requirements of all operations planned to take place in the area during the **next five years**, but not necessarily limited to that period, taking due account of the long-term planning and implementation strategies.
- Corrections to the plan should be notified to the ICAO Regional Office accredited to the State.

4.2.113 The meeting noted that the ASPIG was apprised of the procedure to amend ANPs found in ANPs and the online system to process amendments to eANPs. The meeting noted that Airports listed in ANP are not necessarily listed in AIPs since these airports may be planned and are being built but not commissioned. Conversely, all international airports listed in AIP should be listed in the ANP since the AIP shows “operating” airports.

4.2.114 In conclusion, the meeting noted the following considerations:

- International airports can be found not just in ANPs but also AIPs;

- not all airports listed in ANPs are listed in AIPs but the reverse is true;
- not listing international airports in ANPs does not obviate the need for certification;
- all airports used for international operations to be certified per Annex 14, Vol I, para 1.4.1 irrespective if it is listed/not listed in ANPs; and
- list of certified international airports can be found in a State's AIP.

Water Aerodromes

4.2.115 The meeting recalled that the Assembly Resolution A40-8 that requests the Council, within the current allotted budget, and as a matter of priority, to review existing SARPs related to aerodromes and to develop specific Standards and Recommended Practices in the appropriate Annexes to the Convention in order to address the design, certification, management, safety and reporting requirements for water aerodromes operations.

Vertiport Regulation

4.2.116 The meeting noted that, in 2022, the UAE carried out an applicability assessment, initial impact assessment and a gap analysis against ICAO Annex 14 Volume 2, FAA Engineering Brief No. 105 Vertiport Design, and EASA PTS-VPT-DSN, and drafted the first national regulation of its kind on Vertiports.

4.2.117 The meeting highlighted that, the UAE has developed a robust regulatory framework for the certification and oversight of vertiports with the following objectives:

- a) Ensure continued safety, regularity and efficiency of VTOL/eVTOL aircraft operations at vertiports and aerodromes.
- b) Ensure the vertiport is in compliance with the relevant national regulations and international standards and best practices.

4.2.118 The meeting noted that UAE referred the UAE Civil Aviation Regulation on Vertiports (CAR-HVD) to the ICAO Vertiport Design Subgroup for discussion and consideration in the development of relevant SARPs.

4.2.119 The meeting noted with appreciation UAE proposal to offer support in providing guidance and trainings to member states on vertiports certification. The meeting agreed that UAE will coordinate with ICAO MID Office to conduct a two-day Webinar on Vertiports Certification.

Certification of Heliport, Helideck, and Vertiport Training Providers

4.2.120 The subject was addressed in WP/61 presented by UAE. The meeting was apprised of the UAE Civil Aviation Regulation on Heliport, Helideck and Vertiport Training Provider Certification (CAR-HVD) and noted with appreciation the UAE General Civil Aviation Authority invitation to States, interested in benchmarking, to visit their certified training centres.

4.2.121 The meeting noted with appreciation the discussion raised by UAE on Advanced Air Mobility (AAM). Accordingly, the meeting agreed that the AAM to be included in the MID-RASP 2023-2025 Edition as a SEI/Safety action and UAE to take the lead in developing an AAM study report to be presented to SEIG/6 meeting for review.

The New concept of the Aircraft Classification Rating/Pavement Classification Rating (ACR-PCR)

4.2.122 The meeting noted that the ASPIG was apprised of the Development process of the ACR-PCR method that was finalized by the Airfield Pavement Expert Group (APEG) in the beginning of 2018, followed by the full ICAO review and adoption process.

4.2.123 The meeting noted that the ACR-PCR method has been effective since July 2020 as:

- Aircraft manufacturers should start publishing their ACR,
- Trainings for users (CAAs, airports, aircraft manufacturers) could be initiated,
- CAAs should implement the new ICAO standard into the national regulations,
- Airports could consequently start implementing the new protocol.

4.2.124 The meeting noted that the method will be fully applicable in November 2024 where Airports would have published their PCR accordingly. The meeting emphasis on the importance of training prior the deployment phase. The meeting highlighted that training should be targeting specific audience notably:

- Specialized airport engineers.
- Consultants working on airport pavement design.
- Specialized State CAA engineers

Aerodromes Emergency Planning

4.2.125 The subject was addressed in WP/60 presented by UAE. The meeting was apprised of the UAE experience on the application of the risk-based approach to emergency planning at airports with multi-runway operations.

4.2.126 The meeting encouraged States to consider developing and implementing similar guidance related to the subject and encourage member states to share their experiences and best practices thence.

Obstacles Control

4.2.127 The subject was addressed in WP/62 presented by UAE. The meeting noted with appreciation the Obstacle Control and Oversight Regulatory Framework applicable in UAE and encourage States to share regulatory development and implementation experiences for the benefit of all members.

4.2.128 The meeting agreed to conduct a study related to the subject within the ASPIG framework then decide the proposed safety action under the appropriate MID RASP SEI.

*AIIG Outcomes***MENA ARCM/3 MEETING*****Database management***

4.2.129 The subject was address in WP/23, presented by the secretariat.

4.2.130 The meeting was informed about the work progress achieved related to the MENA ARCM database management and noted that the MENA ARCM meeting agreed to the following:

- The criteria and parameters of the Database presented by the MENA ARCM Coordinator.

-
- Initially use a shared folders (excel sheet) for data collection and management. ACAO will assist in developing and hosting the shared-folder, and the MENA ARCM Coordinator to manage and update it.
 - The MENA ARCM Coordinator to draft a technical and financial project proposal in coordination with ACAO and ICAO. In addition, ICAO & ACAO to support in identifying the resource mobilization and funds for the project.
 - Establish an online platform for the management of the database and the technical assistance activities.

Technical Assistance

4.2.131 The meeting was provided with a progress update on the MENA ARCM technical assistance and noted the following:

- The technical assistance process based on the UAE proposal has been presented. It includes two parallel mechanisms using excel sheet or online platform. Dedicated forms have been established for that process.
- Mauritanian and Libyan representatives requested for training support in the field of accident investigation. It has been recommended to use the excel sheet process for that purpose.
- Moroccan AIB kindly offered free seats for MENA ARCM member states to participate in Aircraft accident investigation training course planned for 2023.
- Oman Transport Safety Bureau (OTSB) kindly offered free seats for MENA ARCM Member States to participate in the upcoming specialized courses related to Air Accident investigation organized with the support of International Society of Air Safety Investigators (ISASI)
- The technical assistance process has been insightfully discussed, and the decision has been taken to use it as it is and to review it based on the lessons learnt.
- The Key Performance Indicators has been presented and validated.
- The Non-Disclosure Agreement (NDA) has been presented and the need for it was discussed. However, as paragraph 6 of the MENA ARCM MoU refers, it has been agreed that there is no need for NDA signature by the MENA ARCM States especially with the consideration that the signature would require a complicated process at national level. This shall not prevent States from signing it or signing any equivalent statement for a case-by-case bilateral assistance program.

Event Risk Classification Methodologies workshop

4.2.132 The meeting noted with appreciation the workshop provided to States by ICAO MID Office on the Aviation Risk Management Solution – Event Risk Classification (ARMS - ERC) and European Risk Classification Scheme (ERCS).

ICAO & GCAA Symposium: The Future of Aviation safety and Aircraft Accident Investigation

4.2.133 The meeting noted that the General Civil Aviation Authority (GCAA) of the United Arab Emirates (UAE), in cooperation with the International Civil Aviation Organization (ICAO) has successfully organized the 1st "Future of Aviation Safety and Aircraft Accident Investigation" Symposium in Dubai, during 3 to 4 May 2023.

4.2.134 The meeting was informed that the symposium highlighted the importance of international cooperation in addressing global issues and improving aviation safety standards. The event included keynote speeches, presentations, and panel discussions on topics such as Unmanned Traffic Management and commercial space operations. The symposium provided a forum for experts to exchange ideas and best practices to enhance aviation safety worldwide.

MENA ARCM/4 MEETING**UPDATED PROGRESS ON DATABASE**

4.2.135 The meeting was informed about the analysis of the responses received from the States on the database questionnaire and noted that:

- Nine (9) States out of the 14 Member States responded to the questionnaire and provided updated information. Therefore, MENA ARCM States which did not so, are urged to complete and send the questionnaire to the MENA ARCM Coordinator at the earliest.
- (7) seven areas and (26) twenty-six subareas of cooperation were presented including human resources and technical capabilities of the Member States.

Update on MENA ARCM Technical Assistance Process

4.2.136 The meeting was informed about the update progress on the technical assistance process:

- Establishment of MENA ARCM Logo to strengthen the MENA ARCM identity.
- IFALPA kindly offered for the use of IFALPA Training capabilities for the purpose of aircraft accident investigation.
- Biannual MENA ARCM progress status report to be submitted to the Chairpersons by the MENA ARCM Coordinator for their perusal. Then once finalized, it will be circulated to the MENA ARCM Members for information.
- Updated progress on MENA ARCM Technical Assistance process, to assess the effectiveness of such process, it was decided the use of onsite training case between the Moroccan AIB and KSA AIB for trial.
- MENA ARCM Technical Assistance Standard Operation procedures (SOP) is being developed and will be shared by the MENA ARCM Coordinator.

Shared folders and online platform update

4.2.137 The meeting was provided with an updated progress on the shared folders and the online platform and noted that:

- ACAO established an online Share-folder for data collection and management. A

demonstration of the share-folder has been provided to familiarize the users with the tool.

- For ease of the use of the share-folder, a testing phase will be organized in the upcoming months including awareness virtual training.
- The sharing of future events via the share-folder as requested by Oman.
- The technical assistance Form will continue to be used through emails awaiting the official launch of the use of the share-folder.
- The Share-folder access and use be only limited for MENA ARCM Member States considering the data sensitivity and protection.
- The cost estimation related to the MENA ARCM online database platform to be prepared by MENA ARCM Coordinator, ACAO, and ICAO and be shared with Chairpersons by the end of 2023 for consideration.

ICAO Annex 19 Amendment 2 Proposals

4.2.138 The meeting was informed that ICAO MID office provided to the States the latest update on Safety Management activities, including the content of Amendment 2 to Annex 19 and the 5th edition of the Safety Management Manual ICAO Doc 9859.

The Prevention of Aircraft Accidents and Incidents Through the Collection & Analysis of Safety Data & Safety Information Workshop

4.2.139 The meeting noted that the Fourth Meeting of Middle East North Africa Aircraft Accident and incident Investigation Regional Cooperation Mechanism (MENA ARCM) Committee was held at Rabat, Morocco from 10 to 12 July 2023 back-to-back with “*The Prevention of Aircraft Accidents and Incidents through the Collection & Analysis of Safety Data & Information*” Workshop.

4.2.140 The meeting also noted that the workshop focused and explored various aspect on the collection of safety data & safety information and noted the main outcome of the workshop:

- Highlighted that advanced technologies and digital systems provide us with real-time monitoring, maintenance records, flight data, and numerous other valuable sources. Nevertheless, having data alone is not enough.
- Encouraged States and industry for the development of robust frameworks and mechanisms to collect, collate, and analyze safety data and safety information effectively.
- Urged states and industry to embrace a culture of data-driven safety, create and promote a non-punitive safety culture, and foster a culture of transparency and collaboration among all stakeholders.

MENASASI Seminar

4.2.141 The meeting noted that the MENASASI Seminar was hosted in Jeddah, Saudi Arabia (8-9 Nov 2023) back-to-back with the Health & Safety Hazards in Air Accidents Response and Evidence Awareness for Air Accidents Responders workshop provided by Cranfield University on 7 Nov 2023.

Assistance to aircraft accident victims and their families- UAE.

4.2.142 The subject was address in WP/71 presented by the UAE.

4.2.143 The meeting noted with appreciation and thanked UAE for sharing the challenges in establishing and implementing an effective national plan for providing assistance to aircraft accident victims and their families.

4.2.144 The meeting also noted the importance of assigning specific roles and responsibilities to different stakeholders involved, such as air operators, aerodromes, and other non-aviation stakeholders.

4.2.145 The meeting agreed to assign the Air Accident and Incident Investigation Group (AIIG) to:

- evaluate the family assistance frameworks existing in the MID Region States, and provide a report to RASG-MID.
- propose a platform that will facilitate the entry and movement of aircraft accident victims, their families, and family support staff among the States.

4.2.146 The meeting was informed that the Conference on “Assistance to Aircraft Accident Victims and their Families” will be hosted in Muscat, Oman (7-9 May 2024) and encouraged states, international organizations, and industry to support the Conference.

4.3 SSP Workshop

4.3.1 The subject was addressed in PPT/24 presented by the secretariat. The meeting commended ICAO MID office for conducting the SSP workshop.

4.3.2 The meeting noted that the SSP overview workshop covered the Safety Management Fundamentals; System Description including interfaces; SSP Gap Analysis & Implementation Plan; SSP Coordination Group; States Safety policy and objectives; Training; SRM Framework; Safety Intelligence; Safety performance Management; Management change at the State level, and GASP.

4.4 Future Work Programme

4.4.1 The subject was addressed in WP/52 and WP/53.

REPORT ON AGENDA ITEM 5: MIDANPIRG WORK PROGRAMME**5.1 Follow-up on the MIDANPIRG/20 Conclusions and Decisions**

5.1.1 The subject was addressed in WP/26 presented by the Secretariat. The meeting reviewed the progress made in the implementation of MIDANPIRG/20 Conclusions and Decisions. The actions taken by States and the Secretariat were reviewed. The updated list is provided at **Appendix 5A**.

5.2 MID Region Air Navigation priorities and targets***MID ANP, Volume I: FIR Boundaries PfA***

5.2.1 The subject was addressed in WP/27 presented by the Secretariat. The meeting reiterated MIDANPIRG Conclusion 20/13 regarding necessity of the FIRs descriptions by the States and stressed the importance of supporting a process for checking alignment, and validation of data accuracy.

5.2.2 The meeting noted that ICAO MID Office had carried out required coordination with Iraq, Kuwait, Lebanon, Libya, Oman and Syria as well as ICAO HQ (ANB) to include the lateral limits coordinates and vertical dimensions of their FIRs/UIRs and SRRs in Tables ATM I-1 and SRR I-1, but due to number of inconsistencies only three States (Iraq, Libya and Syria) were ready to submit their own PfAs separately through the ICAO MID Office.

5.2.3 The meeting noted the following key issues and challenges identified in coordination with States as detailed in **Appendix 5B**:

- a) non-adherence with guideline at **Appendix 5C**;
- b) lack of coordination between adjacent States to publish common FIR coordinates;
- c) lack of publication of the FIR description; and
- d) non-adherence with the current coordinates published in ANP, Volume I, Chart ATS – 1.

Progress Report on C-DEC 225/10: Implementation of Doha FIR/SRR

5.2.4 The meeting noted with appreciation that a side meeting for the Multilateral Coordination Group meeting was organized. The meeting encouraged Bahrain and Qatar to continue working together and submit the joint report to ICAO MID Office; in order to arrange for the next multi-lateral group meeting.

Outcomes of the RANP/NANP TF meeting

5.2.5 The subject was addressed in WP/29 presented by the Secretariat.

5.2.6 The meeting noted that the first meeting of the RANP/NANP TF/1 was held in Cairo, Egypt, 19-22 February 2024, which was attended by 55 participants from 10 States and 2 international organizations. The meeting unanimously elected Mr. Nasser Al-Khalaf, Air Traffic Controller & ANS Advisor, Qatar Civil Aviation Authority (QCAA) as the Chairperson and Mr. Abdullah M. Albathi, Director of Air Navigation Safety Systems, Saudi Arabia General Authority of Civil Aviation Authority (GACA), as the Vice Chairperson of the RANP/NANP TF.

5.2.7 The meeting reviewed and agreed to the Terms of Reference (ToRs) of the RANP/NANP Task Force at **Appendix 5D**.

5.2.8 The meeting underlined the importance of designation of Focal Points for internal coordination (at National level) of the submission of required data to the ICAO MID Office. The contact details of the designated focal points and alternates are at **Appendix 5E**.

5.2.9 The meeting reviewed and endorsed the draft of new edition of the MID Air Navigation Strategy (ICAO MID Doc 002) at **Appendix 5F**.

5.2.10 The meeting underlined the need for the MIDANPIRG Sub Groups to allocate enough time in their agenda for the detailed discussion of the ASBU Threads relevant to their technical areas, including the identification of priorities, definition of applicability areas, performance indicators, metrics, targets, etc.

5.2.11 The meeting thanked Kuwait, Qatar, Saudi Arabia and UAE for sharing their experience in the development of National Air Navigation Plan (NANP).

5.2.12 The meeting noted that, although Kuwait, Saudi Arabia and UAE had used the recommended ICAO 6 steps approach for the development of their NANP, they used different methodologies for the implementation of the PBA and they endorsed different structures/layouts and content of the NANP.

5.2.13 The meeting noted that the NANP should be dynamic; and could be structured as a combination of multiple Documents, a web portal, a phone application, etc. The meeting agreed on the importance of automated processes/tools for the development and implementation of NANP; and monitoring and reporting purpose.

5.2.14 The meeting recalled that the GANP & NANP Workshop (Cairo, Egypt, 5-8 March 2023) identified the following challenges related to the implementation of PBA:

- a) Lack of understanding of the performance based approach and its benefits and necessary coordination between all stakeholders at National level;
- b) Lack of automated tools to collect the data necessary for the measurement of the ANS Performance (KPIs);
- c) Lack of historical data in some States;
- d) Lack of human and financial resources in some States;
- e) Lack of guidance related to the implementation of the 6 steps approach and development of the NANP.

5.2.15 The meeting underlined the importance of alignment of the different plans of the service providers and operators at National Level (Airport Operators, ANSPs and Airlines) and the need for cooperation and collaboration at National Level for a successful development and implementation of NANP. The meeting highlighted also the importance of consultation with the users and concerned States and stakeholders, as appropriate, during the development of NANP (the 6 Steps).

5.2.16 The meeting recalled that MIDANPIRG, through Conclusion 20/9, tasked the ICAO MID Office to conduct assistance missions/Workshops at National level on GANP/NANP in 2023-2024. The meeting noted that the ICAO MID Office conducted an assistance mission/Workshop to Kuwait (28

May – 1 June 2023) to support the development of NANP. The meeting encouraged States that need assistance for the development of NANP, to request assistance from the ICAO MID Office.

5.2.17 Based on the above, the meeting agreed to the following Conclusions:

MIDANPIRG CONCLUSION 21/1: RANP/NANP TASK FORCE TOR

That, the RANP/NANP Task Force Terms of Reference (ToR) at Appendix A are endorsed.

and

MIDANPIRG CONCLUSION 21/2: MID REGION AIR NAVIGATION STRATEGY, EDITION, FEBRUARY 2024

That, the MID Region Air Navigation Strategy, Edition February 2024 (ICAO MID DOC 002), is endorsed and be published by the ICAO MID Office.

and

MIDANPIRG CONCLUSION 21/3: NATIONAL AIR NAVIGATION PLAN (NANP)

That, the MID States with support of ICAO MID Office develop their National Air Navigation Plan (NANP) by end of December 2024.

Updating of the GANP and development of NANP

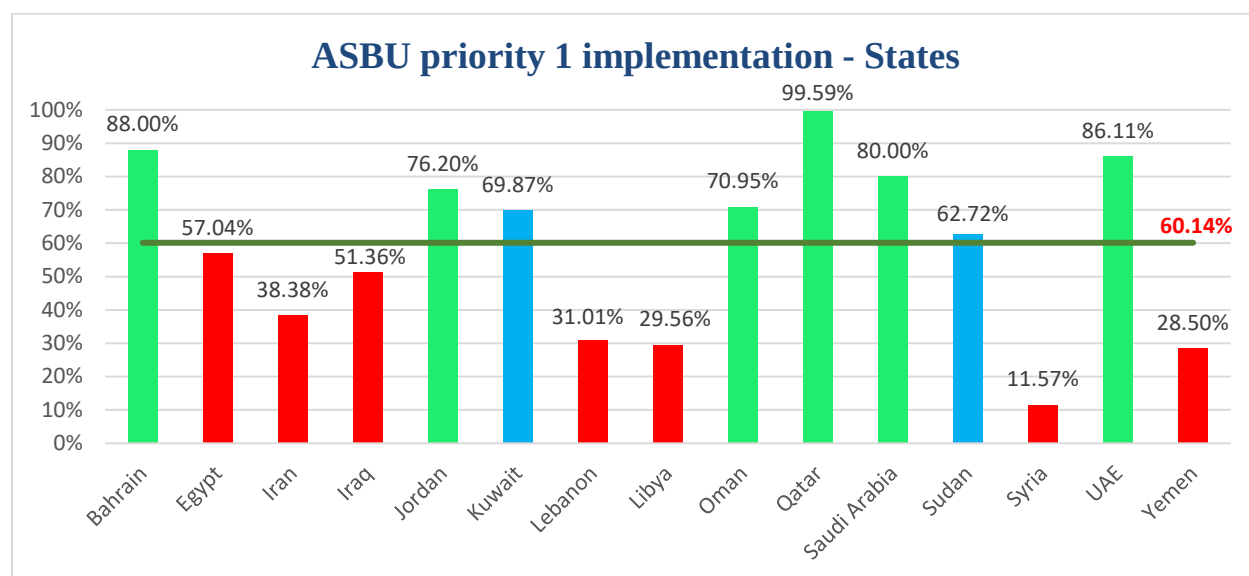
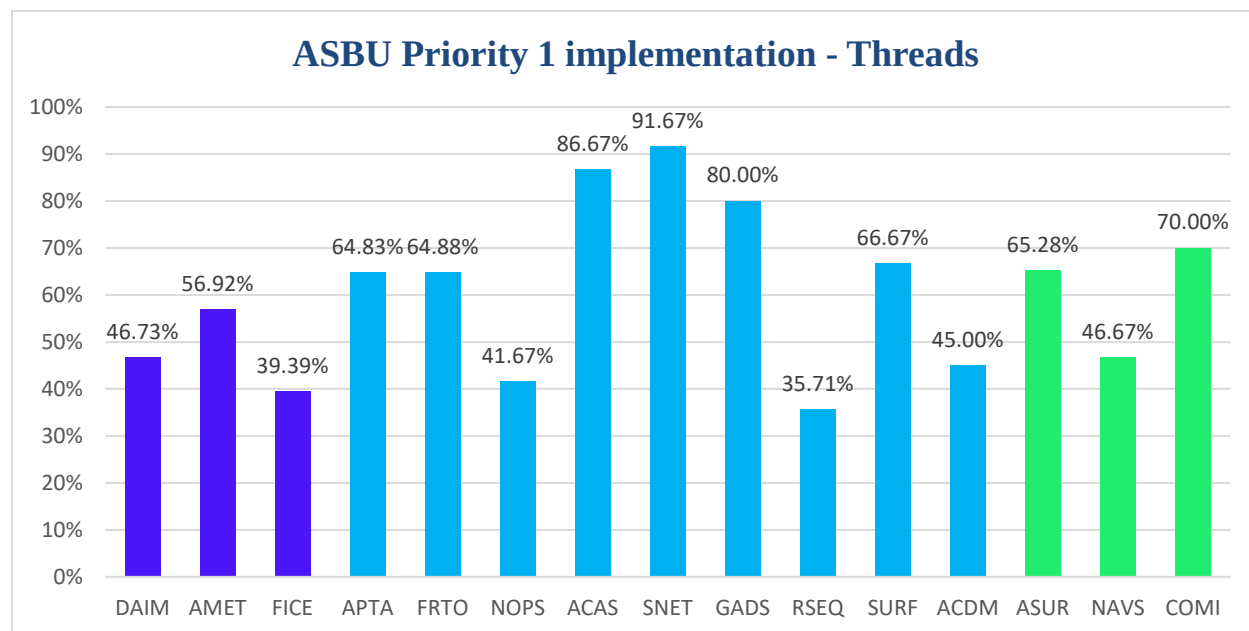
5.2.18 The subject was addressed in IP/12 presented by Saudi Arabia. As defined under the GANP, the fourth level, under responsibility of the States, focuses on national planning. The development of the national air navigation plan, in coordination with relevant stakeholders, is a strategic part of the State aviation development plans and its alignment with regional and global plans is crucial to achieve the common vision being developed in the GANP. The national air navigation plan should serve as reference and master document for the planning and development of air navigation services, deployment of operational improvements, upgrading of infrastructure and facilities and setting of roadmaps for the evolution of air navigation system. The paper encouraged the development of regional guidance material on NANP to support ANS modernization. It also highlighted a proposal for the contents of NANP that may be considered.

MID AN Report for 2023

5.2.19 The subject was addressed in PPT/30 presented by the Secretariat. The meeting noted that ICAO MID Office issued State Letter Ref.: AN 1/7-23/270 dated 6 December 2023 to collect the required information and updates from MID States. The meeting noted that only Bahrain, Egypt, Iran, Jordan, Kuwait, Oman, Qatar, Saudi Arabia and UAE provided update to ICAO MID Office. Accordingly, the meeting urged all States to provide their inputs in timely manner for the development of the next MID Air Navigation Report 2024.

5.2.20 The meeting reviewed the results of the MID Air Navigation Report-2023 at **Appendix 5G**. The meeting noted with appreciation the success stories submitted by Iraq (*establishment of ATFM unit*), Kuwait (*development of NANP and installation of 360 tower Simulator*) and UAE (*implementation of Free Route Airspace (FRA), Data-driven charts migration progress, provide fully compliant eTOD Data, Aeronautical Information Data Integrity, AIM System Wide Information Management (SWIM) and Provision of UAE AIP Digital Dataset*).

5.2.21 The meeting noted with concern that the overall implementation of priority 1 ASBU (15 Threads and 34 Elements) in the MID Region was around **60.14%** in 2023.



5.2.22 Based on all the above, the meeting agreed on the following Conclusion:

MIDANPIRG CONCLUSION 21/4: MID AIR NAVIGATION REPORT-2023

That, the MID Air Navigation Report-2023 is endorsed and be published by the ICAO MID Office.

MID ATS Route Network Table and Progress of PfA

5.2.23 The subject was addressed in WP/31 presented by the Secretariat. The meeting recalled MIDANPIRG meeting Conclusion 20/7. The meeting noted that the PfA (MID.II.2302-ATM) was developed and processed in accordance with standard PfA procedures.

5.2.24 The meeting urged States to update their national publication based on MID ANP VOL II, Table ATM II-MID-I (deletion of prefix “Upper” and change ATS route designators), if required.

5.2.25 The meeting also encouraged the MID States to take required action with the support of ICAO MID Office for resolving the remaining challenges, at **Appendix 5H**.

5.2.26 The meeting reiterated the total number of route designators allocated to the MID Region is **426** (**122** Non-RNAV & **304** RNAV), **66** Non-RNAV designators had been assigned (**56** designators were available) and **205** RNAV designators had been already assigned (**99** designators were available).

Regional & Non-RNAV				Regional & RNAV			
A	B	G	R	L	M	N	P
400-424	400-424	650-674	650-674	300-324	300-324	300-324	300-324
775-799	524-549	775-799	775-799	550-574	550-574	550-574	550-574
				700-724	700-724	700-724	700-724

5.2.27 The meeting noted that based on a study carried out by the ICAO MID Office, the several ATS route designators are used for the same route within/at interface of the MID Region which is having an impact on the availability of route designators and complicate the flight planning. Accordingly, the meeting agreed to urge States to avoid unnecessary changes in ATS route designators and tasked the ICAO MID Office in coordination with the relevant States to develop required Proposal for Amendment (PfA) to MID eANP Volume II, Table ATM II-MID I to make the required harmonization at regional level.

**MIDANPIRG CONCLUSION 21/5: OPTIMIZATION OF MID REGION ATS
ROUTE DESIGNATOR**

That, the ICAO MID Office:

- a) based on Traffic Data Sample (TDS) identify the main flows of the region to maintain their ATS route designators as much as possible through various consecutive FIRs and regions with coordination of relevant States and ICAO Regional Offices; and*
- b) process required Proposal for Amendment (PfA) to the MID eANP Vol II, Table ATM II-MID-I*

6th Edition of the Regional Supplementary Procedures (SUPPS, Doc 7030)

5.2.28 The subject was addressed in PPT/56 presented by the Secretariat. The meeting noted that at the second meeting of the 230th Session, the Council requested the Secretariat to initiate a formal

amendment process for the alignment of the areas of applicability of the regional air navigation plans (ANPs) and the regional supplementary procedures (SUPPS) (AN-Conf/12, Recommendation 6/11 and C-DEC 230/2 refer).

5.2.29 The meeting recalled that the proposed amendments to the respective ANPs for this alignment had been processed and approved by the Council over the past years. The official list of flight information regions (FIRs) is contained in Table GEN I-1, Volume I of the respective ANPs. The next step will be to align the areas of applicability in the ANP with those in the SUPPS.

5.2.30 The meeting noted that the Secretariat carried out a comprehensive review of the SUPPS (Doc 7030) and the proposed amendments had been prepared for all regions. Once the review and consultation of the proposed amendments to all regional parts of the SUPPS are completed, they will be incorporated into the 6th Edition of Doc 7030. It was highlighted that the scope of the proposed amendments to the SUPPS was limited to aligning areas of applicability of ANPs and SUPPS without involving any changes to the existing procedures of the SUPPS, which would be amended at a later stage after the publication of the 6th Edition. Therefore, the following process was followed:

- a) developing the baseline document incorporating the proposals for amendment, which the Council had approved as of 1 March 2024, but had not been published as part of the 5th Edition of Doc 7030;
- b) reflecting the changes made, over the years, to the FIRs contained in the 5th Edition of Doc 7030, in comparison with those contained in Table GEN I-1, Volume I of the respective ANPs; and
- c) transferring the FIRs and associated procedures to corresponding regional part(s) of Doc 7030 and making editorial adjustments where necessary.

5.2.31 The meeting noted that the amendment of SUPPS follows a similar process to the amendment of ANPs, particularly the consultation phase with States. Accordingly, the meeting invited States to respond to the proposed amendments to SUPPS when circulated by the ICAO MID Office and requested MIDANPIRG Sub-Groups to include the review of the MID Region procedures contained in SUPPS in their work programme as applicable.

5.3 ***ANS (AIM, PBN, AGA-AOP, ATM-SAR, CNS and MET***

PBN

Outcome of the PBN SG/8 meeting

5.3.1 The subject was addressed in WP/36 presented by the Secretariat. The meeting noted the outcomes of the Eighth meeting of the Performance Based Navigation Sub-Group (PBN SG/8) held in Doha, Qatar, from 10 to 11 December 2023.

Performance Based Aerodrome Operating Minima (PB-AOM)

5.3.2 The meeting noted that PBN SG/8 meeting was apprised of the Performance Based Aerodrome Operating Minima (PB-AOM) concept of operations (CONOPS). The meeting noted that the CONOPS is aiming primarily to provide information on the proposed concepts of Performance Based Aerodrome Operating Minima. The purpose is also to describe the expected impact for other domains such as aerodromes, air traffic management and navigation systems providers. Thereby, CONOPS is intended

as a coordination instrument between the domains affected by attempting to describe all aspects of PBAOM. Such coordination is intended to be the first step, after which a fully coordinated CONOPS PBAOM can be developed. The CONOPS, notably with its Appendix provide practical examples how PBAOM will influence the interaction between operators, ATC and aerodromes.

5.3.3 In order to provide a deep understanding of the concept, the implications of PBAOM on the aerodrome design and operation, including the challenges of operating in very low visibility and the need to consider how to accommodate advanced aircraft operating at the aerodrome to expand aerodrome availability in restrictive weather conditions, the meeting agreed to the following Conclusion:

MIDANPIRG CONCLUSION 21/6: WEBINAR ON PERFORMANCE-BASED AERODROME OPERATING MINIMA (PBN-AOM)

That, a Webinar on the Performance-Based Aerodrome Operating Minima (PB-AOM) be organized in 2024.

DOC 9849, GNSS Manual Update Summary

5.3.4 The meeting noted that the PBN SG/8 meeting was apprised of the latest updates introduced with the release of Doc 9849, 4th Ed 2023, in particular:

- The potential changes with respect to the new DFMC SBAS standards. Guidance material on GNSS performance reporting for GNSS service providers.
- The inclusion of new operational core constellations and new signal for existing constellations.
- The DFMC SBAS SARPs changes and new SBAS SARPs amendment.
- GNSS Vulnerability – the significant material to address recent developments and thinking with respect to jamming and spoofing.
- GNSS Evolutions and the operational state of GALILEO and BDS providing information on their planned future evolutions.
- Chapter 7: GNSS Implementation – interference monitoring, interference anomaly reporting, and space weather advisory.

5.3.5 Based on the above, and to provide an opportunity for detailed discussions on the implementation of different GNSS elements/options and associated challenges, the meeting agreed to the following Conclusion:

MIDANPIRG CONCLUSION 21/7: WORKSHOP ON PBN/GNSS

That, ICAO, jointly with ACAO organize a Workshop on PBN/GNSS in 2024.

Status of PBN Implementation in the MID Region

5.3.6 The meeting noted that the PBN SG/8 meeting reviewed and updated the status of implementation of priority 1 APTA Thread/Elements in the MID region and the following was highlighted:

- The status of implementation of the APTA B0/1 related to PBN Approaches (with basic capabilities) reached 53.3% far behind the regional target of 100% by Dec. 2017.

- The status of implementation of the APTA B0/2 related to PBN SID and STAR procedures (with basic capabilities) is 53% behind the regional target of 70% by Dec.2022.
- The status of implementation of the APTA B0/4 and B0/5 which reached 65.2%; each element is far behind the regional target of 100% by Dec. 2021.
- The status of implementation of the APTA B0/7 related to Performance based aerodrome operating minima – Advanced aircraft which reached 73.3% above the regional target of 50% by Dec. 2021.

5.3.7 The meeting urged States behind Global and Regional targets to expedite implementation of PBN to achieve the global targets of the Assembly Resolution A37-11 and the regional targets of the MID Air Navigation Strategy.

GNSS disruption in MID Region

5.3.8 The meeting noted that, further to the increasing number of GNSS disruption events around the globe and in particular in the MID Region, the PBN SG/8 meeting acknowledged, safety concerns related to GNSS spoofing and jamming activities, as reported by various AOs and international organizations. The PBN SG/8 meeting was apprised on several mitigation measures tailored for ANSPs and CAAs.

5.3.9 In this respect, the meeting recalled that the SARPs of Annex 10 Volume 1 have been recently updated to add requirements for DFMC SBAS, new core constellations and additional core constellation signal. In addition, the latest updates on the DOC 9849, GNSS Manual, in particular Chapter 5 GNSS Vulnerability with the significant material added to address recent developments with respect to jamming and spoofing. The meeting, therefore, agreed that the RASG-MID Safety Advisory (RSA-14) should be updated to reflect recent developments and changes to maintain its effectiveness and reliability.

5.3.10 Furthermore, the meeting recalled also that the MIDANPIRG/20 endorsed through MIDANPIRG Conclusion 20/18 a NOTAM template for GNSS Interference. Based on the recent new entry of GNSS Spoofing, the meeting recognized the need that the NOTAM Template should be updated to reflect the spoofing activities and its effect on safety of flight operations.

PBN Charting: SID/STAR

5.3.11 The meeting recognized the presence of discrepancies in PBN SID/STAR charts published in the Aeronautical Information Publications (AIPs) of MID States. These disparities were pinpointed through a comprehensive survey, encompassing concerns related to chart title, chart identification, and PBN Box.

5.3.12 The meeting noted that ICAO State Letter 2023/07 provided requirements in Annex 4 and PANS OPS (Doc 8168) concerning PBN box and charting of PBN SIDs and STARs, however specimen charts were not included. It was noted also that it may still take considerable time until a chart specimen is published in the ICAO Charting Manual (Doc 8967).

5.3.13 The meeting acknowledged that the absence of harmonization in SID/STAR charts poses significant challenges for Airspace Users (AUs), introducing potential confusion for both pilots and Air Traffic Control (ATC). Recognizing the importance of harmonization in enhancing safety, efficiency, and standardization, the meeting agreed to the following Draft Decision:

MIDANPIRG DECISION 21/8: PBN SID AND STAR CHARTING AD HOC WORKING GROUP

That a PBN SID and STAR Charting Ad Hoc Working Group,

- a) be established to develop guidance/Specimen of PBN SID and STAR Charts, in coordination with the AIM Sub Group.*
- b) be composed of:*
 - Chairpersons of the PBN SG and the AIM SG*
 - Mr. Taha Mohamed Taha (Egypt)*
 - Rohallah Salehi (Iran)*
 - Mohammad Mahanpour (Iran)*
 - Mr. Raed Ghazawi (Jordan)*
 - Mr. Sulaiman Selmi (Oman)*
 - Mr. Suwarn Raj Upadhyay (Oman)*
 - Mrs. Pamela Erice (Qatar)*
 - Mr. Muhammad Aljuhani (KSA)*
 - Mr. Ayed Murfat (KSA)*
 - Mr. Saqr Obaid Al Marashda (UAE)*
 - Mr. Kedari Manthanwar (UAE)*
 - ICAO Secretariat*
- c) presents its outcome to the PBN SG/9 and AIM SG/11 meetings.*
- d) be dissolved upon the successful completion of its assigned tasks.*

Update on the MID FPP

5.3.14 The subject was addressed in WP/37 presented by the Secretariat. The meeting noted the MID FPP activity report as resulted from the SC/4 to SC/5 Meetings. The meeting noted also the MID FPP achievements, challenges, and the future of the Programme (sustainability). The meeting acknowledged the effectiveness and benefits of the MID FPP, affirming its viability as a valuable solution to assist States in the domains of PANS-OPS and PBN.

5.3.15 The meeting recognized that the MID FPP has offered a broad spectrum of services i.e., initial/advanced/RNP AR (online& onsite) PANS OPS classes, PBN 3-course package for database coding, design, and charting/AIP promulgation, PBN operational approval, PBN airspace design workshops, GBAS/SBAS webinar as well as IFPD and Airspace & Route consultancy projects.

5.3.16 The meeting recalled that the MID FPP business model is based on cost-recovery mechanism (non-profit) and that the Programme financial sustainability is a combination of the following sources: (1) revenue generation services and activities (projects & trainings), (2) Active States' & Donor contributions and (3) voluntary contributions and donations (sponsorship, in-kind & financial contributions, experts).

5.3.17 The meeting recognized the critical financial status of the MID FPP and agreed that regardless of the demonstrated technical effectiveness of the Programme, the future of the MID FPP is at risk and there might be a need to reconsider its business model.

5.3.18 It was stressed that in order to ensure proper MID FPP operations and to assure its sustainability as a result of "lessons learned" from the first two years 2022 & 2023, it is very important that:

- (1) a maximum number of States to join the Programme as Active State for ensuring its financial stability.
- (2) all arrears 2022 and 2023 are retroactively paid without delay.
- (3) all payments in 2024 to be completed in a most expeditious and effective manner.
- (4) States are recommended to consider budget allocation for trainings/workshops of interest considering the Work Plan 2024.
- (5) active participation of States experts in the training and workshop sessions organized by MID FPP.

5.3.19 The meeting discussed recommended options with regard to the future of the MID FPP and the ways to ensure a stable financial platform as follows:

- Foster the commitment to financially support and join the MID FPP by a maximum number of Active States (Civil Aviation Authority (CAA)/national Air Navigation Service Provider (ANSP).
- Encourage Donors from Industry and/or commercial organizations to contribute annually up to the level of an Active State.
- Urge voluntary contributions/sponsorship by Donor States. - States to consider offering experts in secondment to support the Programme.
- Consider the review/amendment of the MID FPP Funding Mechanism i.e., increasing the annual contribution by Active States.
- Consider a payment method to avoid delays in services payment e.g., issuance of proforma and payment 50% of the fees before the start of the activity and the remaining 50% after the delivery of the service.
- Fees should be sought from States benefiting as "user States".

5.3.20 Moreover, the consensus reached in the meeting emphasized the importance of conducting a survey to acquire comprehensive insights and promote inclusivity in the decision-making process. The survey aims to solicit the perspectives of all MID States regarding the future of the MID FPP, encompassing considerations such as the intention to join, potential contributions, expectations, and more. This survey is envisioned as a valuable tool to gather a broad spectrum of views, expectations, and the overall level of support from the participating States.

5.3.21 Based on the above, the meeting agreed to the following Conclusion:

MIDANPIRG CONCLUSION 21/9: MID FPP FUTURE SUSTAINABILITY

That, ICAO MID Office initiates a survey, analyze the feedback received, and subsequently propose coordinated options in consultation with the Chairperson of the MID FPP SC to the DGCA MID/7 meeting for final decision regarding the future of the Programme.

PBN Implementation challenges and lessons learned

5.3.22 The subject was addressed in WP/59 presented by the UAE. The meeting noted the UAE experience with implementing PBN in the UAE airspace and lessons learned from this experience.

5.3.23 The meeting was apprised of the process followed by the UAE in the airspace restructuring project including the needs analysis taking into consideration:

- a) Needs of the airspace users;

- b) Needs of the Service Providers;
- c) Operational requirements;
- d) ATM Requirements;
- e) NAVAIDs requirements;
- f) Current operator capabilities and upgrade requirements;
- g) Capacity benefits;
- h) Environmental benefits.

5.3.24 The meeting took note of the fact that central to the successful implementation of the airspace restructuring project in UAE was the mandate and implementation of the PBN requirements. The meeting acknowledged the following lessons learned through the implementation project, notably :

- a) Regulator must be fully involved in PBN Implementation projects from inception;
- b) Dedicated project management team must be assigned, with the project as primary task so as to ensure full commitment to the project;
- c) Beware of project creep in order to ensure that the project objectives achieves full attention and is the primary focus for the team. (Focus on the purpose of the project);
- d) Early involvement from operators;
- e) Allow sufficient time for retrofits and compliance;
- f) Develop a National policy on exemptions (There will be requests).

5.3.25 The meeting welcomed UAE's willingness to provide guidance and share expertise with member states to facilitate the implementation of PBN and encouraged MID States to share regulatory development and implementation experiences for the benefit of all members.

Introducing new PBN Terminal Flight Procedures at Muscat International Airport IP

5.3.26 IP/6 was submitted by Oman, highlighting the key measures and initiatives taken by Oman CAA in implementing the new PBN terminal flight procedures at Muscat International Airport to allow more efficient accessibility to the Airport and to optimize terminal airspace operations in alignment with ICAO strategic objectives.

ATM-SAR

MID Region Airspace Management

5.3.27 The subject was addressed in WP/32 presented by the Secretariat. The meeting reiterated that the airspace concept provides the outline and intended framework of operations within an airspace to satisfy strategic objectives, including safety and efficiency.

5.3.28 The meeting noted that, in view of the MID top flows calculated by MIDRMA and restrictions imposed by the current LOAs between adjacent FIRs, a study has been carried out by the Secretariat with coordination of MIDANPIRG Chairperson to assess the airspace structure (ATS route network, PBN implementation, establishment of parallel and direct ATS route, implementation of FUA & FRA, Longitudinal Separation minima, ATS route designator and 5LNCs) within the MID Region. The

results of this extensive study indicate that there is a need to improve the following categorisations:

- a) MID ANP Vol II, Table GEN II-1 (Homogeneous areas);
- b) demand and trend analysis;
- c) optimize airspace capacity through implementation of PBN, Civil and Military Cooperation, FUA, FRA and enhanced longitudinal separation;
- d) improvement of CNS structure at regional level to meet the requirement of regional demands and support main international flows;
- e) development of the regional procedure to regulate and harmonize implementation of RAD, TOS and FLAS; and
- f) optimize usage of regional ATS route designators and 5LNC.

5.3.29 The meeting noted the need to establish a centralized entity to address the Airspace management challenges and further enhance the coordination on regional level. Accordingly, the meeting agreed on the following Decisions:

MIDANPIRG DECISION 21/10: MID AIRSPACE MANAGEMENT WORKING GROUP (ASM WG)

That,

- a) *MID Airspace Management Working Group (ASM WG) be established to ensure the continuous development of airspace structure, Free Route Airspace, GNSS vulnerability and FF-ICE implementation at regional level in the most efficient and harmonized manner;*
- b) *The ASM TF to elect Chairperson and develop Terms of Reference during the first meeting of MID ASM Task Force; and*
- c) *States support the MID ASM WG through:*
 - i. *assignment of Focal Point to contribute to the work of the Task Force; and*
 - ii. *sharing states' experience and provision of required data in timely manner.*

and

MIDANPIRG DECISION 21/11: DISSOLUTION OF THE MID ROUTE DEVELOPMENT ACTION GROUP (RDWG)

That, the MID Route Development Action Group (RDWG) is dissolved.

5.3.30 The meeting noted IP/9 submitted by Iraq, including enhancements within Baghdad FIR related to airspace management, FUA, ATFM achievement, SAR, CNS update, AIS, GPS spoofing applied all requirements.

RVSM Operations and Monitoring Activities in the MID Region (SMR 2023)

5.3.31 The subject was addressed in PPT/12 and WP/33 presented by the Secretariat and the MIDRMA, respectively. The meeting recalled MIDANPIRG Conclusion 20/2 related to the data collection required for the development of the MID RVSM MID RVSM Safety Monitoring Report (SMR) 2023.

5.3.32 The meeting reviewed and endorsed the SMR2023 at **Appendix 5I**, and agreed to the following Conclusion:

MIDANPIRG CONCLUSION 21/12: MID RVSM SMR 2023

*That, the MID RVSM Safety Monitoring Report (SMR) 2023 at **Appendix 5I**, is endorsed.*

5.3.33 The meeting appreciated the delivery of the required data by most of the MID States, and noted with concern that no data received for Beirut and Khartoum FIRs while the data received for Tripoli FIR was incomplete, thus those three FIRs were excluded from the SMR2023. Accordingly, the meeting agreed on the following MIDANPIRG Conclusion:

MIDANPIRG CONCLUSION 21/13: NON SUBMISSION OF REQUIRED DATA FOR THE DEVELOPMENT OF SMR2023

That, Lebanon, Libya and Sudan be included in the list of MID Air Navigation Deficiency.

5.3.34 Additionally, the meeting agreed to the following Conclusion:

MIDANPIRG CONCLUSION 21/14: MID RVSM SMR 2024

That,

- a) the FPL/traffic data for the period 15 May – 15 June 2024 to be used for the development of the MID RVSM Safety Monitoring Report (SMR 2024);*
- 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, by 15 July 2024; and*
- c) the final version of the MID RVSM SMR 2024 be ready for presentation and endorsement by the MIDANPIRG/22 Meeting.*

5.3.35 The meeting was apprised of the developments related to the Safety protocol between Muscat and Mumbai FIRs, and the mitigation measures taken by the relevant ACCs to address the LHD reports on the interface with APAC Region.

5.3.36 The meeting was apprised of the development related to the Safety protocol between Sana'a FIR and its adjacent FIRs near the Horn of Africa. The meeting noted with appreciation the coordination meeting organized at the MID Office which resulted in resolving the causes of the LHD reports between Sana'a and Mogadishu FIRs, however, there is still increased number of LHD reports between Sana'a and the other ACCs.

5.3.37 The meeting encouraged concerned States in coordination with the Regional Offices to continue the coordination and report the progress to the upcoming MIDANPIRG meeting; and agreed to keep both Safety Protocols opened.

5.3.38 The meeting noted with concern the increased number of Iranian registered aircraft not supported to meet the minimum monitoring requirement (MMR); reaching 78 aircraft constituting 45% of the Iranian registered aircraft, which is subject to increase to 79% by end of May 2024. The MIDRMA

elaborated that the monitoring of the Iranian registered aircraft was not possible without the renewal of the OFAC license for the use of the EGMU equipment.

5.3.39 The meeting noted with concern the impact on the safety of international air transport due to unknown height-keeping monitoring results of the Iranian registered aircraft due to the limitation imposed on the use of EGMU by MIDRMA. The meeting noted that despite all the efforts with the United States authorities supported by FAA, the OFAC license was not renewed. The meeting recalled that previous practice, the application to OFAC was carried out through FAA Office. However, the meeting was advised by the FAA representative that MIDRMA as the applicant for the license was primary entity responsible for submitting an application through the OFAC website.

5.3.40 Based on the above, the meeting agreed that, in addition to the follow-up by ICAO headquarters with the United States delegation to ICAO, a formal request on the OFAC website be submitted by the Chairman of MIDRMA Board on behalf of the MID Region. Also, the FAA committed to reaching out to OFAC to attempt to convey the need for both a near-term and long-term solution, sharing the safety considerations. Accordingly, the meeting agreed to the following Conclusion:

MIDANPIRG CONCLUSION 21/15: OFAC LICENSE APPLICATION

That,

- a) the Chairman of MIDRMA Board to submit an application on the OFAC website for the renewal of the OFAC License or waiver for the use of the EGMU unconditionally; and*
- b) invited the FAA representative to support and follow-up the application process as appropriate.*

5.3.41 The meeting noted with appreciation the new products of the new version of the MID RVSM analysis Software (MIDRAS), and invited the MID States to benefit from the provided information in their airspace planning.

MIDRMA ADS-B Height Monitoring System (AHMS)

5.3.42 The subject was addressed in WP/39, presented by MIDRMA. The meeting highlighted the benefits of the AHMS, and the need to be introduced within the services provided by the MIDRMA to support the activities of height monitoring.

5.3.43 The meeting noted the study developed by the MIDRMA regarding the capabilities of the Aircraft registered within the MID Region and the ADS-B coverage implemented.

5.3.44 The meeting noted with appreciation the plan developed by the MIDRMA for implementing the MID AHMS service. The meeting reviewed and agreed on the following Decision emanating from the MIDRMA Board/19 meeting:

MIDANPIRG DECISION 21/16: MID ADS-B HEIGHT MONITORING SYSTEM (MID AHMS)

That,

-
- a) States implementing ADS-B to share the archived data with the MIDRMA for evaluation and analysis;
 - b) MIDRMA to coordinate with MAAR for:
 - i. sharing their experience in evaluating and analyzing samples of the received ADS-B data; and
 - ii. providing required training related to AHMS implementation for MIDRMA Staff.
 - c) MIDRMA to develop a mechanism and tools for submitting the ADS-B data by States;
 - d) MIDRMA provides the required training for CNS engineers from member states responsible for extracting ADS-B data from their systems and submitting it to MIDRMA at regular, mutually agreed intervals;
 - e) MIDRMA to develop and document all required processes and procedures to be reflected in the training Manuals for the AHMS implementation, to be incorporated in the MIDRMA Tasks and responsibilities;
 - f) MIDRMA shall continue to provide GMU monitoring service until the AHMS is fully operational, and for the Aircraft not included in the MID-AHMS; and
 - g) the funding mechanism (including services charges) might be revised accordingly (based on cost -recovery basis). In accordance with ICAO Policies on charges for Airports and Air Navigation Services (Doc 9082), in coordination with IATA.

5.3.45 The meeting appreciated the support provided by the MAAR, and encouraged the MID State to share the ADS-B data with the MIDRMA for trial purposes, to support the implementation plan.

Outcomes of the MIDRMA Sustainability Action Group

5.3.46 The subject was addressed in WP/34, resented by the MIDRMA Sustainability Action Group Chairman on behalf of the group. The meeting recalled the MIDRMA Board Decision 19/2 related to the establishment of the Group, and the assigned task to develop a Strategic Plan for the MIDRMA to ensure business continuity and sustainability.

5.3.47 The meeting was appraised with the progress made by the development of the initial draft of the plan. The meeting requested the MSAG to continue the development of the plan and encouraged the States to provide support to the activities of the group.

Free Route Airspace (FRA) Concept and ICAO standard and recommended practices (SARPS)

5.3.48 The subject was addressed in WP/54 presented by UAE. The meeting highlighted the successful experience with Free Route Airspace (FRA) implementation within Emirates FIR. Additionally, the meeting emphasizes ICAO's pivotal role in standardizing FRA implementation for global safety and efficiency objectives. The meeting noted that the consolidated ICAO guidance and standardized guidelines were essential to support further FRA implementation and adoption on global level. The UAE recommends initiate the process developing technical material into ICAO SARPs.

MID Region ATM Contingency Plan

5.3.49 The subject was addressed in WP/40, presented by the Secretariat. The meeting noted that the MID ATM contingency planning Ad-Hoc Action Group based on the variety of contingency raised during the year 2023 (closure of the airspace) and activation of CCT, lessons learned from the past, as well as development of new technologies in aviation and their related threats (GNSS vulnerability and Cybersecurity attack) has agreed on a significant change to the content of MID Doc 003 at **Appendix 5J**. The meeting underlined the establishment of the required structure under ICAO MID website for easier

access of the States updated contingency plan, agreement and contact list. Accordingly, the meeting agreed on the following Conclusion and Decision:

MIDANPIRG CONCLUSION 21/17: MID REGIONAL ATM CONTINGENCY PLAN (V5.0)

That,

- a) the MID Regional ATM Contingency Plan (V5.0), at **Appendix 5J** is endorsed and be published as the MID Regional ATM Contingency Plan (V5.0);*
- b) ICAO MID Office develop required structure on ICAO MID website and keep it up to date regarding MID States contingency plans, agreement, SOD of CCT meetings, contact list and etc.;*
- c) based on the guidelines and template provided in regional contingency plan (V5.0), MID States develop their respective contingency plan and arrangement with adjacent FIRs and share them with ICAO MID; and*
- d) by organizing individual workshops, ICAO MID supports the development of National Contingency Plans by the MID States.*

MIDANPIRG DECISION 21/18: DISSOLUTION OF THE CONTINGENCY PLAN ACTION GROUP

That, the Contingency Plan Action Group is dissolved.

5.3.50 The meeting was apprised of the development on the ICAO HQ related to the Global Priorities - Priority Focus Areas ICAO Crisis Response Mechanism/ Framework which will be reflected in ICAO Business Plan 2023-2025 (PPT/3 refers).

5.3.51 The meeting reviewed the WP/81, presented by IATA. The meeting did not support the content of this WP and confirmed that the current arrangement of the ICAO CCT process is mature and fitting the purpose and meeting the need of the States and Airspace users.

MID Air Traffic Flow Management (ATFM)

5.3.52 The subject was addressed in WP/42, presented by the Secretariat. The meeting recalled the MID Doc.014 ATFM Plan (V2.0), in particular Phase 1A and the associated implantation timeline by 31 December 2023.

5.3.53 The meeting noted with appreciation that the MID Office successfully organized the MID ATFM Implementation Workshop (Doha, Qatar, 6 – 7 February 2023). The meeting was apprised with the outcomes of the Workshop, including the review of the ATFM requirements, and the details of the MID implementation plan (Phase 1A). The Workshop provided an opportunity to support the MID States in taking the proper actions required for implementing Phase 1A of the MID ATFM Implementation Plan within the agreed timelines. Additionally, the Workshop was considered a venue for States and international Organizations to share their experience and challenges among the MID ATFM TF members. A summary

of the outcomes of the Workshop are available under ICAO Website: <https://www.icao.int/mid/pages/2023/atfm%20workshop.aspx>.

5.3.54 Moreover, the meeting reviewed the results of the MID ATFM Survey 2023, and noted the common areas identified by the ATFM TF/8 meeting (Virtual, 31 October - 1 November 2023), mainly related to:

- a) National Regulations and organizational subjects including ATFM posts (56%);
- b) capacity calculation (strategic level) at TMA(s) (40%);
- c) optimize the operations within the TMA(s), ACC(s) and interface with adjacent ACCs (-100%);
- d) daily pre-tactical capacity and demand analysis at TMA(s) (20%);
- e) NOPS B0/1: Initial integration of collaborative airspace management with ATFM (30%);
- f) ATFM Letter of Agreement/Procedures between the ACC(s) (34%); and
- g) coordinated ATFM Daily Plan (ADP) and share with the concerned Stakeholders (20%).

5.3.55 The ATFM TF will focus on the items identified above, and encouraged the MID Office to include, in its plan for the year 2024, further implementation support activities to enhance the level of implementation.

5.3.56 The meeting highlighted that the level of ATFM implementation would vary from one FIR to another based on the level of airspace complexity, number of movements, demand, etc. However, to meet the requirements of Annex 11 (para 3.7.5), the national ATFM position should be the basis of any level of ATFM implementation, starting with the basic capacity vs demand analysis.

5.3.57 The meeting noted with concern the slow progress related to the ATFM Implementation in the MID Region. Accordingly, the meeting urged States to take necessary measures to implement ATFM and requested the ATFM TF to provide appropriate support to the States.

5.3.58 Based on the above, the meeting agreed on the following Conclusion:

MIDANPIRG CONCLUSION 21/19: DEVELOPMENT OF MID STATES ATFM PLAN

That,

- a) *based on the guidelines provided in ICAO MID Doc 014: ATFM Plan (V2.0), MID States develop their respective ATFM implementation plan and agreements with adjacent FIRs and share them with ICAO MID;*
- b) *by organizing individual workshops, ICAO MID supports the development of States National ATFM Plans and implementation of ICAO Doc 014 requirements for Phase I (including Phase IA & IB), where requested; and*
- c) *the MID ATFM Task Force is tasked with the identification of Priority ATFM Implementation Areas within the MID Region, to enable further implementation support activities.*

FF-ICE Implementation

5.3.59 The subject was presented in WP/43, presented by UAE. The meeting recalled the

outcomes of the ICAO Air Navigation World 2023, related to the transition from FPL2012 to FF-ICE, as an essential advancement in air traffic management with an envisaged proposed implementation date by 2034.

5.3.60 The meeting reviewed the advanced benefits of the FF-ICE implementation and the requirements for implementation and noted the need to develop a regional implementation plan to ensure the readiness of ANSPs and operators in the MID Region for a smooth transition to FF-ICE, in line with the ICAO Document 9854.

5.3.61 Accordingly, the meeting agreed on the following Conclusion:

MIDANPIRG CONCLUSION 21/20: MID FF-ICE WORKSHOPS 2024-2025

That the FF-ICE Workshops be conducted in 2025, with the support of the ATFM TF and the relevant Subgroups to address the FF-ICE planning and implementation in the MID Region.

AIDC/OLDI Implementation

5.3.62 The subject was addressed in WP/44, presented by the Secretariat. The meeting noted that the primary objective of the establishment of AIDC/OLDI at MID region was to reduce the ATC Workload factor, and thus reduce the number of coordination failures, which is linked to the number of LHD reports.

5.3.63 The meeting noted the implementation of a semiautomated coordination mechanism and agreement between Tehran ACC and adjacent ACCs (UAE, Bahrain, Qatar and Pakistan) reduced the number of coordination failures significantly. the meeting noted the proposal to alleviate the AIDC/OLDI implementation and agreed to extend the timeline for the implementation to the end of December 2026. The deficiency list will be amended accordingly to remove the current deficiencies related to the AIDC/OLDI implementation to give the States more time to deploy this requirement as per the applicability area.

5.3.64 The meeting noted the interoperability challenges between the systems, particularly at the interface of the MID Region, which the CNS SG had been addressing.

Progress related to CMC/FUA Action Group

5.3.65 The subject was addressed in WP/45, presented by the Secretariat. The meeting recalled MIDANPIRG Decision 20/31 inviting ICAO to organize a workshop to raise awareness among all stakeholders regarding the CMC implementation, including operations of due regard aircraft over high seas.

5.3.66 The meeting also agreed that the ICAO MID Office, in cooperation with the international organizations, to conduct a Seminar to raise awareness of all stakeholders regarding the CMC implementation in particular operations of due regard aircraft over high seas in line with “Article 3 d)” of the Chicago Convention. The Seminar will mainly support the implementation of Doc 10088 at the National level and will address the challenges identified within the Region, including (but not limited to):

- State aircraft operations under Due Regard in particular over the high seas;
- CMC/FUA implementation;
- Drones-Airspace management applications; and
- NMAC reports between Civil and Military aircraft.

5.3.67 The meeting reviewed and agreed on a template for reporting occurrences related to unknown aircraft operating over the high seas in **Appendix 5K**, to be recorded and further analyzed by the States concerned for appropriate actions.

5.3.68 The meeting encouraged States to develop their national Civil and Military Cooperation and Flexible Use of airspace procedures based on guidelines published in ICAO Doc 10088 and support the organization of the CMC/FUA Workshop/Seminar in 2024.

5.3.69 Based on the above, the meeting agreed on the following Decision:

MIDANPIRG DECISION 21/21: DISSOLUTION OF THE CMC/FUA ACTION GROUP

That, the CMC/FUA Action Group is dissolved.

Progress update on the coordination between Oman and Pakistan to enhance airspace over high seas between MID and APAC Regions

5.3.70 The subject was addressed in WP/73, presented by Oman. The meeting noted with appreciation the progress made to enhance the airspace over the high seas at the interface with the APAC Region.

5.3.71 The meeting reiterated the need that all aviation stakeholders at the Middle East and Asia Pacific interface to collaborate and support airspace development initiatives aiming at enhancing safety, improve efficiency of the airspace over the high seas at the interface with Asia Pacific. Including the organization of interregional workshop with the support of the ICAO Regional Offices.

Free Route Airspace (FRA)

5.3.72 The subject was addressed in WP/46, presented by the Secretariat. The meeting noted the implementation of FRA within Emirates FIR on 13 July 2023 was the first FRA implementation in the MID Region, utilizing the advanced ATM system in Sheikh Zayed Air Navigation Centre. Airspace operators have confirmed the benefits due to tons of fuel savings within the area of applicability. The significance of FRA implementation within Emirates FIR was found to benefit more than 55,000 flights annually, achieving fuel savings over 30 million KGs, and operational savings that could exceeding AED 50 million for airlines. In a case study conducted by one airspace user, it has been identified that utilization of FRA in the Emirates FIR for more than 7,600 flights/year would result in more than 205,000 KG/year of savings of fuel. Thus, providing the airspace user with savings exceeding USD 96,000 annually.

5.3.73 The meeting noted that the ATM SG/9 meeting reviewed the process for implementation, presented by UAE, and the plans for implementation presented by Qatar, and agreed that to maximize the benefits, an FRA implementation workshop would be conducted, to support further implementation within the MID Region. Accordingly, the meeting agreed on the following Conclusion.

**MIDANPIRG CONCLUSION 21/22: FREE ROUTE AIRSPACE (FRA)
IMPLEMENTATION WORKSHOP**

That, the ICAO MID Office organize Workshop in 2024 with support of IATA and concerned States and Stakeholder, to foster the implementation of FRA in the MID Region.

Low-level and Higher Airspace Operations

5.3.74 The subject was addressed in WP/79 presented by Saudi Arabia. The meeting recalled the Assembly Resolution A41-9 directs ICAO to review Standards and Recommended Practices (SARPs) relating to, inter alia, the rules of the air, air traffic services, certification, licensing, liability and the environment, for amendment or expansion as necessary, and to develop specific concepts and guidance to facilitate the operation of New Entrants within a global, harmonized framework, taking into account regional frameworks and practices. This Resolution defines the term “New Entrants” as higher airspace operations (HAO) and unmanned aircraft system (UAS) traffic management (UTM) operations.

5.3.75 The meeting noted that the Higher Airspace Operations (HAO) were growing and may pose safety risks when transiting through the ATM airspace below the HA (i.e., below FL 550 or FL660).

5.3.76 The meeting encouraged States to refer to the ICAO website on UAS (through the link: <https://www.icao.int/safety/UA/Pages/ICAO-Model-UAS-Regulations.aspx>) and use the available guidance material and tools.

5.3.77 The meeting recalled the Agenda of the ICAO 14th Air Navigation Conference planned in August 2024, which would be an opportunity for the States to express their views and expectations related to new entrants’ operations.

5.3.78 The meeting noted IP/7 submitted by FAA, related to the Space Activity Coordination.

UAS regulatory challenges

5.3.79 The subject was presented in WP/74 presented by UAE. The meeting noted with appreciation that UAE was in the process of developing U-SPACE Service Provider, U-Space and U-SPACE Management regulations to support all relevant stakeholders’ requirements, whether to enable operations of UAS for State authorities and military use, for commercial flights in both VLOS and BVLOS environments, as well as for consumer flights, while still addressing the safety and security needs of governmental entities.

5.3.80 The UAE’s working paper detailed its approach in developing regulations for U-Space and U-SPACE Management, focusing on enhancing Unmanned Aircraft Systems (UAS) operations. The paper highlighted the transition from managing UAS operations on a case-by-case basis, primarily for military and state purposes, to a more structured approach that accommodates the increasing commercial use of UASs in lower airspace. The General Civil Aviation Authority (GCAA) had been instrumental in this shift, enabling airspace users as a start by implementing specialized procedures for commercial UAS operations, such as restrictions to operations below 400 feet Above Ground Level (AGL) and outside of controlled airspace, and introducing an e-service for commercial operation approvals.

5.3.81 Addressing the growth and diversification of UAS applications, the GCAA aimed to establish a comprehensive regulatory framework for U-SPACE Service Provider certification and U-Space management. This framework is intended to support a variety of UAS operations, including but not limited to night operations and urban air mobility, by leveraging Artificial Intelligence (AI) for dynamic airspace management. The development of the regulations came with its own unique challenges to safely regulate and enable this new emerging technology. The process involved rigorous steps, including benchmarking, industry consultation, and post-implementation review.

5.3.82 The meeting encouraged a regional approach to UAS regulation and operations, suggesting the sharing of regulatory experiences among MID States.

Separation of unknown traffic within civilian airspace.

5.3.83 The subject was addressed in WP/76 presented by UAE. The meeting noted the increased integration of unmanned aircraft systems (UAS) and the potential safety risk due unidentified unmanned aircraft (UA) on civil aviation.

5.3.84 The absence of specific guidelines related to minimum separation from unknown traffic creates ambiguity for air traffic services, so addressing this gap is crucial to ensure air traffic safety and regulatory clarity, making it an essential subject for exploration and potential guidance development.

5.3.85 The meeting invited UAE to present the matter to the relevant ICAO HQ experts group through their nominated members concerning the review of the existing ICAO SARPs pertaining to the separation of unknown traffic within civilian airspace.

Traffic Complexity and Density Relationship in The Determination of ATCO Minimum Experience Requirements.

5.3.86 The subject was addressed in WP/77 presented by UAE. The meeting was provided with a summary on the United Arab Emirates Traffic Complexity and Density and the relationship in the Determination of ATCO Minimum Experience Requirements (MER). The WP provided valuable insights into the relationship between traffic complexity, density, and the determination of ATCO MER, and provides a formula for calculating those values.

5.3.87 The meeting recognized the importance of analyzing how variations in traffic complexity and density impact the determination of MER for ATCOs, understanding this relationship is essential for adapting training programs, ensuring workforce competence, and maintaining a high level of safety in air traffic management. The meeting appreciated the experience shared by UAE and invited the States to support the study to develop the recommendation related to MER and ATCo training Programmes.

CNS Matters

5.3.88 The subject was addressed in PPT/57A, PPT/57B and PPT/57C presented by the Secretariat. The meeting was apprised on the endorsed Conclusions/Decision emanating from the MIDANPIRG/20. The meeting noted the current progress related to the implementation of actions required by these Conclusions/Decision and agreed that new set of Conclusions/Decisions be replacing and superseding the previous once in relation with the following subjects:

Spectrum Management***MIDANPIRG DECISION 21/23: REVIEW OF THE MID REGION ALLOTMENT PLAN***

That, in order to increase the amount of spectrum that can be used for Aeronautical Services, the CNS SG should adopt the revised planning Principle for Aeronautical Frequency Bands of 117.975-137 MHz and review and update, as deem necessary, the current MID allotment plan by Q1 2025.

MIDANPIRG CONCLUSION 21/24: OPTIMIZATION OF FREQUENCY ASSIGNMENT IN THE MID REGION

That, in order to optimize the frequency assignment planning and mitigate VHF frequency congestion at regional level, States are urged to:

- a) coordinate with ICAO MID Office before assigning frequencies for aeronautical services (VHF COM, VHF NAV);*
- b) perform an update/review of the data in the VHF-COM/NAV module; and*
- c) Submit Frequency Requirements for the Period 2023 – 2030 using the Guidance Doc. at **Appendix 5L** by **Q4 2024**.*

Communication Matters

AFTN Resilience of Inter-Regional message exchange

5.3.89 The subject was addressed in WP/70 presented by UAE. The meeting noted the importance of a robust, resilient and reliable AFTN for the sustainability of the ATM operations and recognized the gravity of potential message loss in the inter-regional exchange with AFTN. In this respect, the meeting encouraged States to uplift the capacity and resilience of the inter-regional AFTN and urged States to migrate inter-regional communication links to AMHS.

5.3.90 Based on the above, the meeting agreed to following Conclusion:

MIDANPIRG CONCLUSION 21/25: INTER-REGIONAL COMMUNICATION LINKS

That, in order to enhance the AFS Network efficiency and performance, States be urged to:

- a) investigate the occurrences related to loss of AFTN Data,*
- b) migrate inter-regional communication links to AMHS;*
- c) rationalize the inter-regional connections established on bilateral basis, taking into consideration the regional requirements set in the MID ANP Vol II and operational needs,*
- d) provide the ICAO MID with update the outcomes of a) and their AMHS implementation plans/progress by **30 May 2024**.*

5.3.91 The meeting noted that AMHS/AMC Workshop will be held in Cairo Egypt at the ICAO MID office back-to-back with the MID AMC STG/9 in 2024. The meeting encouraged States to actively participate in both events.

5.3.92 That, in order to provide knowledge and hands-on experience on the use of AMS Web application for new AMC Users The meeting recalled that the ICAO EUR/NAT AFS to SWIM Transition Task Force (AST TF) is working to implement an AMHS gateway between the AMHS community and ARINC. The first implementation step is to validate the addresses within ARINC community that are used for exchanging messages with the existing AFTN network worldwide.

5.3.93 The meeting reiterated MIDANPIRG Conclusion 20/41, accordingly the meeting encouraged Egypt, Libya, and Sudan to validate the ARINC and provide their update to the ICAO MID Office.

MID IP Network Solution

5.3.94 The meeting recalled that eight (8) States (Bahrain, Egypt, Jordan, Lebanon, Kuwait, Oman, Saudi Arabia and UAE) confirmed their interest to join the EUROCONTROL IP Network Project (New PENS) pending technical and financial proposals. The meeting recalled that EUROCONTROL accepted to extend the New PENS project to the MID States, official notification letter and next steps will be communicated to the ICAO MID Office soon.

5.3.95 The meeting may wish to recall that MIDANPIRG/16 meeting (Kuwait, 13-16 February 2017) agreed that the procurement framework of the APAC CRV be used for the implementation of the MID IP Network Project; and through Conclusion 16/15, invited States to engage with the recommended supplier to establish individual service contracts.

5.3.96 The meeting was informed that the ICAO MID Office has been approached by APAC Office to explore the possibility to re-engage the MID States in the APAC CRV project since now the cost would be much less than quoted before.

5.3.97 The meeting agreed to refer the matter to the CNS SG/13 for further study then recommend a solution to MIDANPIRG/22 Meeting.

Navigation Matters

5.3.98 The meeting recalled that the ATM, CNS and PBN Sub-groups were tasked to review and improve the Draft NAV MON plan template to be presented for MIDANPIRG/21 for further review and endorsement. The meeting noted that PBN SG submitted their inputs to that will be finalized during the CNS-SG/13 Meeting after receiving the inputs from the ATM SG. Accordingly, the meeting agreed to the following MIDANPIRG Conclusion:

MIDANPIRG CONCLUSION 21/26: NAV MON Plan Template

That, the CNS SG in coordination with ATM SG and PBN SG review and update, as deem necessary, the NAV MON Plan Template to be presented to MIDANPIRG/22 for endorsement.

5.3.99 The meeting noted that, in order to ensure the resilience of the position, navigation and timing service in the MID region, the CNS SG, in coordination with PBN, ATM Sub-groups, have a joint consultation activity to discuss and identify the best implementation methodology and criteria related to the regional Navigation MON. Consequently, the meeting highlighted that the need to include the ATM Subgroup as part of the supporting groups working on the ASBU element NAVS B0/4 as reflected on Table 1 “MID Region ASBU Threads and Elements (Block 0 & 1) Prioritization and Monitoring” of the MID Region Air Navigation Strategy (Doc 002).

GNSS Radio Frequency Interference (GNSS RFI)

5.3.100 The subject was addressed in WP/78 presented by Saudi Arabia, WP/47 and PPT/48 Presented by the Secretariat.

5.3.101 The meeting recalled that the Global Navigation Satellite System (GNSS) includes navigation satellite infrastructure and various constellations which provide position, navigation, and timing (PNT) information supporting aircraft and air traffic management operations. Therefore, any interruption or disruption to GNSS service has a direct impact on the safety of flights as well as ATM operations ranging from minor disruptions to serious incidents.

5.3.102 The paper from Saudi Arabia proposed that the CNS and ATM sub-groups to identify Navigation Minimal Operating Networks (Nav. MON) that constitute a resilient position and navigation service in the MID region. The meeting recalled that the subject had been addressed within the abovementioned Conclusion.

5.3.103 In PPT/48 presented by the Secretariat, the meeting was apprised of the outcomes of the ICAO EUR/MID NAV Symposium from 6 – 8 February 2024. The meeting noted that a follow-up State Letter would be issued by ICAO HQ that would include the consolidated recommendations emanating from the symposium.

5.3.104 The meeting recognized the safety risks associated with the GNSS Interference in the MID Region. The meeting agreed that the ATM SG in coordination with AIM, CNS and PBN SGs to address the reported occurrences and review the MID RSA 014 on GNSS Vulnerabilities as deemed necessary.

5.3.105 Accordingly, the meeting agreed to the following MIDANPIRG Conclusion:

MIDANPIRG CONCLUSION 21/27: GNSS RFI MITIGATION

That,

- a) States affected with GNSS RFI take necessary mitigation measures and provide update to the ICAO MID Office by 30 May 2024; and*
- b) the ATM SG in coordination with AIM, CNS and PBN SGs to address the reported occurrences and review the MID RSA 014 on GNSS Vulnerabilities as deemed necessary to be presented to MIDANPIRG/22 – RASG-MID/12 for endorsement.*

5.3.106 The meeting noted that Saudi Arabia is planning to present the subject to the ICAO 14th Air Navigation Conference planned in August 2024, and invited the States to support the development of the planned working paper.

Surveillance Matters

Automatic Dependent Surveillance–Broadcast (ADS-B)

5.3.107 The subject was addressed in WP/65 presented by Oman. The meeting was apprised of the ADS-B implementation Plan within Muscat FIR including the advantages that could provide for the enhancement of the Air Traffic Services. The meeting encouraged States to share their best practices, address challenges to support a harmonized approach for the ADS-B implementation in the MID Region. The meeting emphasized the importance of consultation with airspace users during the planning and implementation phases.

ANS Cybersecurity

5.3.108 The subject was addressed in WP/66 presented by UAE, the meeting noted the critical issue of sharing sensitive and confidential aviation-related information through unsecured channels and the associated risk, and non-compliance with international aviation regulations and standards. The meeting urged the States to enforce respective cyber security measures and refrain from sharing confidential information through unsecured channels and encouraged the states to increase awareness of cybersecurity.

5.3.109 The meeting was addressed in PPT/58 presented by the Secretariat and UAE. The meeting

was apprised of the Cybersecurity and Resilience Symposium held in Doha, Qatar, from 6 to 8 November 2023. The meeting noted with appreciation the symposium outcomes reflected on the **Appendix 5M** and agreed to the following Conclusion:

MIDANPIRG CONCLUSION 21/28: CYBERSECURITY SYSTEMS RESILIENCE

*That, States consider the recommendations in **Appendix 5M** which would support the enhancement of their cybersecurity systems resilience.*

Outcomes of the ICAO EUR/MID Radio Navigation Symposium

5.3.110 The subject was addressed in PPT/48 presented by the Secretariat. The meeting noted that the ICAO EUR/MID Radio Navigation Symposium was successfully held in Antalya, Türkiye, from 6 to 8 February 2024. The meeting was apprised of the Outcome/Recommendations of the Symposium. The symposium recommended that:

All Stakeholders: to be aware of the potential safety and capacity impacts of GNSS interference, jamming, and spoofing.

Civil Aviation Authorities (CAAs) to ensure that Air Navigation Service Providers (ANSPs):

- deploy and maintain adequate Distance Measuring Equipment (DME) Infrastructure and DME based Performance Based Navigation (PBN) procedures and enable aircraft operators use of Multi DME and Multi-DME/Inertial Reference System (IRS) complementary solutions as appropriate to maintain PBN operations during GNSS local or regional interference, jamming or spoofing.
- implement and maintain necessary Minimum Operational Networks (MON), or greater, of Navigation Aids and Radar infrastructures (including VHF Omni-directional Range (VOR), Instrument Landing System (ILS) Cat I/II/III and DME) to ensure the necessary levels of resilience for navigation when core constellations, Satellite-based Augmentation System (SBAS) or Ground-based Augmentation System (GBAS) are unusable.

Air Navigation Service Providers (ANSPs):

- to develop contingency procedures (technical and operational) for GNSS RFI events, to minimize any operational impact and ensure continuous safe operation of air traffic. The contingency procedure may require provision of reliable surveillance coverage that is resilient to GNSS interference.
- to Implement/ maintain a GNSS independent time source for synchronization of relevant CNS/ATM infrastructure.
- to issue Notice to Airmen (NOTAMs) on GNSS RFI events in a timely manner; to establish coordination arrangements with neighboring Flight Information Regions (FIRs) on how to best to share their Navigation infrastructures in the event of GNSS RFI and any resulting air traffic diversion.

CAAs/ANSPs:

- to facilitate or deploy as appropriate real-time monitoring and detection solutions for GNSS RFI situational awareness for all stakeholders, while recognizing that only the aircraft operator is responsible to determine their ability to navigate.

- to improve civil-military coordination to address interference risks associated with GNSS testing and conflict zones, to ensure the uninterrupted and reliable operation of navigation systems in diverse applications.

National Military Authorities: to coordinate with National Spectrum Regulators, CAAs and ANSPs, to the extent possible, ahead of any necessary GNSS RFI activity. This will enable ANSPs to mitigate any safety impact to civil aviation.

CAAs: to foster collaboration with their National Spectrum Regulators regarding GNSS RFI.

National Spectrum Regulators:

- to locate and determine the source of reported GNSS RFI and attempt to resolve it, as appropriate. The GNSS RFI resolution may require coordination with other authorities at national or regional levels.
- to report frequent unresolved GNSS RFI incidents to the Radiocommunication Bureau of the International Telecommunication Union (ITU), describing GNSS RFI impact as experienced within their national borders, or as reported by their registered aircraft.

Aircraft Operators:

- to develop a procedure requesting crew to notify Air Traffic Control whenever GNSS RFI events are experienced and notify respective aircraft and avionics Original Equipment Manufacturers (OEMs) and State of aircraft design's CAA through normal safety channels when safety effects are encountered.
- to develop procedures and training based upon information received from aircraft and avionics OEM and State of aircraft design's CAA.
- to place additional emphasis on flight crews closely monitoring aircraft equipment performance for any discrepancies or anomalies, promptly informing ATC of any apparent GNSS degradation, and being prepared to operate without GNSS navigation systems.

Original Equipment Manufacturers (OEMs):

- to improve their equipment and provide further guidance and information on the effects and mitigations of GNSS RFI (including interference, jamming and spoofing) from the perspective of aircraft equipment.
- to ensure that aircraft equipment quickly recovers and resumes GNSS navigation once not impacted anymore by a GNSS RFI event.

ICAO Navigation Systems Panel (NSP): to develop recommendations on how to share information on GNSS RFI (NOTAM or other measures).

All stakeholders: to collaborate towards developing simple and automated common reporting of GNSS RFI and to continue to evolve solutions, while leveraging the ICAO NSP as a common focal point.

ICAO: to continue raising awareness and supporting States, as required.

5.3.111 The meeting praised the efforts of ICAO for organizing such successful event and for the positive outcomes accomplished during the symposium. It strongly encouraged States to ensure that all relevant national stakeholders, each within their respective capacities, undertake the requisite measures to implement the aforementioned recommendations.

AIM**Data Driven IAP Charts**

5.3.112 The subject was addressed in WP/67 presented by the UAE. The meeting took note of the progress made by the United Arab Emirates in implementing Data Driven IAP Charting, encountered challenges, and adopted solutions.

5.3.113 The meeting acknowledged the following challenges facing the implementation of the Data Driven IAP Charting which requires harmonization/Standardization.

5.3.114 One of the attributes of Aeronautical Information Exchange Model (AIXM) is Coding Rules with various versions of ARINC424. Knowing the rules of coding are essential for Flight Management System (FMS) integrators to apply intend of the procedure designer. However such data is filtered out in the data chain. Hence a standard guidance is needed to unify the coding regionally and to be propagated to end users.

5.3.115 Procedures are designed on path and terminator concept and Database Driven charting systems are primarily designed for GML (Geographic Markup Language) based trajectory. RNP approaches with RF (Radius to Fix) faced challenges in depiction of curves on charting application due to tolerances implemented to close gap between the curved trajectories. To overcome this, charting applications prefer 3 point Arc. Adoption of such a solution creates critical safety risks as the AIXM file is intended to be shared with FMS integrator. FMS integrators encode the data as Path and Terminator. Hence a standard guidance is needed to unify the coding regionally and to be propagated to end users.

5.3.116 Legacy charts depict the intent of procedure designer. These legacy charts depict not only final approach profile but profile elements starting from Initial Approach. The profile view becomes complex for Database Driven Charting for approached with multiple Initial approaches (Ex. T - Bar Initial Approach Segments).

5.3.117 The meeting acknowledged the existing challenges and assigned the DDI Ad-hoc WG the responsibility of tackling these issues. The DDI Ad-hoc WG should formulate cohesive and regionally applicable solutions to overcome the identified challenges.

UAE AIM DATASET live operation

5.3.118 The subject was addressed in WP/68 presented by the UAE. The meeting noted UAE's AIM high-level plan and experience with the main activities to set up the stage to go operational with the implementation of ICAO Digital Datasets as part of the strategic GCAA plan for enhancing AIM capabilities, along with the required actions for successful dataset implementation. In addition, the meeting noted that several challenges were identified, including cross-border ownership features, updates to the common route, traceability and accountability specifications with multiple Universally Unique Identifiers (UUIDs), and the adaptation of the forthcoming AIXM 5.2 release and its migration. It was acknowledged that these challenges require regionally applicable solutions. Therefore, the responsibility of addressing these issues was assigned to the DDI Ad-hoc Working Group. The DDI Ad-hoc WG was specifically tasked with formulating comprehensive and regionally relevant solutions to overcome these identified challenges.

Outcome of the AIM SG/10 meeting

5.3.119 The subject was addressed in WP/35 presented by the Secretariat. The meeting noted the

outcomes of the Workshop on Terrain and Obstacle Datasets (TOD) and the Tenth Meeting of the Aeronautical Information Management Sub-Group (AIM SG/10) held at the ICAO MID Regional Office in Cairo, back-to-back from 26 to 29 February 2024.

Workshop on Terrain and Obstacle Datasets (TOD)

5.3.120 The meeting acknowledged the considerable challenges faced by States in complying with longstanding requirements of SARPs concerning the provision of Terrain and Obstacle Datasets (TOD). These challenges span a broad spectrum, encompassing technical, institutional, and implementation aspects. These factors collectively stand as the primary obstacles hindering the progress of TOD provisions in the MID Region, including:

- TOD Resources: Limited/scarcely funding for Regulator/ANSP;
- Lack of training and qualified staff;
- Technical challenges (AIDB);
- Cross-border coordination issues;
- Lack of guidance on TOD validation and verification, data maintenance and oversight;
- Lack of regulatory expertise to establish a National TOD policy in close coordination with the main TOD stakeholders identified at national level, e.g. National Geodetic Authority, Aerodrome Operators, Air Navigations Services Provider, etc.; and
- Lack of TOD awareness and education to decision makers within States to create the political will to invest.

In order to facilitate TOD implementation and compliance, the meeting agreed that:

- Additional workshops and training focused on Digital Data sets including Terrain and Obstacle Data are essential and needed to ensure States compliance;
- Every State should develop a detailed TOD policy;
- Agreements with Data Originators and their certifications are key elements for successful implementation of TOD;
- Data Originators shall take the responsibility of the quality of the data produced and published;
- Data Sets alone is not sufficient as TOD deliverable in the digital environment. Absence of any element of Digital Data Set means data is incomplete (completeness includes DPS, Schema, Metadata, data sets and Exchange Model);
- The transition of AIS officers to data managers and the evolution of Aeronautical Information Management present exciting opportunities for the integration and use of advanced technologies, but it also demands a workforce equipped with new skills in information technology; and
- State CAA policy planners and decision-makers should be closely involved in the planning and implementation of TOD

ASBU Thread DAIM Implementation Monitoring

5.3.121 The meeting noted that AIM SG/10 meeting was apprised of the updated ASBU DAIM Thread/Elements and the monitoring table as per the revised MID Region Air Navigation Strategy (ICAO MID Doc 002) and in line with the Global Air Navigation Plan (GANP 7th edition). The meeting took noted of the status of AIM implementation in MID Region as follows:

DAIM Elements	B1/1 Provision of quality-assured	B1/3 Provision of terrain digital data sets	B1/4 Provision of obstacle digital data sets

	aeronautical data and information		
Average per Element	56.66 %	40 %	37.77 %
DAIM Thread Average	44.8 %		

5.3.122 It was recalled that ICAO MID eANP Vol. III contains a section dedicated to AIM: B0-DATM related to the Service Improvement through Digital Aeronautical Information Management. The meeting noted that the monitoring tables became obsolete for the following reasons:

- The sixth edition of GANP replaces the thread DATM with the DAIM Digital Aeronautical Information Management, refining AIM implementation elements in a more consistent and comprehensive manner.
- The provision of these tables plans duplicates similar action at the ICAO MID regional level with the AIRM
- The monitoring should follow the evolution of the GANP and the revision of the MID Air Navigation Strategy.
- B0 does not exist anymore since the GANP Sixth Edition.

5.3.123 The meeting acknowledged the need to analyze the changes in the GANP, to review the structure of -MID- B0-DATM Tables and to develop appropriate tables for inclusion in ICAO eANP Vol. III.

5.3.124 In this respect, the meeting took note of a proposal from AIM SG/10 meeting to create an action group to:

- review the structure of ASBU-MID- B0-DATM Tables and develop appropriate tables for inclusion in ICAO eANP Vol. III; and
- analyze the ASBU DAIM Thread and Elements, including the identification of priorities, definition of applicability areas, indicators, metrics, targets, as well as the development of a SWOT analysis (Strengths, Weaknesses, Opportunities, Threats) for the ICAO ASBU (Aviation System Block Upgrade) DAIM (Data Analysis and Information Management) as well as the identification of KPAs and KPIs to enable States to organize the preparation of the ASBU DAIM Thread/Elements for its implementation, measure and document the efficiency benefits of the DAIM elements implemented.

Digital Datasets Planning and Implementation

5.3.125 The meeting recalled that MIDANPIRG/18, through Decision 18/17, tasked the Digital Datasets Ad-hoc Working Group (DDI Ad-hoc WG) with the development of a detailed Regional Implementation Plan for Digital Datasets.

5.3.126 The meeting noted that the AIM SG/10 meeting reviewed the progress Report of the Digital Datasets Implementation Ad-hoc Working Group (DDI Ad-hoc WG). This included the review of the draft Regional Implementation Plan for Digital Datasets.

5.3.127 Mindful of the challenges facing States in the Digital Datasets Implementation, the meeting recognized the importance of addressing these challenges and the necessity to overcome them. The meeting

acknowledged the proposal put forth during the AIM SG/10 meeting, suggesting that the DDI Ad-hoc WG continue its efforts in formulating cohesive solutions tailored to the needs of the MID region.

5.3.128 In the pursuit of efficiency and to streamline coordination, the meeting agreed to establish a task force to optimize resources and efforts. This task force is envisioned to substitute the various working groups, streamlining and consolidating their efforts under a unified umbrella.

5.3.129 Based on all the above, the meeting agreed to establish the Aeronautical Information Management Digitalization & Planning Task Force (AIMDP TF) to ensure alignment of the DAIM thread/elements with GANP latest Edition, develop appropriate monitoring tables for inclusion in ICAO eANP Vol. III. This task force, will also be entrusted to ensure a synchronized and harmonized deployment of digital AIS datasets in the MID Region.

5.3.130 Aiming to leverage expertise and maximizing efficiency, the meeting agreed to the following MIDANPIRG Decision to replace and supersede the MIDANPIRG Decision 18/17:

**MIDANPIRG DECISION 21/29: AERONAUTICAL INFORMATION MANAGEMENT
DIGITALIZATION & PLANNING TASK FORCE
(AIMDP TF)**

That,

- a) Aeronautical Information Management Digitalization & Planning Task Force (AIMDP TF) be established to ensure alignment of the DAIM thread/elements with GANP latest Edition, develop appropriate monitoring tables for inclusion in ICAO eANP Vol.III and to ensure a synchronized and harmonized deployment of digital AIM products in the MID Region;*
- b) the terms of reference of the AIMDP TF be developed during the first meeting of Task Force; and*
- c) States support the AIMDP Task Force through:*
 - i. assignment of Focal Point to contribute to the work of the Task Force; and*
 - ii. sharing states' experience, challenges and best practices related to Aeronautical Information Management Digitalization and Planning.*

NOTAM Template on GNSS interference

5.3.131 The meeting recalled that the MIDANPIRG/20 endorsed through MIDANPIRG Conclusion 20/18 a NOTAM template for GNSS interference.

5.3.132 The meeting noted that, in recent times, the Middle East region has experienced an uptick in GPS spoofing events, raising concerns about potential security threats and navigational disruptions. These incidents involve the broadcast of GNSS-like signals that cause avionics to calculate erroneous positions and provide false guidance.

5.3.133 The meeting acknowledged that based on the recent new entry of GNSS Spoofing, the PBN SG/8 meeting held in Doha, Qatar, 12 - 13 December 2023, invited the AIM SG to consider updating the NOTAM Template for GNSS Interference to reflect the spoofing activities and its effect on safety of flight operations.

5.3.134 Based on the above, the meeting agreed to the following Conclusion:

MIDANPIRG CONCLUSION 21/30: REVISED NOTAM TEMPLATE FOR GNSS INTERFERENCE

That,

- a) ICAO and IATA in coordination with AIM SG Chairpersons to develop revised NOTAM template for GNSS interference including jamming and spoofing considering the global and regional developments; by Q4 2024 and
- b) ICAO MID Office circulate the revised NOTAM Template for GNSS interference through State Letter for implementation by States.

NOTAM Template to Disseminate Information Related to Risks to Civil Aviation Over or Near Conflict Zones

5.3.135 The meeting recalled that the twentieth Meeting of the Middle East Air Navigation Planning and Implementation Regional Group MIDANPIRG/20 (Muscat, Oman, 14 – 17 May 2023), endorsed through MIDANPIRG CONCLUSION 20/19, the NOTAM template to be used to disseminate information related to risks to civil aviation over or near conflict zones including the nature and extent of threats arising from the conflict and its consequences for civil aviation.

5.3.136 The meeting was apprised of the Third Edition of ICAO Doc 10084 published in 2023, in particular . the new Appendix G, which describes a systematically coordinated risk assessment and risk communication model that can be used by States. The model consists of three (3) risk levels with correlating governmental security measures expressed in a consistently structured risk communication text (including content, sequence and vocabulary).

5.3.137 The meeting recognized the need to follow the standardized lexicon in the publication of AIP, NOTAM or AIC products for a conflict zone to reduce operator confusion with understanding various State issued information-sharing and further agreed to the following Conclusion to replace and supersede the MIDANPIRG Conclusion 20/19:

MIDANPIRG CONCLUSION 21/31: RISK COMMUNICATION MODEL TO DISSEMINATE INFORMATION RELATED TO RISKS TO CIVIL AVIATION OVER OR NEAR CONFLICT ZONES

That, the guidance contained in the Appendix G of the ICAO Doc 10084, Risk Assessment Manual on Civil Aircraft Operations Over or Near Conflict Zones, Third Edition, 2023, be used to disseminate information regarding the nature and extent of threats arising from the conflict and its consequences for civil aviation.

UAE preparation for significant changes in NOTAM specifications IP

5.3.138 IP/4 was submitted by UAE, highlighting UAE experience in preparation and implementation of the changes in the NOTAM specifications specified in the Seventh Edition of Doc 8126, focusing specifically on the calculation of Q-Line Lower/Upper Limits.

Search and Rescue Implementation Status

5.3.139 The subject was addressed in the WP/49, presented by the secretariat. The meeting recalled the relevant SARPs and guidance material related to SAR, and the MID Doc 010; and the ASBU GADS B1/2.

5.3.140 The meeting highlighted the main findings related to SAR implementation within the MID Region and the status of SAR bi-lateral agreements signed at **Appendix 5N**.

5.3.141 The meeting reiterated the need to explore means to support MID States in eliminating SAR findings and deficiencies by, in particular, organizing a SAR implementation Seminar.

5.3.142 The meeting recalled the MIDANPIRG Conclusion 20/34 related to the organization of SAR Workshop in 2024. The meeting noted that ICAO MID is planning to organize the Workshop during May 2024 and invited the MID States and international organization to actively participate in the event.

Declaration on Continuous Improvement of ANS Provision in the MID Region

5.3.143 The subject was addressed in WP/86, presented by UAE.

5.3.144 The meeting reviewed the initiative to support the improvements of ANS provisions in the MID Region by UAE, to support the growing volume of air traffic which necessitate the advanced air traffic management (ATM) solutions, in line with the regional and global plans.

5.3.145 The meeting reviewed Abu Dhabi Declaration at **Appendix 5O** and agreed on the following Conclusion:

MIDANPIRG CONCLUSION 21/32: ABU DHABI DECLARATION ON CONTINUOUS IMPROVEMENT OF ANS PROVISION IN THE MID REGION

*That, the Abu Dhabi Declaration on Continuous Improvement of air navigation services provision in the MID Region in **Appendix 5O**, is endorsed.*

MIDANPIRG Enhancement Programme (MEP), MOKFANS and the MIDANPIRG Chairman Awards programme

5.3.146 The subject was addressed in PPT/50, presented by the MIDANPIRG Chairman. The meeting recalled the objective of the MEP, and reviewed the Activities summary for the year 2023. And invited the MID States to actively engage and support the initiative. Additionally, the meeting reviewed the Month of Knowledge For Future Air Navigation Services (MOKFANS 2024) programme under the theme of Toward elevated horizons for resilient Air Navigation and Business Continuity and the programme sessions for the year 2024. It was noted that this cycle was convened in parallel to the MIDANPIRG/21, the level of participation was 163 participants.

5.3.147 The meeting recalled the MIDANPIRG Chairperson initiative related to the Award programme, to recognize and celebrate excellence. The meeting reviewed the nomination and selection process, the Contingency Planning Action Group was nominated for the Award. The group members received recognition from the Chairman.

5.4 Air Navigation Deficiencies

5.4.1 The subject was addressed in WP/51 presented by the secretariat. The meeting urged States to use the MID Air Navigation Deficiency Database (MANDD) for the submission of requests for addition, update, and elimination of Air Navigation Deficiencies, including the submission of a specific Corrective Action Plan (CAP) for each deficiency. The meeting reiterated that a deficiency would be eliminated only when a State submit a formal Letter to the ICAO MID Office containing the evidence(s) that mitigation

measures have been implemented for the elimination of this deficiency.

5.4.2 The meeting noted with concern that the majority of deficiencies listed in the MANDDD have no specific Corrective Action Plan (CAP). The meeting urged States to implement the provision of MIDANPIRG Conclusion 15/35 related to elimination of Air Navigation Deficiencies, in particular, the submission of a specific Corrective Action Plan (CAP) for each deficiency.

5.4.3 The meeting reviewed and updated the list of deficiencies in the AIM, AOP, ATM, CNS, SAR and MET fields as reflected in the MID Air Navigation Deficiency Database (MANDDD) at: <https://mandd.icao.int>. The meeting noted that the total number of air navigation deficiencies recorded in MANDDD is 98 deficiencies compared to 116 deficiencies in MIDANPIRG/20.

5.4.4 A quantitative analysis of the MID States' Air Navigation Deficiencies is shown in the Tables and Graphs presented at **Appendices 5P** and **5Q**.

5.4.5 The meeting reviewed the current status of deficiencies:

- In the AOP field: the total number of AOP deficiencies is nine (9) priority "A". Seven (7) deficiencies related to aerodrome certification; one (1) related to runway physical characteristics; and one (1) related to apron lighting. The lack of implementation of aerodromes' certification represents 78% of these deficiencies.
- In the AIM field: as reported by AIM SG/11, the meeting agreed to remove the deficiencies reported against Iraq related to AIP and aeronautical charts and two deficiencies against Saudi Arabia related to terrain and obstacle data set; the total number of AIM deficiencies is forty-five (45); thirty-nine (39) priority "A" and six (6) priority "B". Twenty (20) deficiencies related to eTOD (based on the agreement to include new deficiencies related to the non-provision of TOD for Area 2a/TOFP and OLS); five (5) related to QMS; five (5) related to AIXM; six (6) related to WAC; three (3) related to pre-flight information services; one (1) related to AIP and aeronautical charts; three (3) related to AIRAC adherence; and two (2) related to WGS-84.
- In the ATM field: as reported by Qatar, the meeting agreed to remove the deficiency reported against Qatar related to contingency agreement. Also as reported by MIDRMA SMR 2023, new deficiency added against Sudan related to lack of provision of required data to MIDRMA; the total number of deficiencies is seventeen (17); ten (10) priority "A" and seven (7) priority "B". Seven (7) related to the uncompleted signature of contingency agreements; seven (7) related to the non-implementation of planned regional ATS Routes, and three (3) related to unsatisfactory reporting of large Height deviation (LHD) and Traffic Data Sample (TDS) to the MIDRMA.
- In the CNS field: as reported by ATM SG/9, the meeting agreed to remove the deficiencies reported against Bahrain, Egypt, Iran, Iraq, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Sudan and UAE related to implementation of the Priority 1 AIDC/OLDI connection; the total number of CNS deficiencies is four (4); two (2) priority "A" and two (2) priority "B". Two (2) deficiencies are related to ATS Direct speech circuits, one (1) related to Inter-Regional Communication link with ICAO EUR/NAT Region and one (1) for HF service.
- In the MET field: as reported by MET SG/11, the meeting agreed to remove the deficiencies reported against Jordan related to SADIS service; the total number of MET deficiencies is fourteen (14) priority "A" deficiencies. five (5) related to QMS, eight (8) related to METAR, TAF, SIGMET and WAFS and one (1) related to SADIS.

- In the SAR field: the total number of deficiencies is nine (9) priority “A”. Five (5) related to the lack of implementation of SAR provisions; and four (4) related to non-compliance with the carriage of Emergency Locator Transmitter (ELT) requirements.

5.4.6 The meeting highlighted that the lack of implementation of priority 1 interconnection will result in additional ANS deficiency to the MID Air Navigation Deficiency Database (MANDD). Therefore, it was agreed that deficiencies related to the lack of implementation of Priority 1 AIDC/OLDI connections will be added by end of December 2026.

5.4.7 The meeting agreed to follow up on deficiencies filed in MANDD and the ICAO MID Office will send quarterly reminder to the States’ Focal Points to update the status of deficiencies and submit the related Corrective Action Plans (CAP).

5.5 ***States’ bilateral coordination***

5.5.1 Several coordination meetings were conducted between States and Organizations, to discuss common interest subjects and pending issues,

5.5.2 Saudi Arabia organized a side meeting with the adjacent States to elaborate on the plans related to the Saudi Future Airspace Concept (SFAC) with all the adjacent States. Saudi Arabia invited the States to designate Focal Points for further coordination.

5.5.3 The participating States and organizations appreciated the organization of this arrangement to discuss collaboration opportunities, which will further enhance the implementation of Regional Programmes.

5.6 ***Future Work Programme***

5.6.1 Saudi Arabia notified the meeting that a number of the working group has been established during the recent period, The meeting noted with concern the increased number of expert groups established or required to be established, as illustrated in the presented working papers. The meeting established an Action Group to look into the current MIDANPIRG Structure and the requests received for new expert groups and provide initial analysis and recommendations for the way forward.

5.6.2 The Action Group highlighted the following observations:

- the main Sub-Groups are needed to assist the work of MIDANPIRG;
- there was inconsistency in using terminology for naming the groups and subsidiary bodies, which were not in line with MIDANPIRG—Procedural Handbook (e.g., Ad-hoc Group, Ad-hoc working group, Action Group, etc.);
- there are several inactive subsidiary bodies;
- some of the tasks could be carried by the SGs themselves instead of establishing new WGs, Ad-hoc WG, AGs and TFs etc.; and
- some of the newly requested subsidiary bodies were discussed in the main Sub-Groups and justified in accordance with the work that should be carried out in accordance with the MIDANPIRG work programme.

5.6.3 Based on the outcome of the analysis of the Action Group; the meeting agreed to the following naming convention of subsidiary bodies and the hierarchy structure:

- Sub-groups (Main body for each area): ATM, PBN, AIM, CNS, MET SGs
- Working Groups (WGs): are established under the SGs if the work involves long-term and complex tasking and require expertise different than the members of the SG.
- Task Forces (TFs): to be established under the SGs or WGs for specific tasks and their lifetime is subject to the completion of the tasks they were established for.
- (so TFs should be established based on well-defined tasks and timelines).

Note. Establishing SGs, WGs and TFs requires approval by MIDANPIRG, including their ToRs.

- Action Groups (AGs) are established by the Chairpersons of SGs or WGs to carry out some tasks within their working arrangements and Do Not require MIDANPIRG approval.

5.6.4 The meeting agreed to the following Initial Criteria for the establishment of new expert groups to be submitted to MIDANPIRG along with draft ToRs:

- tasks are in the work programme of MIDANPIRG;
- tasks cannot be carried out by the SGs themselves;
- tasks require additional resources (States, ANSPs and International Organizations experts and ICAO staff)
- level of priority
- timelines

5.6.5 The meeting agreed that the Action Group on the review of the MIDANPIRG Structure continue its work in coordination with the Chairperson of MIDANPIRG and all the Chairpersons of the SGs supported by the Secretaries of the SGs to carry out a comprehensive review of the MIDANPIRG Work Programme to agree on next 5 years programme and recommend an amendment to the MIDANPIRG Structure taking into consideration:

- regional and global requirements
- regional needs
- specific States needs
- priorities
- available resources

5.6.6 Meantime, the meeting agreed to:

- a) maintain all the current main Sub-Groups (ATM SG, MET SG, AIM SG, PBN SG and CNS SG);
- b) agree to establish ASM WG to include the work proposed for FRA AG, GNSS AG and FF-ICE;
- c) dissolve the RPAS/UTM AG and include its work under the ASM WG;

- d) dissolve the Contingency AG and CMC AG;
- e) merge the DDI Ad-Hoc WG with the new DAIM AG to be AIM Digitalization TF;
- f) Include the work proposed for the AMC Routing Table AG under the CNS SG;

5.6.7 Based on all the above, the meeting requested the ICAO MID Office to draft and present an amendment to MIDANPIRG - Procedural Handbook during MIDANPIRG/22 based on the outcome of the Action Group on MIDANPIRG Structure, the meeting reviewed and agreed to the following updated MIDANPIRG Structure:

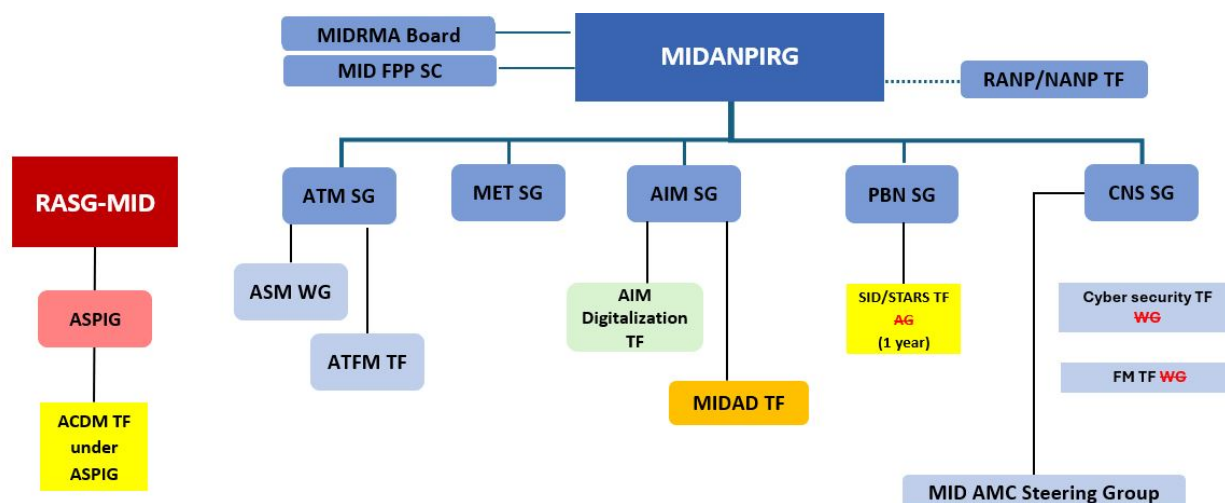


Figure 1. revised MIDANPIRG Structure 2024

5.6.8 Accordingly, the meeting agreed to the following Decision:

MIDANPIRG DECISION 20/33: MIDANPIRG REVISED STRUCTURE

That, the revised MIDANPIRG Structure 2024 is endorsed to be included in MIDANPIRG Procedural Handbook.

5.6.9 The meeting agreed to conduct an extraordinary meeting during Q4 2024 to review and finalized the structure, to be presented to the MIDANPIRG/22 meeting.

REPORT ON AGENDA ITEM 6: RASG-MID/MIDANPIRG WORKING ARRANGEMENTS**6.1 Working Arrangements**

6.1.1 The subject was addressed in WP/52 presented by the Secretariat. The meeting recalled that according to revised PIRG and RASG Terms of Reference (ToRs), which was endorsed by 41st of ICAO Assembly, the MIDANPIRG/19 & RASG-MID/9 and the MIDANPIRG/20 & RASG-MID/10 were conducted in a combined mode with plenary sessions and parallel tracks for the MIDANPIRG and RASG-MID.

6.1.2 The meeting recalled that MIDANPIRG/20 & RASG-MID/10 meeting agreed to maintain the current arrangement for the conduct of MIDANPIRG and RASG meetings; and requested the Secretariat to conduct a Survey and analyze the feedback to measure efficiency of the current arrangements; and present the results of the survey to MIDANPIRG/21 and RASG-MID/11 meetings.

6.1.3 Accordingly, the Survey has been developed and disseminated to the MID States to gauge their satisfaction. The replies have been analyzed by the Secretariat, as follows:

- Eleven (11) MID States have replied to the Survey.
- Ten (10) States have indicated their satisfaction with the current arrangement.
- One (1) State suggests having back-to-back arrangement.

6.1.4 In addition, the following are some comments and suggestions received from the States:

- The current setup/format of the meeting is cost-effective achieving: sessions management, achieving regional cooperation and decision making with clear objectives and enhanced engagement and efficiency.
- Improve the sharing of information and best practices.
- Conduct workshops and/or other events during the meetings.

6.1.5 Based on the foregoing, the meeting agreed to maintain the current arrangements. The meeting commended the Secretariat and Chairmen of the groups to consider and implement the States' comments and suggestions including conduct of SSP Workshop as part of the RASG-MID Programme.

6.2 Dates and Venue of MIDANPIRG/22 and RASG-MID/12

6.2.1 The subject was addressed in WP/53 presented by the Secretariat. The meeting recalled with appreciation the offer by Qatar to host the MIDANPIRG/22 and RASG-MID/12 meetings, Qatar confirm the offer and requested the MID Office to coordinate with the Focal point for the exact date and details. The exact dates of the meetings will be coordinated between the ICAO MID Office, the Chairpersons of both Groups and Qatar. The meeting would be tentatively planned after Ramadan.

6.2.2 The meeting noted with appreciation the interest of Iran to host the MIDANPIRG/23 and RASG-MID/13 meetings.

6.3 Fifth MID Region Safety Summit

6.3.1 The meeting noted with appreciation that the Fifth MID Region Safety Summit would be generously hosted by Kuwait during December of 2024.

REPORT ON AGENDA ITEM 7: ANY OTHER BUSINESS***Overflight permission number in Item 18 of the ATS FPL***

7.1 The meeting noted IP/10 submitted by IATA. The meeting noted the information shared of the risk created by a growing demand of States mandating the inclusion of overflight permit numbers in item 18 of the Air Traffic Service flight plan message and the need for States to remove the requirement for the inclusion of overflight permission, and other administrative data to be included in item 18 of the ATS FPL message.

Overflight permission “File n Fly”

7.2 The meeting noted IP/20 submitted by IATA. The meeting noted that every States has the unilateral and absolute right to permit or deny entry into the area recognized as its territory and similar right to control all movements within such territory; the growth in aviation and the economic benefits demands a new and sustainable approach to applying for such in order to ensure efficient utilization of airline resources, optimization of network planning and performance, resilience and sustainable aviation. The paper presented the users proposal for a file n fly concept for consideration where by the ICAO flight plan serves as the means for overflight permission compliance. it was further noted that IATA and ACAO held a workshop in 2022 on the subject of a simplified process.

CANSO Working Programme

7.3 The meeting noted IP/15 submitted by CANSO. The meeting acknowledged CANSO's commitment to supporting the MID Region in the planning and implementation of their National Air Navigation Plans and Regional Air Regional Plan through various CANSO working groups and initiatives.

APPENDICES

MID Region

Airports Collaborative Decision-Making Task Force (MID ACDM-TF)

Terms of Reference

1. SCOPE

The scope and objective of the MID ACDM-TF is to identify, plan and assist in the implementation of A-CDM at the list of Airports concerned by the ACDM Implementation, as defined on the MID Regional Air Navigation Plan (ACDM applicability area agreed by the MID States).

2. PURPOSE:

The purpose of the Regional Task Force is to enhance the MID Region Airports preparedness for the ACDM Implementation. The task force will provide technical assistance, guidance, and support for Airports to ensure the successful implementation of ACDM processes and tools.

3. COMPOSITION:

The Regional Task Force will be composed of Subject Matter Experts from International/Regional Organizations, States, airport operators and Airport Stakeholders, including airlines, ground handlers and air traffic control. The task force will be chaired by a representative from the States defined within the ACDM applicability Area.

4. ROLES AND RESPONSIBILITIES:

The Regional Task Force will have the following roles and responsibilities:

- a) Assist, support, and enhance the MID Region Airports preparedness for the ACDM Implementation,
- b) Review the Current status of ACDM Implementation Plan in MID Region,
- c) Check the Readiness of the newly Implemented Elements/Enablers of any ACDM Project,
- d) Review the effectiveness of existing Airports ACDM projects in the MID Region,
- e) Assist, as requested, the implementation of coordination procedures between Airports and relevant stakeholders:
 - i. Facilitate the exchange of information and best practices between airport stakeholders to ensure that stakeholders are aware of the latest developments in ACDM processes, tools, and technologies,
 - ii. Provide guidance and support for the implementation of ACDM processes, including training and education for Airport and relevant stakeholders,
 - iii. Monitor the implementation of ACDM processes and evaluate their effectiveness to identify areas for improvement, and
 - iv. Ensure that ACDM processes are achieving their intended objectives, including optimizing the use of airport resources, reducing delays, and enhancing safety.

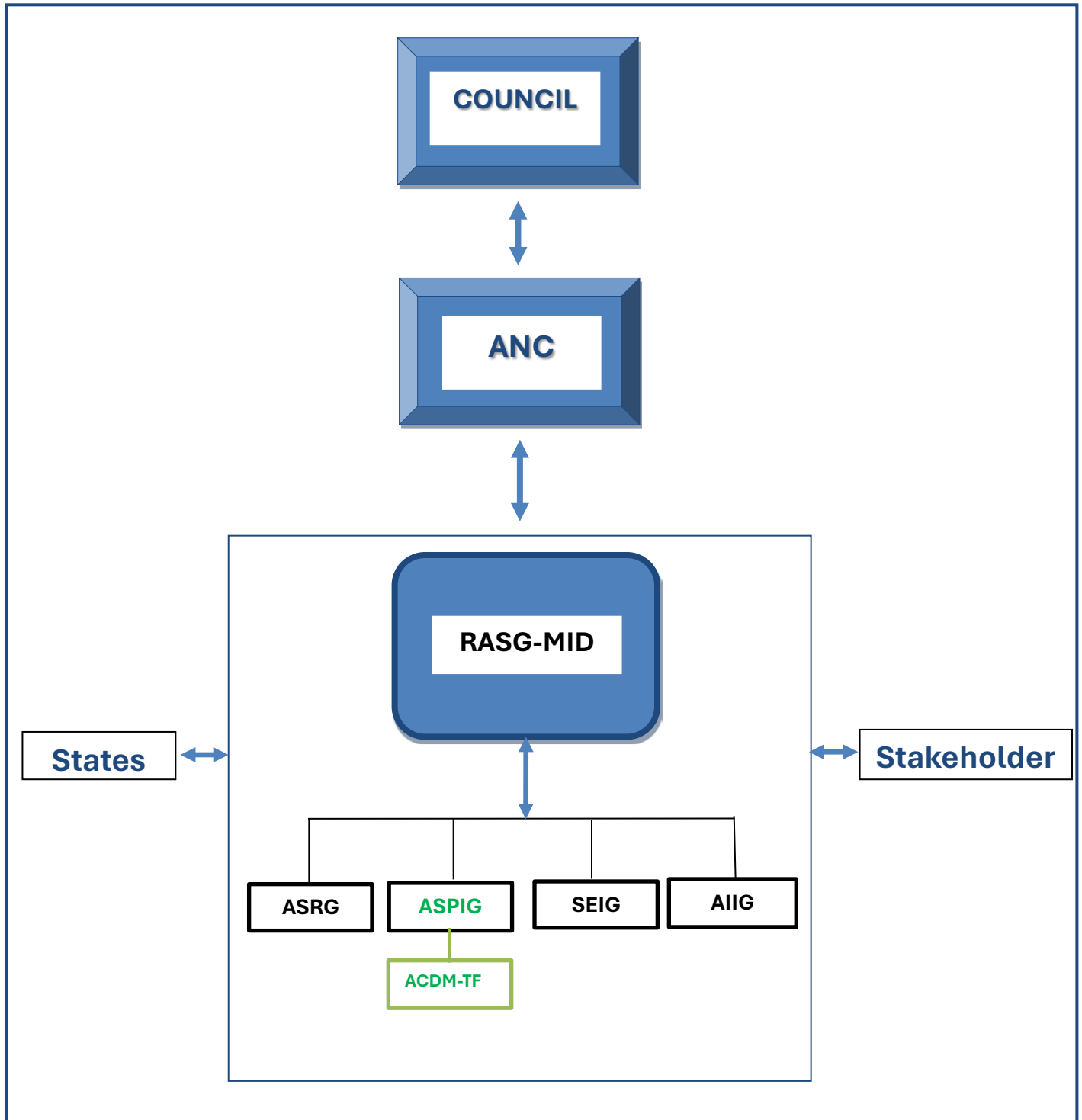
5. MEETINGS AND REPORTING:

The Regional Task Force will meet on a regular basis to discuss the implementation of ACDM processes and tools. The task force will produce regular progress reports and provide recommendations for improvements to airport stakeholders.

6. WORKING METHODS:

The Task force meeting should be held at least once a year for three-days.

RASG-MID ORGANIZATIONAL STRUCTURE
Including the endorsed ACDM-TF



ASRG	Annual Safety Report Group	SEIG	Safety Enhancement Implementation Group
ASPIG	Aerodromes Safety & Planning Implementation Group	AIIG	Accident & Incident Investigation Group
ACDM-TF	Airport Collaborative Decision Making Task Force		

FOLLOW-UP ACTION PLAN ON PIRG/RASG MID CONCLUSIONS AND DECISIONS

No.	CONCLUSIONS AND DECISIONS	CONCERNS/ CHALLENGES (RATIONALE)	DELIVERABLE/ TO BE INITIATED BY		TARGET DATE	STATUS/REMARKS
C. 1	EVOLUTION OF AVIATION SAFETY PLANNING That, States, nominate a focal point and provide information on the Secure Portal on Operational Safety Risks and Emerging Issues to support work of RASG and provide inputs for future editions of GASP	Sharing of the operational safety risks and emerging issues	Support the update of the future editions of GASP	ICAO States	August 2023	Completed SL issued
C. 2	SHARING OF THE NASP That States, be reminded to share the latest version of their NASPs with ICAO HQ and ICAO MID Office for posting on the GASP public website.	Compliance with Assembly Resolution A40-1	State Letter	States	August 2023	Completed SL issued
C. 3	MENA ARCM That States be encouraged to sign the MENA AIG Regional Cooperation Mechanism (MENA ARCM) MoU, if not yet done.	Enhancement of cooperation among MENA States in the provision of AIG area	Sign the MoU to support States in AIG area	States	July 2023	Actioned Discussed during MENA ARCM/4 meeting and during the AIGP/8 meeting
C. 4	MENA RSOO That, a) States are encouraged to Join the MENA RSOO by signing the revised Memorandum of Agreement; and b) States and Stakeholders are urged to support the establishment and operations of the MENA RSOO to enhance aviation safety at National and Regional levels.	Enhancement of States' Oversight Capabilities, increase USOAP EI and support development and implementation of SSP	Sign the MoA to legally establish MENA RSOO and launch its operation	States	2024	Completed MENA RSOO signing ceremony has been held on 6 Dec 2023 in Riyadh.

No.	CONCLUSIONS AND DECISIONS	CONCERNS/ CHALLENGES (RATIONALE)	DELIVERABLE/ TO BE INITIATED BY		TARGET DATE	STATUS/REMARKS
C. 5	CONTINUOUS COLLABORATION APPROACH TO MANAGING AND ENHANCING SAFETY IN MID REGION That, a) States and Stakeholders are urged to support the implementation of the Continuous Collaboration Approach to Managing and Enhancing Safety in MID Region; b) Continuous Collaboration Approach to Managing and Enhancing Safety in MID Region to be included as a strategic approach within the RASG-MID and MIDANPIRG frameworks; and c) Coordinating the prioritization of Member States needs with ICAO MID Regional Office.	Managing and Enhancing Safety in MID Region Challenges include: 1) Unstable Security/Political Situation 2) Financial Constraint (financial resources) 3) Insufficient qualified and experienced technical staff 4) Development of NASP and SSP implementation 5) Lack of sharing of safety information	Fostering effective risk management capabilities in the MID Region, State and industry level to cope with the systemic and operational safety risks and wide-ranging effects of the crisis and constitute an important enabler for building back a more resilient aviation system	States and all Stakeholders and partners	On-going	Actioned DGCA-MID/6 meeting (Abu Dhabi, 1 – 3 November 2022) endorsed the Approach and commended the ICAO MID Regional Office for developing this Collaborative Approach for safety Enhancement and Management in the MID Region. MIDANPIRG/20 & RASG-MID/10 supported the Approach and included it in its framework under MID RASP.
C.6	COORDINATION TO ENHANCE AIRSPACE OVER HIGH SEAS BETWEEN MID REGION AND APAC That, a) ICAO MID is tasked to initiate and foster inter-regional and sub-regional initiatives that aim to enhance the airspace at the interface with the ASIA Pacific region; and b) States and aviation stakeholders are encouraged to collaborate and support airspace development initiatives aiming at enhancing safety, improve efficiency of the airspace over the high seas at the interface with Asia Pacific.	the need to optimize the airspace over high seas between the MID and APAC Regions, to further enhance safety and enhance capacity and efficiency.		Oman, Saudi Arabia and UAE		



EUR OPS BULLETIN

Serial Number: 2023_001

Effective: 27 July 2023

Subject: Risks related to altimeter setting errors during APV Baro-VNAV and non-precision approach operations

1. Introduction and scope

1.1 Recent incidents have highlighted that an erroneous altimeter setting can have serious consequences on flight safety during final approach operations. After recalling how aircraft barometric altitude is determined and used in certain approach operations, this bulletin lists a set of recommendations to mitigate altimeter setting errors.

2. Barometric altitude

2.1 Barometric altitudes are widely used in aviation today:

- to ensure vertical separation between aircraft and terrain on instrument flight procedures.
- to define certain vertical approach paths.
- to determine all the minimum altitudes, in particular the MDA/DA (Minimum Descent Altitude/Decision Altitude) on non-precision, APV and CAT I precision approaches.

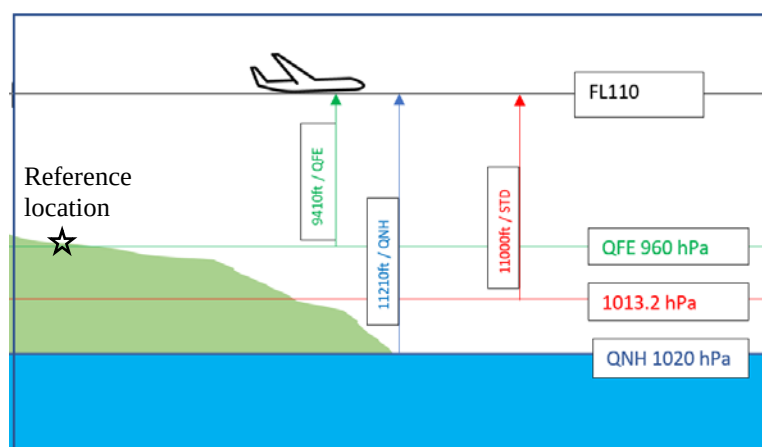


Figure 1 – Altimeter setting

2.2 Aircraft pressure altimeters are calibrated according to the International Standard Atmosphere, to indicate the elevation of the aircraft above a selected datum. The selected datum depends on the barometric reference pressure set on the altimeter sub-scale, which can be:

- QNH or local pressure at a reference location, converted to Mean Sea Level: in this case the altimeter will indicate the altitude of the aircraft.
- 1013.2 hPa: in this case the altimeter will indicate the Flight Level of the aircraft.
- QFE or local pressure at a reference location: in this case the altimeter will indicate the height of the aircraft above that reference location

3. Risks

3.1 The technical characteristics of the altimeter induce two risks that could lead to the determination of an erroneous altitude:

- 1) The incorrect altimeter setting
- 2) The temperature effect (difference between the real atmosphere and the standard atmosphere)

3.2 Barometric altimeter setting errors can lead to significant altimeter deviations. Each 1hPa error equates to approximately 30 ft of height difference; therefore, an altimeter setting error of 10 hPa would result in an altitude error of about 300 ft.

3.3 The effects of temperature can be anticipated because they are directly related to the deviation from the standard ISA temperature. They can lead to a reduction of safety margins, but technical solutions exist, as well as operational procedures, already in place, which allow to limit these effects, in particular by cold temperature corrections.

Note – Further guidance on the “RNP approach and RNP AR approach operations in non-standard temperature conditions” is available in the Performance-Based Navigation (PBN) Manual (Doc 9613), Fifth Edition, Volume II, Attachment B.

4. Final approach operations

4.1 The consequences of an erroneous altimeter setting will be more severe on the final segment of the approach for which the obstacle clearance margins are reduced. Most final approach operations can be affected by an erroneous altimeter setting. But they will not all be affected in the same manner.

4.2 ILS CAT I, GLS CAT I, RNP APCH down to LPV minima provide vertical guidance to the runway that is not dependent on barometric altitude. Therefore, once established on the glide path, an altimeter setting error will not affect the vertical profile. As a result, only the Decision Altitude (DA) based on barometric altitude, may still be subject to an error, such that the crew might make the decision either to land or go around higher or lower than expected, depending on the error of the altimeter setting.

4.3 On the other hand, the entire vertical path of non-precision approaches operated as either Dive & Drive (stepdown) or using a Continuous Final Descent Approach (CDFA) technique, as well as RNP APCH to LNAV or LNAV/VNAV minima and RNP AR operations can all be highly impacted by altimeter setting error.

4.4 If the altimeter setting is set incorrectly on the altimeter sub-scale, the aircraft could be significantly above or below the safe vertical profile as determined by the procedure design. The barometric altimeter setting error will also affect the MDA/DA and the possible check of altitude versus distance to the threshold made by the crew will not allow them to detect this type of error.

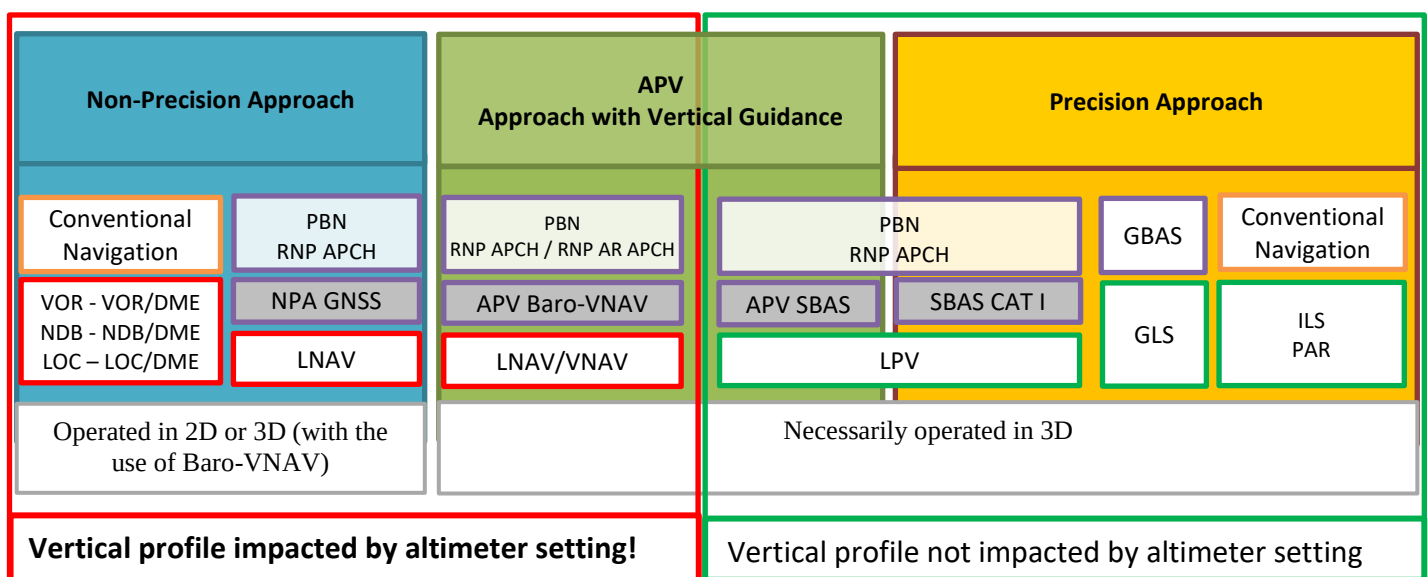


Figure 2 – Approach procedures and Altimeter setting

Note – APVs (Approaches with Vertical Guidance) are usually materialized under two different minima lines on a single RNP approach chart: LNAV/VNAV (using Baro-VNAV technology) versus LPV (using the Satellite Based Augmentation System, SBAS). However, the minima are associated to two different approach technologies since Baro-VNAV relies on barometric altitude to define the vertical path, whereas SBAS is based on geometric altitude. ICAO therefore recommends that the term APV is not used anymore in an operational context. Operators and pilots should be aware of these differences in order to avoid any confusion when considering the minima line.

Focus on Baro-VNAV

4.5 Baro-VNAV offers vertical guidance based on the aircraft's barometric altitude and a vertical profile encoded in the navigation database. It simplifies the CDFA flight technique and provides the same operating mode for crew to perform all non-precision approaches and Baro-VNAV approaches. The way Baro-VNAV information is integrated in the cockpit may make Baro-VNAV operations look like precision approach operations. However, unlike precision approach operations, Baro-VNAV operations are based on barometric references, that is why the altitude versus distance checks, which may allow detection of a final segment vertical path error when operating an ILS, GLS or RNP with LPV minima, are ineffective for Baro-VNAV operations, as the same erroneous information is being used for the vertical profile definition and the altitude check.

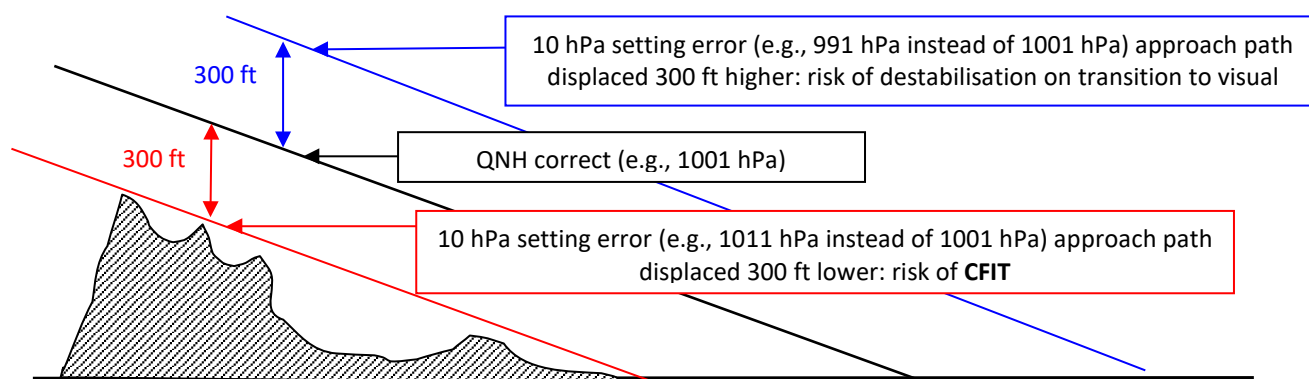


Figure 3 – Example of altitude deviation resulting from altimeter setting error

4.6 As with any non-precision approach operation, it is therefore imperative to ensure the correct altimeter setting when using Baro-VNAV, keeping in mind that both the vertical profile and the DA would be impacted in case of error.

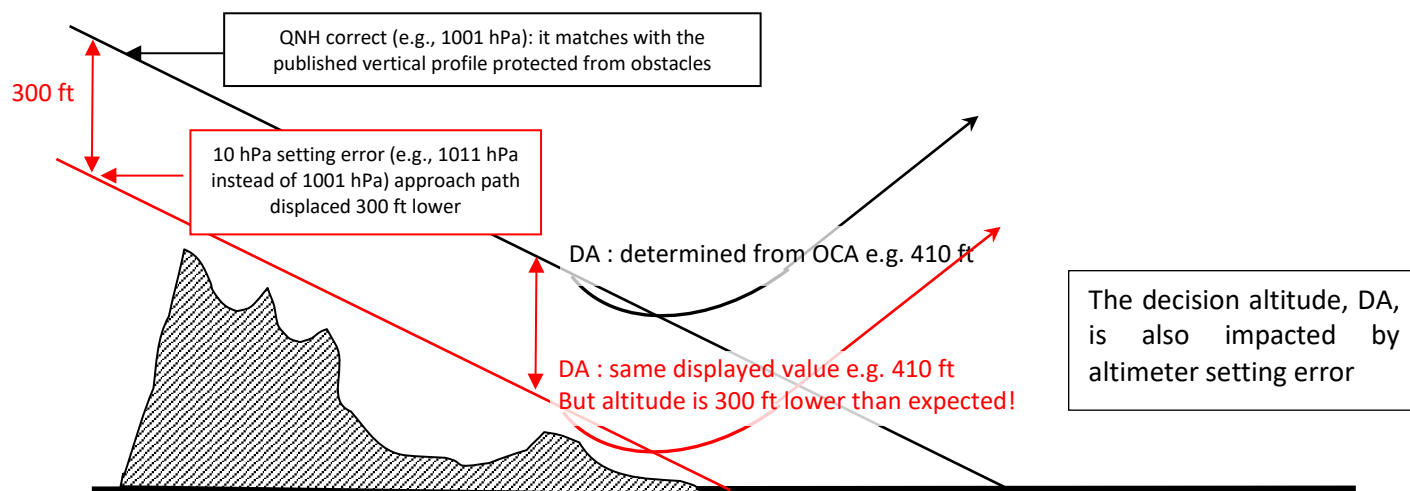


Figure 4 – Example of the impact of an altimeter setting error on DA

5. Root causes

5.1 The altimeter setting involves several steps, which may be subject to errors:

- Incorrect determination of the local barometric pressure, use of regional pressure instead of local barometric pressure values or transmission of a wrong value by the meteorological service provider,
- Provision of incorrect QNH through ATIS (where available)
- Ineffective ATC-Pilot communication, such as: wrong value given by ATC, incorrect read back not detected by ATC, radio/frequency issue, etc.
- Incorrect selection of the altimeter setting by the crew due to different factors such as: high workload, confusion in the unit of the barometric setting (Inch Hg instead of hPa), confusion between QNH and QFE, absence of effective crosscheck between crew members, flight deck system failure, etc.

Transition altitude/level

5.2 The transition level is the lowest flight level available for use above the transition altitude, where altimeter setting is set to 1013.2 hPa. The transition altitude is the level below which the vertical position of an aircraft is controlled by reference to altitudes, where altimeter setting is set to QNH.

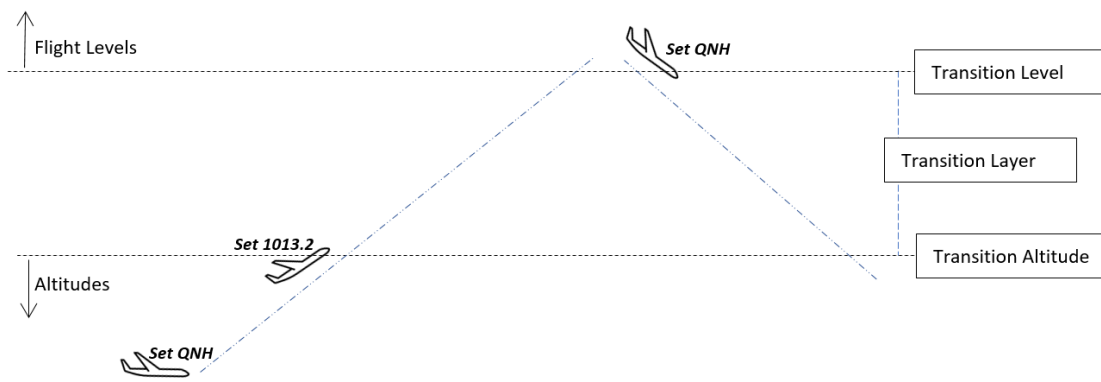


Figure 5 – Transition Altitude/Level

5.3 Altimeter setting error in approach can occur when the crew switches from 1013.2 hPa to QNH and vice versa. Depending on operators' usual area of operation, using variable transition altitude instead of fixed transition altitude may cause crew confusion and result in a premature or late setting of the correct altimeter reference. Furthermore, as the crew's workload intensifies during the descent and landing phase, a low transition altitude/level may require the crew to adjust the altimeter settings when their workload is already high, which can increase the likelihood of altimeter setting errors. In addition, a low transition altitude/level can reduce the opportunity to detect a possible altimeter setting error before the aircraft intercepts the final approach segment.

6. Proposed Mitigations

6.1 Aircraft operators and ANSPs are reminded of the importance of ensuring that the correct barometric altimeter setting is provided and entered in the aircraft's systems.

6.2 Some mitigations are as follows:

At aircraft operator's level

- Encourage the use of those 3D operations where final segment profiles cannot be impacted by wrong barometric altimeter setting (ILS, RNP APCH down to LPV minima, GLS).
- Establishment and strict adherence to the standard operating procedures for the use of the VNAV function.
- Consider adjusting the operating minima by taking into account the operational exposure and/or crew experience with approach procedures that are vulnerable to QNH errors.
- Apply Crew Resource Management techniques, such as cross-checking and monitoring.
- Consider altitude callouts, whereby the aircraft's radio altimeter can provide height callouts to the pilot when passing specific values (e.g. 500 ft and 1000 ft), which can be interpreted to assess whether the

aircraft is deviating from the intended vertical profile. This mitigation is more effective when the terrain is relatively flat.

- Configure correct QNH in all altimeters (main, standby) and FMS. The flight crew should pay attention to a barometric reference that significantly differs from the one used for approach preparation. That could be the symptom of a barometric reference error. The flight crew should consider cross-checking of the barometric references from all available sources (METAR, ATIS and ATS).
- Apply standard communication and phraseology between the pilot and air traffic services.
- Pilots should use effective Threat & Error Management (TEM) techniques to identify and mitigate against incorrect altimetry when preparing to fly an approach that relies directly on an accurate pressure altimeter sub-scale setting (e.g. use of Baro-VNAV, non-precision approaches).

At ANSP level

- Consider fixed and harmonized transition altitudes/levels which can harmonize the switch from 1013.2 hPa to QNH.
- Consider using the barometric pressure settings provided by Mode S EHS (Enhanced Surveillance) and ADS-B equipped aircraft, to enable the timely identification of aircraft operating with incorrect barometric altimeter setting.
- Consider introducing procedures to provide aircraft with the QNH at different phases of approach, including when clearing an aircraft for the approach or at first contact with the tower.
- Apply standard communication and phraseology between the pilot and air traffic services.

Technical solutions

- Consider using those 3D approach procedures where the final segment cannot be impacted by wrong QNH setting (ILS, RNP APCH down to LPV minima or GLS).
- Use of recovery safety nets, such as Minimum Safe Altitude Warning (MSAW) and Approach Path Monitor (APM) by ATC and Terrain Avoidance and Warning System (TAWS) by pilots, which can alert actors and thus lead to recovery actions associated with operational procedures.
Note – these safety nets are not available in all aircraft or ATS units and their technology varies from one site to another. Their intrinsic characteristics, in particular resulting from choices intended to limit the false alarm rate, lead them, in certain cases, not to be triggered, without this being a malfunction. To get the most consistent alerts, aircraft operators should ensure that the latest available software version and the latest terrain and obstacle database are loaded in the TAWS.
- Consider the use of datalink for transmission of MET information, including QNH, to aircraft.
- Consider other emerging monitoring solutions that would offer comparison between barometric altitude with GNSS-driven altitude.

7. Recommendations

7.1 In order to better manage the risks related to altimeter setting errors, in particular during APV Baro-VNAV and non-precision approach operations, the followings are recommended:

a) General recommendations:

- to ensure that awareness of the risk of altimeter setting errors and their consequences is shared;
- to assess the robustness of the mitigation measures described in the previous point, and to consider implementing them, when relevant;
- to report all situations that have generated deviations in order to improve the visibility of this type of event, preferably with a perspective of the appropriate treatment in each case;
- to contribute collectively to training on this risk, to disseminate best practices and to promote exchanges between domains in order to better understand the limits of the systems;
- MET Service providers to ensure provision of quality-assured MET information to users;
- aircraft operators, to investigate methods to identify incorrect altimeter setting with the Flight Data Monitoring (FDM) Program; and

- Relevant ANC Panel(s), to assess the potential review of APV Baro-VNAV criteria concerning the likelihood of QNH errors.

b) *Recommendations on Training:*

- Barometric altitude setting is largely dependent on human factors. Therefore, it is recommended to consider appropriate initial and recurrent training subjects to pilots and ATCOs, including the following:

For pilots:

- o Initial and recurrent training should address the limits of barometric altimetry, and the impact of incorrect barometric pressure settings on vertical position including those factors outlined in this bulletin.
- o Training and/or promotional initiatives on altimeter setting procedures, different impacts of QNH errors between geometric and barometric approaches and possible mitigation measures, use of standard phraseologies, adhering to read back and hear back, etc.
- o Training on 3D operations including the difference between 3D depending on Baro-VNAV and other 3D approach operations, highlighting the critical importance of Barometric setting for Baro-VNAV operations.
- o Training on 3D RNP operations highlighting the RNP chart layout where LNAV/VNAV and LPV minima co-exist.

For ATCO:

- o Initial and recurrent training should address the limits of barometric altimetry, and the impact of incorrect barometric pressure settings on vertical position including those factors outlined in this bulletin.
- o Training and/or promotional initiatives on altimeter setting procedures, different impacts of QNH errors between geometric and barometric approaches and possible ATC mitigation measures on erroneous setting of altimeter setting by flight crew, use of standard phraseologies for transmitting QNH information to pilots, paying attention to pilots' read back and hear back, etc.

FOLLOW-UP ACTION PLAN ON RASG-MID/10 CONCLUSIONS AND DECISIONS

No.	CONCLUSIONS AND DECISIONS	CONCERNS/ CHALLENGES (RATIONALE)	DELIVERABLE/ TO BE INITIATED BY		TARGET DATE	STATUS/REMARKS
C. 10/1	11TH ASR That, the Eleventh MID Annual Safety Report is endorsed and be posted on the ICAO MID Website.	Sharing the final 11 th MID-ASR for the period 2017-2021 with identified MID Region safety priorities	MID-ASR 11 th Edition published on the ICAO website	RASG-MID/10	July 2023	Completed
C. 10/2	SHARING OF SAFETY DATA ANALYSIS That, in order to present an improved version of the 12th MID-ASR to the MID-ASRG/5 meeting, States be urged to provide the ICAO MID Office by 30 May 2023 with the number of accidents, serious incidents and incidents, safety data analysis/information, and their associated safety recommendations in Appendix 5.1A for the past 5 years (2018 – 2022) and using the template in Appendix 5.1B .	Collection of safety data for a Harmonized database	Safety Data Analysis for development of ASR	States	May 2023	Completed
C.10/3	RSA ON EGPWS/TAWS That, the guidance material (RSA-16) on measures to improve the effectiveness of Enhanced Ground Proximity Warning System (EGPWS)/Terrain Awareness and Warning System (TAWS) at Appendix 5.2B is endorsed.	Continuous reduction of the Operational Safety Risk (CFIT)	RSA-16 on measures to improve the effectiveness of EGPWS/ TAWS circulate to all States	IATA ICAO	August 2023	Completed <i>SL issued File Ref.: ME4 -23/156; dated 3 August 2023</i>
C. 10/4	RSA ON DG INSPECTORS OVERSIGHT That, the guidance material (RSA-18) to support States inspectors to conduct oversight to ensure safe transport of dangerous goods by air at Appendix 5.2C is endorsed	Share best practices on transport of dangerous goods by air	RSA-18 to support States inspectors to conduct oversight to ensure safe transport of dangerous goods by air circulate to all States	Bahrain and Oman ICAO	August 2023	Completed <i>SL issued File Ref.: ME4 -23/157; dated 3 August 2023</i>

No.	CONCLUSIONS AND DECISIONS	CONCERNS/ CHALLENGES (RATIONALE)	DELIVERABLE/ TO BE INITIATED BY		TARGET DATE	STATUS/REMARKS
C. 10/5	RSA ON OCCURRENCE REPORTING That, the guidance material (RSA-17) to support States' on developing an occurrence reporting system for the CAA and on establishing an effective operation of the mandatory and voluntary reporting systems at Appendix 5.2D is endorsed.	Share best practices on occurrence reporting	RSA-17 to support States' on developing an occurrence reporting system circulated to all States			Completed <i>SL issued File Ref.: ME4 -23/15; dated 3 August 2023</i>
C. 10/6	RSA ON SMS ASSESSMENT That, the guidance material (RSA-19) to support States' on developing and conducting an SMS Assessment on their Service providers at Appendix 5.2E is endorsed.	Share best practices on conducting SMS assessment tool	RSA-19 to support States' on developing and conducting an SMS Assessment on their Service providers circulated to all States	UAE ICAO	August 2023	Completed <i>SL issued File Ref.: ME4 -23/159; dated 3 August 2023</i>
C. 10/7	MID-RASP 2023-2025 EDITION That, a) the MID-RASP 2023-2025 Edition including the Safety Enhancement Initiatives (SEIs) and the MID region Safety Performance Measurement and Monitoring (SPMM) at Appendix 5.2F is endorsed; and b) urge States, international organization, and industry to support the MID-RASP 2023-2025 Edition activities including SEIs and their respective safety actions.	Sharing the final MID-RASP 2023-2025 Edition	MID-RASP 2023-2025 Edition published on the ICAO website	RASG-MID/10	August 2023	Completed
D. 10/8	ESTABLISHMENT OF THE ACTION GROUP That, the Action Group composed of the following States & international organizations and their nominated experts, is established to develop the guidance material to assist MID Region States in the issuance of exemptions related to temporary deviations from standards impacting Articles 38 and 40 of the Chicago Convention.	Share best practices on the issuance of exemptions	RSA the issuance of exemptions related to temporary deviations	Qatar supported by Iran, Sudan, UAE, ACAO, IATA	Oct. 2024	On-going

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No.	CONCLUSIONS AND DECISIONS	CONCERNS/ CHALLENGES (RATIONALE)	DELIVERABLE/ TO BE INITIATED BY		TARGET DATE	STATUS/REMARKS
	- Iran: Mr. Mahmoodreza Rohani - Qatar: Dr. Ramy Saad - Sudan: Mr. Bahaeldin AbdAlrahim Yassin - UAE: Mr. Ahmed Salim Abdalla AlSaabri - IATA: Mr. Jehad Faqir - ACAO: Mr. Hicham Bennani.					
D. 10/9	ESTABLISHMENT OF THE ACTION GROUP That, the Action Group composed of the following States and their nominated experts, is established to develop the guidance material to support States for the conduct of remote surveillance. - Iran: Mr. Jaber Goodarzi - Jordan: Eng. Rawan Al-Naimat - Qatar: Dr. Ramy Saad - Saudi Arabia: TBD - Sudan: Mr. Bahaeldin AbdAlrahim Yassin - UAE: Mr. Eisa Saeed Al Mesmari - ACAO: Mr. Hicham Bennani	Share best practices on the conduct of remote surveillance	RSA to support States for the conduct of remote surveillance	Qatar supported by Iran, Jordan, Saudi Arabia, Sudan, UAE, and ACAO.	Oct. 2024	On-going
C. 10/10	DEVELOPMENT OF NATIONAL AVIATION SAFETY PLAN (NASP) IN MID STATES					Completed

No.	CONCLUSIONS AND DECISIONS	CONCERNS/ CHALLENGES (RATIONALE)	DELIVERABLE/ TO BE INITIATED BY		TARGET DATE	STATUS/REMARKS
	That, States a) urged to develop and implement the NASP in line with the GASP and MID-RASP, if not yet done so; b) encouraged to continue to use existing ICAO guidance material and tools to implement their NASPs; c) encouraged to share the latest version of their NASPs with ICAO HQ and ICAO Regional MID office for posting on the GASP public website; d) encouraged to request assistance from the ICAO MID Regional Office related to the development of their NASPs including the conduct of assistance missions and/or customized NASP Workshop for each State; and e) encouraged to share their experiences related to the development of their NASPs during the SEIG meetings and/or Regional NASP Workshop to be organized by the ICAO MID Regional Office in 2024.	Compliance with Assembly Resolution A40-1	State Letter	ICAO	Aug. 2023	<i>SL issued File Ref.: ME4 & FS1/2-23/155; dated 3August 2023</i> <i>NASP workshops conducted</i> <i>Virtual meetings with States on NASP development have been conducted</i>
C. 10/11	DEVELOPMENT OF SSP IN MID STATES That, States be: a) encouraged to effectively implement their State Safety Programme in a timely manner, and to strengthen the implementation of safety management systems in their aviation industry; b) encouraged to request assistance from the ICAO MID Regional Office related to the development and implementation of their SSPs including the conduct of assistance missions and/or customized SSP implementation Workshop for each State;	Support States with the development and Implementation of SSP	State Letter	ICAO	Feb. 2023	Completed <i>SSP workshops conducted</i> <i>SSP training course conducted</i> <i>Survey conducted</i>

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No.	CONCLUSIONS AND DECISIONS	CONCERNS/ CHALLENGES (RATIONALE)	DELIVERABLE/ TO BE INITIATED BY		TARGET DATE	STATUS/REMARKS
	c) encouraged to support the SMIT activities; d) share their experiences on the development of their SSPs during the SEIG meetings; e) encouraged to share their latest version of SSP manuals with ICAO MID Office; and f) States are urged to provide the ICAO MID Office by 30 June 2023 with the SSP information using the template in Appendix 5.2G to support MID office in identifying and prioritising the needs of States on SSP development and implementation.					
C. 10/12	ADHERENCE TO ICAO ANNEX 13 That, the State conducting an investigation must submit a Preliminary report to ICAO within thirty days of the date of the accident and release the final report within twelve months in accordance with ICAO Annex 13 requirement.	Sharing of the Final Investigation Report	RASG-MID/10	States		Completed <i>Discussed during the AIGP/8 meeting and highlighted during MENA ARCM/4 meeting</i>
D. 10/13	DISSOLUTION OF THE CIVIL HELICOPTER OPERATIONS WORKING GROUP That, a) the CHOPWG is dissolved; b) the RASG-MID Organizational Structure be updated as at Appendix 5.5A; and c) the RASG-MID Procedural Handbook be revised and presented to RASG-MID/11 Meeting for endorsement.	Low participation	RASG-MID/10	ICAO States	May 2023	Completed

No.	CONCLUSIONS AND DECISIONS	CONCERNS/ CHALLENGES (RATIONALE)	DELIVERABLE/ TO BE INITIATED BY		TARGET DATE	STATUS/REMARKS
C. 10/14	SAFETY DATA ANALYSIS COLLECTION RELATED TO CIVIL HELICOPTER OPERATIONS That States are urged to share their Safety Data Analysis to be included in MID Region Annual Safety Report.	Collection of safety Data Analysis related to Civil Helicopter Operations for a Harmonized database	Safety Data Analysis for development of ASR	States	May 2024	Completed Highlighted and discussed during the ASRG/5 meeting. Safety Data analysis related Civil Hel operations to be received from States will be included in the upcoming 13 th MID ASR

LIST OF OCCURRENCE CATEGORIES TAXONOMY

Scope: State of Occurrence

The data to be collected be based on scheduled commercial operations for aircraft.

Occurrence Category	ADREP/CICTT taxonomy	Remarks
Runway Excursion (RE)	Veer off or overrun off the runway surface.	
Abnormal Runway Contact (ARC)	Any landing or take-off involving abnormal runway or landing surface contact.	
Loss of Control-Inflight (LOC-I)	Loss of Control while, or deviation from intended flight path, in flight.	
Controlled Flight Into Terrain (CFIT)	Inflight collision or near collision with terrain, water, or obstacles without indication of loss of control.	
MID Air Collision (MAC)/ NMACs	Airprox/TCAS Alerts, Loss of separation as well as NMAC or collisions between aircraft inflight.	
Fire/Smoke (F-NI)	Fire or smoke in or on the aircraft, in flight, or on the ground, which is not the result of impact.	
Runway Incursion (RI)	Any occurrence at aerodrome involving the incorrect presence of an aircraft, vehicle, or person on the protected area of a surface designated for landing and takeoff of aircraft.	
System Component Failure –Non-Power Plant (SCF-NP)	Failure or malfunction of an aircraft system or component other than the power plant.	
Turbulence Encounter (TURB)	In-flight turbulence encounter.	
Birdstrike (BIRD)	Occurrences involving collisions/near collisions with bird(s).	
Navigation Errors (NAV)	Occurrences involving the incorrect navigation of aircraft on the ground or in the air	
System Component Failure- Power Plant (SCF-PP)	Failure or malfunction of an aircraft system or components related to the power plant.	

Security related (SEC)	Criminal/Security acts which result in accidents or incidents (per Annex 13 to the Convention on International Civil Aviation).	
Wind shear	Flight into wind shear or thunderstorm	

NB: States may share any other occurrence category or national safety concern.

TEMPLATE FOR THE COLLECTION OF ACCIDENT, SERIOUS INCIDENT AND INCIDENT DATA AND SAFETY ANALYSIS

Name of State:

1- **Occurrences:** *The data to be collected be based on scheduled commercial operations involving Aeroplane having a Maximum Take-off Weight (MTOW) above 5700 kg.*

[illegible]

11	Navigation Errors (NAV)															
12	System Component Failure- Power Plant (SCF- PP)															
13	Security related (SEC)															
14	Wind shear															

States should provide the number of accident, serious incidents, and incidents related to each category mentioned in the template above for the past five years (2019-2023)

Scope: State of Occurrence

2- **Brief- Safety data Analysis (Root-cause analysis, Trends, Low probability high consequence (LPHC) events if any, etc.)**

3- **Identified Top Five safety risks**

4- **Safety mitigations/Recommendations**

TEMPLATE FOR THE COLLECTION OF ACCIDENT, SERIOUS INCIDENT AND INCIDENT DATA AND SAFETY ANALYSIS

Name of State:

1- Occurrences: *The data to be collected involving commercial helicopters operations*

[illegible]

	Errors (NAV)															
12	System Component Failure-Power Plant (SCF-PP)															
13	Security related (SEC)															
14	Wind shear															

States should provide the number of accident, serious incidents, and incidents related to each category mentioned in the template above for the past five years (2019-2023)

Scope: State of Occurrence

2- **Brief- Safety data Analysis (Root-cause analysis, Trends, Low probability high consequence (LPHC) events if any, etc.)**

3- **Identified Top Five safety risks**

4- **Safety mitigations/Recommendations**

Global Navigation Satellite System GNSS-Radio Frequency Interference Safety Risk Assessment

Version 3 September 2023



GNSS Radio Frequency Interference - Fact Sheet

Safety Issue			
Global Navigation Satellite System Radio Frequency Interference – GNSS RFI			
Regional Exposure	NAM/EUR/MENA/AFI/LATAM/ASPAC	Sector Exposure	All sectors
Key Risk Area	Controlled Flight Into Terrain, Mid Air Collision (MAC), Runway Safety	Proximity	Current/Emerging/Future
Summary of the Safety Issue			
Global Navigation Satellite System (GNSS), which involves systems such as Global Positioning System (GPS), Russia's GLONASS, China's BeiDou, and Europe's Galileo, includes navigation satellite infrastructure and constellations which provide position, navigation, and timing (PNT) information supporting aircraft and air traffic management operations. Satellite navigation signals are weak and can easily be compromised by a range of growing threats, including intentional or unintentional signal interference, jamming, spoofing, and/or manipulating position and timing information. The effects of such threats vary greatly. Satellite signal jamming and spoofing can have a serious impact on the accuracy of navigation systems and, in some cases, result in unusual system behaviour. Today, airspace users rely heavily on the accuracy of aircraft systems and the aircraft's ability to monitor its reliability. Aircraft avionics such as Flight Management Systems (FMS) require GNSS position for navigation and timing. GNSS position is also used for systems including the Terrain Avoidance Warning System (TAWS) or Enhanced Ground Proximity Warning Systems (EGPWS). Therefore, uninterrupted GNSS PNT service is essential for the safety and operation of flights.			
Purpose and Scope of SRA:			
This document provides a structured approach to assess the GNSS Radio frequency interference safety issue (GNSS-RFI) and proposes actions for IATA and recommendations to other stakeholders. It provides a standard description of potential threats and preventive controls. This Safety Assessment serves as a resource to assist IATA members in assessing operational risks and limitations linked to the loss of onboard GNSS capability. Also, it helps in determining if member airline safety controls are effectively controlling GNSS Interference risks or if additional mitigation actions are required.			



Introduction

According to [EASA Safety Information Bulletin Operations – ATM/ANS SIB No.: 2022-02R1](#) GNSS RFI has become a significant safety risk, particularly in geographical areas surrounding conflict zones and in the eastern Mediterranean, Middle East, Baltic Sea, and Arctic area, where RFI can increase pilots' and air traffic controllers workload

The Black Sea area:

- FIR Istanbul LTBB, FIR Ankara LTAA.
- Eastern part of FIR Bucuresti LRBB, FIR Sofia LBSR.
- FIR Tbilisi UGGG, FIR Yerevan UDDD, FIR Baku UBBA.

The southeastern Mediterranean area, Middle East:

- FIR Nicosia LCCC, FIR Beirut OLBB, FIR Damascus OSTT, FIR Tel Aviv LLLL, FIR. Amman OJAC, northeastern part of FIR Cairo HECC.
- Northern part of FIR Baghdad ORBB, northwestern part of FIR Tehran OIIX.
- Northern part of FIR Tripoli HLLL.

The Baltic Sea area (FIRs surrounding FIR Kaliningrad UMKK):

- Western part of FIR Vilnius EYVL, northeastern part of FIR Warszawa EPWW. southwestern part of FIR Riga EVRR.

Arctic area:

- Northern part of FIR Helsinki EFIN, northern part of FIR Polaris ENOR.

Air operators are encouraged to develop or update their own risk model using the appropriate assessment technique, considering the exposure to threats and the effectiveness of their safety controls within their own operation.

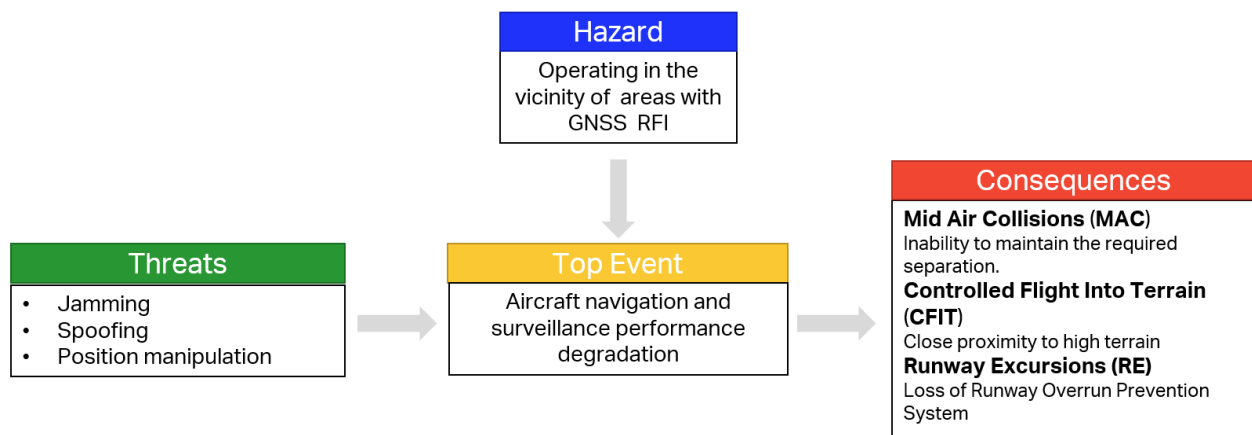


Figure 1 GNSS RFI - Risk Model

Hazard

Relates to a condition with the potential to cause a potential unsafe operational state, loss, or damage. This risk assessment points to operating in the vicinity of areas affected by GNSS RFI as the source of potential degradation of aircraft navigation and surveillance systems.

The exposure to GNSS RFI varies by region. According to industry data (Airbus), 10,843 RFI events were detected globally in 2021. In 2022, this number soared to 49,605, especially in regions such as the Middle East and Eastern Europe. However, events have been recorded across the globe, as depicted in figures 2 to 4. Some States, such as the USA, conduct regular and deliberate military interference with GPS in the USA National Airspace System (NAS) for testing purposes but typically issue notices in advance.

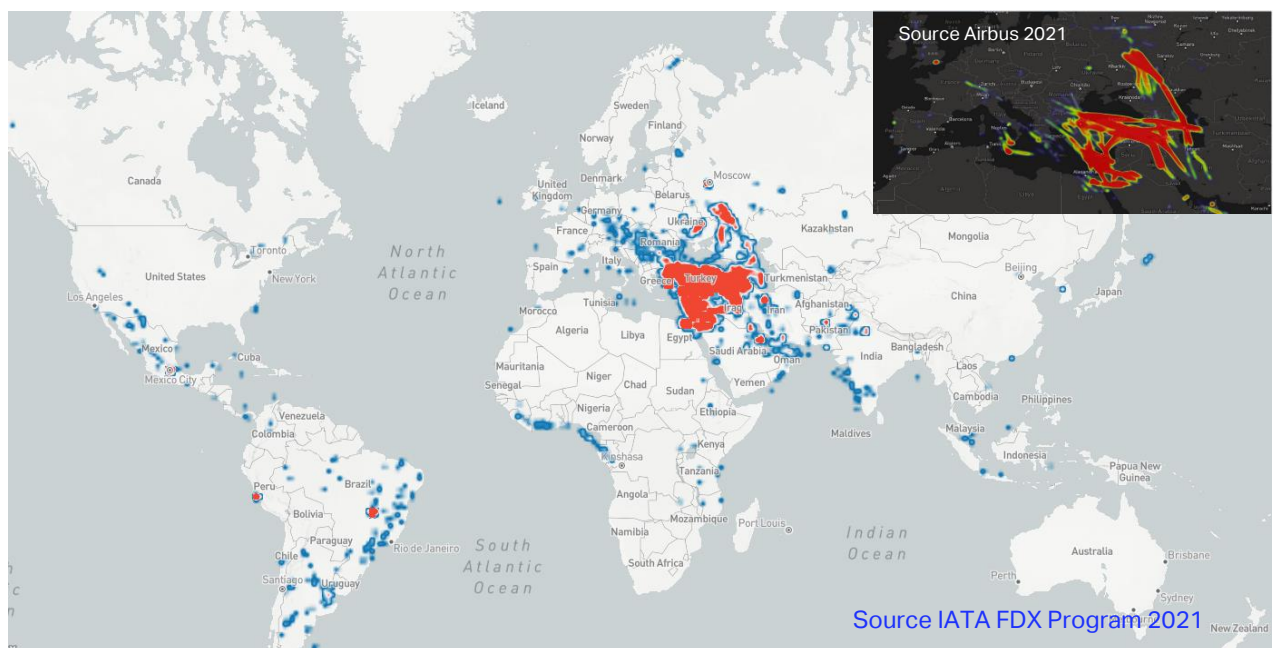


Figure 2 GNSS RFI Recorded events 2021.

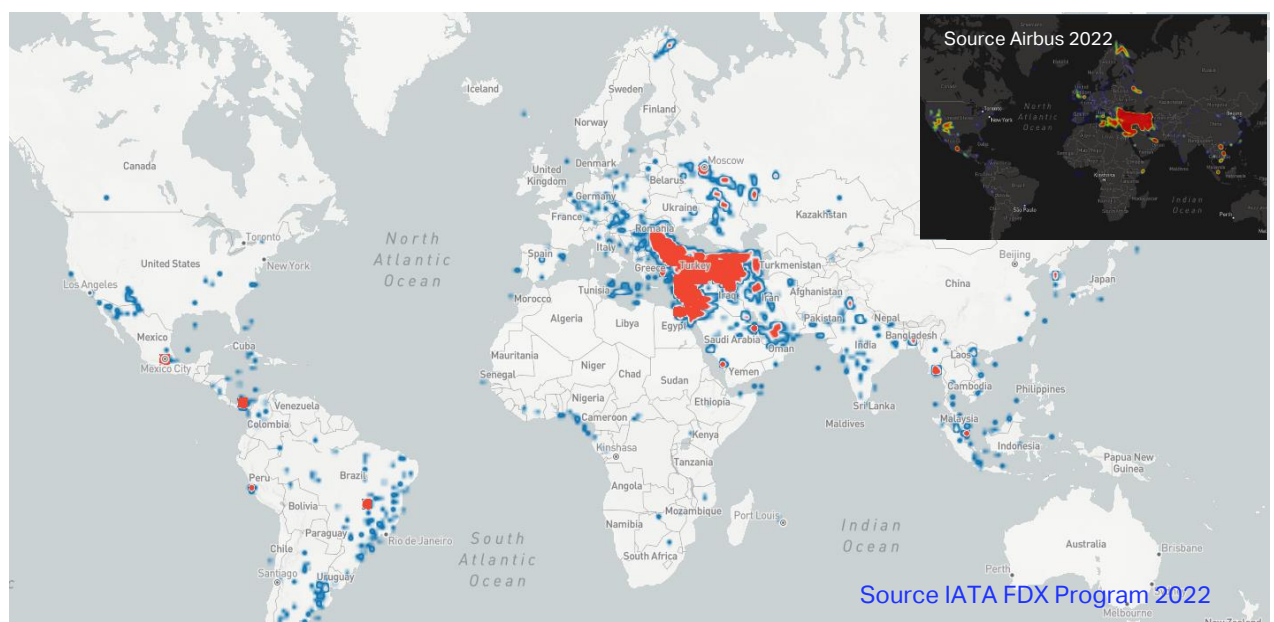


Figure 3 GNSS RFI Recorded events 2022.

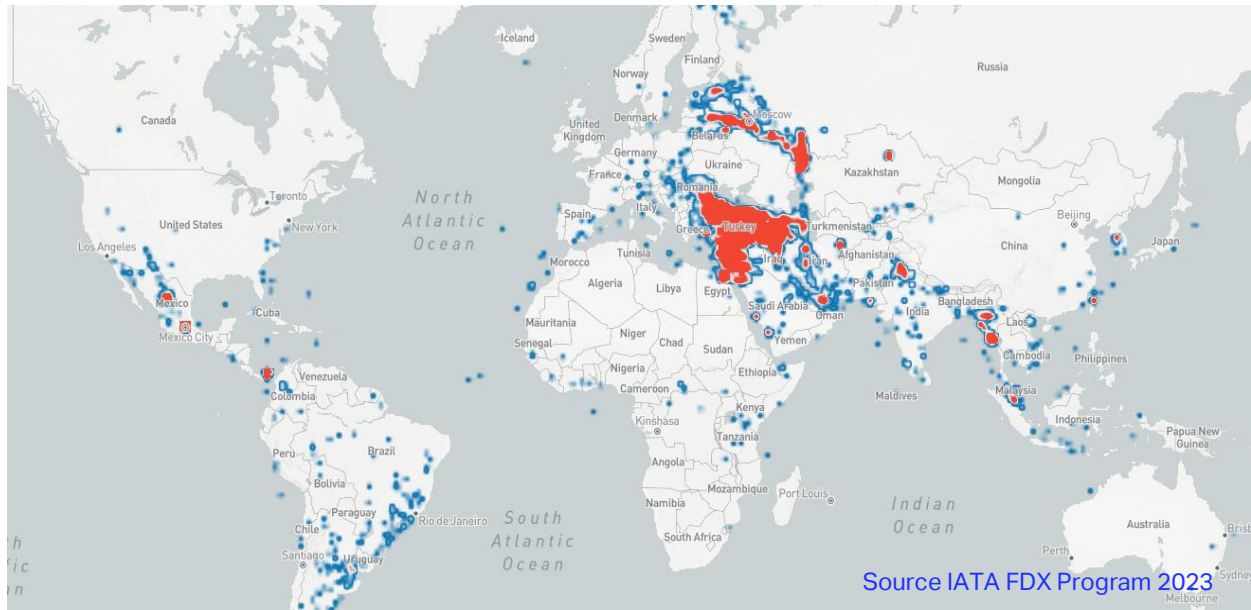


Figure 4 GNSS RFI Recorded events (Jan-Jun 2023)

Call to action. It is recommended that operators assess the exposure to GNSS RFI throughout their operational network. One way to gather information and monitor GNSS-RFI zones is by utilizing the [IATA Flight Data Exchange \(FDX\) program](#). It provides GNSS loss data reported by over 300 operators and offers details such as regional and country route pairs. To stay informed and take necessary actions to mitigate risk.

The portal [GPSiam](#) may be used as an alternative source of information. It uses data provided by ADS-B exchange to generate maps of likely GNSS-RFI based on aircraft reports of their navigation system accuracy.

Top Event

It is defined as a point in time when an organization loses control over a hazard, resulting in an unsafe operational state or undesired safety state. This risk assessment defines degradation of navigation and surveillance performance as the top event.

Call to action. Establish a set of Safety Performance Indicators (SPI) related to GNSS RFI and the aircraft navigation and surveillance performance degradation.

There are navigation and surveillance capability degradations that flight crews can experience in the cockpit during a GNSS RFI event. A detailed description of these cockpit effects is given in the Airbus In service information [34.36.00049 - GNSS loss and GNSS Interferences on Airbus A/C](#). *(available to subscribers of the Airbus customer portal)*

For a more accurate analysis of the impact of GNSS RFI events on an air operator's network, it is advisable to establish a set of SPIs that can be closely monitored through the operator's flight data monitoring program. These SPIs could relate to navigation display/primary flight display annunciations, Electronic Centralized Aircraft Monitor (ECAM) alert status, or inoperative system ECAM messages as described in the Airbus in-service information cockpit effects section.

Encouraging flight crews to submit GNSS RFI-related safety reports is also recommended as a complementary means to capture and follow up on the GNSS RFI Issue. However, it is recommended to join the FDX program to enable capturing of GNSS RFI occurrences recorded from a Digital Flight Data Recorder (DFDR). Navigation systems are unlikely to produce warnings for spoofing compared to jamming, as the systems do not detect spoofing. Ensure Flight crews are informed about how to recognize spoofing.

Additionally, ensure the established safety reporting program captures the required details to report GNSS RFI events to Air Navigation Service Providers (ANSPs), other Authorities, and IATA through IDX when GNSS RFI events are confirmed.

Monitoring Cockpit effects will determine specific airports, routes, flight levels, and flight phases where it is most likely to experience GNSS RFI interference. This intelligence will support and drive very specific mitigation actions. Each operator's risk of exposure to GNSS RFI varies based on their operational network.

Threats.

Should be understood as a potential cause of a top event or as precursors of an undesired safety state. The different threats and how likely they are to affect is key to conducting an accurate risk assessment. Broadly, the degradation of an aircraft's navigation and surveillance performance may result from the following precursors.

Precursors	Description
Jamming	Locally generated RF interference is used to "drown out" satellite signals. Main possible sources: PPD – Personal Privacy devices, TV Broadcast Station malfunction, and Military RFI.
Spoofing	Fake satellite signals are broadcast to fool it into believing it is somewhere else or at a different point in time. (Position Manipulation)
Solar Storms	Electromagnetic interference from solar flares and other solar Activity "drowns out" the satellite signals in space.
Signal Reflection	Reflection due to objects such as buildings

Table 1 GNSS RFI precursors.

With jamming, the GPS signal is interrupted to the point of being unusable. With spoofing, a false GPS signal is broadcasted, causing GPS systems to produce false positioning without warning flight crews. From the Air operator's standpoint, it is challenging to anticipate GNSS-RFI occurrence through safety monitoring activities.

Call to action. Integrate into the risk management activities a periodic evaluation of the exposure to threats identified in the GNSS RFI risk model. This approach is key to reducing exposure, especially to spoofing.

The industry is currently [developing solutions to detect RFI](#) areas, determine their source and location, and improve notifications to airspace users.

Consequences.

Defined as a potential accident scenario resulting from the top event which might result in loss or damage. GNSS RFI may lead to the following scenarios.

Systems affected / Accident scenarios		CFIT	MAC	RE
Navigation	Downgraded Aircraft position computation GPS	X		
	Loss of FLS ¹ , GLS ² , SLS ³ deviations	X		
Surveillance	Loss of Terrain Awareness Warning System (TAWS)	X		
	False TAWS Alerts false "Pull up" calls (or no calls)			
	Loss of ADS-B ⁴ Out Reporting		X	
	False ADS-B Out Position Reporting		X	
Communication	Loss of Traffic Collision Alerting System (TCAS)		X	
	Loss of CPDLC ⁵		X	
Others	Loss of Runway Overrun Prevention System – (ROPS), or Runway Situation Awareness Tools			X

Table 2 GNSS RFI potential consequences.

Additionally, GNSS RFI might impact multiple aircraft systems, resulting in operational constraints, including degradation of RNP/RNAV capability, among others.

Call to action. Review the consequences mentioned above. The purpose is to ensure that all consequences and weakened recovery controls are included in the risk model. This will provide information to assess recovery controls' effectiveness.

Preventive Controls

Should be understood as a barrier that prevents a threat from becoming a top event. A set of prevention controls configures the organization's mitigation strategy to reduce and control the risk of GNSS RFI.

¹ FMS Landing System

² GBAS Landing System (Ground Based Augmentation System)

³ SBAS Landing System (Satellite Base Augmentation Systems)

⁴ Automatic Dependent Surveillance-Broadcast

⁵ Controller Pilot Data Link Communication

Preventive Controls from the Operator's Perspective

Flight planning | Checking NOTAMS related to Known or expected GNSS RFI.

Flight Planning | Checking the availability of non-GNSS based routes, procedures, and approaches (ILS, VOR, and DME).

Flight Planning | Consider limitations caused by inoperative radio navigation systems to operate in GNSS RFI-affected areas.

En route | Enforce ECAM/EICAS procedures for loss of GNSS.

Post-flight | Technical report in the maintenance logbook in case of experiencing any cockpit effects related to GNSS RFI

Post-flight | Establish Maintenance/Operations feedback after troubleshooting results for loss of GNSS-related reports.

Post-flight | Report any identified suspected GNSS RFI events to regional and international organizations (ANSPs)

Post-flight | When RFI is suspected, aircraft data should be sent to OEMs for further investigation.

Table 3 GNSS RFI Preventive controls

According to The GNSS RFI Correspondence Group (CG), the reporting of confirmed GNSS RFI occurrences to the spectrum authority is important as the spectrum authority oversees investigating to solve the interference. Therefore, it is important to confirm that GNSS outage events were not due to equipment failure. [Refer to Airbus recommendations to establish a mechanism to confirm GNSS RFI events.](#) *(available to subscribers of the Airbus customer portal)*

To reduce the impact of GNSS RFI, reporting in a timely manner would allow them to improve risk area identification and information services, as well as to take enforcement action.

Call to action. Ensure preventive controls are documented, implemented, and trained as required. It is recommended to outline a contingency/mitigation procedure to prevent threats from degrading navigation, surveillance, and other avionics system performance.

Additionally, establish feedback with maintenance organizations to confirm RFI or equipment malfunction. And establish a [mechanism to report confirmed RFI events to ANSPs](#), national authorities, and IATA. Airlines participating in the Incident Data Exchange (IDX) program are encouraged to share GNSS interference-related occurrences.

Additional Preventive Controls – External Air operators

The interference susceptibility of GNSS can be reduced using multiple navigation receivers operating on different frequencies. Frequency diversity could employ receivers of the same type. Interference reduction is one of the reasons for the introduction and further expansion of the new civil channel on L5 1176.45 MHz (GPS - American constellation).

The use of multi-constellation hybrid receivers can improve availability and reliability. However, their higher cost and effectiveness against broadband interference across the entire GNSS frequency range are limitations.

The following table summarizes the undertaken initiatives to mitigate the effect of GNSS-RFI on civil aviation.

Preventive controls from National/International organizations and OEMs
Regulatory control or interference emissions - ITU regulations to protect civil aviation from GNSS RFI. - Coordination activities for civil/military GNSS interference testing.
Identification and localization of interfering sources - ITU's Satellite Interference Reporting and Resolution System (SIRRS).
Mitigation of RFI onboard - Development of Multi-Frequency / Multi-Constellation (DFMC) receivers and Minimum Operational Performance Standards (MOPS).

Table 4 GNSS RFI External to Operators preventive controls

Call to action to operators. Identify the SIRRS Administration Manager role in the applicable ANSPs/national authorities to ensure any potential air operator's reporting requirements are met and gaps are addressed when reporting interference cases.

An online application has been developed by the Radiocommunication Bureau in response to Resolution 186 of ITU Plenipotentiary Conference 2014 with the aim to facilitate administrations and space stakeholders to report a case of harmful interference affecting space services.

Recovery controls

Considered the barriers that prevent a top event from developing into an accident.

Operators / Recovery controls
En route – Enforce Abnormal/emergency procedures
En route – Establish/enforce procedures to cross-checking position using other available navigation systems (radio Navaids VOR, DME), INS and visual references.
En route - Establish/enforce procedures for location cross-check with air traffic control (ATC) before attempting troubleshooting.
En route - Establish/enforce procedures to revert to available alternate navigation systems (VOR, DME, INS) radar vectors from ATC.
En route - Establish/enforce requirements to notify ATC about the GNSS outage, loss, or degradation of ADS-B OUT due to interference.
Approach - Establish/enforce procedures to conduct conventional arrival/approach procedures.

Table 5 GNSS RFI recovery controls

Call to action. Ensure recovery controls are documented, implemented, and trained as required. It is recommended to identify additional safety controls, such as dead reckoning as an alternative navigation method (If applicable) to avoid non-desire outcomes.

Additional Recommendations

To address this issue of harmful interference to GNSS, IATA invites:

Airlines

- To develop/update their own risk model using the appropriate assessment technique to evaluate the operator's exposure to GNSS RFI hazards across the operational network.
- To establish a safety Performance Indicator (SPI) related to GNSS RFI and the aircraft navigation and surveillance performance degradation.
- To enforce flight crews to submit GNSS RFI-related safety reports is also recommended as a complementary means to capture and follow up on the GNSS RFI Issue.
- Periodically evaluate established SPIs and exposure to GNSS RFI to determine the effectiveness of controls.
- To ensure preventive controls listed in [Table 3](#) *GNSS RFI Preventive controls* are documented, implemented, and trained as required.
- To establish a mechanism to report confirmed RFI events to ANSPs, national authorities, and IATA.
- To ensure SRRS reporting requirements are met and any potential gaps are addressed when reporting interference cases.
- To Ensure recovery controls listed in [Table 5](#) *GNSS RFI recovery controls* are documented, implemented, and trained as required.

IATA

- To assist operators in identifying GNSS interference hotspots, evaluating the feasibility of providing near real-time source information such as FDX could help assess exposure to jamming and spoofing threats.

ANSP

- To promptly notify airlines and airspace users once interference to GNSS was notified.
- To inform flight crews and air traffic controllers about the impact of GNSS interference and establish effective contingency procedures and capabilities as appropriate.

STATES

- To implement appropriate mitigation measures as contained in ICAO GNSS Manual (Doc 9849) as a matter of high priority and to report progress and any difficulties to ICAO.
- While using GNSS jammers during military exercises and operations, to recognize the intended impact of harmful interference to civil flight operations and to exercise caution to the maximum extent possible to protect the safety of civil aircraft.

- To establish and ensure appropriate frequency regulations are in place and maintained to protect allocated GNSS frequencies from harmful interference in line with ITU Radio Regulations.
- To carefully consider operational risks associated to harmful interference to GNSS during their planning for rationalization of conventional navigation and surveillance infrastructures and to incorporate inputs from airspace users while developing a CNS rationalization plan.
- To ensure that contingency procedures are established in coordination with air navigation service providers and airspace users and that essential conventional navigation infrastructure, particularly Instrument Landing System (ILS), are retained and fully operational.

ICAO

- In coordination with manufacturers and airspace user communities, to develop a global strategy on Alternative Position, Navigation, and Timing. This A-PNT strategy should aim to ensure continuity of flight and ATM operations during interruptions of GNSS and should include the increasing capabilities and roles of onboard INS/IRU.
- In cooperation with the International Telecommunications Union (ITU) to analyze the reported cases of harmful interference to GNSS and establish appropriate measures to address the safety impact on aviation.



ICAO MID

SAFETY

MID-RASP

MIDDLE EAST REGIONAL AVIATION SAFETY PLAN



Second Edition

2023-2025

MIDDLE EAST REGIONAL AVIATION SAFETY PLAN (MID-RASP)



SECOND EDITION 2023–2025

Executive Summary

The Global Aviation Safety Plan (GASP) presents the global strategy for the continuous improvement of aviation safety. The purpose of the GASP is to continually reduce fatalities, and the risk of fatalities, by guiding the development of a harmonized aviation safety strategy.

The GASP promotes the effective implementation of a State safety Programme (SSP) including National Aviation Safety Plan (NASP), a State's safety oversight system, and a risk-based approach to managing safety as well as a coordinated approach to collaboration between States, international organizations, and industry.

The vision of the GASP is to achieve and maintain the aspirational safety goal of zero fatalities in commercial operations by 2030 and beyond, which is consistent with the United Nations' *2030 Agenda for Sustainable Development*. The plan's mission is to continually enhance international aviation safety performance and resilience by providing a collaborative framework for States, regions and industry.

The Middle East Regional Aviation Safety Plan (MID-RASP) 2023-2025 Edition considers and supports the objectives and priorities of GASP 2023-2025 Edition. MID-RASP also emphasizes the importance of identifying and mitigating risks at MID region level. In addition, MID-RASP is to create a common focus on regional aviation safety issues as a continuation of the MID region work to improve aviation safety and to comply with ICAO standards and supports MID States and industry in implementing the GASP 2023-2025 Edition.

Furthermore, the States national aviation safety plan (NASPs) should be developed in alignment with the GASP and the MID-RASP. However, priority should be given to national safety concerns. Moreover, the NASP should be also aligned and coordinated with the MID-RASP (as appropriate) and with other efforts aimed at enhancing aviation safety.

MID-RASP provides a three-year plan for States in MID Region to strengthen its safety oversight capability and implement an effective safety management. This relates to the continuous reduction of regional operational risks and improvement in States' safety oversight and safety management capabilities. It adopts a risk-based approach to managing safety at regional-level through a coordinated approach and collaboration between States in the region, regional organizations and industry.

The RASG-MD is the governing body responsible for the development, implementation and monitoring of the MID-RASP, in collaboration with the ICAO MID Office, international and regional organizations and with the aviation industry. The MID-RASP is to be reviewed by the Safety Enhancement Implementation Group (SEIG) every year mainly to include new identified Safety Enhancement initiatives' (SEIs), review the existing SEIs, as well as their respective actions.

The MID Region's strategic approach to managing safety at the regional level is to address the region's operational risks and other safety issues in a timely manner. Therefore, the MID-RASP strategic approach would focus on organizational challenges/issues, regional operational safety risks, and emerging risks as indicated below.

- a. Organizational challenges/issues including the States 'safety oversight, safety management, aircraft accident and incident investigation, human factors and competence of personnel, and Cybersecurity.
- b. Regional operational safety risks, the focus would be on Regional high risks categories (R-HRC) identified in the GASP 2023-2025 Edition mainly the LOCI-I, CFIT, RE, RI, and MAC; and
- c. Emerging risks, the focus would be on COVID-19 pandemic outbreak, Civil drones (Unmanned Aircraft Systems), GNSS outages, impact of security on safety, and 5G interference with Radar Altimeter frequency band.

MID Region safety indicators and targets were aligned with the 2023-2025 GASP goals and regional specific objectives and priorities. The RASG-MID would use the indicators listed in the MID Region Safety Performance Measurement & Monitoring (SPMM) to measure safety performance and monitor each regional safety target. Moreover, the RASG-MID would continuously monitor the implementation of the SEIs listed in the MID-RASP and measure safety performance of the regional civil aviation system, to ensure the intended results are achieved, using the MID Region SPMM.

The MID Region SPMM includes six (6) Goals in line with GASP 2023-2025 Edition. For each Goal established in the MID Region SPMM, identified SEI(s) be mapped to it including their respective actions. Thus, to address regional operational risks, organizational issues, and emerging risks; 24 SEIs and 61 safety actions have been identified, developed and proposed.

The MID-RASP provides guidance on how States should identify which top risks and key safety issues mentioned in the GASP and MID-RASP apply to their national context and then to be included in their NASPs. States should also add other safety issues which are unique to their operational context. Several MID-RASP SEIs which are intended for implementation by States at the national level are recommended for inclusion in their NASPs.

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PART-I. PLANNING

1. INTRODUCTION

1.1 Objectives and Principles

The MID Regional Aviation Safety Plan (MID-RASP) presents the **strategic direction** for the **management of aviation safety** at the regional level. It constitutes the regional safety plan for MID Region, setting out the strategic priorities, main risks affecting the regional aviation system and the necessary actions to mitigate those risks to further improve aviation safety.

The purpose of this MID-RASP is to continually reduce fatalities, and the risk of accidents, through the development and implementation of regional SEIs. A safe aviation system contributes to the economic development of MID Region, the States which comprise it, and their industries. In addition, MID-RASP is to create a common focus on regional aviation safety issues as a continuation of the MID Region work to improve aviation safety and to comply with ICAO standards. This approach complements the existing system of developing safety regulations, complying with them and investigating accidents and serious incidents when they occur.

The MID-RASP promotes the effective implementation of a State safety Programme (SSP) and Safety Management System (SMS) including National Aviation Safety plan (NASP), State's safety oversight system, and a risk-based approach to managing safety as well as a coordinated approach to collaboration between States, international organization, and industry. All stakeholders are encouraged to support and implement the MID-RASP as the regional strategy for the continuous improvement of aviation safety.

The MID RASP allows the region to define the strategy for improving safety within a specified timeframe, through defined Safety Enhancement Initiatives (SEIs).

The MID-RASP establishes the first layer of priorities which is further complemented at national level by national safety plans and Programmes. It builds a network for action; thus, coordination and close collaboration are key to keeping it up to date and effective.

The MID-RASP Edition 2023-2025 covers the three-year period between 2023 and 2025 and will be updated on a yearly basis, as required, to cover subsequent three years' periods. It is a rolling 3-year plan.

The planning activity would be followed up by a reporting activity, in which progress on the actions is evaluated and also documented. This feedback loop ensures that the process to manage risks continuously improves and may contribute to the identification of new safety issues.

MID Region is committed to enhancing aviation safety, to the resourcing of supporting activities and to increasing collaboration at the regional level.

1.2 Relationship between MID-RASP and GASP and other Plans

Aviation's contribution towards the United Nations 2030 Agenda for Sustainable Development and in order to maximize the benefits of aviation, the priorities of the aviation sector should be integrated and reflected in State's economic and social development planning with an appropriately balanced development of transport modes, including multi-modal and urban planning initiatives. In addition, recognizing that air transport is a catalyst for sustainable development and that it represents an essential lifeline for Least Developed Countries (LDCs), and especially for Landlocked Developing Countries (LLDCs).

ICAO Business Plan takes into consideration all of the work mandated to be undertaken by ICAO, regardless of source of funding. The Business Plan sets out the Strategic Objectives and priorities to guide the activities of the Organization to support Members States in their attainment of a safe, secure, efficient, economically viable and environmentally responsible air transport network.

ICAO's global plans are essential in supporting safe, secure, efficient, economically viable and environmentally responsible air transportation. They provide a means to advance ICAO's Strategic Objectives. The ICAO global plans include: the GASP, the GANP and the Global Aviation Security Plan (GASeP).

The GASP presents the global strategy for the continuous improvement of aviation safety. The purpose of the GASP is to continually reduce fatalities, and the risk of fatalities, by guiding the development of a harmonized aviation safety.

The purpose of the Global Air Navigation Plan (GANP) is to drive the evolution of the global air navigation system to meet the ever-growing expectations of all sectors in the aviation community by equitably accommodating all airspace user operations in a safe, secure and cost-effective manner while reducing the aviation environmental impact. To this end, the GANP provides a series of operational improvements to increase capacity, efficiency, predictability and flexibility, while ensuring interoperability of systems and harmonization of procedures. The implementation of the GANP is enabled by promoting the effective implementation of safety oversight and a safety management approach to oversight, including SRM to permit innovation in a managed way.

The GASP complements the GANP by providing States and industry with the tools to implement a safety management approach through their SSP and SMS. The GANP, through the evolution of the system described in the conceptual roadmap and the operational improvements detailed in the technical frameworks, supports the goals within the GASP and the GASeP by enhancing safety and security of the air navigation system as reflected in the performance ambitions.

The GASP goals and targets support the GASeP by providing best practices and models that can be as effective in managing security as they are in safety management. These include effective oversight, organizational culture, risk management and assurance processes. The GASeP in turn supports the GASP's vision of zero fatalities.

MID-RASP considers and supports the objectives and priorities of GASP. The purpose of GASP is to continually reduce fatalities, and the risk of accidents, by guiding the development of a harmonized aviation safety strategy and the development and implementation of regional and national aviation safety plans. A safe aviation system contributes to the economic development of States and their industries. The GASP promotes the effective implementation of SSP and SMS including NASP, a State's safety oversight system, and a risk-based approach to managing safety as well as a coordinated approach to collaboration between States, international organizations, and industry. One of the GASP goals is for States to improve their effective safety oversight capabilities and to progress in the implementation of SSPs including NASPs. Thus, GASP calls for States to put in place robust and sustainable safety oversight systems that should progressively evolve into more sophisticated means of managing safety.

Assembly Resolution A40-1 also calls for each State to develop and implement a national aviation safety plan (NASP), in line with the GASP goals, targets and the global high-risk categories of occurrences (G-HRCs). The NASP should also be developed having close regard for the RASP, while acknowledging that each State may have its own, specific safety issues and priorities, including addressing significant safety concerns (SSCs).

In addition, to addressing systemic safety, GASP addresses Global high-risk categories (G-HRC) of occurrences, which are deemed global safety priorities. These categories were determined based on actual fatalities from past accidents, high fatality risk per accident or the number of accidents and incidents. The following G-HRCs have been identified for the 2023-2025 edition of the GASP: controlled flight into terrain (CFIT); Loss of control in flight (LOC-I); Mid-air collision (MAC); runway excursion (RE); and runway incursion (RI). The GASP G-HRCs are addressed in MID-RASP.

The MID-RASP considers the objectives and priorities of the GASP to enhance the level of safety in aviation and to better prepare the Member States for the ICAO Universal Safety Oversight Audit Programme (USOAP) audits and State Safety Programme Implementation Assessment (SSPIA) of their SSPs.

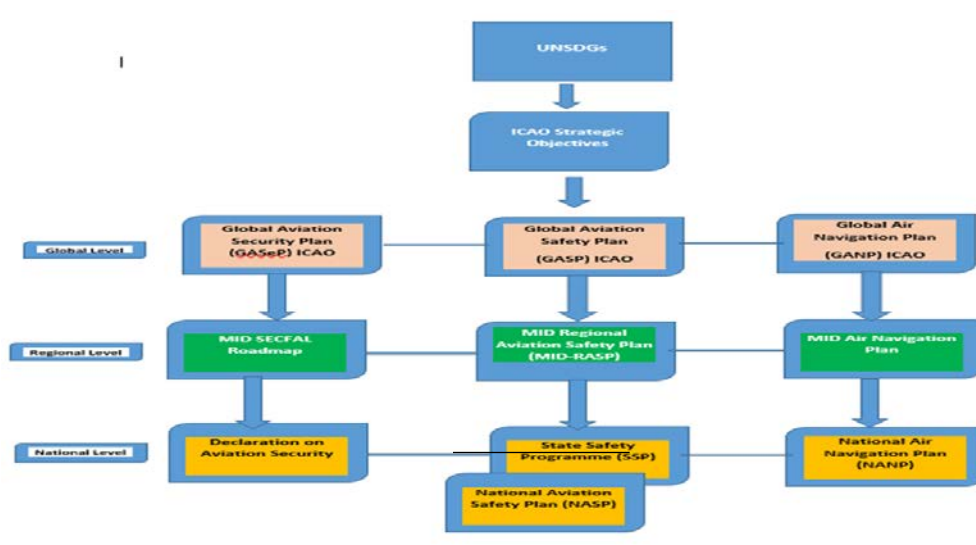
This MID-RASP edition 2023-2025 provides references to corresponding GASP 2023-2025 Safety Enhancement Initiatives (SEIs); covering organizational challenges, Regional operational risks, and emerging risks.

The 2023-2025 Edition of the GASP would set forth ICAO's Safety Strategy in support of the prioritization and continuous improvement of aviation. The plan guides the implementation of regional and national aviation safety plans.

The 2023-2025 Edition of the GASP includes a new set of goals, targets and indicators, in line with the United Nations' 2030 Agenda for Sustainable Development.

In respect of MID Region SPMM, the GASP provides the global strategic direction while the MID Region SPMM provides regional specific goals and support the region's strategic approach to managing safety at the regional level. Consequently, MID region safety indicators and targets were aligned with the 2023-2025 GASP goals and targets as relevant in the MID Region. Furthermore, the RASG-MID would continuously monitor the implementation of the identified SEIs in the MID-RASP and measure safety performance of the regional civil aviation system, to ensure the intended targets are achieved, using the MID Region safety performance measurement & monitoring to this plan. Moreover, MID safety performance measurement & monitoring Goals support the region's strategic approach to managing safety at the regional level. Therefore, for each Goal established in the MID Region SPMM identified SEI(s) is mapped to it including their respective actions.

The MID Region SPMM is included as an appendix and became an integral part of MID-RASP.



Graph 1: Relationship between MID-RASP and other Plans

2. HOW MID-RASP IS STRUCTURED

This MID-RASP presents the regional strategy for enhancing aviation safety for a period of three years. It is comprised of two parts and 7 chapters. The 2023-2025 MID- RASP Edition comprises two distinct parts:

- **Part I. Planning** provides an introduction, describes how the MID-RASP is developed and monitored and includes the safety priorities. It consists of **Chapters 1 to 5**.
- **Part II. Implementation** contains the safety performance measurement & monitoring and the detailed list of MID-RASP safety actions. It consists of **Chapters 6 and 7**.
- Both parts are supported by a number of appendices providing further details or assisting the reader.

Part-I. Planning

Part I provides an introductory explaining the main objective of this MID-RASP. Chapter 2, 3, and 4 explain how MID-RASP is structured, developed, monitored and presents the structure of the document. Chapter 5 presents safety priorities and the key actions taken as indicated below:

- 5.1 Organizational Challenges/issues
- 5.2 Regional operational safety risks
- 5.3 Emerging risks

Part-II. Implementation

Part II contains the safety performance measurement and monitoring and the detailed list of MID-RASP safety actions. It consists of Chapters 6 and 7.

Chapter 6 presents the MID Region safety indicators and targets.

In respect of **chapter 7**, it facilitates the identification of SEIs and their respective actions relevant for each Goal identified in the MID Region Safety performance measurement and monitoring as follows:

- Goal 1: Achieve a continuous reduction of operational safety risks;
- Goal 2: Strengthen States' safety oversight capabilities;
- Goal 3: Implement effective State safety Programmes (SSPs);
- Goal 4: Increase collaboration at the regional level;
- Goal 5: Expand the use of industry Programmes and safety information sharing networks ; and
- Goal 6: Ensure the appropriate infrastructure is available to support safe operations.

The MID Region SPMM includes six (6) Goals in line with GASP 2023-2025 Edition. For each Goal established in the MID Region SPMM, identified SEI(s) is mapped to it including their respective actions and the following information is provided:

Goal: Goal supports the region's strategic approach to managing safety at the regional level.

- **Name:** Goal #Number - SEI# Number: Description of the SEI
- **Target(s)/Metrics.** Targets which serve to fulfil their respective Regional Goal
- **Rationale** behind the safety issue (why it has been identified as an issue)
- **What it is to be achieved** (objective)
- **How we intend to monitor improvement** in the future
- **How we intend to achieve** the objective; here, the various actions contributing to mitigate

- the identified risk in that area are described
- **Actions:** The tasks required for the implementation of the SEI. The actions support the SEI and Targets of the Regional Goal
- **References:**
 - Indicates key existing global documents from which the SEI is adopted, if applicable.

Stakeholders: The entities/ stakeholders in the MID region, to which the Actions are addressed

Example Action 1: Description of the Action to be taken

Subtask(s) if needed to be added

Owner(s): Appointed Group/State(s)/Organization(s) to further develop details for implementation of the respective Action.

Priority: Low, Medium, High

Completion Date: The date in which the respective Action is expected to be implemented.

Status: new, ongoing, on hold, completed. (Provide also updated progress if any)

Example Action 2: Description of the Action to be taken

Subtask(s) if needed to be added

Owner(s): Appointed Group/State(s)/Organization(s) to further develop details for implementation of the respective Action

Priority: Low, Medium, High

Completion Date: The year(s) in which the respective Action is expected to be implemented

Status: new, ongoing, on hold, completed. (Provide also updated progress if any)

EXPECTED OUTPUT

Deliverable(s)

TIMELINE

Description of the Result to be achieved

The year in which the respective Target is expected to be achieved

3. HOW MID-RASP IS DEVELOPED AND MONITORED

The RASG-MD is the governing body responsible for the development, implementation and monitoring of the MID-RASP, in collaboration with the ICAO MID Office, international and regional organizations and with the aviation industry. The MID-RASP was developed in consultation with States, regional organizations, and other stakeholders in the region, and in alignment with the 2023-2025 of the GASP. If required, RASG-MID would seek the support of MIDANPIRG and RASFG-MID, other sub-groups, States, regional organizations, and industry to ensure the timely implementation of SEIs to address safety deficiencies and mitigate risks. Through close monitoring of the SEIs, SEIG would make adjustments to the MID-RASP and its initiatives, if needed, and update the MID-RASP document accordingly.

Furthermore, the MID-RASP is to be reviewed by SEIG every year mainly to include new identified SEIs, review the existing SEIs, and their respective actions. In addition, the MID-RASP is to be updated/endorsed by RASG-MID at least every three years and as deemed necessary.

The SEIG is established to assist RASG-MID to develop and monitor the implementation of SEIs as at **Appendix A** related to identified regional operational risks, organizational challenges, and emerged risks. In addition, the SEIG takes the lead and ensures that SEIs are implemented in a timely, effective and efficient manner in coordination with RASG-MID, MIDANPIRG, and RASFG-MID groups and sub-groups (ASRG, ASPIG, AIIG, ATM-SG,...etc), States, regional organizations, and industry.

As a first step towards establishing this system and to facilitate MID-RASP implementation, it is necessary to enhance the communication and flow of safety data and information, as well as coordination processes, among RASG-MID and its subsidiaries, States, and regional organizations. There is also the need to continue to enhance collaboration with MIDANPIRG through coordinated processes to sustain the collection and sharing of regional air traffic management (ATM) data and the sharing and resolution of safety issues. This, in turn, would support the implementation of Aviation System Block Upgrade (ASBUs) and ensure that their implementation accounts for and properly manages existing and emerging risks, e.g. approaches with vertical guidance (APV) to mitigate risks associated with CFIT and runway excursions.

The MID-RASP was developed with the aim of addressing the MID region's operational and other safety issues in a timely manner, and as applicable. It is expected that this approach would facilitate MID States' support and participation in the implementation of these SEIs and their respective actions at both the regional and national levels. The three-year period of the MID-RASP, i.e. 2023 to 2025, was selected to coincide with the GASP review period of the same duration, to ensure continued alignment with the latest global plans.

States should ensure that a NASP is maintained and regularly reviewed. The MID-RASP provides the identified safety priorities in the region and States should identify which top risks and key issues mentioned in the GASP and MID-RASP which apply to their national context and identify suitable mitigations actions within their NASP. States should also add/consider other safety issues which are unique to their operational context. Furthermore, States to establish a NASP taking into account the GASP and MID-RASP; and based on their operational safety needs.

The key contents of the MID-RASP were developed using an eight-step process recommended by the GASP to develop RASPs and NASPs, similar to the Plan-Do-Check-Act (PDCA) continuous improvement cycle, as follows:

- Step 1: Conduct self-evaluation;
- Step 2: Identify hazards and safety deficiencies;
- Step 3: Develop list of prioritized regional safety issues;
- Step 4 – Define goals, indicators, and targets
- Step 5: Perform gap analysis to identify SEIs;
- Step 6: Develop a list of prioritized SEIs;
- Step 7: Develop a Regional aviation safety plan; and
- Step 8: Monitor implementation

The MID-RASP has been developed in congruence with the GASP, and supports the GASP aspirational goal of zero fatalities by 2030 and its objectives, goals, targets and indicators.

- a. The MID-RASP structure adheres closely to GASP;
- b. A comprehensive gap analysis was undertaken to identify the existing gaps between the existing work by RASG-MID, and subsequently also compared with ICAO Manual: Doc 10131, 'Manual on the Development of Regional and National Aviation Safety Plans;
- c. The MID Region SPM is aligned with GASP 2023-2025 Edition, retained and included as an Appendix in the MID-RASP; and
- d. MID-RASP SEIs were selected taking into consideration relevant SEIs for the region in line with GASP 2023-2025 Edition as well as relevant work plan items of DCGA, RASG-MID, MIDANPIRG, and RASFG-MID meetings. Moreover, GASP SEIs for States and Industry (domestic) were not considered as these are more suitable to be included in the NASPs of the MID States.

The MID-RASP supersedes the previous work of the RASG-MID subsidiary bodies (RAST and SST) initiatives to elevate the commitment of the MID Region to improve its safety oversight capability, which relates to the continuous reduction of regional operational risks and improvement in safety

oversight capabilities and safety management of States. In particular, the MID-RASP serves to raise awareness of safety risks and consequences, to States, industry and relevant stakeholders to commit and provide resources including financial, staffing and technical expertise, to making improvements in safety management, oversight capability and operational safety performance. It also provides a basis to facilitate information sharing between relevant stakeholders who can take actions or provide support to address issues.

At the regional level, the MID-RASP commits RASG-MID to continue the following efforts as indicated below:

- a. Focus on the update and the development of the new regional SEIs to address the Regional High-Risk Categories (R-HRCs) of LOC-I, CFIT, MAC, RI and RE, and other priorities;
- b. Support States to strengthen safety oversight capabilities
- c. Assist States in the development and implementation of SSP and SMS including the development of NASPs;
- d. Promote regional government and industry collaboration for sharing safety information and best practices in safety management;
- e. Promote the effective implementation of AGA, with a focus on implementation of Aerodrome Certification including the SMS, runway safety Programmes including the establishment of Runway Safety Teams (RSTs) and Global reporting Format methodology (GRF);
- f. Support States in the development of Unmanned aircraft system (UAS) national regulations;
- g. Support States on COVID-19 pandemic activities to enable a safe and secure return to operations, the GNSS interference, the impact of security on safety, manage Cybersecurity risks; and 5G interference with Radar Altimeter frequency band.
- h. Support States to establish and activate the MENA RSOO;
- i. Provide continuous support for the MENA ARCM activities.
- j. Continue implementation support to States and industry, including the development of improved guidance materials as well as the organization of workshops and training to provide assistance and guidance to MID States; and
- k. Put in place a structure for the collection, analysis and sharing of safety and operational data in the region to support a comprehensive approach to risk management, and facilitate initiatives to develop regional data collection, and analysis.

States and industry are committed to the following efforts:

- a. Implement, as appropriate, the GASP SEIs and MID-RASP SEIs and their respective actions in strategic and timely manner;
- b. (For any States with SSCs), accord priority to the resolution of any SSCs identified by the ICAO USOAP CMA Programme. These should draw on the necessary resources available, including technical assistance from other States and Regional Programmes to resolve the SSCs promptly;
- c. Accord priority to the implementation of SSP and SMS;
- d. Use data-driven methodologies to identify R-HRCs and their safety issues, and implement collaborative solutions to reduce accident rates and fatalities in the Region, and likewise accord priority to the implementation of respective SEIs; and
- e. Consider various options to leverage ICAO-recognized industry assessment Programmes such as the IATA Operational Safety Audit (IOSA), IATA Safety Audit for Ground Operations (ISAGO), IATA Standard Safety Assessment Programme (ISSA), and ACI APEX Programme. These options range from recognition of such Programmes to encouraging registration by all applicable operators as a means to strengthen their safety management and compliance.

4. OPERATIONAL CONTEXT

4.1 Worldwide Perspective

After the year 2020 when the global economy experienced the worst crisis since the Great Depression as a consequence of the COVID-19 pandemic, the activity in 2021 rapidly recovered and the prospects for the following years are that this trend will continue. However, it is too soon to draw firm conclusions, considering the uncertainties on the evolution of certain threats (not only the pandemic, but also climate change, increasing public debts and geopolitical changes).

According to the last general IMF forecast available at (<https://www.imf.org/en/Publications/WEO/Issues/2021/10/12/world-economic-outlook-october-2021>), GDP fell by 3.3 % in 2020 and is expected to rebound by 5.9 % in 2021, to continue with a growth rate of 4.9 % in 2022. Behind these global figures quite diverse situations are found in national economies due to differences in the pace of vaccine roll-out and the capability of States to offer financial support. The pandemic also affected the job market, the employment conditions and other socio-economic factors. From a worldwide perspective, according to the International Labour Office, the unemployment rate grew by 1.1 point to 6.5 % in 2020, compared to 5.4 % in 2019, and will only slowly decrease to an expected 6.3 % in 2021 and 5.7 % in 2022. (https://www.ilo.org/wcmsp5/groups/public/-/-dgreports/-/-dcomm/-/-publ/documents/publication/wcms_795453.pdf). *Table 1.2 Employment-to-population ratio, unemployment rate.*

From a worldwide aviation perspective, large aeroplane commercial passenger flights, constituting the bulk of the aviation activity, showed an unprecedented drop in 2020 and started to recover in 2021. The closure of borders fundamentally contributed to this drop in traffic, hitting airline international traffic far more than domestic traffic. If the current positive trend of pandemic recovery continues, the domestic traffic in terms of number of airlines' commercial passengers would recover in 2022 in comparison with the 2019 level. International traffic would only recover in 2024.

4.2 Middle East Perspective

The Middle East Region has been, for years, at the forefront of aviation growth and reshaping the global long-haul markets by elevating its hub position for connecting Europe and Asia-Pacific, in line with the west to east shift of the geographical centre of gravity of air transport operations. Growth of the Region started to undergo a significant transition and slow down recently. Air transport supports 2.4 million jobs and USD 130 billion in GDP in the Middle East.

With the further movement of the air transport centre of gravity from West to East, the geographic position of the Gulf hubs will continue to offer a strategic advantage to several airlines in the Region. According to ICAO long-term traffic forecasts, total passenger traffic of the Middle East Region is expected to grow by around 4.6 per cent annually up to 2045, the second fastest growth among all Regions after Asia and Pacific. The Middle East is expected to be the fastest growing Region in terms of freight traffic growth, and is projected to grow at 5.4 per cent annually up to 2045. This increase will, in turn, drive growth in the economic output and jobs that are supported by air transport in the next decade. By 2036, it is forecasted that the impact of air transport and the tourism it facilitates in the Middle East will have grown to support 4.3 million jobs (78 per cent more than in 2016) and a USD 345 billion contribution to GDP (an increase of 166 per cent).

The Middle East has to contend with situations unique to the Region such as fluctuating oil revenues, regional conflict and overcrowded air space. In addition, airlines in this Region are now facing challenges to their business models.

The growth of air transport requires a high-performing aviation system including airlines, airports and ATM. The overall efficiency of the ATM system commensurate with the level of predicted traffic growth should be increased through improved airspace design and organization. Furthermore, this

Region is in need of political commitment to market liberalization. Although the Middle East is home to some of the world's largest hub airports, the relations between States are still mostly bound by bilateral air services agreements that limit market access to each other. (Source: *Aviation Benefits Report-2019*).

The economic and social situation in the Middle East is similar to the world outlook provided above. The COVID-19 pandemic has battered world-wide aviation in a way that could never have been imagined and we are still trying to assess the full extent of the impact that it will have on civil aviation in the longer term. While the pandemic is not yet over, there are signs at last that vaccination offers a viable way to reduce levels of infection and a basis to realistically plan for a full reopening. Throughout the pandemic, the ICAO MID Office has continued to work collaboratively with all stakeholders to ensure that the industry is equipped to resume the flight operations.

In addition, the MID-RPTF mechanisms continued to serve as a platform for coordination and cooperation amongst all stakeholders to support States with the implementation of the CART and HLCC recommendations as well as the recovery of aviation industry in the MID Region during the COVID-19 pandemic outbreak.

During 2021 the reduction in airline passenger flights due to COVID-19 continued, subsequently resulting also in lack of capacity to transport cargo in that aircraft. The same can be stated for the complexity of operations, ranging from quarantine measures imposed on flight crews, disruption in training and scheduling, and the need to transport cargo in the cabin.

Airlines continued to have a large portion of their aircraft grounded, leaving flight and cabin crew members with uncertainty about the return to normal operations.

However, the recovery during the summer of 2021 was faster than expected. This was a positive development but led to difficulties for operators to cope with the increased demand, adding complexity in the return to service of aircraft and flight crews.

Over the last five years, the global scheduled commercial international operations accounted for approximately 24.96 million departures in 2021, compared to 36.3 million departures in 2017. The MID Region shows a decrease in traffic volumes during 2021. Total scheduled commercial departures in 2021 accounted for approximately 806,274 estimated departures compared to 1.37 million departures in 2017. In terms of aircraft accidents, the MID Region had no accident during the year 2021. The 5-year average accident rate for 2017-2021 is 2.21, which is slightly below the global average rate (2.41) for the same period. The MID Region accident rate in 2020 is higher than the global accident rate, which is 2.14 accidents per million departures.

The MID Region had no fatal accident in 2021. However, the 5-year average fatal accident rate for 2017-2021 is 0.42, which is almost similar to the global average rate (0.41) for the same period. The MID Region had no fatal accidents in 2017, 2019, and 2021. However, two fatal accidents occurred in 2018 and 2020. The 2018 accident caused 66 fatalities and the year 2020 caused 176 fatalities.

In terms of Safety Management, the average EI for SSP foundation PQs for States in the MID Region is 76, 1%. Implementation of SSP is one of the main challenges faced by the State in the MID Region. The RASG-MID addresses the improvement of SSP implementation in the MID Region as one of the top SEIs. In connection with this, the RASG-MID/9 endorsed the Safety Management Implementation Team (SMIT) handbook to support MID States in the implementation of the SSP in an effective and efficient way.

Common challenges in MID Region include:

- a. The political/security situation in some States, the cross-national variation in Aviation development as well as the relatively small accreditation area, impede the provision of Technical assistance, implementation of Regional projects and the achievement of the Regional safety, air navigation and Security targets;

- b. The drastic reduction in traffic volumes due to the COVID-19 crisis and the new risks induced by its impacts;
- c. The lack of financial and human resources in some States, combined with the complexity of administrative arrangements for the approval of duty travel, political sensitivities, etc., affected the level of attendance to the activities organized by the ICAO MID Office as well as States' support to the MIDANPIRG, RASG-MID and the MID-RASFG Work Programmes and their subsidiary bodies;
- d. Low level of reporting by States (inputs to the MID-Air Navigation Report and MID Annual Safety Report, incidents, national plans, success stories, replies to State Letters, etc; and
- e. Resources constraints (financial and technical personnel) in the Regional Office, combined with a high rotation rate vs. necessary time for new staff/comers to cope with the way of doing business in ICAO considering the MID Region-specific challenges.

5. STRATEGIC PRIORITIES

The MID-RASP presents the safety priorities that were developed based on the ICAO GASP's including organizational challenges, operational safety risks, and emerging risks as well as region-specific issues identified by a safety risk assessment and published in MID Region Annual Safety Reports and RASG-MID activities. Additionally, the MID region's strategic approach to managing safety at the regional level is to address the region's operational issues and other safety issues in a timely manner. Therefore, the MID-RASP strategic approach would focus on organizational challenges/issues, regional operational safety risks, and emerging risks as indicated in graph 2 below.

- a. Organizational challenges/issues including the States 'safety oversight, safety management, aircraft accident and incident investigation, Human factors and competence of personnel, and Cybersecurity. In terms of human factors and competence of personnel, as new technologies emerge on the market and the complexity of the system continues increasing, it is of key importance to have the right competencies and adapt training methods to cope with new challenges. It is equally important for aviation personnel to take advantage of the safety opportunities presented by new technologies;
- b. In respect of regional operational safety risks, the focus would be on R-HRC identified in the GASP 2023-2025 Edition mainly the LOC-I, CFIT, RE, RI, and MAC; and
- c. Regarding the emerging risks, the focus would be on the COVID-19 crisis and the new risks induced by its impacts, Civil drones (Unmanned Aircraft Systems), Management of security risks with safety impact, and GNSS interference, and 5G interference with Radar altimeter band frequency.



Graph 2: Safety Priorities

Therefore, the MID-RASP adopts three focus areas approach:

First focus area involves enhancing existing regional mechanisms to strengthen effective safety oversight capabilities and improve the implementation of effective safety management, in particular to:

- a. Draft the MID-RASP 2023-20225 Edition and consider inputs from MID Annual Safety Report (MID ASR), MID Region safety management Roadmap, Runway Safety Go-Team; RASG-MID, MIDANPIRG, and RASFG-MID.
- b. enhance coordination and communication with regional organizations including ACAO, ACI, CANSO, IATA, and other regional mechanisms, MENA ARCM, especially MENA RSOO once activated;
- c. improve the scheduling and streamline the number of regional safety-related events including workshops, trainings, seminars; and
- d. improve communication and sharing of safety information between States, international organizations, and industry.

In addition to the varying levels of safety oversight capabilities in the MID Region, other regional safety issues and activities have been identified and selected for inclusion in the MID-RASP. These were derived from the RASG-MID reports, analysis of USOAP data, accident and incident investigation reports, safety oversight activities over recent years from MID States, as indicated below:

- a. Improve Regional Cooperation for the provision of Accident & Incident Investigation;
- b. Improve implementation of ELP requirements;
- c. Sharing of Safety Recommendations related to Accidents and Serious Incidents;
- d. Enhance State Oversight on Dangerous Goods;
- e. Need to manage the cybersecurity risks; and
- f. 5G interference with Radio altimeter frequency band.

Second focus area involves addressing effectively regional operational safety risks including specific operational risks stemming from the crisis as the vision of the GASP is to achieve and maintain the goal

of zero fatalities in commercial operations by 2030 and beyond.

Third focus area involves addressing the emerging safety risks that might impact safety in the future including recovering from the COVID-19 crisis without adversely affecting the high level of safety performance GNSS outages/vulnerability, civil drones to ensure safe operation of unmanned aircraft system (UAS), impact of security on safety, and 5G interference with Radar Altimeter frequency band. Additionally, for emerging risks, SEIs/safety actions would be developed and covered under the focus areas (organizational challenges and Regional operational safety risks).

5.1 Organizational Challenges/Issues

Organizational challenges are systemic issues which take into consideration the impact of organizational culture, and policies and procedures on the effectiveness of safety risk controls. Organizations include entities in a State, such as the civil aviation authorities (CAAs) and service providers, such as operators of aeroplanes, ATS providers and operators of aerodromes. Organizations should identify hazards in systemic issues and mitigate the associated risks to manage safety. A State's responsibilities for the management of safety comprise both safety oversight and safety management, collectively implemented through an SSP.

It is crucial that States' safety oversight capabilities and safety management, and aviation infrastructure should keep pace with these regional safety issues.

Therefore, for the triennium of 2023-2025, the MID Region should continue to focus its efforts in addressing the following top Regional organizational issues:

- a. Lower USOAP EI scores, especially States with EI below 60% as well as AIG, ANS, AGA, and OPS areas;
- b. Slow pace of SSP development & implementation including the NASP development, as well as understanding of newer safety management and performance based concepts;
- c. Slow pace of SMS acceptance and surveillance;
- d. Slow pace of developing Risk Management framework to support decision-making and deploy the resources needed to mitigate risks effectively;
- e. Improve Regional Cooperation for the Provision of Accident & Incident Investigation;
- f. Enhance State Oversight on Dangerous Goods;
- g. Support States related to Human factors and Competence of Personnel
- h. Support States to manage the cybersecurity risks;
- i. Management of security risks with safety impact;
- j. Slow pace of implementation of RASG-MID conclusion/ MID-RASP SEIs/safety actions and tools to mitigate identified safety risks and safety deficiencies;
- k. Insufficient resources and expertise to manage and collect safety data and safety information on a State level, and no formal mechanisms in place that allow for the sharing and benchmarking of information at the Regional level; and
- l. Increasing risks associated with airspace structure including ATS networks and associated airspaces to accommodate the traffic flow in safe and efficient manner.

5.1.1 Strengthening of States' Safety Oversight Capabilities

Safety oversight is defined as a function by means of which States ensure effective implementation of the safety-related SARPs and associated procedures contained in the Annexes to the Convention on International Civil Aviation and related ICAO documents. States have overall safety oversight responsibilities, which emphasize a State's commitment to safety in respect of the State's aviation activity. An individual State's responsibility for safety oversight is the foundation upon which a safe global air transport system is built. States that experience difficulties in carrying out safety oversight functions can impact the state of International Civil Aviation.

USOAP-CMA audits had identified that States inability to effectively oversee aviation operations which remains a global concern. In respect of MID Region, the regional average overall Effective Implementation (EI) (13 out of 15 States have been audited) is 74, 67 %, which is above the world average 68.68 % (as of 29 May 2022). Three (3) States are currently below EI 60%.

All eight areas have an EI above 60%. However, the areas of AIG, AGA and ANS still need more improvement. Regarding the Critical Elements (CEs), CE4 (Qualified technical personnel) improved and is above 60% (62.39%) EI, whereas CE8 (resolution of safety issues) is the only one below EI 60% (58. 89%) EI.

Moreover, the effective implementation in certification, surveillance, and resolution of safety concerns need to be improved.

Key Actions completed/planned
a. Conducted technical assistance and NCLB mission activities to States
b. Capacity building activities
c. Developed and implemented a specific NCLB plan of actions for prioritized States according to established criteria
d. Established MENA RSOO to assist States and start operations

5.1.2 Improve Regional Cooperation for the Provision of Accident & Incident Investigation

In respect of MID Region, the regional average overall Effective Implementation (EI) (13 out of 15 States have been audited) is 74.67 %, which is above the world average 68.68 % (as of 29 May 2022). Three (3) States are currently below EI 60%. Regarding the Critical Elements (CEs), CE4 (Qualified technical personnel) improved and is above 60% (60.08%) EI, whereas CE8 (resolution of safety issues) is the only one below EI 60% (59. 47%) EI. All eight areas have an EI above 60%. However, the area of AIG still need more improvement.

Key Actions completed/planned
a. AIG Strategy in the Provision of AIG Functions endorsed by the DGCA-MID/4
b. MENA AIG Regional Cooperation Mechanism (ARCM) endorsed by the DGCA meeting in Kuwait
c. Organized AIG capacity building activities
d. Draft MENA ARCM implementation action plan endorsed by the RSC/7
e. MENA ARCM Establishment and Activation

5.1.3 Sharing of Safety Recommendations related to Accidents and Serious Incidents

- a. The Safety recommendations are the utmost results of investigation or safety studies conducted by States. In accordance with the provisions of Annex 13, a State shall send to ICAO a copy of the Final Report on its investigations into accidents and serious incidents involving aircraft of a maximum mass of over 5,700 kgs.
- b. A safety recommendation is defined as a proposal by an accident investigation authority, based on information derived from an investigation. The intended purpose of a safety recommendation is the prevention of accidents or incidents, and the reduction of the consequences of such occurrences.

Key Actions completed/planned
a. Establishment of an Ad-hoc Action Group championed by Saudi Arabia and UAE
b. The Questionnaire on establishing safety recommendations platform developed and circulated to MENA ARCM Member States. The questionnaire analysis has been shared with MENA ARCM/2 meeting

5.1.4 Improve Implementation of ELP Requirements

The decision to address language proficiency requirements (LPRs) for pilots and air traffic controllers was first made by the 32nd Session of the ICAO Assembly in September 1998 as a direct response to several fatal accidents, including one that cost the lives of 349 persons, as well as to previous fatal accidents in which the lack of proficiency in English was identified as a contributing factor. The intent was to improve the level of language proficiency in aviation worldwide and reduce the communication breakdowns caused by a lack of language skills. LPRs have now moved beyond implementation (Assembly Resolution A38-8 refers), entering a phase of post implementation.

Key Actions completed/planned
a. Development and dissemination the Questionnaire on ELP
b. Analysis of the survey results and was reviewed by the RSC/7

5.1.5 Enhance State Oversight on Dangerous Goods

The data analysis results of the USOAP-CMA OPS area showed that Dangerous Goods is one of the unsatisfactory PQs in operations for some states in the region. The identified issues highlighted in the analysis report as indicated below:

- a. States have not implemented an effective system for safety oversight of the various entities involved in the transport of dangerous goods, including shippers, packers, cargo handling companies and air operators. Regarding the latter, some States, the authorities have not effectively reviewed the dangerous goods procedures of air operators, contained in the operations and ground handling manuals, mostly due to a lack of qualified dangerous goods inspectors.
- b. Some States have not kept records relating to dangerous goods-related approvals; and
- c. In addition, in some States, dangerous goods inspector procedures have not been established and implemented.

Safety actions have been planned to be taken during the year 2020 and 2021. However, due to the COVID-19 pandemic some of the ICAO MID Office work Programme activities have been postponed for 2022 including Dangerous Goods workshop.

Key Actions completed/planned
a. Dangerous Goods webinar
b. Dangerous Goods Capacity building activities

5.1.6 Improve the Safety Management

Despite the fact that the last years have clearly brought continued improvements in safety across every operational domain, the latest accidents and serious incidents and the massive worldwide impact of the COVID-19 pandemic on the aviation system underline the complex nature of aviation safety and the significance of addressing human and organizational factor aspects.

Effective safety management including robust risk management policies and processes are essential in dealing with the multiple impacts of the pandemic on the aviation system, both at authority and organization level. This is supported by ICAO Annex 19 on the reporting, analysis and follow-up of occurrences in civil aviation and when applicable, by flight data monitoring (FDM) requirements.

Therefore, States should build upon fundamental safety oversight systems to fully implement SSPs according to Annex 19, States shall require that applicable service providers under their authority implement an SMS. The SMS enables service providers to capture and transmit safety information which contributes to safety risk management. In this context, the role of the State evolves to include the establishment and achievement of safety performance targets as well as effective oversight of its service providers' SMS. Individual States should provide safety information derived from their SSPs to their respective RASGs to contribute to Regional safety risk management activities. The average EI for SSP foundation PQs for States in the MID Region is 76, 18%.

An SSP requires increased collaboration across operational domains to identify hazards and manage risks. Aviation authorities and organizations should anticipate new emerging threats and associated challenges by developing SRM principles.

Implementation of SSP is one of the main challenges faced by the State in the MID Region. The RASG-MID addresses the improvement of SSP implementation in the MID Region as one of the top Safety Enhancement Initiatives (SEIs). In connection with this, the RSC/7 endorsed the safety management Roadmap and established the Safety Management Implementation Team (SMIT). Furthermore, the RASG-MID/9 endorsed the SMIT handbook to support MID States in the implementation of the SSP in an effective and efficient way

ICAO launched SSP Implementation Assessments (SSPIAs) phase 2 under the USOAP CMA. The assessments are based on a qualitative assessment of a State's progress in implementing a State Safety Programme (SSP), using SSP-related PQs.

The PQs are reflective of Annex 19- Safety Management and the Safety Management Manual (Doc 9859).

Unlike the USOAP CMA's audit activities, SSPIAs are linked to applicable SSP components rather than critical elements (CEs). The SSP components are:

1. State safety policy, objectives and resources;
2. State safety risk management;
3. State safety assurance; and
4. State safety promotion

The SSP assessment covers 8 areas as indicated below:

1. SSP general aspects (GEN);
2. safety data analysis general aspects (SDA);
3. personnel licensing and training (PEL);
4. aircraft operations (OPS);
5. airworthiness of aircraft (AIR), approved maintenance organization (AMO) aspects only;
6. air navigation services(ANS), air traffic services provider (ATSP) aspects only;
7. aerodromes and ground aids (AGA); and
8. aircraft accident and incident investigation (AIG).

In 2020, ICAO developed guidance supporting the determination of maturity levels for each SSP-related PQ. The SSP-related PQs, complemented by the maturity level matrices for each of the SSP audit areas, are available in the CMA Library of the USOAP CMA Online Framework (OLF) at www.soa.icao.int (restricted access). These matrices describe the level of progress for each element of the SSP, which can be described as:

- Not present and not planned;
- Not present but being worked on;
- Present; or
- Present and effective.

ICAO will use the SSP maturity level matrices for the scheduled SSPIAs under Phase 2, which will begin in 2021. This phase of assessments will utilize the maturity level matrices to provide a more detailed, quantitative measurement of a State's progress in the implementation and maintenance of its SSP. Two assessment missions have been planned for the year 2022.

Key Actions completed/planned
a. Conducted continuously SSP/SMS capacity building activities
b. Development of the MID Region Safety Management Implementation Roadmap
c. Establishment of the Safety Management Implementation Team (SMIT) and SMIT Handbook endorsed by RASG-MID/9
d. Establishment the MENA RSOO to support States in the expeditious implementation of SSP
e. Guidance material development
f. Technical Assistance missions

5.1.7 Certification of International Aerodromes

All eight areas have an EI above 60%. In respect of the Critical Elements (CEs), CE4 (Qualified technical personnel) improved and is above 60% (60.08%) EI, whereas CE8 (resolution of safety issues) is the only one below EI 60% (59.47%) EI. However, the areas of AGA still need more improvement.

Key Actions completed/ planned
a. Conducted Aerodrome Safety Management Workshops
b. Wildlife hazard Management and Control Workshop
c. RSA on Wildlife Management and Control Regulatory Framework & Guidance Material.
d. Certification of Annex 14 training courses
e. GRF training courses

5.1.8 Establishment of Runway Safety Teams at International Airports

All eight areas have an EI above 60%. In terms of the Critical Elements (CEs), CE4 (Qualified technical personnel) improved and is above 60% (60.08%) EI, whereas CE8 (resolution of safety issues) is the only one below EI 60% (59.47%) EI. However, the areas of AGA still need more improvement

Key Actions completed/planned
a. Runway Safety Go-Team Missions
b. Support States to implement the Global Reporting Format Methodology through capacity building activities

5.1.9 Human Factors and Competence of Personnel

As the aviation system changes, it is imperative to ensure that human factors and the impact on human performance are taken into account, both at service provider and regulatory levels.

Human factors and human performance are terms that are sometimes used interchangeably. While both human factors and human performance examine the capabilities, limitations and tendencies of human beings, they have different emphases:

- Human Factors (HF) – this term focusses on why human beings function in the way that they do. The term incorporates both mental processes and physical ones, and the

interdependency between the two.

- Human Performance (HP) – the output of human factors is human performance. This term focusses on how people do the things that they do.

As new technologies emerge on the market and the complexity of the system continues increasing, it is of key importance to have the right competencies and adapt training methods to cope with new challenges. CRM has been identified in the MID ASR as most important human factors issue in the domain of commercial air transport and safety actions would be identified and developed. In addition, Team Resource Management (TRM) was introduced into ATC following the success achieved with Crew Resource Management (CRM) in the airline community enhancing teamwork practices. The practice is applied within virtually every airline with training given to pilots and other operational staff. Within the last decade in ATM there have been numerous advances in widespread acceptance of SMS under the guidance of ICAO. ICAO has now mandated the use of SMS Manual Doc 9859 to standardize the approach to safety. TRM as defined by ICAO is an integral component of SMS under human factor

Key Actions completed/planned
a. CRM and TRM workshops/webinars
b. FRMS workshops/webinars

5.1.10 Cybersecurity Resilience

The global civil aviation ecosystem is accelerating towards more digitalization. This implies that any exchange of information within any digital workflow of the aviation community needs to be resilient to information security threats which have consequences on the safety of flight or the availability of airspace and beyond. Aware of the complexity of the aviation system and of the need to manage the cybersecurity risk the MID Region needs to consider and address information security risks in a comprehensive and standardized manner across all aviation domains. In addition, it is essential that the aviation industry and civil aviation authorities share knowledge and learn from experience to ensure systems are secure from individuals/organizations with malicious intent.

Key Actions completed/planned
a. Cybersecurity symposium/workshops
b. Development of MID Region Cybersecurity Action Plan

5.2 Regional Operational Safety Risks

Operational safety risks arise during the delivery of a service or the conduct of an activity (e.g. operation of an aircraft, airports or of air traffic control). Operational interactions between people and technology, as well as the operational context in which aviation activities are carried out are taken into consideration to identify expected performance limitations and hazards. The RASG-MID utilizes available safety data and information to determine the region's operational safety risks which include G-HRCs and additional regional operational safety risks.

5.2.1 Address Operational Safety Risks in Commercial Air Transport (CAT) Aeroplane Operations above 5,700 kgs

In terms of an aircraft accident, the MID Region had no accident during the year 2021. The 5-year average accident rate for 2017-2021 is 2.21, which is slightly below the global average rate (2.41) for the same period. The MID Region accident rate in 2020 is higher than the global accident rate, which is 2.14 accidents per million departures.

The MID Region had no fatal accident in 2021. However, the 5-year average fatal accident rate for 2017-2021 is 0.42, which is almost similar to the global average rate (0.41) for the same period. The MID Region had no fatal accidents in 2017, 2019, and 2021. However, two fatal accidents occurred in 2018 and 2020. The 2018 accident caused 66 fatalities and the year 2020 caused 176 fatalities.

The GASP 2023-2025 Edition identifies the G-HRCs as LOC-I, CFIT, MAC, RE and RI. In the MID Region in 2017-2021 the topmost frequent accidents related to the loss of control-inflight and runway safety, which includes RE and ARC during Landing. In terms of fatality risk, the fatal accidents for the period 2017- 2021 were attributed to LOC-I.

Therefore, for the triennium of 2023-2025, the MID Region should continue to focus its efforts on mitigating and minimizing occurrences related to the R-HRCs for this time period, namely:

1. Loss of Control-In Flight (LOC-I);
2. Runway Safety (RS); mainly (RE and ARC during landing);
3. Runway Incursion (RI);
4. Controlled Flight into Terrain (CFIT); and
5. Mid-Air Collision (MAC).

MAC is established as a top risk for the MID region based on the existing data driven approach used to determine the R-HRCs though there is no fatal accident during the last five years. Therefore, there is a need for the MID region to build up its capability to collect and analyze safety data pertaining to MAC.

In addition, safety issues have been identified in the MID ASR and need to be considered by the States while developing their NASP as well as the industry as indicated at **Appendix B**.

5.2.2 Aircraft Upset in Flight (Loss of Control-Inflight)

Aircraft upset or loss of control inflight is the most common accident outcome for fatal accidents in CAT aero plane operations. It includes uncontrolled collisions with terrain, but also occurrences where the aircraft deviated from the intended flight path or intended aircraft flight parameters, regardless of whether the flight crew realized the deviation and whether it was possible to recover or not. It also includes the triggering of stall warning and envelope protections. During 2017-2021 aircraft upset, or loss of control contributed to one fatal accident involving MID Region aeroplane.

Key Actions completed/Planned
a. Organized and promoted training provisions on recovery from upset scenarios (UPRT workshops)
b. Assistance to States to implement the SSP/SMS through workshops/trainings
c. Development and publication of RSAs related to the LOC-I Airplane States Awareness (ASA) – Low Speed Alerting Standard Operating Procedures Effectiveness and Adherence Airplane States Awareness (ASA) –Training –Flight Crew training (Approach to stall & Up set recovery) Verification and Validation
d. Construction, approval and implementation of RNAV(GNSS) / RNP-AR procedures to all runways not currently served by precision approach procedure
e. Develop guidance material/share best practices on Ground Handling Service Provider Certification Process
f. Guidance material on flight crew proficiency
g. Advisory Circular: Mode Awareness and Energy State Management Aspects of Flight Deck Automation

5.2.3 Runway Excursion

Runway excursion covers materialized runway excursions, both at high and low speed, and occurrences where the flight crew had difficulties in maintaining the directional control of the aircraft or of the braking action during landing, where the landing occurred long, fast, off-centred or hard, or where the aircraft had technical problems with the landing gear (not locked, not extended or collapsed) during

landing. During the period 2017-2021, Runway Excursions and abnormal runway contact accidents and serious incidents mainly occurred in the landing phase of flight.

Key Actions completed/planned	
a.	Conduct of assistance missions by the Runway Safety Go-Team (RST)
b.	Establishment of a MID-FPP to support states on the effective implementation of the PBN procedures
c.	Promoted operational improvements and safety enhancements associated with the implementation of ASBU modules, e.g. PBN, CDO. Implementation of Performance-Based Navigation (PBN); particularly Approaches with Vertical Guidance (APV)
d.	Assistance to States to implement the SSP/SMS
e.	RSA on Wildlife Management and Control Regulatory Framework & Guidance Material
f.	Support States to implement the Global Reporting Format (GRF) Methodology through Webinar/ Workshops/Training
g.	Guidance material on un-Stabilized Approach
h.	MID Region Action Plan/Milestones on the Global Reporting Format (GRF) Implementation.

5.2.4 Runway Incursion (RI)

A Runway Incursions refers to the incorrect presence of an aircraft, vehicle or person on an active runway or in its areas of protection. Their accident outcome is runway collisions. While there were no fatal accidents or accidents involving MID States operators in the last years involving runway collision, the risk of the reported occurrence demonstrated to be very real. In addition to this, MID States should provide further data analysis regarding runway incursion to identify the root causes and associated safety issues.

Key Actions completed/planned	
a.	Conduct of assistance missions by the Runway Safety Go-Team (RST)
b.	Assistance to States to implement the SSP/SMS

5.2.5 Controlled Flight into Terrain (CFIT)

It comprises those situations where the aircraft collides or nearly collides with terrain while the flight crew has control of the aircraft. It also includes occurrences, which are the direct precursors of a fatal outcome, such as descending below weather minima, undue clearance below radar minima, etc. There was no fatal accident involving MID States operators during this period. This key risk area has been raised by some MID States and in other parts of the world that make it an area of concern. However, additional data is needed for further analysis to identify the underlying safety issues.

Key Actions completed/planned	
a.	Establishment of MID-FPP to support states on the effective implementation of the PBN procedures
b.	Promoted operational improvements and safety enhancements associated with the implementation of ASBU modules; e.g., PBN, CDO, CCO. Implementation of Performance-Based Navigation (PBN); particularly Approaches with Vertical Guidance (APV)
c.	Assistance to States to implement PBN routes for en-route and terminal airspace through meeting and workshops/seminars
d.	Assistance to States to implement the SSP/SMS

e. Development and publication of RSAs
f. Construction, approval and implementation of RNAV (GNSS) / RNP-AR procedures to all runways not currently served by precision approach procedure
g. Guidance for designing RNP Approach

5.2.6 Mid-Air Collision (MAC)

Refers to the potential collision of two aircraft in the air. It includes direct precursors such as separation minima infringements, genuine TCAS resolution advisories or airspace infringements. Although there have been no aero-plane mid-air collision accidents in recent years within the MID States. This key risk area has been raised by some MID States specifically in the context of the collision risk posed by military aircraft operating in Gulf area over the high seas which are not subject to any coordination with related FIRs for airborne operation. This is one specific safety issue that is a main priority in this key risk area. However, additional data is needed for further analysis to identify the underlying safety issues.

Key Actions completed/planned
a. Assistance to States to implement the SSP/SMS
b. Establishment of Near Mid-Air Collision (NMAC) Group to carry out further analyses of the reported NMAC incidents and provide feedback to the ATM SG and ASRG.
c. Conduct workshop to implement Civil-Military cooperation
d. Conduct seminar on raising awareness among stakeholders related to the potential risk of MAC over high seas

5.3 Emerging Risks

Emerging safety issues are risks that might impact Safety in the future. These may include a possible new technology, a potential public policy, a new concept, a business model or idea that, while perhaps an outlier today, could mature and develop into a critical mainstream issue in the future or become a major trend in its own right. Therefore, for the triennium of 2023-2025, the MID Region should continue to focus its efforts on mitigating and minimizing the safety impact of emerging risks for this time period, namely:

- a. Support States on establishing the UAS regulatory framework.
- b. Decrease the GNSS interference impact.
- c. support on maintaining collectively the pre-pandemic high aviation safety level throughout the recovery phase and improving safety post-recovery due to the drastic reduction in traffic volumes due to the COVID-19 crisis and the new risks induced by its impacts.
- d. Management of security risks with safety impact.
- e. 5G interference with Radio Altimeter frequency band.

The emerging risks SEIs and safety actions will be covered under organizational issues and operational safety risk SEIs.

5.3.1 GNSS interference

GNSS interference, including intentional and unintentional signal interference, has been identified as a major safety issue.

Flight Data Exchange analysis showed that the majority of GPS Signal Lost was detected within or in vicinity of Turkish airspace (Ankara FIR and Istanbul FIR), and in Eastern Mediterranean area. Compared to previous analysis, the identified hot spots have been expanded into entire Anatolian peninsula, including Istanbul FIR.

The GNSS interference SEI /safety actions covered under CFIT SEI.

Key Actions completed/t planned
a. RSA on GNSS vulnerability has been developed and published
b. Safety data analysis shared by IATA
c. Raise awareness on the potential impact of GNSS interference on the aviation during the Civil-Mil Workshop
d. Urge States to follow the reporting procedure agreed by MIDANPIRG Conclusion 19/4 when needed

5.3.2 COVID-19 Pandemic Outbreak- Safe return to operations

It was noted that the rapidly evolving COVID-19 crisis heavily affected all aspects of civil aviation. The urgent need to coordinate all efforts to reduce the risks of the spread of COVID-19 by air transport and to protect the health of air travellers and aviation personnel, while maintaining essential aviation transport operations and ensuring an orderly return to normal operations in due course was underlined. The COVID-19 pandemic resulted in an extreme reduction in operations that began in late March 2020. Recovering from this crisis without adversely affecting the high level of safety performance is proposed as a strategic priority.

In addition to the specific operational risks stemming from the crisis, there are currently a substantial number of exemptions and extensions granted; however, the use of flexibility provisions is diminishing. The aviation safety issues arising as a result of the pandemic have been identified and those safety issues that were considered to constitute the highest risk to the aviation system were assessed and resulted in a number of safety interventions and the publication of guidance material including ICAO CART documents to support stakeholders with the management of the specific risks posed by the crisis. The UAS SEIs /safety actions covered under MAC SEI.

Key Actions completed/planned
a. Establishment of MID Region Recovery Plan Task Force (MID-RPTF) to assist in developing regional restart and recovery planning
b. MID-RPTF activities
c. Conduct of teleconferences with DGCAs and Regional international organization
d. Development of MID CART Regional Implementation Roadmap
e. Continuous communication and coordination with MID States;
f. Development of a COVID-19 web page to communicate to States and all stakeholders the guidance material issued by ICAO, WHO, international organizations, States best practices and
g. Deployment of iPacks
h. Capacity building activities

5.3.3 Ensure the safe operations of UAS (drones)

The number of drones at the global level has increased. Available evidence demonstrates an increase of drones coming into close proximity with manned aviation (both aeroplanes and helicopters) and the need to mitigate the associated risk. The civil aviation authority is responsible for, inter alia, ensuring aviation safety and protecting the public from aviation hazards. Operators of aircraft, whether manned or unmanned, are likewise responsible for operating safely. The rapid rise of UAS raises new challenges that were not considered in historic aviation regulatory frameworks. Before devising any regulatory framework for UAS operations, the regulator should understand and assess the UAS situation in its State.

UA operations will involve stakeholders' familiar with aviation as well as many who are not. It is important to include these stakeholders from the beginning when developing the UAS regulations. Their early involvement will ensure that the regulations appropriately address the needs of these groups while also serving to educate them on expectations and what is feasible.

Therefore, safety actions would be developed to support States to develop their national regulations in order to ensure safe operation of UAS.

Key Actions completed/planned
a. UAS iPack deployment
b. Drones symposium
c. Conduct survey on States UAS regulatory framework

5.3.4 Management of security risks with safety impact

The crash of flight MH17 immediately raised the question why the aero plane was flying over an area where there was an ongoing armed conflict. Similar events had occurred in the MID region. Thus, military or terrorist conflicts may occur in any State at any time and pose risks to civil aviation. This is why it's important for governments, aircraft operators, and other airspace users such as air navigation service providers (ANSPs), to work together to share the most up-to-date conflict zone risk-based information possible to assure the safety of civilian flights.

Furthermore, flying over or nearby conflict zones is related to both security and safety management and requires an integrated risk management process, as proposed by ICAO in the second edition of the Risk Assessment Manual for Civil Aircraft Operations Over or Near Conflict Zones (Doc 10084) as an activity for further development. Several steps have to be taken, as part of the continuous risk assessment cycle including: the collection of information and intelligence; the subsequent threat analysis; the security risk assessment; the hazard identification; the safety risk assessment; the determination of the acceptable risk level and lastly information sharing. Each mitigating action should be accompanied with the identification of (new) hazards as a result of unintended consequences of the risk assessment mitigating actions.

The crash of flight MH17 shows, safety and security are intertwined. To manage the risks related to flying over conflict zones and other risks at the interface of safety and security as good as possible, closer cooperation between both worlds is necessary.

Key Actions taken/planned
a- Circulate ICAO Doc 10084 Risk Assessment Manual for Civil Aircraft Operations Over or Near Conflict Zones
b- Organize seminar/Symposium to exchange experiences and good practices on assessing the risks and sharing of information related to the overflying of conflict zones in coordination with RASFG-MID and MIDANPIRG
c- Encourage States to issue NOTAMs to share threats information emanated from conflict zones within their airspaces.

5.3.5 5G Operation on Radio Altimeter

Radar altimeters (RA), operating at 4.2-4.4 GHz, are the only sensors onboard a civil aircraft which provide a direct measurement of the clearance height of the aircraft over the terrain or other obstacles (i.e. the Above Ground Level - AGL - information).

The RA systems' input is required and used by many aircraft systems when AGL is below 2500 ft. Any failures or interruptions of these sensors can therefore lead to incidents with catastrophic outcome, potentially resulting in multiple fatalities. The radar altimeters also play a crucial role in providing

situational awareness to the flight crew. The measurements from the radar altimeters are also used by Automatic Flight Guidance and Control Systems (AFGCS) during instrument approaches, and to control the display of information from other systems, such as Predictive Wind Shear (PWS), the Engine-Indicating and Crew-Alerting System (EICAS), and Electronic Centralized Aircraft Monitoring (ECAM) systems, to the flight crew.

There is a major risk that 5G telecommunications systems in the 3.7–3.98 GHz band will cause harmful interference to radar altimeters on all types of civil aircraft- including commercial transport airplanes; business, regional, and general aviation airplanes; and both transport and general aviation helicopters. If there is no proper mitigation, this risk has the potential for broad impacts to aviation operations in the United States as well as in other regions where the 5G network is being implemented next to the 4.2-4.4 GHz frequency band.

List of potential equipment failures:

Auto land functions, EICAS/ECAM, False or missing GPWS alert, Unreliable instrument Indications, and Abnormal behaviors in Automatic Flight Systems.

The 5G interference with Radar Altimeter SEIs/safety actions covered under CFIT SEI.

Key Actions taken/planned	
a-	Develop a guidance material on safeguarding measures to protect Radio Altimeter from potential harmful interference from 5G Operation
b-	Conduct a Webinar addressing the matter to raise awareness and promote the guidance material developed by the RADALT AG.

PART-II. IMPLEMENTATION

6. SAFETY IMPLEMENTATION

6.1 Safety Monitoring and Implementation

This section presents an outline of the safety performance indicators reflecting the MID Region safety strategic priorities in the area of safety. The RASG-MID would use the indicators listed in the MID Region SPMM at **Appendix C** to measure safety performance and monitor each regional safety target. Furthermore, the MID Region SPMM includes six (6) Goals in line with GASP 2023-2025 Edition.

The RASG-MID would continuously monitor the implementation of the identified SEIs in the MID-RASP and measure safety performance of the regional civil aviation system, to ensure the intended targets are achieved, using the MID Region SPMM to this plan. Therefore, for each Goal established in the MID Region SPMM, identified SEI(s) be mapped to it including their respective actions.

MID region safety indicators and targets were aligned with the 2023-2025 GASP goals and targets as relevant in the MID Region. A MID Region Annual safety report would be annually published to provide stakeholders with relevant up-to-date information on the progress made in achieving the regional safety goals and targets, as well as the implementation status/progress of the SEIs.

In the event that the regional safety goals and targets are not met, the causes would be addressed and presented to stakeholders. If RASG-MID identifies critical operational safety risks, reasonable measures would be taken to mitigate them as soon as practicable, possibly leading to an earlier revision of the MID-RASP by SEIG.

The monitoring of safety performance and its enhancement is achieved through identification of relevant Goals and Safety Indicators, taking into consideration the GASP 2023-2025 and regional specific objectives and priorities, as well as the adoption and attainment of Safety Targets with a specific timeframe.

The MID Region Safety performance measurement and monitoring includes the following Goals:

Aspirational Goal: Zero fatality by 2030, the GASP aspirational goal of ‘zero fatalities in commercial operations by 2030 and beyond’.

Goal 1: Achieve a Continuous Reduction of Operational Safety Risks: This is related to 2023-2025 GASP Goal 1. This is aligned with the high-level ICAO safety metrics, thereby facilitating comparison of MID Region performance with global averages. Indicators related to risk areas are identified through the MID Region risk assessment methodology and described in the MID Region ASR. These ‘operational’ safety indicators would continue to be monitored through the MID Region ASR.

Goal 2: Strengthen States’ safety oversight capabilities: This is related to 2023-2025 GASP Goal 2. The Monitoring will be based on the available data published through USOAP-CMA (OLF) and iSTARS. The Regional average overall Effective Implementation (EI) in the MID Region (13 out of 15 States have been audited) is 74.67 %, which is above the world average 68.68% (as of 29 May 2022). Three (3) States are currently below EI 60%. The objective is aligned with the 2023-2025 GASP requiring all States to improve their score for the effective implementation (EI) of the critical elements (CEs) of the State’s safety oversight system (with focus on priority PQs) as follows: a) by 2024 -75 per cent; b) by 2026 – 85 per cent EI score; c) by 2030 EI Score – 95 per cent EI score.

Goal 3: Implement effective State safety Programmes (SSPs): This is related to 2023-2025 GASP. Related indicators will mainly be based on data available through ICAO iSTARS and USOAP-CMA (OLF). Feedback provided by Member States and Regional organizations would also be considered.

MID Office will in addition collect relevant documentation and information from States (SSP and NASP). The objective is aligned with the 2023-2025 GASP requiring all States to implement the foundation of an SSP by 2023, all States to publish a national aviation safety plan (NASP) by 2024, all States to work towards an effective SSP with maturity levels – Present by 2025, and Present and Effective by 2028.

Goal 4: Increase Collaboration at the Regional Level: This is related to 2023-2025 GASP. Related indicators will mainly be based on data available through ICAO iSTARS and USOAP-CMA (OLF). Feedback provided by Member States would be also considered. The objective is aligned with the 2023-2025 GASP requiring all States to achieve a positive safety oversight margin, and an effective SSP, to actively lead RASGs' safety risk management activities, by 2025.

Goal 5: Expand the use of Industry Programmes and safety information sharing networks: This is related to 2023-2025 GASP. Related indicators will mainly be collected from IATA and other international and regional organizations. Feedback provided by Member States would also be considered. The objective is aligned with the 2023-2025 GASP requiring all States that do not expect to meet GASP Goals 2 and 3 to seek assistance to strengthen their safety oversight capabilities or facilitate SSP implementation, all States to contribute information on operational safety risks, including SSP safety performance indicators regional aviation safety group (RASG) by 2025, and all regions to publish an updated regional aviation safety plan (RASP), in line with the 2023–2025 edition of GASP by 2023.

Goal 6: Ensure the appropriate infrastructure is available to support safe operations: This is related to 2023-2025 GASP Goal 6. Related indicators will mainly be based on data available through ICAO iSTARS. Feedback provided by Member States would also be considered. The objective is aligned with the 2023-2025 GASP requiring all States to implement the air navigation and airport core infrastructure including aerodrome safety by 2025.

6.2 Communication of Progress to RASG-MID and Regional Stakeholders

A MID Region Annual safety report would be annually published to provide stakeholders with relevant up-to-date information on the progress made in achieving the regional safety goals and targets, as well as the implementation status of the SEIs. In addition, the abovementioned information would culminate in a report on progress of implementation of the MID-RASP SEIs and their respective actions as well as in achieving the regional safety goals and targets; would be presented at every SEIG and RASG-MID meetings as well as safety seminars. The progress report should cover at least the following aspects:

- a. Brief overview of the overall implementation of the MID-RASP;
- b. Analysis on delay/ challenges encountered in implementation of SEIs and their respective actions; and
- c. If regional safety goals and targets are not met, causes would be addressed and presented to relevant stakeholders.

7 SAFETY ACTIONS

This chapter addresses system-wide problems that affect aviation as a whole including the SEIs and their respective actions. In most scenarios, these problems are related to organizational processes and procedures, regional operational safety risks, and emerging risks. The safety actions in this chapter are driven principally by the need to maintain or increase the current level of safety in the aviation sector for the region.

This chapter also facilitates the identification of SEIs and their respective actions relevant for each Goal established in the MID Region Safety performance measurement and monitoring as follows:

- **Goal 1:** Achieve a continuous reduction of operational safety risks.
- **Goal 2:** strengthen States safety oversight capabilities.
- **Goal 3:** Implementation of effective State safety Programmes.
- **Goal 4:** Increase collaboration at the regional level.
- **Goal 5:** Expand the use of industry Programmes and safety information sharing networks.
- **Goal 6:** Ensure the appropriate infrastructure is available to support safe operations.

7.1 Organizational Challenges/issues

7.1.1 Goal 2: Strengthen States' Safety Oversight Capabilities

The States safety oversight capabilities remains an issue mainly for AIG, AGA, ANS, and OPS areas. The lack of effective oversight remains an issue and the difficulties experienced by some authorities in properly discharging their oversight responsibilities is a concern also in the light of the size, scope and complexity of the aviation industry that some of them oversee.

Furthermore, while a number of CAAs have reached a suitable and stable level of maturity, certain continue to underperform and/or struggle in achieving sustainable improvements. Most notably, while progress has been noted in the implementation of Authorities' management systems, effective oversight of undertakings' safety management systems continues to be an area of concern in several domains.

7.1.1.1 G2-SEI-01: Strengthening States' Safety Oversight Capabilities

Target: The safety targets of this goal are indicated in the MID Region SPM at **Appendix C**.

Rationale:

The CEs are essentially the safety defense tools of the State Safety Oversight system needed for the effective and sustainable implementation of a safety-related policy and associated procedures. The effective implementation of the CEs is an indication of a State's capability for safety oversight. States must establish CE-1 through CE-5 prior to the implementation of CE-6 through CE-8 in order to provide effective safety oversight and safety management. An individual State's responsibility for safety oversight is the foundation upon which a safe global air transport system is built. States that experience difficulties in carrying out safety oversight functions can impact the state of International Civil Aviation.

States should work to continually improve their effective implementation of the eight CEs of the State's safety oversight system in all relevant areas, as appropriate to their aviation system complexity. Through collaborative efforts, the level of effective implementation of the CEs of a State's safety oversight system can increase, particularly in those States where a State faces shortages of human, financial or technical resources.

The below elements are considered enablers of a robust safety oversight system, expected to be in place according to the requirements in force:

1. ability and determination to conduct effective oversight;
2. ability to identify risks through a process to collect and analyze data;
3. ability to mitigate the identified risks in an effective way, implying measurement of performance and leading to continuous improvement;
4. willingness and possibility to exchange information and cooperate with other CAAs;
5. ability to ensure the availability of adequate personnel, where 'adequate' includes the notion of sufficient training and proper qualification; and
6. focus on the implementation of effective management systems in industry, wherever required by the regulations in force.

What we want to achieve:

A robust oversight system across MID Region, where each CAA is able to properly discharge its oversight responsibilities, with particular care to exchange of information and cooperation with other

CAAs and to the implementation of management systems in all organizations, as well as to ensure the availability of adequate personnel in CAAs. In addition, to Support MID Region States' civil aviation authorities to Strengthen States' Safety Oversight Capabilities and increase progressively the USOAP-CMA EI results.

How we monitor improvement:

Significant increase of the number of States with an EI above 60% and implementing risk-based oversight.

How we want to achieve it: This SEI should be considered by States for inclusion in their NASPs.

Actions: A1-A2-A3-A4-A5-A6-A7
A1- Conduct Capacity Building Activities to promote effective implementation of SARPs,
A2- Conduct technical assistance activities and NCLB missions to States with a focus on ANS, AGA, AIG, and OPS areas.
A3- Develop and implement a specific NCLB plan of actions for prioritized States
A4- Conduct a Capacity Building Activity for Aerodrome Inspectors (Training Course on Aerodrome Inspection) (Action addressed under G6-SEI-01 A5)
A5- Develop guidance material to assist MID Region States in the issuance of exemptions related to temporary deviations from standards
A6- Develop guidance material to support States for the conduct of remote surveillance
A7- Develop guidance material on the enhancement of understanding the concept of judicial enforcement for aviation inspectors

References: ICAO SARPs and guidance documents and 2023-2025 GASP Goal 2 "Strengthen States' safety oversight capabilities"

Component 1 — State Safety Oversight (SSO) System

Phase 1 — Establishment of a Safety Oversight Framework

- GASP SEI-1: Consistent implementation of ICAO SARPs at the national level.
- GASP SEI-3: Regional safety enhancement initiatives to support consistent coordination of Regional Programmes in establishing adequate safety oversight capabilities.
- GASP SEI-4 & GASP SEI-10: Strategic collaboration with key aviation stakeholders to enhance safety in a coordinated manner.
- GASP SEI-5: Provision of the Regional safety information to ICAO by asking States to complete, submit and update all relevant documents and records.

Phase 2 — Implementation of a Safety Oversight System

- GASP SEI-6: Continued implementation of and compliance with ICAO SARPs at the Regional level.
- GASP SEI-8: Strategic collaboration with key aviation stakeholders to enhance safety in a coordinated manner.
- GASP SEI-9: Continued provision of the primary source of Regional safety information to ICAO by asking States to update all relevant documents and records as progress is made.

Stakeholders: RASG-MID, MIDANPIRG, States, international organizations, and industry

Action 1: Conduct Capacity Building Activities to promote effective implementation of SARPs

Owner: ICAO, States, international organizations, and industry

Priority: Medium

Completion date: 2025

Status: Ongoing

Action 2: Conduct technical assistance and NCLB missions to States with focus on ANS, AGA, AIG, and OPS areas

Owner: ICAO

Priority: High

Completion date: 2025

Status: Ongoing

Action 3: Develop and implement a specific NCLB plan of actions for prioritized States

Owner: ICAO and concerned States

Priority: High

Completion date: 2025

Status: Ongoing

Action 4: Conduct a Capacity Building Activity for Aerodrome Inspectors (Training Course on Aerodrome Inspection) (Action addressed under G6-SEI-01 A5)

Owner: Qatar and ICAO

Priority: Medium

Completion date: 2025

Status: New

A5- Develop guidance material to assist MID Region States in the issuance of exemptions related to temporary deviations from standards

Owner: Qatar supported by Iran, Sudan, UAE, and IATA

Priority: Medium

Completion date: 2025

Status: New

A6- Develop guidance material to support States for the conduct of remote surveillance

Owner: Qatar supported by Iran, Jordan, Saudi Arabia, Sudan, UAE, and ACAO

Priority: Medium

Completion date: 2025

Status: New

A7- Develop guidance material on the enhancement of understanding the concept of judicial enforcement for aviation inspectors

Owner: Qatar supported by Saudi Arabia and UAE

Priority: Medium

Completion date:	2025
Status:	New
EXPECTED OUTPUT	
Deliverable(s)	Timeline
MID States to improve their score for the effective implementation (EI)	2025

7.1.1.2 G2-SEI-02: Improve Regional Cooperation for the Provision of Accident & Incident Investigation

Target/Metrics: The safety targets of this goal are indicated in the MID Region SPM at **Appendix C**.

Rationale:

States should work to continually improve their effective implementation of the CEs of the State's safety oversight system in the area of AIG. Through collaborative efforts and joining the MENA ARCM, the level of effective implementation of the CEs of a State's AIG can increase, particularly in those States where a State faces shortages of human, financial or technical resources.

What we want to achieve:

MID Region States to Strengthen States' Safety Oversight Capabilities and increase progressively the USOAP-CMA EI results in the area of AIG.

How we monitor improvement:

Increase of the number of States with an EI above 60% for AIG area and then establishing an independent aircraft accident and incident investigation authority.

How we want to achieve it:

Actions: A1-A2
A1- Support of MENA ARCM activities
A2- Conduct AIG Capacity Building Activities.

References: ICAO SARPs and guidance documents and 2023-2025 GASP Goal 2 "Strengthen States' safety oversight capabilities"

Component 1 — State Safety Oversight (SSO) System

Phase 1 — Establishment of a Safety Oversight Framework

- GASP SEI-2: Establishment of an independent regional accident and incident investigation process, consistent with Annex 13.
- GASP SEI-3: Regional safety enhancement initiatives to support consistent coordination of Regional Programmes in establishing adequate safety oversight capabilities.
- GASP SEI-4: Strategic collaboration with key aviation stakeholders to enhance safety in a coordinated manner.

Stakeholders: RASG-MID, States, international organization, and industry

Action 1: Support of MENA ARCM activities

Owner: ICAO, ACAO, and MENA ARCM Member States

Priority: High

Completion date: 2025

Status: Ongoing

Action 2: Conduct AIG Capacity Building Activities

Owner: ICAO, States, international organizations, and industry

Priority: Medium

Completion date: 2025

Status: Ongoing

EXPECTED OUTPUT

Deliverable(s)

Timeline

MID States to improve their score for the effective implementation (EI) especially the area of AIG 2025

7.1.1.3 G2-SEI-03: Sharing of Safety Recommendations related to Accidents and Serious Incidents

Target/Metrics: The safety targets of this goal are indicated in the MID Region SPM at **Appendix C**.

Rationale:

States should work to continually improve their effective implementation of the CEs of the State's safety oversight system in the area of AIG. Through collaborative efforts, the level of effective implementation of the CEs of a State's AIG can increase, particularly in those States where a State faces shortages of human, financial or technical resources.

What we want to achieve:

MID Region States' civil aviation authorities to Strengthen States' Safety Oversight Capabilities and increase progressively the USOAP-CMA EI results in the area of AIG. In addition, the prevention of accidents or incidents, and the reduction of the consequences of such occurrences.

How we monitor improvement:

Increase of the number of States with an EI above 60% for AIG area and establishing an independent aircraft accident and incident investigation authority.

How we want to achieve it:

Action: A1

A1- Establishing a Platform for Sharing Safety Recommendations for MENA ARCM Member States

References: ICAO SARPs and guidance documents and 2023-2025 GASP Goal 2 "Strengthen States' safety oversight capabilities"

Component 1 — State Safety Oversight (SSO) System

Phase 1 — Establishment of a Safety Oversight Framework

- GASP SEI-3: Regional safety enhancement initiatives to support consistent coordination of Regional Programmes in establishing adequate safety oversight capabilities
- GASP SEI-4: Strategic collaboration with key aviation stakeholders to enhance safety in a coordinated manner

Stakeholders: RASG-MID, States, and international organization

Action 1: Development of platform on sharing safety recommendations

Owner: ICAO, ACAO, and MENA ARCM Member

Priority: Low

Completion date: 2025

Status: On-hold

EXPECTED OUTPUT

Deliverable(s)	Timeline
Improve MID States the effective implementation (EI) in the area of AIG	2025

7.1.1.4 G2-SEI-04: Enhance State Oversight on Dangerous Goods

Target/Metrics: The safety targets of this goal are indicated in the MID Region SPM at **Appendix C**.

Rationale:

States should work to continually improve their effective implementation of the eight CEs of the State's safety oversight system in the area of OPS.

What we want to achieve:

States to implement an effective system for safety oversight of the various entities involved in the transport of dangerous goods. In addition, MID Region States' to Strengthen States' Safety Oversight Capabilities and increase progressively the USOAP-CMA EI results in the area of OPS and enhance the state oversight on Dangerous Goods

How we monitor improvement:

Increase of the number of States with an EI above 60% for OPS area and then to Strengthen States' Safety Oversight Capabilities.

How we want to achieve it: This SEI should be considered by States for inclusion in their NASPs.

Actions: A1

A1- Conduct Dangerous Goods (DG) capacity building activities including Lithium batteries fires/smoke risks in cabin

A2- Develop guidance material on carriage and transport of Lithium batteries

References: ICAO SARPs and guidance documents and 2023-2025 GASP Goal 2 "Strengthen States' safety oversight capabilities" and ICAO Annex 18 "Safe Transport of Dangerous Goods by Air".

Component 1 — State Safety Oversight (SSO) System

Phase 1 — Establishment of a Safety Oversight Framework

GASP SEI-1: Consistent implementation of ICAO SARPs at the national level

Phase 2 — Implementation of a Safety Oversight System

GASP SEI-6: Continued implementation of and compliance with ICAO SARPs at the Regional level

Stakeholders: RASG-MID, States, international organizations, and industry

Action 1- Conduct Dangerous Goods (DG) capacity building activities including Lithium batteries fires/smoke risks in cabin

Owner: ICAO, States, international organizations, and industry.

Priority: Medium

Completion date: 2025

Status: Ongoing

Action 2: Develop guidance material on carriage and transport of Lithium batteries

Owner: IATA

Priority: Medium

Completion Date: 2025

Status: Ongoing

EXPECTED OUTPUT

Deliverable(s)	Timeline
MID States to improve their score for the effective implementation (EI) especially the area of OPS	2025

7.1.1.5 G2-SEI-05: Human factors and Competence of Personnel

Target/Metrics: The safety targets of this goal are indicated in the MID Region SPM at **Appendix C**.

Rationale:

Human factors and competence of personnel are strategic priorities in the region. Human factors and the impact on human performance, as well as medical fitness are strategic priorities. As new technologies and/or operating concepts emerge on the market and the complexity of the system continues increasing, it is of key importance to properly address human factors and human performance, in terms of both limitations and its contribution to delivering safety, as part of the safety management implementation. CRM has been identified in the MID ASR as most important human factors issue in the domain of commercial air transport Aeroplanes above 5700 kgs. The safety actions related to competence of personnel mainly English language proficiency would be further developed in the future.

The main objectives of TRM for operational staff are the development of attitudes and behaviour, which will contribute to enhanced teamwork skills and performance in order to reduce teamwork failures as contributory factors in ATM related incidents and accidents. The benefits of TRM are considered to be enhanced Threat and Error Management capabilities, continuity and stability of teamwork, task efficiency, sense of working as a part of a larger and more efficient team, increased job satisfaction; and improved use of staff resources.

In addition, the safety action identified currently related to aviation personnel is also focusing on fatigue risk management (FRMS) by COVID-19 to mitigate safety issues in all domains such as personal readiness, flight crew perception or crew resource management (CRM) and communication, which play a role in improving safety across all aviation domains.

What we want to achieve:

Ensure continuous improvement in safety management activities as related to human factors and human performance.

How we monitor improvement:

Improvement in aviation personnel competence at all levels and then to Strengthen States' Safety Oversight Capabilities.

How we want to achieve it: This SEI should be considered by States for inclusion in their NASPs.

Actions: A1-A2-A3-A4
A1- Advisory Circular: Crew Resource Management Training Programme (CRM). (Action addressed under G1-SEI-04:CFIT)
A2- Conduct Crew Resource Management capacity building activities
A3- Organize Team Resource Management capacity building activities.
A4- FRMS capacity building activities

References: ICAO SARPs and guidance documents and 2023-2025 GASP Goal 2 "Strengthen States' safety oversight capabilities". ICAO Human Performance Manual (ICAO Doc 10151) and ICAO Safety Management Manual (ICAO Doc 9859).

Component 1 — State Safety Oversight (SSO) System

Phase 1 — Establishment of a Safety Oversight Framework

GASP SEI-1: Consistent implementation of ICAO SARPs at the national level

Stakeholders: RASG-MID, States, industry, international organizations

Action 2: Organize Crew Resource Management capacity building activities

Owner: ICAO, States, international organizations, and industry.

Priority: Medium

Completion date: 2023

Status: ongoing

Action 3: Organize Team Resource Management capacity building activities

Owner: ICAO, States, international organizations, and industry

Priority: Medium

Completion Date: 2023

Status: ongoing

Action 4: FRMS capacity building activities

Owner: ICAO, States, international organizations, and industry

Priority: Medium

Completion Date: 2025

Status: ongoing

EXPECTED OUTPUT

Deliverable(s)	Timeline
MID States to improve their score for the effective implementation (EI) and mitigate contributing factors to accidents and incidents	2025

7.1.1.6 G2-SEI-06: Management of security risks with safety impact

Target/Metrics: The safety targets of this goal are indicated in the MID Region SPMM at **Appendix C**.

Rationale:

The safety action in this area is aimed at mitigating the security related safety risks. The safety action in this area also include the mitigation of the risks posed by flying over zones where an armed conflict exists. Managing the impact of security on safety is a strategic priority in MID region.

What we want to achieve:

Increase safety by managing the impact of security on safety and mitigating related safety risks.

How we monitor improvement:

Continuous assessment and mitigation of security threats.

How we want to achieve it: This SEI should be considered by States for inclusion in their NASPs.

Actions: A1

Action 1- Organize seminar/Symposium/workshop to exchange experiences and good practices on assessing the risks and sharing of information related to the overflying of conflict zones in coordination with RASFG-MID and MIDANPIRG

References: ICAO SARPs and guidance documents and 2023-2025 GASP Goal 2 “Strengthen States’ safety oversight capabilities”. ICAO Annex 17.

Component 1 — State Safety Oversight (SSO) System

Phase 1 — Establishment of a Safety Oversight Framework

- GASP SEI-1: Consistent implementation of ICAO SARPs at the national level

Stakeholders: RASG-MID, RASFG-MID, MIDANPIRG, States, international organizations, industry

Action 1- Organize seminar/Symposium/workshop to exchange experiences and good practices on assessing risks and sharing of information related to the overflying of conflict zones in coordination with RASFG-MID and MIDANPIRG

Owner: ICAO

Priority: High

Completion date: 2023

Status: Ongoing

EXPECTED OUTPUT

Deliverable(s)

mitigate contributing factors to accidents and incidents

Timeline

2025

7.1.1.7 G2-SEI-07: Managing cybersecurity risks

Target/Metrics: The safety targets of this goal are indicated in the MID Region SPMM at **Appendix C**.

Rationale:

The safety action in this area is aimed at mitigating the cybersecurity related safety risks. Assess the safety impact of cybersecurity threats to aviation users, support the development of mitigations and specific Training actions, identify and mitigate the vulnerabilities of aviation products and identify the required changes to aviation standards.

What we want to achieve:

Increase safety by managing the impact of cybersecurity on safety and mitigating related safety risks.

How we monitor improvement:

Continuous assessment and mitigation of cybersecurity threats.

How we want to achieve it: This SEI should be considered by States for inclusion in their NASPs.

Actions: A1-A2-A3

A1- Develop a Regional Action Plan to bridge the gap between ICAO Cyber Security Action plan and the implementation level of Cyber Resilience in the MID Region

A2- Conduct activities on Cyber Security and Resilience- (Jointly ANS and AVSEC)

A3- Develop a MID Region Cybersecurity Action Plan.

References: ICAO SARPs and guidance documents and 2023-2025 GASP Goal 2 “Strengthen States’ safety oversight capabilities”. ICAO Annex 17.

Component 1 — State Safety Oversight (SSO) System**Phase 1 — Establishment of a Safety Oversight Framework**

- GASP SEI-1: Consistent implementation of ICAO SARPs at the national level

Stakeholders: RASG-MID, RASFG-MID, MIDANPIRG, States, international organizations, industry

Action 1- Develop a Regional Action Plan to bridge the gap between ICAO Cyber Security Action plan and the implementation level of Cyber Resilience in the MID Region

Owner: ANS Cyber SeC Action group

Priority: Medium

Completion date: 2025

Status: New

Action 2- Conduct activities on Cyber Security and Resilience

Owner: ICAO

Priority: Medium

Completion date: 2025

Status: New

Action 3: Develop a MID Region Cybersecurity Action Plan

Owner: Cybersecurity Security Ad-hoc Group

Priority: Medium

Completion date: 2025

Status: New

EXPECTED OUTPUT

Deliverable(s)	Timeline
mitigate contributing factors to accidents and incidents	2025

7.1.1.8 G2-SEI-08: Impact of COVID-19 pandemic- Safe return to operations

Target/Metrics: The safety targets of this goal are indicated in the MID Region SPMM at **Appendix C**.

Rationale:

States should manage a dedicated safety promotion campaign in support of safe return to operations. The safety action in this area is aimed at mitigating the COVID-19 pandemic related safety risks. The safety action in this area would focus on continuous support to the MID-RPTF and sharing of guidance material/best practices to mitigate the risks stemmed from the pandemic.

What we want to achieve:

Increase safety by managing the impact of COVID-19 pandemic on safety and mitigating related safety risks.

How we monitor improvement:

Continuous assessment and mitigation of COVID-19 pandemic induced safety risks.

How we want to achieve it: This SEI should be considered by States for inclusion in their NASPs.

Actions: A1-A2
A1- Continued support to the aviation industry through MID-RPTF meetings/Activities, as needed
A2- Sharing of guidance material/best practices

References: ICAO SARPs and guidance documents and 2023-2025 GASP Goal 2 “Strengthen States’ safety oversight capabilities”.

Component 1 — State Safety Oversight (SSO) System

Phase 1 — Establishment of a Safety Oversight Framework

- GASP SEI-1: Consistent implementation of ICAO SARPs at the national level

Stakeholders: RASG-MID, RASFG-MID, MIDANPIRG, States, international organizations, industry	
Action 1- Continued support to the aviation industry through MID-RPTF Activities, as needed	
Owner:	States, international organizations, and industry
Priority:	High
Completion date:	2025
Status:	Ongoing
Action 2: Sharing of guidance material/best practices	
Owner:	States, international organizations, and industry
Priority:	High
Completion date:	2025

Status:	Ongoing
EXPECTED OUTPUT	
Deliverable(s)	Timeline
mitigate contributing factors/safety issues to accidents and incidents 2025	

7.1.2 Goal 3: Implementation of Effective States Safety Programme (SSP)

7.1.2.1 G3-SEI-01: Implement an effective Safety Management

Target: The safety targets of this goal are indicated in the MID Region SPM at **Appendix C**.

Rationale:

Management of safety in a systematic and proactive way enables authorities and organizations to set up management systems that take into consideration potential hazards and associated risks before aviation accidents occur. This global move is at the core of ICAO Annex 19. This safety area would enable further work to improve reporting processes, occurrence investigation at organizational level, and also the continued development of integrated data collection taxonomies.

What we want to achieve:

MID Region States to implement SSP and consequently their services providers to implement SMS. In addition, work with authorities and organizations to implement safety management.

How we monitor improvement:

ICAO Annex 19 framework requiring safety management is in place across all aviation domains, and organizations and authorities are able to demonstrate compliance.

How we want to achieve it: This SEI should be considered by States for inclusion in their NASPs.

States to give priority to the work on SSPs

In the implementation and maintenance of the SSP, States should in particular:

- ensure effective implementation of the Annex 19 Requirements and address deficiencies in oversight capabilities, as a prerequisite for effective SSP implementation;
- ensure effective coordination between State authorities having a role in safety management;
- ensure that inspectors have the right competencies to support the evolution towards risk- and performance based oversight;
- ensure that policies and procedures are in place for risk- and performance based oversight, including a description of how an SMS is accepted and regularly monitored;
- establish policies and procedures for safety data collection, analysis, exchange and protection;
- establish a process to determine safety performance indicators at State level addressing outcomes and processes;
- ensure that an approved SSP document is made available and shared with other States; and
- ensure that the SSP is regularly reviewed and that SSP effectiveness is regularly assessed;
- ensure that the specific safety risks induced by COVID-19 be assessed and be included in the State risk picture.

SMS Assessment

States should make use of the available tools to support risk- and performance-based oversight. States also should regularly monitor status of compliance with SMS requirements of their industry.

SMS international cooperation

States should promote the common understanding of safety management and human factors principles and requirements in different countries, share lessons learned and encourage progress and harmonization, through active participation in the RASG-MID and other safety groups and fora.

FDM precursors of main operational safety risks

States in partnership with industry, other regional and international organizations should complete the good practice documentation which supports the inclusion of main operational safety risks such as RE, RI, LOC-I, CFIT and MAC into operators' FDM Programmes.

States to set up a regular dialogue with their national aircraft operators on flight data monitoring (FDM) Programmes

States to set up a regular dialogue with their national aircraft operators on flight data monitoring (FDM) Programmes, with the objectives of:

- promoting the operational safety benefits of FDM,
- fostering an open dialogue on FDM Programmes that takes place in the framework of just culture,
- encouraging operators to include and further develop FDM events relevant for the prevention of REs, MACs, CFIT and LOC-I, or other issues identified by the SSP

Actions: A1-A2
A1- Conduct SSP/SMS capacity building activities
A2- Conduct technical assistance missions by SMIT

References: ICAO Annex 19 and GASP 2023-2025 Goal 3 "Implement effective State Safety Programmes"

Component 2 — State Safety Programme

- GASP SEI-10: Start of promotion of SSP implementation at the regional level.
- GASP SEI-11: Regional safety enhancement initiatives to support consistent coordination of Regional Programmes for SSP implementation.
- GASP SEI-12: Strategic collaboration with key aviation stakeholders to support SSP implementation.
- GASP SEI-13: Start of SSP implementation at the national level.
- GASP SEI-14: Regional allocation of resources to support continued development of the proactive use of risk modelling capabilities.
- GASP SEI-15: Regional collaboration with key aviation stakeholders to support the proactive use of risk modelling.
- GASP SEI-16: Advancement of safety risk management at the regional level.

Component 2 — State Safety Programme

GASP SEI-7: Strategic collaboration with key aviation stakeholders to complete SSP implementation

Stakeholders: RASG-MID, States, industry, international organizations	
Action 1- Conduct SSP/SMS training courses and workshops	
Owner:	ICAO, supported by organizations, and industry
Priority:	High
Completion Date:	2025
Status:	ongoing

Action 2- Conduct technical assistance missions by SMIT**Owner:** ICAO and SMIT Team**Priority:** High**Completion Date:** 2025**Status:** New**EXPECTED OUTPUT**

Deliverable(s)	Timeline
MID States to implement the foundation of an SSP	2023
MID States to implement an effective SSP	2025

7.1.2.2 G3-SEI-02: NASP Development & Implementation

Target: The safety targets of this goal are indicated in the MID Region SPM at **Appendix C**.

Rationale:

States should ensure that a NASP is maintained and regularly reviewed. The MID-RASP provides the identified safety priorities in the Region and States should identify which top risks and key issues mentioned in the GASP and MID-RASP; which apply to their national context, and identify suitable mitigation actions within their NASP. States should also add/consider others which are unique to their operational context.

What we want to achieve:

MID Region States to develop NASP. Successful implementation of the NASP actions would require the commitment of resources from stakeholders within State, availability of data to effectively monitor the achievement of NASP Targets, and proper project governance. In addition to the actions, NASP shall also consider how to measure their effectiveness.

How we monitor improvement:

ICAO GASP requiring States to develop NASP and region to develop RASP.

How we want to achieve it: This SEI should be considered by States for inclusion in their NASPs.

States to establish and maintain a National Aviation Safety Plan (NASP)

States should ensure that a NASP is maintained and regularly reviewed. NASP should:

- describe how the plan is developed and endorsed, including collaboration with different entities within the State, with industry and other stakeholders;
- include safety objectives, goals, indicators and targets in line with in line with GASP as well as regional safety plan;
- identify the main safety risks at national level in addition to the ones identified in MID-RASP as applicable to the State;
- include series of SEIs to address safety issues; and
- Reflect the GASP and MID-RASP SEIs as applicable to the State.

Actions: A1-A2**A1-** Conduct NASPs workshops & technical assistance missions**A2-** NASP iPacks deployment

References: ICAO Annex 19 and GASP 2023-2025 Goal 3 “Implement effective State Safety Programmes”

Component 2 — State Safety Programme

- GASP SEI-10: Start of promotion of SSP implementation at the Regional level.
- GASP SEI-11: Regional safety enhancement initiatives to support consistent coordination of Regional Programmes for SSP implementation.
- GASP SEI-12: Strategic collaboration with key aviation stakeholders to support SSP implementation.
- GASP SEI-13: Start of SSP implementation at the national level.
- GASP SEI-14: Regional allocation of resources to support continued development of the proactive use of risk modelling capabilities.
- GASP SEI-15: Regional collaboration with key aviation stakeholders to support the proactive use of risk modelling.
- GASP SEI-16: Advancement of safety risk management at the Regional level.

Component 2 — State Safety Programme

GASP SEI-7: Strategic collaboration with key aviation stakeholders to complete SSP implementation

Stakeholders: RASG-MID, States, industry, international organizations

Action 1- Conduct NASPs workshops & technical assistance missions

Owner: ICAO

Priority: High

Completion Date: 2025

Status: Ongoing

Action 2- NASP iPacks deployment

Owner: ICAO and States

Priority: High

Completion Date: 2025

Status: New

EXPECTED OUTPUT

Deliverable(s)	Timeline
MID States to develop and implement NASP	2025

7.1.3 Goal 4: Increase Collaboration at the Regional Level

7.1.3.1 G4-SEI-01: Development and Implementation of MID-RASP

Target: The safety targets of this goal are indicated in the MID Region SPMM at **Appendix C**.

Rationale: The RASG-MD is the governing body responsible for the development, implementation and monitoring of the MID-RASP, in collaboration with the ICAO MID Office, international and regional organizations and with the aviation industry. The MID-RASP is to be reviewed by the Safety Enhancement Implementation Group (SEIG) every year mainly to include new identified Safety Enhancement initiatives' (SEIs), review the existing SEIs, as well as their respective actions.

What we want to achieve:

States, international organization, and industry to increase collaboration at the regional level so that to enhance safety.

How we monitor improvement:

MID region to publish an updated regional aviation safety plan (MID-RASP), in line with the 2023–2025 edition of GASP.

How we want to achieve it: This SEIs included in MID-RASP to be considered by States for inclusion in their NASPs.

References: GASP 2023-2025 Goal 4 “Increase collaboration at the Regional level”

Action: A1

A1- Development and Implementation of MID-RASP 2023-2025 Edition

Component 1 — State Safety Oversight (SSO) System

Phase 1 — Establishment of a Safety Oversight Framework

- GASP SEI- SEI-1: Consistent implementation of ICAO SARPs at the Regional level.
- GASP SEI-3: Regional safety enhancement initiatives to support consistent coordination of Regional Programmes in establishing adequate safety oversight capabilities.
- GASP SEI-5: Provision of the Regional safety information to ICAO by asking States to complete, submit and update all relevant documents and records.

Phase 2 — Implementation of a Safety Oversight System

GASP SEI-9: Continued provision of the primary source of Regional safety information to ICAO by asking States to update all relevant documents and records as progress is made.

Stakeholders: RASG-MID, MIDANPIRG, RASFG-MID, States, International organizations, and industry.

Action 1: Development and Implementation of MID-RASP 2023-2025 Edition

Owner: SEIG

Priority: High

Completion date: 2025

Status: Ongoing

EXPECTED OUTPUT

Deliverable(s)	Timeline
To manage and enhance safety at the regional	2025

7.1.3.2 G4-SEI-02: Enhance collaboration between States, international organizations, and industry

Target: The safety targets of this goal are indicated in the MID Region SPM at **Appendix C**.

Rationale: cooperation and collaboration among all stakeholders through conducting MID RCM meetings and agreeing on joint activities to avoid duplication of effort.

What we want to achieve:

States, international organizations, and industry to increase collaboration at the regional level so that to enhance safety.

How we monitor improvement: Reinforce efficient and effective cooperation and collaboration with all stakeholders, avoiding duplication and optimizing the allocation of resources at the regional level.

How we want to achieve it: Joint Programme activities

References: GASP 2023-2025 Goal 4 “Increase collaboration at the Regional level”

Actions: A1-A2
A1- Develop and agree on joint work activities through MID-RCM meetings
A2- Support the establishment of MENA RSOO and its activities

Component 1 — State Safety Oversight (SSO) System

Phase 1 — Establishment of a Safety Oversight Framework

- GASP SEI- SEI-1: Consistent implementation of ICAO SARPs at the Regional level.
- GASP SEI-3: Regional safety enhancement initiatives to support consistent coordination of Regional Programmes in establishing adequate safety oversight capabilities.
- GASP SEI-5: Provision of the Regional safety information to ICAO by asking States to complete, submit and update all relevant documents and records.

Phase 2 — Implementation of a Safety Oversight System

GASP SEI-9: Continued provision of the primary source of Regional safety information to ICAO by asking States to update all relevant documents and records as progress is made.

Stakeholders: RASG-MID, MIDANPIRG, RASFG-MID, States, international organizations, and industry.

Action 1: Develop and agree on joint work activities through MID RCMs

Owner: ICAO, States, international organizations, industry

Priority: High

Completion date: 2025

Status: New

Action 2: Support the establishment of MENA RSOO and its activities

Owner: ICAO and States

Priority: Medium

Completion date: 2025

Status: New

EXPECTED OUTPUT

Deliverable(s)	Timeline
To increase States USOAP EI and SSP level of maturity.	2025

7.2.1 Goal 5: Expand the Use of Industry Programmes and safety information sharing networks

7.1.4.1 G5-SEI-01: Promote the Use of industry Programmes

Target: The safety targets of this goal are indicated in the MID Region SPM at **Appendix C**.

Rationale:

What we want to achieve:

Work with authorities and organizations to increase the number of service providers participating in the corresponding ICAO recognized industry assessment Programmes.

How we monitor improvement:

Increase the number of service providers participating in the corresponding ICAO recognized industry assessment Programmes. The RASG-MID, IATA, and ACI will give feedback on the effectiveness of the activities.

How we want to achieve it:

Actions:	A1-A2
A1-	Encourage IATA's IOSA and ISAGO registrations through safety promotion
A2-	Encourage the implementation of ACI Airport Excellence (APEX) in Safety Programme
References: This is related to 2023-2025 GASP Goal 5 "Expand the use of industry Programmes and safety information sharing networks"	

Component 1 — State Safety Oversight (SSO) System

GASP SEI-1 — Strategic collaboration with key aviation stakeholders to enhance safety in a coordinated manner.

Stakeholders: RASG-MID, States, industry, international organizations	
Action 1: Encourage IATA's IOSA and ISAGO registrations through safety promotion	
Owner:	IATA
Priority:	Medium
Completion Date:	2025
Status:	Ongoing
Action 2: Encourage the implementation of ACI Airport Excellence (APEX) in Safety Programme	
Owner:	ICAO and ACI
Priority:	medium
Completion Date:	2025
Status:	ongoing
EXPECTED OUTPUT	
Deliverable(s)	Timeline
Increase the number of service providers participating in ICAO recognized industry assessment Programmes and maintain recurrent APEX Missions in the region:	2025

7.2.1 Goal 6: Ensure the Appropriate Infrastructure is available to Support Safe Operations

7.1.1.1 G6-SEI-01: Certification of International Aerodromes

Target/Metrics: The safety targets of this goal are indicated in the MID Region safety strategy at Appendix C.

Rationale:

Many International Airports are yet to be fully certified and many that are certified are facing challenges to apply the Standards and Recommended Practices (SARPs) as laid out in ICAO Annex 14- Aerodromes and the ICAO Manual on Certification of Aerodromes (Doc 9774).

What we want to achieve:

MID Region States to improve international aerodromes infrastructures and ensure continuous improvement.

How we monitor improvement:

The number of certified international airports. The RASG-MID, members States, and partners would provide feedback on the effectiveness of the activities.

How we want to achieve it: This SEI should be considered by States for inclusion in their NASPs.

Actions:	A1-A2-A3-A4-A5-A6
A1-	Support States on the implementation of the ICAO Annex 14 requirements to achieve compliance with regards to Aerodrome Design and Operations, through Workshops/Trainings
A2-	Enhance capacity building for States CAAs and Airport operators related to aerodromes certification through Workshops/Training
A3 –	Deployment of iPack on Aerodrome Re-Start
A4 -	Support States in implementing aerodrome oversight/inspection mechanism through capacity building activities on Aerodrome Oversight
A5 –	Conduct a Capacity Building Activity for Aerodrome Inspectors (Training Course + OJT)
A6 –	Conduct a Wildlife Hazard Management Control capacity building Activities

References: ICAO SARPs and guidance documents and 2023-2025 GASP. This is related to 2023-2025 GASP Goal 6 “Ensure the appropriate infrastructure is available to support safe operations”

Component 1 — State Safety Oversight (SSO) System

- GASP SEI-1: Consistent implementation of ICAO SARPs at the Regional level.
- GASP SEI-3: Regional safety enhancement initiatives to support consistent coordination of Regional Programmes in establishing adequate safety oversight capabilities.
- GASP SEI-4: Strategic collaboration with key aviation stakeholders to enhance safety in a coordinated manner.

Stakeholders: RASG-MID, States, industry, International organizations

Action 1: Support States on the implementation of the ICAO Annex 14 requirements to achieve compliance with regards to Aerodrome Design and Operations, through capacity building activities

Owner: ICAO and ACI.

Priority: High

Completion Date: 2025

Status: Ongoing

Action 2: Enhance capacity building for States CAAs and Airport operators related to aerodromes certification through capacity building activities

Owner: ICAO and ACI

Priority:	High
Completion date:	2025
Status	ongoing
Action 3: Deployment of iPack on Aerodrome Re-Start	
Owner:	ICAO
Priority:	Medium
Completion Date:	2025
Status:	Ongoing
A4: Support States in implementing aerodrome oversight/inspection mechanism through capacity building activities on Aerodrome Oversight	
Owner:	ICAO and FAA
Priority:	Medium
Completion Date:	2025
Status:	New
A5: Conduct a Capacity Building Activity for Aerodrome Inspectors (Training Course + OJT)	
Owner:	TBD
Priority:	Medium
Completion Date:	2025
Status:	New
A6: Conduct a Wildlife Hazard Management Control capacity building Activities	
Owner:	ICAO, ACAO, WBA
Priority:	Medium
Completion Date:	2025
Status:	New
EXPECTED OUTPUT	
Deliverable(s)	Timeline
Increase the number of Certificated International Aerodromes	2025

7.1.5.2 G6-SEI-02: Establish Runway Safety Team (RST) at International Aerodromes

Target: The safety targets of this goal are indicated in the MID Region SPMM at **Appendix C**.

Rationale:

Many States have difficulties on the development of the Runway Safety Programme and the establishment of Runway Safety Teams (RSTs) at airports as an effective means to reduce runway related accidents and incidents.

What we want to achieve:

MID Region States' civil aviation authorities to establish an effective RSTs at their aerodromes which would significantly reduce the runway safety related risks.

How we monitor improvement:

Number of the RSTs established at international aerodromes and number of the RST missions

conducted. The RASG-MID, members States, and partners will give feedback on the effectiveness of the activities.

How we want to achieve it: This SEI should be considered by States for inclusion in their NASPs.

Actions:	A1-A2
A1-	Conduct of assistance missions by the Runway Safety Go-Team (RST)
A2-	Support States to implement the Global Reporting Format Methodology through capacity building activities: (Action addressed under G1-SEI-02: Runway Excursion)

References: ICAO SARPs and guidance documents and 2023-2025 GASP. This is related to 2023-2025 GASP Goal 6 “Ensure the appropriate infrastructure is available to support safe operations”.

Component 1 — State Safety Oversight (SSO) System

- GASP SEI-1: Consistent implementation of ICAO SARPs at the Regional level.
- GASP SEI-3: Regional safety enhancement initiatives to support consistent coordination of Regional Programmes in establishing adequate safety oversight capabilities.
- GASP SEI-4: Strategic collaboration with key aviation stakeholders to enhance safety in a coordinated manner.

Stakeholders: RASG-MID, States, industry, international organizations	
Action 1: Conduct of assistance missions by the Runway Safety Go-Team (RST)	
Owner:	ICAO, RSP (Runway Safety Programme Partners)
Priority:	High
Completion date:	2025
Status:	Ongoing
Action 2: Support States to implement the Global Reporting Format Methodology through capacity building. (Action addressed under G1-SEI-02: Runway Excursion)	
Owner:	ICAO, ACI and Aircraft Manufactures
Priority:	High
Completion Date:	2025
Status:	Ongoing
EXPECTED OUTPUT	
Deliverable(s)	Timeline
Increase the number of establishment RST at international aerodromes	
2025	

7.2 Regional Operational Safety Risks

7.2.1 Goal 1: Achieve a continuous reduction in Operational Risks

7.2.1.1 G1-SEI-01: Aircraft upset in flight (LOC-I)

Target: The safety targets of this goal are indicated in the MID Region safety strategy at **Appendix C**.

Rationale:

Loss of control usually occurs because the aircraft enters a flight regime which is outside its normal

envelope, usually, but not always, at a high rate, thereby introducing an element of surprise for the flight crew involved. Prevention of loss of control is a strategic priority. In addition, Aircraft upset or loss of control is the key risk area with the highest risk related to fatal accidents in CAT aeroplane operations having a maximum take-off weight above 5700 kg. It includes uncontrolled collisions with terrain, but also occurrences where the aircraft deviated from the intended flight path or intended aircraft flight parameters, regardless of whether the flight crew realized the deviation and whether it was possible to recover or not. It also includes the triggering of stall warning and envelope protections. During 2017-2021 Aircraft upset or Loss of control contributed to one accident and counted for around 27% of fatalities. During the year 2018, the LOC-I occurred during En-route phase of flight.

What we want to achieve:

Increase safety by continuously assessing and improving risk controls to mitigate the risk of loss of control.

How we monitor improvement:

Continuous monitoring of safety issues identified in the MID Region annual safety report for CAT aeroplane above 5,700 kgs.

How we want to achieve it:

States should set up a regular dialogue with their national aircraft operators on flight data monitoring (FDM) Programmes, with the objectives of: promoting the operational safety benefits of FDM, fostering an open dialogue on FDM Programmes that takes place in the framework of just culture, encouraging operators to include and further develop FDM events relevant for the prevention of LOC-I, or other issues identified by the SSP.

States to include LOC-I in national SSPs: LOC-I should be addressed by the States on their SSPs and included in NASPs. This should include as a minimum agreeing a set of actions and measuring their effectiveness.

Actions:	A1-A2-A3
A1-	Guidance material on flight crew proficiency
A2-	Advisory Circular: Mode Awareness and Energy State Management Aspects of Flight Deck Automation
A3-	Conduct Upset Recovery Workshops/Webinars
A4-	Develop guidancematreial on the air cargo safety

References:

- GASP 2023-2025 Goal 1 "Achieve a Continuous Reduction of Operational Safety Risks".
- GASP SEIs (States, Region, and industry) – Mitigate contributing factors to LOC-I accidents and incidents.

Stakeholders: RASG-MID, States, industry, international organizations/associations	
Action 1: Guidance material on flight crew proficiency	
Owner	IATA and Aircraft manufacturers
Priority:	Medium
Completion Date:	2025
Status:	Ongoing
Action 2: Advisory Circular: Mode Awareness and Energy State Management Aspects of Flight Deck Automation	

Owner:	IATA and Aircraft manufacturers. Supported by KSA
Priority:	High
Completion Date:	2025
Status:	ongoing
Action 3: Conduct Upset Recovery workshop/Webinar	
Owner:	ICAO, IATA, Industry.
Priority:	High
Completion Date:	2025
Status:	Ongoing
A4- Develop guidance material on the air cargo safety	
Owner:	Oman
Priority:	Medium
Completion Date:	2025
Status:	New
EXPECTED OUTPUT	
Deliverable(s)	Timeline
Mitigate contributing factors to LOC-I accidents and incidents	2025

7.2.1.2 G1-SEI-02: Runway Safety- Runway Excursion

Target: The safety targets of this goal are indicated in the MID Region SPM at **Appendix C**.

Rationale:

Runway excursion covers materialized runway excursions, both at high and low speed, and occurrences where the flight crew had difficulties in maintaining the directional control of the aircraft or of the braking action during landing, where the landing occurred long, fast, off-centred or hard, or where the aircraft had technical problems with the landing gear (not locked, not extended or collapsed) during landing. During 2017-2020, Runway Excursions and abnormal runway contact accidents and serious incidents mainly occurred in the landing phase of flights.

What we want to achieve:

Increase safety by continuously assessing and improving risk controls to mitigate the risk of RE.

How we monitor improvement:

Continuous monitoring of safety issues identified in the MID Region annual safety report for CAT aeroplane above 5,700 kgs.

How we want to achieve it:

States to set up a regular dialogue with their national aircraft operators on flight data monitoring (FDM) Programmes, with the objectives of: promoting the operational safety benefits of FDM, fostering an open dialogue on FDM Programmes that takes place in the framework of just culture, encouraging operators to include and further develop FDM events relevant for the prevention of REs.

States to include Runway Excursions in national SSPs: REs should be addressed by the States on their SSPs and included in NASPs in close cooperation with the aircraft operators, air traffic control,

and airport operators. This should include as a minimum agreeing a set of actions and measuring their effectiveness.

Actions:	A1-A2
A1-	Support States to implement the Global Reporting Format (GRF) Methodology through capacity building activities
A2-	MID Region Action Plan/Milestones on the Global Reporting Format (GRF) Implementation

References:

- GASP 2023-2025 Goal 1 “Achieve a Continuous Reduction of Operational Safety Risks”.
- GASP SEIs (States, Region, and industry) – Mitigate contributing factors to RE accidents and incidents.

Stakeholders: RASG-MID, MIDANPIRG, States, industry, international organizations/associations

Action 1: Support States to implement the Global Reporting Format (GRF) Methodology through capacity building activities (Reference: G3-SEI-02)

Owner: ICAO, ACI, and Aircraft Manufactures

Priority: Medium

Completion Date: 2025

Status: Ongoing

Action 2: MID Region Action Plan/Milestones on the Global Reporting Format (GRF) Implementation

Owner: ICAO

Priority: High

Completion Date: 2025

Status: ongoing

EXPECTED OUTPUT

Deliverable(s)	Timeline
Mitigate contributing factors to RE accidents and incidents	2025

7.2.1.3 G1-SEI-03: Runway Safety- Runway Incursion

Target: The safety targets of this goal are indicated in the MID Region SPM at **Appendix C**.

Rationale:

Collision on runway covers collisions between an aircraft and another object (other aircraft, vehicles, etc.) or person that occur on a runway of an aerodrome or other predesignated landing area; it does not include collisions with birds or wildlife. While there were no fatal accident or accident involving MID States operators in the last years involving runway collision, the risk of the reported occurrence demonstrated to be very real.

What we want to achieve:

Increase safety by continuously assessing and improving risk controls to mitigate the risk of RI.

How we monitor improvement:

Continuous monitoring of safety issues identified in the MID Region annual safety report for CAT aeroplane above 5,700 kgs.

How we want to achieve it:

States to include Runway Incursions in national SSPs: RIs should be addressed by the States on their SSPs and included in NASPs in close cooperation with the aircraft operators, air traffic control, and airport operators. This should include as a minimum agreeing a set of actions and measuring their effectiveness.

Action:	A1
A1- Conduct Capacity Building Activities on the Advanced Surface Movement Guidance and Control System (A-SMGCS) Implementation	

References:

- GASP 2023/2025 Goal 1 “Achieve a Continuous Reduction of Operational Safety Risks”.
- GASP SEIs (States, Region, and industry) – Mitigate contributing factors to RI accidents and incidents.

Stakeholders: RASG-MID, MIDANPIRG, States, industry, international organizations

Action 1: Conduct Capacity Building Activities on the Advanced Surface Movement Guidance and Control System (A-SMGCS) Implementation

Owner: ICAO

Priority: High

Completion Date: 2025

Status: New

EXPECTED OUTPUT

Deliverable(s)	Timeline
Mitigate contributing factors to RI accidents and incidents	2025

7.2.1.4 G1-SEI-4: Controlled Flight into Terrain (CFIT)**7.2.1.4.1 G1-SEI-4A1- Controlled Flight into Terrain (CFIT)**

Target: The safety targets of this goal are indicated in the MID Region SPM at **Appendix C**.

Rationale:

It comprises those situations where the aircraft collides or nearly collides with terrain while the flight crew has control of the aircraft. It also includes occurrences, which are the direct precursors of a fatal outcome, such as descending below weather minima, undue clearance below radar minima, etc. There was no fatal accident involving MID States operators during this period. This key risk area has been raised by some MID States and in other parts of the world that make it an area of concern.

What we want to achieve:

Increase safety by continuously assessing and improving risk controls to mitigate the risk of CFIT.

How we monitor improvement:

Continuous monitoring of safety issues identified in the MID Region annual safety report for CAT aeroplane above 5,700 kgs.

How we want to achieve it:

States to set up a regular dialogue with their national aircraft operators on flight data monitoring (FDM) Programmes, with the objectives of: promoting the operational safety benefits of FDM, fostering an open dialogue on FDM Programmes that takes place in the framework of just culture,

encouraging operators to include and further develop FDM events relevant for the prevention of CFIT or other issues identified by the SSP.

States to include CFITs in national SSPs: CFIT should be addressed by the States on their SSPs and included in NASPs. This should include as a minimum agreeing a set of actions and measuring their effectiveness.

Actions: A1-A2-A3
A1- Advisory Circular: Instrument Approach Procedures Using Continuous Descent Final Approach Techniques
A2- Guidance for designing RNP Approach
A3- Advisory Circular: Crew Resource Management Training Programme (CRM)

References:

- GASP 2023-2025 Goal 1 “Achieve a Continuous Reduction of Operational Safety Risks”.
- GASP SEIs (States, Region, and industry) – Mitigate contributing factors to CFIT accidents and incidents.

Stakeholders: ICAO, RASG-MID, MIDANPIRG States, industry, international organizations	
Action 1: Advisory Circular: Guidance for Operators on Training Programme on the use of GPWS	
Owner:	IATA and Aircraft manufacturers
Priority:	Medium
Completion Date:	2025
Status:	ongoing
Action 2- Guidance for designing RNP Approach	
Owner:	ICAO AND MID-FPP
Priority:	Medium
Completion Date:	2025
Status:	New
Action 3: Advisory Circular: Crew Resource Management Training Programme (CRM)	
Owner:	IATA and Aircraft manufacturers
Priority:	High
Completion Date:	2025
Status:	ongoing

EXPECTED OUTPUT

Deliverable(s)	Timeline
Mitigate contributing factors to CFIT accidents and incidents	2025

7.2.1.4.2 G1-SEI-4A2- 5G Operation on Radio Altimeter

Stakeholders: ICAO, RASG-MID, MIDANPIRG, RASFG-MID States, industry, international organizations	
Action 1: Develop a guidance material on safeguarding measures to protect Radio Altimeter from potential harmful interference from 5G Operation	
Owner:	Radio Altimeter action group (RADALT AG)

Priority: Medium

Completion Date: 2025

Status: New

Action 2: Conduct a Webinar addressing the matter to raise awareness and promote the guidance material developed by the RADALT AG

Owner: ICAO and RADALT AG

Priority: Medium

Completion Date: 2025

Status: New

EXPECTED OUTPUT

Deliverable(s)	Timeline
Mitigate contributing factors to CFIT accidents and incidents including LOC-I	2025

7.2.1.5 G1-SEI-05: Airborne Conflict (Mid-Air Collisions)

7.2.1.5.1 G1-SEI-05A1: Loss of separation/TCAS RA

Target: The safety targets of this goal are indicated in the MID Region SPMM at **Appendix C**.

Rationale:

Airborne collision includes all occurrences involving actual or potential airborne collisions between aircraft, while both aircraft are airborne, and between aircraft and other airborne objects. This also includes all separation-related occurrences caused by either air traffic control (ATC) or cockpit crew, AIRPROX reports and genuine ACAS alerts. It includes direct precursors such as separation minima infringements, genuine TCAS resolution advisories or airspace infringements.

Although there have been no aeroplane mid-air collision accident in recent years within the MID States, this risk area has been raised by some MID States specifically in the context of the collision risk posed by military aircraft operating in Gulf area over the high seas which are not subject to any coordination with related FIRs for airborne operation. This is one specific safety issue that is a main priority in this key risk area.

States must have due regard for the safety of civil aircraft and must have established respective regulations for national State aircraft.

Some States had reported an increase in incidents involving close encounters between civil and military aircraft and more particularly an increase in non-cooperative international military traffic over the high-sea waters. The States could consider the following recommendations:

1. Fully apply the ICAO Manual on Civil-Military Cooperation in Air Traffic Management (Doc 10088);
2. Closely coordinate to develop, harmonize and publish operational requirements and instructions for State aircraft to ensure that 'due regard' for civil aircraft is always maintained;
3. Support the development and harmonization of civil/military coordination procedures for ATM at MID Region level and beyond if possible; and
4. Report relevant occurrences.

What we want to achieve:

Increase safety by continuously assessing and improving risk controls to mitigate the risk of MAC.

How we monitor improvement:

Continuous monitoring of safety issues identified in the MID Region Annual Safety Report for CAT aeroplane above 5,700 kgs.

How we want to achieve it:

States to include MACs in national SSPs: MACs should be addressed by the States on their SSPs and included NASPs. This should include as a minimum agreeing a set of actions and measuring their effectiveness.

States to reinforce the appropriate reactions of flight crew in response to an airborne collision avoidance system (ACAS) resolution advisories (RA), which would help to mitigate the risk of mid-air collisions by providing safety promotion material and clear messages to pilots on the need to follow the instructions of the ACAS in high-risk situations.

Actions:	A1-A2
A1-	Conduct workshop to implement Civil-Military cooperation
A2-	Conduct seminar on raising awareness among stakeholders related to the potential risk of MAC over high seas

References:

- GASP 2023-2025 Goal 1 "Achieve a Continuous Reduction of Operational Safety Risks".
- GASP SEIs (States, Region, and industry) – Mitigate contributing factors to MAC accidents and incidents.
- ICAO Doc 10088 'Manual on Civil/Military Cooperation in Air Traffic Management'

Stakeholders: RASG-MID, MIDANPIRG, States, industry, international organizations

Action 1: Conduct workshop to implement Civil-Military cooperation

Owner: ICAO, IATA, and States

Priority: High

Completion Date: 2025

Status: Ongoing

Action 2: Conduct seminar on raising awareness among stakeholders related to the potential risk of MAC over high seas

Owner: ICAO and States

Priority: High

Completion Date: 2025

Status: Ongoing

EXPECTED OUTPUT

Deliverable(s)	Timeline
Mitigate contributing factors to MAC accidents and NMAC incidents	2025

7.2.1.5.2 G1-SEI-05A2: GNSS Interference

Stakeholders: RASG-MID, MIDANPIRG, States, industry, international organizations

Action 1: Raise awareness on the potential impact of GNSS interference on the aviation during the Civil-Mil Workshop.

Owner:	ICAO and IATA
Priority:	Medium
Completion Date:	2025
Status:	New
Action 2: Urge States to follow the reporting procedure agreed by MIDANPIRG Conclusion 19/4 when needed.	
Owner:	ICAO
Priority:	Medium
Completion Date:	2025
Status:	New
EXPECTED OUTPUT	
Deliverable(s)	Timeline
Mitigate contributing factors to MAC accidents and NMAC incidents	2025

7.2.1.5.3 G1-SEI-05A3: Ensure the Safe Operations of UAS (drones)

Target: The safety targets of this goal are indicated in the MID Region SPMM at Appendix C.

Rationale:

The civilian use of UAS has markedly increased in recent years. Research and development into the civilian applications of unmanned aircraft (UA) is a dynamic and rapidly evolving area. Control and guidance systems are now available that enable these aircraft to perform a variety of tasks that were previously unachievable, unreasonably expensive, or involved too much personal risk. As a result, UA have an increasing presence in controlled and uncontrolled airspace. In addition, available evidence demonstrates an increase of drones coming into close proximity with manned aviation (both aeroplanes and helicopters) and the need to mitigate the associated risk. In connection with this, some States in the region developed their national regulations to ensure safe operations of UAS. However, there are currently some States in the region are unable to develop their national regulations to ensure safe operations of UAS. Therefore, guidance material to be developed to assist states' CAA personnel in the implementation and oversight of UAS operations and to mitigate the risk of the MAC. When available, the guidance material would serve as an example for consideration by MID States to create, add, or amend, future or existing national UAS guidance material by the respective CAA.

What we want to achieve:

MID Region States' civil aviation authorities to develop national regulations to ensure safe operations of UAS and to create growth while maintaining a high and uniform level of safety.

How we monitor improvement:

Increase of number of states established national regulations to ensure safe operations of UAS. The RASG-MID, members States, and partners would give feedback on the effectiveness of the activities.

How we want to achieve it: This SEI should be considered by States for inclusion in their NASPs

Actions:	A1-A2-A3
A1- UAS iPack deployment	

A2- Organize symposium
A3- Conduct survey on States UAS regulatory framework

References: ICAO SARPs and guidance documents and 2023-2025 GASP. This is related to 2023-2025 GASP Goal 1. “Achieve a Continuous Reduction of Operational Safety Risks”

Component 1 — State Safety Oversight (SSO) System

- GASP SEI-1: Consistent implementation of ICAO SARPs at the Regional level.
- GASP SEI-3: Regional safety enhancement initiatives to support consistent coordination of Regional Programmes in establishing adequate safety oversight capabilities.

Stakeholders: RASG-MID, MIDANPIRG, States, industry, international organizations

Action 1: UAS iPack Deployment

Owner: ICAO

Priority: High

Completion date: 2025

Status: New

Action 2: Organize symposium related to drones (UAS)

Owner: ICAO, ACAO. Supported by FAA

Priority: Medium

Completion date: 2023

Status: Ongoing

Action 3- Conduct survey on States UAS regulatory framework

Owner: ICAO and States

Priority: Medium

Completion date: 2023

Status: New

EXPECTED OUTPUT

Deliverable(s)

Timeline

Ensure the safe operations of UAS to mitigate the risk of MID-Air Collision (MAC).

2025

7.2.1.5.2 G1-SEI-05A2: GNSS Interference

Stakeholders: RASG-MID, MIDANPIRG, States, industry, international organizations

Action 1: Raise awareness on the potential impact of GNSS interference on the aviation during the Civil-Mil Workshop.

Owner: ICAO and IATA

Priority: Medium

Completion Date: 2025

Status: New
Action 2: Urge States to follow the reporting procedure agreed by MIDANPIRG Conclusion 19/4 when needed.

Owner: ICAO

Priority: Medium

Completion Date: 2025

Status: New

EXPECTED OUTPUT

Deliverable(s)	Timeline
Mitigate contributing factors to MAC accidents and NMAC incidents	2025

7.2.1.5.3- G1-SEI-05A3: Ensure the Safe Operations of UAS (drones)

Target: The safety targets of this goal are indicated in the MID Region SPM at Appendix C.

Rationale:

The civilian use of UAS has markedly increased in recent years. Research and development into the civilian applications of unmanned aircraft (UA) is a dynamic and rapidly evolving area. Control and guidance systems are now available that enable these aircraft to perform a variety of tasks that were previously unachievable, unreasonably expensive, or involved too much personal risk. As a result, UA have an increasing presence in controlled and uncontrolled airspace. In addition, available evidence demonstrates an increase of drones coming into close proximity with manned aviation (both aeroplanes and helicopters) and the need to mitigate the associated risk. In connection with this, some States in the region developed their national regulations to ensure safe operations of UAS. However, there are currently some States in the region are unable to develop their national regulations to ensure safe operations of UAS. Therefore, guidance material to be developed to assist states' CAA personnel in the implementation and oversight of UAS operations and to mitigate the risk of the MAC.

When available, the guidance material would serve as an example for consideration by MID States to create, add, or amend, future or existing national UAS guidance material by the respective CAA.

What we want to achieve:

MID Region States' civil aviation authorities to develop national regulations to ensure safe operations of UAS and to create growth while maintaining a high and uniform level of safety.

How we monitor improvement:

Increase of number of states established national regulations to ensure safe operations of UAS. The RASG-MID, members States, and partners would give feedback on the effectiveness of the activities.

How we want to achieve it: This SEI should be considered by States for inclusion in their NASPs

Actions:	A1-A2-A3
A1- UAS iPack deployment	
A2- Organize symposium	
A3- Conduct survey on States UAS regulatory framework	

References: ICAO SARPs and guidance documents and 2023-2025 GASP. This is related to 2023-2025 GASP Goal 1. "Achieve a Continuous Reduction of Operational Safety Risks"

Component 1 — State Safety Oversight (SSO) System

- GASP SEI-1: Consistent implementation of ICAO SARPs at the Regional level.
- GASP SEI-3: Regional safety enhancement initiatives to support consistent coordination of Regional Programmes in establishing adequate safety oversight capabilities.

Stakeholders: RASG-MID, MIDANPIRG, States, industry, international organizations

Action 1: UAS iPack Deployment

Owner: ICAO

Priority: High

Completion date: 2025

Status: New

Action 2: Organize symposium related to drones (UAS)

Owner: ICAO, ACAO. Supported by FAA

Priority: Medium

Completion date: 2023

Status: Ongoing

Action 3- Conduct survey on States UAS regulatory framework

Owner: ICAO and States

Priority: Medium

Completion date: 2023

Status: New

EXPECTED OUTPUT

Deliverable(s)	Timeline
Ensure the safe operations of UAS to mitigate the risk of MID Air Collision (MAC)	2025

7.2.1.5.4 G1-SEI-05A4: Expansion of ATS route Networks

Stakeholders: RASG-MID, MIDANPIRG, States, industry, international organizations

Action 1: Conduct gap analysis to identify current ATS route networks gaps

Owner: ICAO and States

Priority: Medium

Completion Date: 2025

Status: New

Action 2: Establishment of parallel unidirectional ATS routes (De-confliction)

Owner: ICAO and States

Priority: Medium

Completion Date: 2025

Status: New

EXPECTED OUTPUT

Deliverable(s)	Timeline
Mitigate contributing factors to MAC accidents and NMAC incidents	2025

Appendix A- SEIG TORs

SAFETY ENHANCEMENT INITIATIVE GROUP (SEIG)

TERMS OF REFERENCE

1. PURPOSE OF THE SEIG TO:

- 1.1 Support the RASG-MID in the development/update of the MID Regional Aviation Safety Plan (MID-RASP) and the monitoring of the implementation of Safety Enhancement Initiatives (SEIs) related to identified safety issues.
- 1.2 Assist in the development, implementation and review of SEIs to reduce aviation safety risks. These SEIs could be established based on the analysis of regional data, based on ICAO initiatives or the initiatives of other relevant organizations or based on the risks and issues identified through the USOAP audits process.
- 1.3 Recommend safety mitigations to the RASG-MID related to identified safety issues which would reduce aviation risks.

1.4 In order to meet its Terms of Reference, the SEIG shall:

- a. follow-up the updates of the Global Aviation Safety Plan (GASP) and support the development, update and implementation of the MID Regional Aviation Safety Plan (MID-RASP) at the regional level and provide feedback to the RASG-MID;
- b. identify and develop the SEIs, which are aligned with the regional priorities and targets, for implementation within the MID Region. The focus of these SEIs is to effectively and economically mitigate the safety risks identified by the ASRG;
- c. identify difficulties, challenges and deficiencies related to the implementation of each SEI and propose mitigation measures;
- d. identify assistance Programmes such as, but not limited to, workshops, seminars and capacity building activities to improve the level of implementation of the approved SEIs by the RASG-MID;
- e. share expertise and experience and provide recommended actions for each SEI, in a prioritized manner based on best practices;
- f. monitor the status of achieving related safety objectives and targets included in the MID Region Safety Strategy;
- g. identify areas of concern to aviation safety that may be unique to the region, and develop data and mitigations to address those concerns;
- h. work closely with States and stakeholders to ensure that SEIs and mitigation measures are implemented through a coordinated effort;
- i. propose input to the RASG-MID for the development of the RASG-MID Annual Work Programme; and

- j. Coordinate with relevant RASG-MID, MIDANPIRG and MID-RASFG subsidiary bodies issues with common interest.

2. COMPOSITION

The SEIG is composed of Members designated by the MID States and Partners.

3. ROLES AND RESPONSIBILITIES

- SEIG Chairpersons: – Coordinate SEIG activities and provide overall guidance and leadership;
- ICAO: Support; and
- Partners: collaborate in the development of materials as requested by the SEIG, and provide technical expertise and support, as required.

4. MEETINGS ARRANGEMENTS

- The Chairperson, in close co-operation with the Secretary, shall make all necessary arrangements for the most efficient working of the SEIG. The SEIG shall at all times conduct its activities in the most efficient manner possible with a minimum of formality and paper work (paperless meetings). Permanent contact shall be maintained between the Chairperson, Secretary and Members of the SEIG to advance the work. Best advantage should be taken of modern communications facilities, particularly video-conferencing (Virtual Meetings) and e-mails.
- Face-to-face meetings will be conducted when it is necessary to do so.

Appendix B- Identified safety issues as indicated in the 11th MID ASR

Potential Accident Outcome							
Safety Issues	CFIT	LOC-I	MAC	GCOL	RE/ARC	Injury Damage inflight	Injury Damage on Ground
Monitoring of flight paremeters and automation modes	X	X			X		
Adverse Convective weather	X	X			X	X	
Un-stabilized Approach		X			X		X
Flight planning and preparation	X	X	X	X	X		
Crew Resource Management	X	X	X	X	X		
Handling of technical failure	X	X		X	X		X
Handling and execution of GOA	X	X			X		
Loss of separation in flight/ and/or airspace/TCAS RA			X			X	
Experience, training and competence of Flight Crews	X	X	X		X		
Deconfliction between IFR and VFR traffic			X				
Inappropriate flight control inputs		X			X		
Fatigue	X	X					
Entry of aircraft performance data		X					
Contained engine Failure/Power Plant Malfunctions		X			X	X	
Birdstrike/Engine Bird ingestion		X			X		
Fire/Smoke-non impact		X				X	
Wake Vortex		X				X	
Deviation from pitch or roll attitude	X	X			X		
Security Risks with impact on Safety		X					
Tail/Cross wind/Winds hear		X			X		X

Potential Accident Outcome							
Safety Issues	CFIT	LOC-I	MAC	GCOL	RE/ARC	Injury Damage inflight	Injury Damage on Ground
Runway Incursion				X	X		X
Maintenance events	X	X				X	
Contaminated runway/Poor braking action					X		X
Clear Air Turbulence (CAT) and Mountain Waves		X				X	

Appendix C-MID Region-Safety Performance Measurement &Monitoring (SPMM)

Aspirational Goal: Zero Fatality by 2030

Goal 1: Achieve a Continuous Reduction of Operational Safety Risks

Safety Indicator	Safety Target	Timeline
Number of accidents per million departures	Regional average rate of accidents to be in line with the global average rate	2025
Number of fatal accidents per million departures	Regional average rate of fatal accidents to be in line with the global average rate	2025
Number of fatalities per million departures	Number of fatalities per billion passengers carried (fatality rate) to be in line with the global average rate	2025
Number of Runway Excursion accidents per million departures	Regional average rate of Runway Excursion accidents to be below the global average rate	2025
Number of Runway Incursion accidents per million departures	Regional average rate of Runway Incursion accidents to be below the global average rate	2025
Number of LOC-I related accidents per million departures	Regional average rate of LOC-I related accidents to be below the global rate	2025
Number of CFIT related accidents per million departures	Regional average rate of CFIT related accidents to be below the global rate	2025
Number of Mid Air Collision (accidents)	Regional average Mid Air Collision accident	2025

Goal 2: Strengthen States' Safety Oversight Capabilities

Safety Indicator	Safety Target	Timeline
USOAP-CMA Effective Implementation (EI) results: a. Regional average EI b. Number of audited States with an overall EI over 60% c. Regional average EI by area d. Regional average EI by CE e. Regional average EI of PPQs	a. Regional average EI to be above 80% : b. All MID audited States to be above 60% EI c. Regional average EI for each area to be above 70% d. Regional average EI for each CE to be above 70% e. Regional average EI PPQs above 75% :	a. 2023-2025 b. 2023-2025 c. 2023-2025 d. 2023-2025 e. 2023-2025

Goal 3: Implement effective State safety Programmes (SSPs)

Safety Indicator	Safety Target	Timeline
Regional Average SSP Foundation	85%	2023- 2025
Number of States having an SSP that is present*	At least 4 States	2023- 2025
Number of States that have developed and published a national aviation safety plan (NASP)	All States	2023- 2025
Number of States that require applicable service providers under their authority to implement an SMS	All States	2023- 2025

*: The term “present” is based on the maturity levels established in the ICAO SSP Implementation Assessment (SSPIA).

Goal 4: Increase Collaboration at the Regional Level

Safety Indicator	Safety Target	Timeline
Percentage of safety enhancement initiatives (SEIs)/Safety Actions completed	80%	2023-2025
Number of States seeking/receiving assistance, to strengthen their Safety Oversight capabilities through NCLB MID Strategy/Technical assistance	States with SSC as a first priority All States as a second priority having EI below 80%	2023-2025
Number of States seeking assistance to facilitate SSP & NASP implementation through NCLB MID Strategy/Technical assistance	All States	2023-2025
Number of States sharing safety information including operational safety risks and emerging issues to support the development of MID ASR	All States	2023-2025

Goal 5: Expand the use of Industry Programmes and safety information sharing networks

Safety Indicator	Safety Target	Timeline
Use of the IATA Operational Safety Audit (IOSA), to complement safety oversight activities.	a. Maintain at least 60% of eligible MID airlines to be certified IATA-IOSA at all times. b. All MID States with an EI of at least 60% use the IATA Operational Safety Audit (IOSA) to complement their safety oversight activities.	a. 2023-2025 b. 2023- 2025
Use of the IATA Safety Audit for Ground Operations (ISAGO) certification, as a percentage of all Ground Handling service providers	The IATA Ground Handling Manual (IGOM) endorsed as a reference for ground handling safety standards by all MID States. Pursue at least 25% increase in ISAGO registration	2023-2025
Coordinate the ACI Airport Excellence (APEX) in Safety Programme	At least 2 ACI APEX in Safety to be conducted for 2 Airports of the Region per year	2023-2025
Number of States that have established Safety data collection and processing system (SDCPS)	At least 12 States	2023-2025
Number of MID RASP developed in consultation with industry	MID-RASP 2023-2025	2023

Goal 6: Ensure Appropriate Infrastructure is available to Support Safe Operations

Safety Indicator	Safety Target	Timeline
Percentage of Certified International Aerodromes*	65%	2023-2025
Percentage of Runway Safety Team (RST) effectively implemented at International Aerodromes*	80%	2023-2025
Percentage of Global reporting Format (GRF) Plans implemented for International Aerodromes*	75%	2023-2025

*: International Aerodromes included in the MID ANP (Aerodromes Operations: AOP Table I-I)

Appendix D: Safety Actions- Consolidated List of SEIs with their respective Actions for follow up- Draft

SEI Code	SEI Name	Actions	Owner(s)	Status/Progress	Completion Date
Regional Operational Safety Risks					
Goal 1: Achieve a Continuous Reduction in Operational Risks					
G1-SEI-01:	Aircraft Upset in Flight (LOC-I)	A1- Guidance material on flight crew proficiency	IATA and Aircraft manufacturers/industry	To be supported by Airbus	2025
		A2- Advisory Circular: Mode Awareness and Energy State Management Aspects of Flight Deck Automation	IATA and Aircraft manufacturers/industry.	To be supported by Airbus	2025
		A3- Conduct Upset Recovery capacity building activities	UPRT Workshop. Airbus, ICAO, Kuwait		2025
		A4- Develop guidance material on the air cargo safety	Oman		2025
G1-SEI-02:	Runway Safety- Runway Excursion	A1- Support States to implement the Global Reporting Format (GRF) Methodology through capacity building activities.	ICAO and ACI		2025
		A2- MID Region Action Plan/Milestones on the Global Reporting Format (GRF) Implementation.	ICAO		2025

SEI Code	SEI Name	Actions	Owner(s)	Status/Progress	Completion Date
G1-SEI-03:	Runway Safety- Runway Incursion	A1- Conduct Capacity Building Activities on the Advanced Surface Movement Guidance and Control System (A-SMGCS) Implementation	ICAO	To be supported by Euro-Control, FAA	2023
G1-SEI-04A1:	Controlled Flight into Terrain (CFIT)	A1- Advisory Circular: Instrument Approach Procedures Using Continuous Descent Final Approach Techniques.	IATA and Aircraft manufacturers		2025
		A2- Guidance for designing RNP Approach	ICAO and MID FPP		2025
		A3- Advisory Circular: Crew Resource Management Training Programme (CRM)	IATA and Aircraft manufacturers		2025
G1-SEI-04A2	5G Operations on Radar Altimeter	A1- Develop a guidance material on safeguarding measures to protect Radio Altimeter from potential harmful interference from 5G Operation	Radio Altimeter Action Group (RADALT AG)	To be supported by Boeing	2025
		A2- Conduct a Webinar addressing the matter to raise awareness and promote the guidance material developed by the RADALT AG	ICAO and RADALT AG	To be supported by Airbus & Boeing	2025
G1-SEI-05B1:	MAC- Loss of Separation	A1- Conduct workshop to implement Civil-Military cooperation	ICAO, States, and International Organizations		2025
		A2- Conduct seminar on raising awareness among stakeholders related to the potential risk of MAC over high seas	ICAO, States, and international organizations		2025
G1-SEI-05B2:	GNSS Interference	A1: Raise awareness on the potential impact of GNSS interference on the aviation during the Civil-Mil Workshop	ICAO and IATA		2025

SEI Code	SEI Name	Actions	Owner(s)	Status/Progress	Completion Date
		A2- Urge States to follow the reporting procedure agreed by MIDANPIRG Conclusion 19/4 when needed	ICAO		2025
G1-SEI-05B3:	Ensure the Safe Operations of UAS (Drones)	A1- UAS iPack deployment	ICAO and States		2025
		A2- Organize symposium on Drones related subjects	ICAO and ACAO	Supported FAA and Boeing	2023
		A3- Conduct survey on States UAS regulatory framework	ICAO and States		2025
G1-SEI-05B4:	Expansion of ATS route Networks	A1- Conduct gap analysis to identify current ATS route networks gaps	ICAO and States		2025
		A2- Establishment of parallel unidirectional ATS routes (De-confliction)	ICAO and States		2025
Organizational Challenges/issues					
Goal 2: Strengthen States’ Safety Oversight Capabilities					
G2-SEI-01:	Strengthening of States' Safety Oversight Capabilities	A1- Conduct Capacity Building Activities to promote effective implementation of SARPs	ICAO, States, International Organizations, and Industry	“Inspectors training” to be Supported by Airbus.	2025
		A2- Conduct technical assistance and NCLB missions to States , with focus on states with EI<80% as well as ANS, AIG, AGA, and OPS areas	ICAO and States		2025
		A3- Develop and implement a specific NCLB plan of actions.	ICAO, States, International Organizations, and Industry		2025

SEI Code	SEI Name	Actions	Owner(s)	Status/Progress	Completion Date
		A4 - Conduct a Capacity Building Activity for Aerodrome Inspectors (Training Course on Aerodrome Inspection) (Action addressed under G6-SEI-01 A5)	States (Qatar) and ICAO		2025
		A5- Develop guidance material to assist MID Region States in the issuance of exemptions related to temporary deviations from standards	Qatar	supported by Iran, Sudan, UAE, ACAO, and IATA	2025
		A6- Develop guidance material to support States for the conduct of remote surveillance	Qatar	supported by Iran, Jordan, Saudi Arabia, Sudan, UAE, and ACAO	2025
		A7- Develop guidance material on the enhancement of understanding the concept of judicial enforcement for aviation inspectors	Qatar	supported by Saudi Arabia and UAE	2025
G2-SEI-03:	Sharing of Safety Recommendations related to Accidents and Serious Incidents	A1- Establishing a Platform for Sharing Safety Recommendations for MENA ARCM Member States	ICAO, ACAO, and MENA ARCM Member States	On-hold	2025
G2-SEI-04:	Enhance State Oversight on Dangerous Goods	A1- Dangerous Goods (DG) capacity building activities including Lithium batteries fire/smoke risk in cabin	ICAO, States, International Organizations, And Industry		2025
		A2- Develop guidance material on carriage and transport of Lithium batteries	IATA, States, International Organizations, And Industry		2025
G2-SEI-05:	Human factors and Competence of Personnel	A1- Advisory Circular: Crew Resource Management Training Programme (CRM). (Action addressed under G1-SEI-04: CFIT).	IATA and Industry		2025

SEI Code	SEI Name	Actions	Owner(s)	Status/Progress	Completion Date
		A2- Organize Crew Resource Management Capacity building activities	ICAO & Jordan, States, International Organizations, and Industry	CBTA and EBT to be supported by Airbus and FAA	2025
		A3- Organize Team Resource Management Capacity building activities	ICAO & Jordan States, International Organizations, and Industry	FAA	2025
		A4- Conduct Fatigue Risk Management and Mental Health Best Practices Capacity building activities	ICAO & Jordan States, International Organizations, and Industry	To be supported by Airbus	20225
G2-SEI-06:	Impact of security on safety	A1- Organize seminar/Symposium/Workshop to exchange experiences and good practices on assessing the risks and sharing of information related to the overflying of conflict zones in coordination with RASFG-MID and MIDANPIRG.	ICAO		2025
		A2- Risk management on conflict zone workshop	ICAO/ACAO		2023
G2-SEI-07:	Managing cybersecurity risks	A1- Develop a Regional Action Plan to bridge the gap between ICAO Cyber Security Action plan and the implementation level of Cyber Resilience in the MID Region	ANS Cyber SeC Action Group		2025
		A2- Conduct activities on Cyber Security and Resilience- (Jointly ANS and AVSEC)	ICAO	To be supported by Boeing	2025

SEI Code	SEI Name	Actions	Owner(s)	Status/Progress	Completion Date
		A3- Develop a MID Region Cybersecurity Action Plan	Cybersecurity Security Ad-hoc Group		2025
G2-SEI-08:	Impact of COVID-19 pandemic- Safe return to operations	A1- Continued support to the aviation industry through MID-RPTF meetings/Activities, as needed	ICAO, States, International Organizations, and Industry		2025
		A2- Sharing of guidance material/best practices	ICAO, States, International Organizations, and Industry	To be support by Airbus	2025
Goal 3: Implementation of Effective States Safety Programme (SSP)					
G3-SEI-01:	Implement an effective Safety Management	A1- Conduct ICAO SSP/SMS Capacity building activities	SSP workshops for States. SMS & Flight Data analysis workshop for airlines. Airbus, ACAO and ICAO. 2023		2025
		A2- Conduct Technical Assistance missions by SMIT	ICAO and States		2025
G3-SEI-02:	NASP Development & Implementation	A1- Conduct NASPs workshops & technical assistance missions	ICAO		2025
		A2- NASP iPacks deployment	ICAO		2025
Goal 4: Increase Collaboration at the Regional Level					
G4-SEI-01:	Development and Implementation of	A1- Development and Implementation of MID-RASP 2023-2025 Edition	ICAO & SEIG		2023

	MID-RASP				
G4-SEI-02:	Enhance collaboration between States, international organizations, and industry	A1- Develop and agree on joint work activities through MID-RCM meetings	ICAO, States, Regional Groups, International Organizations, and Industry		2025
		A2- Support the establishment of MENA RSOO and its activities	ICAO and States		2025

Goal 5: Expand the Use of Industry Programmes and Safety Information Sharing Networks

G5-SEI-01:	Promote the Use of industry Programmes	A1- Encourage IATA's IOSA and ISAGO registrations through safety promotion	IATA		2025
		A2- Encourage the implementation of ACI Airport Excellence (APEX) in Safety Programme	ICAO and ACI		2025

Goal 6: Ensure the Appropriate Infrastructure is available to Support Safe Operations

G6-SEI-01:	Certification of International Aerodromes	A1- Support States on the implementation of the ICAO Annex 14 requirements to achieve compliance with regards to Aerodrome Design and Operations, through capacity building activities.	ICAO and ACI		2025
		A2- Enhance capacity building for States CAAs and Airport operators related to Aerodromes Certification through capacity building activities.	ICAO and ACI		2025
		A3 - Deployment of iPack on Aerodrome Re-Start	ICAO and States		2025
		A4 - Support States in implementing aerodrome oversight/inspection mechanism through capacity building activities on Aerodrome Oversight	ICAO	Supported by FAA	2025
		A5 – Conduct a Capacity Building Activity for Aerodrome Inspectors	States (Qatar) and ICAO		2025

		(Training Course on Aerodrome Inspection)			
		A6 – Conduct a Wildlife Hazard Management Control capacity building Activities	ICAO, ACAO, WBA	Supported by International Organizations	2025
G6-SEI-02:	Establish Runway Safety Team (RST) at International Aerodromes	A1- Conduct Runway Safety Go-Team (RST) assistance missions	ICAO	Supported RSP (Runway Safety Programme Partners)	2025
		A2: Support States to implement the Global Reporting Format Methodology through capacity building activities: (Action addressed under G1-SEI-02: Runway Excursion).	ICAO and ACI		2025

Appendix E:

SEIs identified in MID-RASP may be considered by States for inclusion in their NASPs, as appropriate

SEI Code	SEI name
Organizational Challenges	
Goal 2: Strengthen States' Safety Oversight Capabilities	
G2-SEI-01:	Strengthening of States' Safety Oversight Capabilities
G2-SEI-04:	Enhance State Oversight on Dangerous Goods
G2-SEI-05:	Human factors and Competence of Personnel
G2-SEI-06:	Impact of security on safety
G2-SEI-07:	Managing cybersecurity risks
G2-SEI-08:	Impact of COVID-19 pandemic- Safe return to operations
Goal 3: Implementation of Effective States Safety Programme (SSP)	
G3-SEI-01:	Implement safety management
G3-SEI-02:	NASP Development & Implementation
Goal 6: Ensure the Appropriate Infrastructure is available to Support Safe Operations	
G6-SEI-01:	Certification of International Aerodromes
G6-SEI-02:	Establish Runway Safety Team (RST) at International Aerodromes
Regional Operational Safety Risks	
Goal 1: Achieve a continuous reduction in Operational Risks	
G1-SEI-01:	Aircraft upset in flight (LOC-I)
G1-SEI-02:	Runway Excursion (RE)
G1-SEI-03:	Runway Incursion (RI)
G1-SEI-4A1:	Controlled Flight Into Terrain (CFIT)
G1-SEI-04A2:	5G operations on Radar Altimeter
G1-SEI-05A1:	MAC- Loss of separation/TCAS RA
G1-SEI-05A2:	GNSS Interference
G1-SEI-05A3:	Ensure the Safe Operations of UAS (drones)

Appendix F: Definitions

Accident Investigation Authority. The authority designated by a State as responsible for aircraft accident and incident investigations within the context of Annex 13.

Audit Area. One of eight audit areas pertaining to the Universal Safety Oversight Audit Programme (USOAP), i.e. primary aviation legislation and civil aviation regulations (LEG), civil aviation organization (ORG); personnel licensing and training (PEL); aircraft operations (OPS); airworthiness of aircraft (AIR); aircraft accident and incident investigation (AIG); air navigation services (ANS); and aerodromes and ground aids (AGA).

Contributing Factors. Actions, omissions, events, conditions, or a combination thereof, which, if eliminated, avoided or absent, would have reduced the probability of the accident or incident occurring, or mitigated the severity of the consequences of the accident or incident. the identification of contributing factors does not imply the assignment of fault or the determination of administrative, civil or criminal liability.

Critical Elements (CEs). The critical elements of a safety oversight system encompass the whole spectrum of civil aviation activities. They are the building blocks upon which an effective safety oversight system is based. The level of effective implementation of the CEs is an indication of a State's capability for safety oversight.

Effective Implementation (EI). A measure of the State's safety oversight capability, calculated for each critical element, each audit area or as an overall measure. The EI is expressed as a percentage.

Operator. The person, organization or enterprise engaged in or offering to engage in an aircraft operation.

Safety. The state in which risks associated with aviation activities, related to, or in direct support of the operation of aircraft, are reduced and controlled to an acceptable level.

Safety Audit. A USOAP CMA audit that a State requests and pays for (on a cost recovery basis). The State determines the scope and date of a safety audit. Also see definition of audit.

Safety Data. A defined set of facts or set of safety values collected from various aviation related sources, which is used to maintain or improve safety.

Note: such safety data is collected from proactive or reactive safety-related activities, including but not limited to:

- a. accident or incident investigations;
- b. safety reporting;
- c. continuing airworthiness reporting;
- d. operational performance monitoring;
- e. inspections, audits, surveys; or
- f. safety studies and reviews.

Safety Enhancement: initiative (SEI). One or more actions to eliminate or mitigate risks associated with contributing factors to a safety occurrence or to address an identified safety deficiency. There are two main types of SEIs to address safety risks and issues at the Regional level.

Safety Information. Safety data processed, organized or analyzed in a given context so as to make it useful for safety management purposes.

Safety Management System (SMS). A systematic approach to managing safety, including the necessary organizational structures, accountability, responsibilities, policies and procedures.

Safety Oversight. A function performed by a State to ensure that individuals and organizations performing an aviation activity comply with safety-related national laws and regulations.

Safety Performance. A State or a service provider's safety achievement as defined by its safety performance targets and safety performance indicators.

Safety Performance Indicator. A data-based parameter used for monitoring and assessing safety performance.

Safety Performance Target. The State or service provider's planned or intended target for a safety performance indicator over a given period that aligns with the safety objectives.

Safety Risk. The predicted probability and severity of the consequences or outcomes of a hazard.

Significant Safety Concern (SSC). Occurs when the State allows the holder of an authorization or approval to exercise the privileges attached to it, although the minimum requirements established by the State and by the Standards set forth in the Annexes to the Convention are not met, resulting in an immediate safety risk to International Civil Aviation.

State Safety Programme (SSP). An integrated set of regulations and activities aimed at improving safety.

Appendix G: Abbreviations and Acronyms

AIIA:	Accident and Incident Investigation Authority
ACI:	Airports Council International
ADRM:	Aerodrome
AGA:	Aerodrome and Ground Aids
AIG:	Aircraft Accident and Incident Investigation
ALAR:	Approach and Landing Reduction
ANS:	Air Navigation Services
ANSP:	Air Navigation Service Provider
APV:	Approaches with Vertical Guidance
ARC:	Abnormal Runway Contact
ASBU:	Aviation System Block Upgrade
ASR:	Annual Safety Report
ATM:	Air Traffic Management
ATS:	Air Traffic Services
BIRD:	Bird Strike
CAA:	Civil Aviation Authority
CASI:	Civil Aviation Safety Inspectors
CAST:	Commercial Aviation Safety Team
CE:	Critical Element
CFIT:	Controlled Flight into Terrain
CICTT:	CAST/ICAO Common Taxonomy Team
CMA:	Continuous Monitoring Approach
CRM:	Crew Resource Management
CAST:	US Commercial Aviation Safety Team
DGCA:	Conference of Directors General of Civil Aviation
EI:	Effective Implementation
FDAP:	Flight Data Analysis Programme
FIR:	Flight Information Region
F-NI:	Fire/ Smoke (Non-Impact)
GADSS:	Global Aeronautical Distress and Safety System
GANP:	Global Air Navigation Plan
GASeP:	Global Aviation Security Plan
GASOS:	Global Aviation Safety Oversight System
GASP:	Global Aviation Safety Plan
GASP-SG:	Global Aviation Safety Plan Study Group
GEN:	General Aspects
GPWS:	Ground Proximity Warning System
G- HRC:	Global-High Risk Categories of Occurrences
IATA:	International Air Transport Association
ICAO:	International Civil Aviation Organization
IFALPA:	International Federation of Airline Pilots' Associations
IOSA:	IATA Operational Safety Audit
ISAGO:	IATA Safety Audit for Ground Operations
iSTARS:	Integrated Safety Trend Analysis and Reporting System
LOC-I:	Loss of Control In-flight
MAC:	AIRPROX/ TCAS alert/ loss of separation/ near miss collisions/ mid-air collisions
MTOW:	Maximum Take-Off Weight

NASP:	National Aviation Safety Plan
NCLB:	No Country Left Behind
NDP:	National Development Plan
OAG:	Official Airline Guide
OPS:	Flight Operations (USOAP Audit Area)
ORG:	Civil Aviation Organization (USOAP Audit Area)
PDCA:	Plan-Do-Check-Act methodology
RAMP:	Ground Handling
RASG:	Regional Aviation Safety Group
RASP:	Regional Aviation Safety Plan
RE:	Runway Excursion (departure or landing)
RI:	Runway Incursion
RS:	Runway Safety
RSOO:	Regional Safety Oversight Organization
RST:	Runway Safety Team
RTC:	ICAO Regional Training Centre of Excellence
SAFE:	ICAO Safety Fund
SARPs:	Standards and Recommended Practices
SCF-NP:	System/Component Failure or Malfunction – Non-power plant
SCF-PP:	System/Component Failure or Malfunction - Power plant
SDCPS:	Safety Data Collection and Processing System
SEI:	Safety Enhancement Initiatives
SISG:	ICAO's Safety Indicator Study Group
SMS:	Safety Management Systems
SPI:	Safety Performance Indicator
SSC:	Significant Safety Concern
SSO:	State Safety Oversight
SSP:	State Safety Programme
SRP:	Safety Reporting and Programme
TCAS:	Traffic Collision and Avoidance System
TOR:	Terms of Reference
UAS:	Unmanned Aircraft Systems
UNK:	Unknown or Undetermined
UPRT:	Upset Prevention and Recovery Training
USOAP:	Universal Safety Oversight Audit Programme
USOS:	Undershoot/ Overshoot

-END-

CREDITS

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Consolidated List of SEIs with their respective Safety Actions

SEI Code	SEI Name	Actions	Owner(s)	Status/Progress	Completion Date
Regional Operational Safety Risks					
Goal 1: Achieve a Continuous Reduction in Operational Risks					
G1-SEI-01:	Aircraft Upset in Flight (LOC-I)	A1- Guidance material on flight crew proficiency	IATA to be supported by Airbus	Planned 2025	2023- 2025
		A2- Advisory Circular: Mode Awareness and Energy State Management Aspects of Flight Deck Automation	IATA to be supported by Airbus	Planned 2025	2023- 2025
		A3- Conduct Upset Recovery capacity building activities	UPRT Workshop. Airbus, ICAO, Kuwait	Regional ICAO UPRT Workshop (jointly involving Airbus, ICAO, Kuwait) conducted in Kuwait 7-11 May 2023. Completed for 2023/Continuous for 2024	2023-2025
		A4- Develop guidance material on the air cargo safety	Oman	Planned for 2024	2023-2025
G1-SEI-02:	Runway Safety- Runway Excursion	A1- Support States to implement the Global Reporting Format (GRF) Methodology through capacity building activities.	ICAO and ACI	Completed for 2023/ continuous for 2024/2025	2023-2025
		A2- MID Region Action Plan/Milestones on the Global Reporting Format (GRF) Implementation.	ICAO	Completed for 2023/ continuous for 2024/2025	2023-2025
G1-SEI-03:	Runway Safety- Runway Incursion	A1- Conduct Capacity Building Activities on the Advanced Surface Movement Guidance and Control System (A-SMGCS) Implementation	ICAO To be supported by Euro-Control, FAA	Completed Conducted February 2023	2023-2025

SEI Code	SEI Name	Actions	Owner(s)	Status/Progress	Completion Date
G1-SEI-04A1:	Controlled Flight into Terrain (CFIT)	A1- Advisory Circular: Instrument Approach Procedures Using Continuous Descent Final Approach Techniques.	IATA supported by aircraft manufacturers	Planned 2025	2023-2025
		A2- Guidance for designing RNP Approach	ICAO and MID FPP	Planned for 2024	2023-2025
		A3- Advisory Circular: Crew Resource Management Training Programme (CRM)	IATA supported by Aircraft manufacturers		2023-2025
		A4- Awareness Material on the vulnerabilities of BARO-VNAV approaches and mitigation actions	ICAO	Planned for 2024	2023-2025
G1-SEI-04A2	5G Operations on Radar Altimeter	A1- Develop a guidance material on safeguarding measures to protect Radio Altimeter from potential harmful interference from 5G Operation	Radio Altimeter Action Group (RADALT AG) To be supported by Boeing	Completed Publication of the guidance material: MID DOC 15 edition 1.0 in May 2023.	2023-2025
		A2- Conduct a Webinar addressing the matter to raise awareness and promote the guidance material developed by the RADALT AG	ICAO and RADALT AG To be supported by Airbus & Boeing	Completed The webinar has been conducted.	2023-2025
G1-SEI-05B1:	MAC- Loss of Separation	A1- Conduct workshop to implement Civil-Military cooperation.	ICAO supported by States, and International Organizations	At national level, workshop has been conducted in Iran in 2022 and follow up meeting was conducted in Aug 2023. In this respect the action plan has been developed and agreed. Completed In addition, this issue has been raised by Iran during MIDANPIRG 20 meeting. As agreed in the side meeting with participation of Bahrain, Iran, Oman, Qatar, Saudi Arabia and UAE, states are going to report safety issues regarding the operation of due regard specifically	2023-2025

SEI Code	SEI Name	Actions	Owner(s)	Status/Progress	Completion Date
				over the high seas to ICAO MID for further study and actions. At regional level, the plan was postponed to 2024. The ATM SG developed a draft reporting form, will be presented to the MIDANPIRG/21 for endorsement	
		A2- Conduct seminar on raising awareness among stakeholders related to the potential risk of MAC over high seas	ICAO supported by States, and international organizations		2023-2025
G1-SEI-05B2:	GNSS Interference	A1: Raise awareness on the potential impact of GNSS interference on the aviation during the Civil-Mil Workshop	ICAO and IATA	The CMC Workshop is planned during 2024.	2023-2025
		A2- Urge States to follow the reporting procedure agreed by MIDANPIRG Conclusion 19/4 when needed	ICAO	SL has been issued. Completed	2023-2025
		A3- Capacity Building on GNSS operations and GNSS RFI	ICAO and ACAO	Regional GNSS Workshop is planned for 2024	2023-2025
G1-SEI-05B3:	Ensure the Safe Operations of UAS (Drones)	A1- UAS iPack deployment	ICAO and States		2023-2025
		A2- Organize symposium on Drones related subjects	ICAO and ACAO supported by FAA and Boeing	ACAO organized Drones symposium in Morocco during the period 4-5 October 2023. Completed/Continuous for 2024.	2023-2025
		A3- Conduct survey on States UAS regulatory framework	ICAO and States	To be circulated during 2024	2023-2025
		A4- Develop an AAM study report	UAE	Planned for 2024	2023-2025

SEI Code	SEI Name	Actions	Owner(s)	Status/Progress	Completion Date
G1-SEI-05B4:	Expansion of ATS route Networks	A1- Conduct gap analysis to identify current ATS route networks gaps	ICAO and States	Required data and information have been gathered and dashboard was deployed. Completed.	2023-2025
		A2- Establishment of parallel unidirectional ATS routes (De-confliction)	ICAO and States	Establishment of the parallel airway at interface of Kuwait and Iraq is on process. In addition Iran requested to establish new parallel ATS route between Iran and Iraq to accommodate regional traffic in the most safe and efficient manner. Completed. In addition, During last MIDANPIRG proposed to enhance the structure of the ATS route at interface of MID and APAC regions by establishment of required parallel airways. This WP was supported by UAE and Saudi Arabia and endorsed by MIDANPIRG 20. Ongoing.	2023-2025
Organizational Challenges/issues					
Goal 2: Strengthen States’ Safety Oversight Capabilities					
G2-SEI-01:	Strengthening of States' Safety Oversight Capabilities	A1- Conduct Capacity Building Activities to promote effective implementation of SARPs	ICAO, States, International Organizations, and Industry.	USOAP workshops conducted. ACAO and Singapore CAA: an AOC certification & Flight Inspectors course conducted in Amman the 29 -2 Jun 2023. Completed/continuous for 2024. ICAO & GCAA Symposium: “The Future of Aviation safety and Aircraft Accident Investigation” in Dubai, during 3 to 4 May 2023.	2023-2025

SEI Code	SEI Name	Actions	Owner(s)	Status/Progress	Completion Date
				“The Prevention of Aircraft Accidents and Incidents through the Collection & Analysis of Safety Data & Information” Workshop held in Rabat, Morocco from 11 to 12 July 2023	
		A2- Conduct technical assistance and NCLB missions to States , with focus on states with EI<80% as well as ANS, AIG, AGA, and OPS areas	ICAO and States	TAs conducted 2023 (Kuwait, Lebanon, Oman, Sudan, Libya). ANS Technical assistance to Kuwait, Sudan, Jordan and Lebanon conducted. Completed.	2023-2025
		A3- Develop and implement a specific NCLB plan of actions.	ICAO, States, International Organizations, and Industry		2023-2025
		A4 - Conduct a Capacity Building Activity for Aerodrome Inspectors (Training Course on Aerodrome Inspection) (Action addressed under G6-SEI-01 A5)	States (Qatar) and ICAO	Conducted February 2023. Completed.	2023-2025
		A5- Develop guidance material to assist MID Region States in the issuance of exemptions related to temporary deviations from standards	Qatar supported by Iran, Sudan, UAE, ACAO, and IATA	Planned for 2024	2023-2025
		A6- Develop guidance material to support States for the conduct of remote surveillance	Qatar supported by Iran, Jordan, Saudi Arabia, Sudan, UAE, and ACAO	Planned for 2024	2023-2025
		A7- Develop guidance material on the enhancement of understanding the	Qatar supported by Saudi Arabia and UAE	Planned for 2024	2023-2025

SEI Code	SEI Name	Actions	Owner(s)	Status/Progress	Completion Date
		concept of judicial enforcement for aviation inspectors			
G2-SEI-03:	Establishment of MENA ARCM Database	A1- Establishing a Platform for Sharing data for MENA ARCM Member States	ICAO, ACAO, and MENA ARCM Member States	ACAO has established a share folder as an initial step for sharing information. Online platform establishment is on going	2023-2025
G2-SEI-04:	Enhance State Oversight on Dangerous Goods	A1- Dangerous Goods (DG) capacity building activities including Lithium batteries fire/smoke risk in cabin	ICAO, States, International Organizations, IATA, And Industry		2023-2025
		A2- Develop guidance material on carriage and transport of Lithium batteries	IATA supported by States, International Organizations, And Industry	Guidance material to be endorsed by RASG-MID/11	2023-2025
G2-SEI-05:	Human factors and Competence of Personnel	A1- Advisory Circular: Crew Resource Management Training Programme (CRM). (Action addressed under G1-SEI-04: CFIT).	IATA		2023-2025
		A2- Organize Crew Resource Management Capacity building activities	ACAO, ICAO & Airbus,	Planned for 2024	2023-2025
		A3- Organize Team Resource Management Capacity building activities	ACAO, ICAO & Airbus	Planned for 2024	2023-2025
		A4- Conduct Fatigue Risk Management and Mental Health Best Practices Capacity building activities	ACAO, ICAO & Airbus	Planned for 2024	2023-2025
		A5. Data analysis and Artificial intelligence	UAE	Planned for 2025	

SEI Code	SEI Name	Actions	Owner(s)	Status/Progress	Completion Date
G2-SEI-06:	Impact of security on safety	A1- Organize seminar/Symposium/Workshop to exchange experiences and good practices on assessing the risks and sharing of information related to the overflying of conflict zones in coordination with RASFG-MID and MIDANPIRG.	ICAO		2023-2025
		A2- Risk management on conflict zone workshop	ICAO/ACAO	Planned for 2024	2023-2025
G2-SEI-07:	Managing cybersecurity risks	A1- Develop a Regional Action Plan to bridge the gap between ICAO Cyber Security Action plan and the implementation level of Cyber Resilience in the MID Region	ANS Cyber SeC Action Group	Completed.	2023-2025
		A2- Conduct activities on Cyber Security and Resilience- (Jointly ANS and AVSEC)	ICAO supported by Boeing	Completed conducted Nov 2023	2023-2025
		A3- Develop a MID Region Cybersecurity Action Plan	Cybersecurity Security Ad-hoc Group	Completed	2023-2025
G2-SEI-08:	Impact of COVID-19 pandemic- Safe return to operations	A1- Continued support to the aviation industry through MID-RPTF meetings/Activities, as needed	ICAO, States, International Organizations, and Industry	Completed Aviation medicine workshop conducted Feb 2023	2023-2025
		A2- Sharing of guidance material/best practices	ICAO, States, International Organizations, and Industry	Completed.	2023-2025

Goal 3: Implementation of Effective States Safety Programme (SSP)

G3-SEI-01:	Implement an effective Safety Management	A1- Conduct ICAO SSP/SMS Capacity building activities	SSP workshops for States. 2023 SMS & Flight Data analysis workshop for airlines. ACAO, Airbus and ICAO.	SSP training course and SSP workshop conducted. (Kuwait & Oman) 2023 SRM Workshop conducted 2024. SMS & Flight Data analysis workshop for airlines Conducted Nov 2023. Completed/Continuous for 2024.	2023-2025
		A2- Conduct Technical Assistance missions by SMIT	ICAO and States		2023-2025
G3-SEI-02:	NASP Development & Implementation	A1- Conduct NASPs workshops & technical assistance missions	ICAO. 2023	Workshop conducted in Kuwait and Qatar 2023. Completed/Continuous for 2024	2023-2025
		A2- NASP iPacks deployment	ICAO	If requested by states	2023-2025

Goal 4: Increase Collaboration at the Regional Level

G4-SEI-01:	Development and Implementation of MID-RASP	A1- Development and Implementation of MID-RASP 2023-2025 Edition	SEIG	Published May 2023. Completed	2023-2025
G4-SEI-02:	Enhance collaboration between States, international organizations, and industry	A1- Develop and agree on joint work activities through MID-RCM meetings	ICAO, States, Regional Groups, International Organizations, and Industry	Completed Conducted Oct 2023	2023-2025
		A2- Support the establishment of MENA RSOO and its activities	ICAO and States	States Signed the RSOO MoU on Dec 2023 and RSOO started its operations. Completed.	2023-2025

Goal 5: Expand the Use of Industry Programmes and Safety Information Sharing Networks

G5-SEI-01:	Promote the Use of industry Programmes	A1- Encourage IATA's IOSA and ISAGO registrations through safety promotion	IATA	Completed/ Continuous action for 2024/2025	2023-2025
		A2- Encourage the implementation of ACI Airport Excellence (APEX) in Safety Programme	ICAO and ACI	Completed/ Continuous action for 2024/2025	2023-2025

Goal 6: Ensure the Appropriate Infrastructure is available to Support Safe Operations

G6-SEI-01:	Certification of International Aerodromes	A1- Support States on the implementation of the ICAO Annex 14 requirements to achieve compliance with regards to Aerodrome Design and Operations, through capacity building activities.	ICAO and ACI	Planned activity for 2025	2023-2025
		A2- Enhance capacity building for States CAAs and Airport operators related to Aerodromes Certification through capacity building activities.	ICAO and ACI	Planned activity for 2025	2023-2025
		A3 - Deployment of iPack on Aerodrome Re-Start	ICAO and States		2023-2025
		A4 - Support States in implementing aerodrome oversight/inspection mechanism through capacity building activities on Aerodrome Oversight	ICAO Supported by FAA	Planned activity for 2024/2025	2023-2025
		A5 – Conduct a Capacity Building Activity for Aerodrome Inspectors (Training Course on Aerodrome Inspection)	States (Qatar) and ICAO	Conducted February 2023. Completed.	2023-2025

		A6 – Conduct a Wildlife Hazard Management Control capacity building Activities	ICAO, ACAO, WBA	Regional Symposium planned for 2024	2023-2025
G6-SEI-02:	Establish Runway Safety Team (RST) at International Aerodromes	A1- Conduct Runway Safety Go-Team (RST) assistance missions	ICAO. Supported RSP (Runway Safety Programme Partners)	Planned for 2024	2023-2025
		A2: Support States to implement the Global Reporting Format Methodology through capacity building activities: (Action addressed under G1-SEI-02: Runway Excursion).	ICAO and ACI	Completed for 2023/ continuous for 2024/2025	2023-2025



Lithium Battery Risk Assessment Guidance for Operators – 3rd Edition

Introduction

This document is based on the International Civil Aviation Organization (ICAO) Annex 6 – *Operation of Aircraft, Part I – International Commercial Air Transport – Aeroplanes* and the associated *Guidance for Safe Operations Involving Aeroplane Cargo Compartments* Doc (10102), the ICAO *Technical Instructions for the Safe Transport of Dangerous Goods by Air* (Technical Instructions) (Doc 9284) and the 61st Edition of the IATA Dangerous Goods Regulations (DGR). It is designed to outline potential strategies operators may wish to consider for addressing and mitigating the risks associated with the transport of lithium batteries, in cargo and mail as well as in passenger and crew baggage.

Following the published position by the aircraft manufacturers in 2015 that the original equipment manufacturer's fire suppression systems in aircraft cargo compartments were not designed to contain the hazards associated with the carriage of dangerous goods, including lithium batteries, various actions have been taken to mitigate the risk through a multi-layer approach, such as forbidding the carriage of lithium ion batteries (UN 3480) as cargo on passenger aircraft, limiting the state of charge of lithium ion batteries to not exceeding 30% of their rated capacity for air transport, establishing the SAE Aerospace G-27 Committee to develop a performance-based standard for lithium battery packaging and from recommending to mandating operators to conduct safety risk assessments for the transport of items cargo compartments.

The strategies outlined in this guidance document are primarily directed at an operator's internal processes and procedures, although there are strategies for engaging with other entities in the supply chain, such as manufacturers of lithium batteries, shippers, freight forwarders and the travelling public.

This guidance document is divided into cargo operations, focussing on cargo and mail transported in aircraft cargo compartments, and passenger operations, paying particular attention to both carry-on and checked baggage that are carried by passengers and crew.

Background

Lithium batteries power many portable electronic devices (PEDs) as well as heavy duty machinery and vehicles; they have become the battery of choice due to their high energy density, which allows them to operate for a long duration, and the availability of various types with different chemistries makes them suitable for a wide range of electronic products. These batteries and the products that are operated by them are also very often transported by air because of the tight timeframe to assemble the products and consequentially to launch the products in a timely manner, the short product shelf-life and sometimes need to be delivered at short notice in the case of life-saving medical devices.

There are well-established and stringent international requirements applicable to the manufacture, testing and transport of lithium batteries, and the legitimate lithium battery industry has an outstanding safety record since these batteries started to be transported by air in the mid-1970s; however, they can possibly go into a thermal runaway if the design type has not been subjected to mandatory safety tests or they are not handled properly and subsequently lead to deformation. In addition, with the reported occurrences of undeclared dangerous goods around the world, consideration must always be given to the potential of undeclared dangerous goods, which may also present a significant risk.

Overview of Lithium Batteries

A battery is defined as two or more cells which are electrically connected together and fitted with devices necessary for use, for example, a case, terminals, marking and protective devices. The term "lithium battery" refers to a family of different chemistries, comprising many types of cathodes and electrolytes. Units that are commonly referred to as "battery packs", "modules", "battery assemblies", "power banks", or "power generators" having the primary function of providing a source of power to another piece of equipment are for the purposes of this guidance document and the IATA Dangerous Goods Regulations, to be classified as batteries.

Lithium batteries are separated into two main categories, lithium metal batteries and lithium-ion batteries:

Lithium metal batteries are generally primary (non-rechargeable) batteries that have lithium metal or lithium compounds as an anode. Also included in this category are lithium alloy batteries. Lithium metal batteries are generally used to power devices such as watches, calculators, cameras, temperature data loggers, car key fobs and defibrillators.

NOTE:

Lithium metal batteries packed by themselves (not contained in or packed with equipment) (Packing Instruction 968) are forbidden for transport as cargo on passenger aircraft, unless shipped under the conditions of an exemption issued by all States concerned, or as permitted under an approval in accordance with Special Provision A201.



Figure 1 – Example of lithium metal cells and batteries

Lithium-ion batteries (sometimes abbreviated to Li-ion batteries) are secondary (rechargeable) batteries where the lithium is only present in an ionic form in the electrolyte. Also included within the category of lithium-ion batteries are lithium polymer batteries. Lithium-ion batteries are generally used to power devices such as mobile telephones, laptop computers, tablets, power tools and e-bikes.



Figure 2 – Example of lithium ion cells and batteries

Note:

Lithium ion batteries packed by themselves (Packing Instruction 965) (not contained in or packed with equipment):

- (a) must be shipped at a state of charge (SoC) not exceeding 30% of their rated capacity. Cells and/or batteries at a SoC of greater than 30% may only be shipped with the approval of the State of Origin and the State of the Operator under the written conditions established by those authorities, see Special Provision A331; and*
- (b) are forbidden for transport as cargo on passenger aircraft, unless shipped under the conditions of an exemption issued by all States concerned, or as permitted under an approval in accordance with Special Provision A201.*

More information about the safe transport of lithium batteries by air can be found in the [IATA Lithium Battery Guidance Document \(www.iata.org/lithiumbatteries\)](http://www.iata.org/lithiumbatteries).

Cargo Operations

Challenges

Because of the huge, worldwide demand for lithium batteries, billions of them are shipped annually as air cargo. Volumes are expected to increase substantially over the coming years, with batteries becoming smaller, more powerful and even more longer lasting. The IATA Dangerous Goods Board previously estimated that, on some routes, lithium batteries were present in some 25% of cargo shipments. This estimate only takes into account those lithium batteries that are known to be transported (i.e. those that have been declared to the operator). It does not include undeclared shipments, the exact amount of which is unknown.

Counterfeit & Substandard Lithium Batteries

According to the international air transport regulations, each cell or battery type must be proven to have met the requirements of each test of the UN Manual of Tests and Criteria, Part III, subsection 38.3 (i.e. UN 38.3 test). However, many lithium batteries that do not meet the UN 38.3 test requirements are available for sale on the Internet and in some parts of the world. These batteries are sometimes manufactured to look alike to the genuine branded products and are very often sold at a price that is far cheaper than the genuine products. As these batteries have not been tested to the UN 38.3 test standards, they are less safe to transport, with higher potential risk and may fail or catch fire when subjected to the shocks and loadings encountered under the normal conditions of transport.

Problems when Using Counterfeit Batteries

Not only is there a risk of counterfeit batteries unexpectedly overheating or catching fire when being charged, damage to the camera may also occur.

Compared with genuine batteries, counterfeit batteries have significantly less charge capacities. Counterfeit batteries may also deteriorate quickly after frequent use, inaccurately show battery power levels, expand and become stuck into the camera slot, cause sudden power loss, or damage camera data.

In addition, even genuine batteries can deteriorate quickly and lose charge capacity when charged with counterfeit chargers.

Sony cannot guarantee against accidents, battery or camera damage, data destruction or other problems caused by counterfeit batteries or chargers. Furthermore, Sony cannot repair counterfeit batteries or chargers.

This information is to help ensure the safety of our customers and prevent unexpected problems while using your Sony products.

Is one of your accessories counterfeit?

Below is a list of the most commonly found counterfeited Sony accessories. Please note that in addition to batteries and chargers, battery grips and other power accessories are also counterfeited frequently.

If you have already purchased any of the products listed here, please carefully check whether it is counterfeited or not.

The most frequently counterfeited Sony batteries and chargers:

Batteries	Chargers
- NP-BN1 - NP-BX1 - NP-FG1 - NP-FW50 - NP-FV50 - NP-FV70 - NP-FV100 - NP-FZ100	- BC-TRN - BC-TRV - BC-TRX - BC-TRW - BC-VW1



Figure 3 – Information on counterfeit batteries released by Sony (<https://www.sony.co.uk/electronics/support/articles/00200938>)

Undeclared Lithium Batteries

Lithium batteries have become such a common, everyday commodity that they have been taken for granted by consumers, with little thought given to the precautions that need to be taken to ensure lithium batteries do not pose a risk in air transport. This is an issue for passenger baggage as well as air cargo. Experience has shown that there are shippers who, either deliberately or through ignorance, do not follow the requirements set out in the DGR. Consequently, incidents involving lithium batteries catching fire on board aircraft have occurred. It is not always possible to determine the cause of such incidents, but where a cause has been determined, they would appear to be almost invariably due to non-compliance with the requirements.



Figure 4 – Fire damage to a package of incorrectly packed lithium metal button cells, which occurred after unloading

There was a great deal of publicity surrounding the loss of three cargo aircraft due to on board cargo fires:

- 7 February 2006: DC-8 Philadelphia – aircraft landed safely but was destroyed by fire which had started in the descent.
- 3 September 2010: Boeing 747, Dubai – the aircraft crashed during an attempt to return to Dubai due to a severe in-flight fire; both crew members were killed.
- 27 July 2011: Boeing 747, 130 km west of Jeju Airport, South Korea – the aircraft crashed into the sea following a severe in-flight fire; both crew members were killed.

It is known that all three aircraft were carrying lithium batteries as cargo, some of which on the Boeing 747 that crashed in Dubai were subsequently determined to have not complied with the regulatory requirements. However, the degree to which the lithium batteries were involved in these incidents (i.e. whether they were the cause of or aggravated the fire) could not be concluded.

Airmail

Safety concerns are not restricted to baggage and cargo. Mail is carried extensively on board passenger and cargo aircraft, both internationally and on relatively short domestic flights. Lithium batteries, whether shipped on their own or packed with equipment, are not permitted in airmail. Nevertheless, numerous websites advertise lithium batteries for sale with delivery by airmail as an option. Couple this with the fact that a number of such batteries may not comply with the regulatory requirements, with the batteries not meeting the UN 38.3 testing requirements, incorrectly packaged or exceeding 30% state of charge, it is not surprising that there have been a number of incidents involving lithium batteries in airmail.



Figure 5 – A non-compliant laptop battery ordered online and sent by airmail, which caught fire shortly after being unloaded from a passenger aircraft at London Heathrow Airport

There are provisions that allow for lithium batteries, when contained in equipment only, to be sent by airmail providing the Civil Aviation Authority (CAA) has approved the Designated Postal Operator (DPO) of the State (country) in which the airmail is offered for carriage. However, in many parts of the world, there is a lack of communication between the DPO and CAA and so the approval system may not be in place in some countries. There may also be other problems, such as:

- the CAA may not have authority over airmail or the DPO, and is therefore unable to exercise the necessary oversight; and
- the postal authority may not be subject to the civil aviation regulations.

Consequently, it is recommended that operators carrying airmail should liaise closely with the CAA and DPO in their State.

The Universal Postal Union (UPU) provides a list of designated postal operators that have received approval to accept equipment containing lithium batteries in airmail. The dates from which these DPOs have been authorised to accept these mail packages and other related information can be found on the UPU website at the following link:

<http://www.upu.int/fileadmin/documentsFiles/activities/postalSecurity/listAuthorizedDOsLithiumBatteriesEn.pdf>

It is important to note that the approval for the DPO is only valid for international airmail offered in that State. Some of the approved DPOs may have satellite branches established in States outside of their own for which they have received the approval. This practice is commonly known as Extraterritorial Office of Exchange (ETOE), which is a facility belonging to a postal operator outside its national territory in another country. However, ETOE without an approval granted by their operating state is not permitted to accept equipment containing lithium batteries in airmail.

E-commerce

E-commerce is growing at an unprecedented rate in recent years and is expected to grow by 20% by 2022 globally with some regions having even more significant growth. The rapid growth of e-commerce is mainly because of the maturity of technology, special offers from online shops, change of purchase behaviour and the wide availability of products.

The growth of e-commerce not only offers a business opportunity for small start-up companies and retailers, but also logistics players in the supply chain, such as air operators as well as freight forwarders. E-commerce is slightly different from the mail business, which primarily handles letters and small parcels, and have limitations on the types of lithium batteries (contained in equipment only) that can be accepted. E-commerce packages are very often transported as traditional air cargo, containing various products (including lithium batteries shipped alone and packed with equipment), consolidated from different sources and sometimes might also be transported in a comparably less rigid and robust packaging. From experience, some of these shipments are initially consigned as a shipper-built unit (BUP), and on arrival at the destination, the units will be broken down by freight forwarders and the individual packages will be re-consigned as domestic postal parcels through local mail service.

The combination of the complexity of e-commerce implies that these packages might have a potentially higher risk level than traditional cargo.

Safety Risk Assessment

Introduction

With the entry into effect from 5 November 2020 of Chapter 15 – Cargo Compartment Safety to ICAO Annex 6 – *Operation of Aircraft*, it will be mandatory for operators to conduct safety risk assessments when transporting items in aircraft cargo compartments. This requirement will be applicable to all operators that transport items in the aircraft cargo compartments, namely cargo, baggage and mail. The safety risk assessments shall include at least the:

- hazards associated with the properties of the items to be transported;
- capabilities of the operator;
- operational considerations;
- capabilities of the aeroplane and its systems;
- containment characteristics of unit load devices;
- packing and packaging;
- safety of the supply chain for items to be transported; and
- quantity and distribution of dangerous goods items to be transported.

The ICAO *Safety Management Manual* (Doc 9859) and ICAO *Guidance for Safe Operations Involving Aeroplane Cargo Compartments* (Doc 10102) contain comprehensive guidance for both industry and regulators on safety risk assessments. This guidance will not reproduce large parts of these documents, but it is useful to consider the basic elements of safety risk assessment as it applies to lithium batteries.

Identify the hazards

The first step to conduct a safety risk assessment is to identify potential hazards. In the case of carriage of lithium batteries as cargo, here are some examples of potential hazards that can be found:

- poor quality of the lithium batteries manufactured in the surrounding areas of the operator's hub and network (e.g. counterfeit or substandard lithium batteries);
- the acceptance policy of other operators in the market as well as different local regulatory requirements in the nearby States (e.g. if some operators are imposing more requirements / restrictions on accepting lithium batteries, some shippers might channel some poor quality shipments to other operators or might even not declare the shipments);
- lack of competence / training of employees, including those of contracted ground handling agents, resulting in the acceptance of non-compliant shipments;
- lack of monitoring of ground handling agents (including cargo terminal operators and ramp handling agents), leading to mis-handling of shipments and consequently potential damage to lithium batteries that could result in cell failure leading to thermal runaway;
- low credibility of shippers / freight forwarders and in some cases, co-loaders (i.e. consolidating through multiple layers of shippers / freight forwarders before handing over to the operator's appointed cargo agent);
- DPOs that do not have an approval from the Civil Aviation Authority of the State might be accepting lithium battery shipments in mail, send by air as cargo and subsequently after the breakdown of the cargo, the shipment turns into mail again at the destination sorting facility; and
- large volume of e-commerce parcels containing high capacity lithium batteries that are packed in plastic bags or simply undeclared.

Assess the likelihood of occurrence

After identifying the potential hazards, assess the likelihood of the hazards to occur. There can be five levels of occurrence probability:

Likelihood	Description	Value
Frequent	Likely to occur many times (has occurred frequently)	5
Occasional	Likely to occur sometimes (has occurred infrequently)	4
Remote	Unlikely to occur, but possible (has occurred rarely)	3
Improbable	Very unlikely to occur (not known to have occurred)	2
Extremely improbable	Almost inconceivable that the event will occur	1

Table 1 – Possible risk probability

Evaluate the severity of the occurrence

Once the likelihood of occurrence is determined, move forward to evaluate the severity of the hazards in conjunction with the potential consequences caused by the hazards. Similar to occurrence probability, there are generally five levels of risk severity:

Severity	Description	Value
Catastrophic	- Aircraft / equipment destroyed - Multiple deaths	A
Hazardous	- A large reduction in safety margins, physical distresses or a workload such that operational personnel cannot be relied upon to perform their tasks accurately or completely - Serious injury - Major equipment damage	B
Major	- A significant reduction in safety margins, a reduction in the ability of operational personnel to cope with adverse operating conditions as a result of an increase in workload or as a result of conditions impairing their efficiency - Serious incident - Injury to persons	C
Minor	- Nuisance - Operating limitations - Use of emergency procedures - Minor incident	D
Negligible	Few consequences	E

Table 2 – Possible safety risk severity

Risk index rating

By combining the occurrence probability and the severity of the risk (i.e. likelihood x severity), a risk index rating can be assigned. This risk index rating will give an indication on how tolerable the risk is, and can assist and guide an operator to put more focus and investment on risk mitigation measures for the high risk areas.

Safety Risk		Severity				
Probability		Catastrophic A	Hazardous B	Major C	Minor D	Negligible E
Frequent	5	5A	5B	5C	5D	5E
Occasional	4	4A	4B	4C	4D	4E
Remote	3	3A	3B	3C	3D	3E
Improbable	2	2A	2B	2C	2D	2E
Extremely improbable	1	1A	1B	1C	1D	1E

Table 3 – Example of a safety risk matrix

Safety Risk Index Range	Safety Risk Description	Recommended Action
5A, 5B, 5C, 4A, 4B, 3A	INTOLERABLE	Take immediate action to mitigate the risk or stop the activity. Perform priority safety risk mitigation to ensure additional or enhanced preventative controls are in place to bring down the safety risk index to tolerable.
5D, 5E, 4C, 4D, 4E, 3B, 3C, 3D, 2A, 2B, 2C, 1A	TOLERABLE	Can be tolerated based on the safety risk mitigation. It may require management decision to accept the risk.
3E, 2D, 2E, 1B, 1C, 1D, 1E	ACCEPTABLE	Acceptable as is. No further safety risk mitigation required.

Table 4 – Possible safety risk tolerability

Example

Below is an example on conducting safety risk assessments with respect to lithium batteries consigned as cargo.

An operator of all-cargo aircraft wishes to assess the risk associated with the carriage of cargo from Hong Kong.

Likelihood – Experience has shown that a few previous incidents were related to some undeclared or non-compliant lithium battery shipments accepted for air transport in Hong Kong. Consequently, a fire in cargo is possible and likelihood should be Level 3.

Severity level – If the cargo catches fire on the main deck of a cargo aircraft, this may become uncontrollable, resulting in a catastrophic situation. Therefore, the severity level should be catastrophic (A).

Therefore, the risk index would be likelihood (3) x severity (A) = 3A Intolerable.

In this case, the operator will need to implement additional mitigations to reduce the safety risk into at least the tolerable range although it is preferable to try to achieve a level of risk that is acceptable. Given that the safety risk level is intolerable, all risk mitigations in place should be reviewed. This process may involve senior representatives from cargo, engineering, flight operations and safety departments. In considering the review, the following factors should be taken into account:

Preventative controls – lithium batteries must comply with very stringent regulatory requirements before being offered for carriage by air.

Escalation factors – shippers' inadvertent or wilful non-compliance with the requirements.

Escalation controls – operator considers a system whereby lithium batteries will only be accepted from freight forwarders or shippers who have been vetted by the operator.

Despite preventive controls being in place, there is always the possibility that an unsafe event (in this case a lithium battery thermal event) can occur. Consequently, "recovery measures" must be considered (i.e. what can be done to prevent the unsafe event developing into the ultimate consequence, the loss of life or the aircraft). However, as with preventive controls, recovery measures can also be weakened by escalation factors that need to be controlled.

The following may apply for the example:

Recovery measure – fire containment covers on all pallets or use of fire-resistant containers.

Escalation factor – covers incorrectly applied, reducing their effectiveness.

Escalation control – covers are only applied by trained personnel and the deployment of covers will be verified by another qualified staff member.

The above elements can be more easily demonstrated with a bowtie risk analysis model, which has been adopted by some operators and regulators. The strength of a bowtie model is that it allows users to easily visualise the assessment and identify the safety barriers that are in place, or lack of, to minimise the likelihood of the occurrence of an unsafe event.

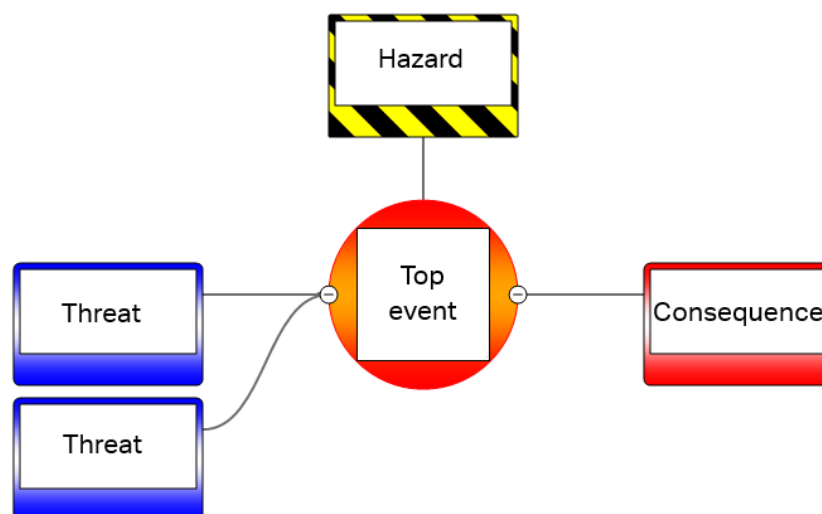


Figure 6 – An example of a bowtie risk analysis model

The bowtie risk analysis model puts the focus around the hazard that can potentially cause damage to the organisation and the top event that will be led by the identified hazard. The threats that can contribute to the top event as well as the ultimate consequence that is to be caused by the top event shall be laid out to the left and right respectively.

This process can stimulate to the identification of preventative measures which can eliminate the threat or prevent the threat from triggering the occurrence of the top event, and explore potential measures that reduce the likelihood of an event or mitigate the severity of the consequence should the top event occur.

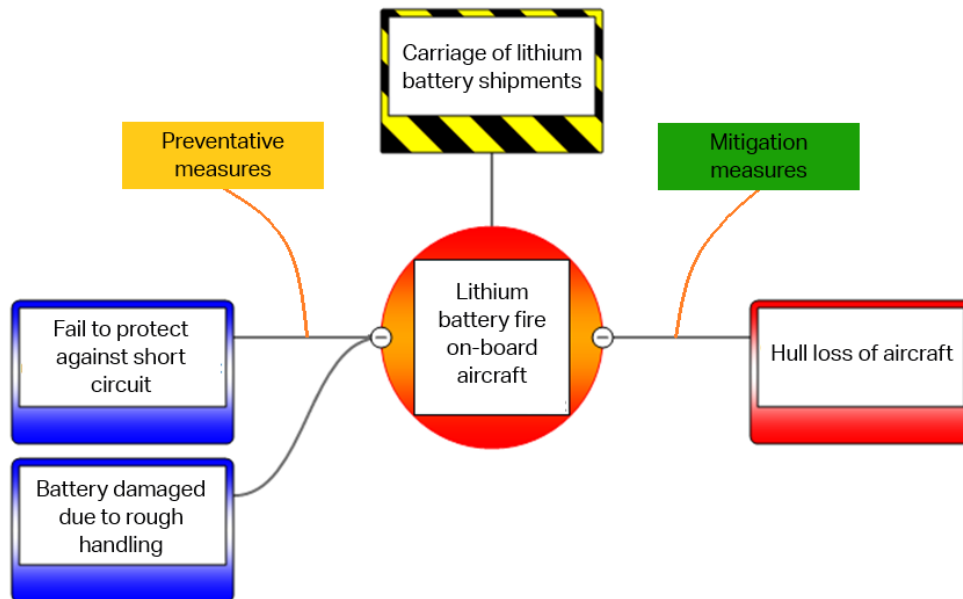


Figure 7 – An example of a bowtie risk analysis model for the carriage of lithium battery shipments

A sample of a complete bowtie risk model compiled by the UK Civil Aviation Authority can be [downloaded](#) for reference.

Determination of severity levels and likelihood can be subjective but it is always important that the safety culture of an operator embraces the concept that many activities associated with air transport, including the carriage of lithium batteries, involve risks that must be identified and mitigated to achieve an acceptable level of safety.

It is essential that each operator conducts and documents their own safety risk assessments based on their own operational realities. The risks and their severity, the effectiveness of mitigations and controls, as well as the overall risk tolerance will be unique to each operation. As such, it is important to stress that this document is just a guidance and should not be considered as an actual assessment of an operation. In keeping with safety management system (SMS) requirements, it is important to note that any safety risk assessment completed should be regularly reviewed and updated accordingly. This is to ensure that any operational or regulatory changes as well as advances in industry technology are reflected in the final outcome.

Risk Mitigation Measures

Operators should be mindful that threats may arise due to some external factors that are beyond their control. Not all safety risks can be eliminated entirely but operators can consider various approaches to mitigate the risks to as low as practicable and acceptable.

Below are some risk mitigation areas that operators can consider:

- training and competency;
- acceptance and handling procedures;
- outreach and awareness; and
- future asset investment.

Training & Competency

Because of the prevalence of lithium batteries and their inherent properties, incidents may occur in baggage, cargo and mail whether through non-compliance with the air transport requirements, or through subsequent damage. Possibly the greatest mitigation measure is the appropriate training of all staff to be able to intervene in an incident or, better still, prevent an incident from occurring.

Staff are required to be trained to carry out the functions for which they are responsible and it is important for operators to consider the extent to which staff need to be trained.

With respect to lithium batteries, training can be:

Preventative (i.e. to stop an incident from occurring) and is generally relevant to staff handling cargo, mail and baggage before flight (e.g. dangerous goods and cargo acceptance staff, and loaders). Other staff (e.g. sales and reservation staff) can also have a preventative role. Training should concentrate on detection of:

- undeclared hidden lithium battery shipments;
- damaged packages; and
- declared shipments containing lithium batteries but not in compliance with the regulations (e.g. declaring a power bank shipment as lithium batteries contained in equipment).

Reactive (i.e. respond to an incident involving fire, smoke or fumes) and is relevant to flight and cabin crew. It is essential that, in addition to general familiarisation training, flight and cabin crew receive comprehensive safety training to cover the hazards presented by lithium batteries, including safe handling and emergency procedures.

Incidents also provide an indication of the effectiveness of the preventative barriers. For this reason, it is critical that operators implement a "just culture" approach to reporting of dangerous goods incidents. All staff should be encouraged to report all dangerous goods incidents, even when the incident may have occurred as a result of an error or mistake by the staff member, e.g. a Unit Load Device (ULD) falling off a dolly due to the locks not being properly deployed / raised.

The incident report and subsequent investigation allow the operator to revise policies, procedures or work instructions to strengthen the preventative barriers, which act to reduce the exposure to risk.

For operators that have their operational functions outsourced to ground handling agents, they should ensure that their suppliers are following the same principle and their employees are trained and competent. In order to achieve this, operators can implement periodic audit programmes and carry out random checks on shipments which have been accepted on their behalf.

Safety Training for Flight Crew

As with any cargo fire, the options available to flight crew are severely limited. During the flight, it is impossible for flight crew to determine whether lithium batteries are involved, or indeed, whether the smoke / fire warning is genuine. It must be appreciated that the notification to captain (NOTOC) will only detail the fully regulated dangerous goods being carried as cargo. It shall never be assumed that, if lithium batteries are stated on the NOTOC, they are the source of the fire. Similarly, the absence of lithium batteries on the NOTOC does not necessarily mean that none are being carried; there is always the possibility of undeclared lithium batteries in cargo.

Flight crew should be trained to respond to an emergency suspected of involving lithium batteries carried as cargo by following the standard operating procedure for smoke or fire events, the most important aspect of which is: **LAND AS SOON AS POSSIBLE**.

Flight crew of cargo aircraft have options not available to those of passenger aircraft. Experience has shown that once a fire has become uncontrollable, a catastrophic situation can quickly develop, and it may not be possible to reach a suitable airport in time to land. Should a suitable airport not be within reach, it may be necessary to verify that the smoke / fire warning on the main cargo deck is genuine by visual inspection. Flight crew can also establish the extent and severity of the fire at this time. If this cannot be achieved from the flight deck (e.g. through a porthole), it may be necessary to investigate further. Ideally, someone other than a member of the operating crew should do this, but this may not always be possible (i.e. the operating crew may be the only occupants). If a closer visual inspection is required, this should be done with extreme caution. Flight crew may achieve this by opening the flight deck door as little as possible to obtain a view of the cargo compartment. However, if this is not possible, it may be necessary to access the cargo compartment using appropriate personal protective equipment (PPE) such as fire gloves and portable breathing equipment (PBE). The following are the objectives of visual inspection:

- determine whether smoke or fire is present. Even if there are no signs of smoke or fire, it must not be assumed that the warning was false, and the appropriate procedures, including landing as soon as possible, should still be followed. The situation should be monitored regularly for the remainder of the flight;
- if smoke is present, and a small fire is the obvious source, it may be possible to extinguish the fire using a portable on board fire extinguisher. After the fire is extinguished, if it is apparent that lithium batteries were involved, they should be doused with copious amounts of water to cool them and prevent reignition. After this has been done, the crew member should return to the flight deck and the appropriate procedures for smoke / fire on the main deck should be followed, with the affected cargo being regularly monitored for the remainder of the flight for any signs of smoke or fire;
- if it is apparent that a large fire is present, no attempt should be made to enter the main deck cargo compartment. In this instance, as well as following the appropriate procedures, consideration should be given to the possibility that continued flight may not be possible and other options (e.g. ditching, forced landing) may need to be considered.

Clearly, the presence of fire on board an aircraft is an extremely stressful situation for flight crew, which can be made worse should smoke penetrate the flight deck. Consequently, practical emergency training should address the difficulties that will be encountered in continuing to control an aircraft if there is smoke on the flight deck.

Acceptance & Handling Procedures

Acceptance

In addition to a comprehensive acceptance check, which seeks to verify as far as possible that all applicable requirements for packages (and documentation) have been met for fully regulated dangerous goods, ICAO and IATA require measures to be taken to ensure packages are not damaged during handling or transport and these are particularly relevant to lithium batteries. For example, packages must be:

- secured in an aircraft in a manner that will prevent movement;
- protected against damage:
 - during flight, for example by the movement of baggage, mail, stores or other cargo;
 - during their preparation for transport, for example during handling after acceptance and prior to loading.

Whilst an acceptance check is only required when fully regulated dangerous goods are first accepted for carriage by air, when packages are transshipped, operators should verify packages are free from damage or leakage and the marks and labels are still intact (labels must be replaced by the operator if they have become lost, detached or illegible).

Loading

Specifically for (standalone) lithium batteries (UN 3090 or UN 3480), they must be segregated from other dangerous goods classified in Class 1 (explosives) other than Division 1.4S, Division 2.1 (flammable gases), Class 3 (flammable liquids), Division 4.1 (flammable solids) and Division 5.1 (oxidizers).

There are no specific regulatory requirements addressing where lithium batteries should be loaded on an aircraft, operators may wish to consider loading them in a "Class C" cargo compartment and avoid the critical avionic systems. A Class C cargo compartment is one, where:

- there is a separate approved smoke detector or fire detector to give a warning to the flight crew;
- there is an approved built-in fire extinguishing system controllable from the flight deck;
- there are means of excluding hazardous quantities of smoke, flames or extinguishing agent from any compartment occupied by the crew or passengers;
- there are means of controlling ventilation and draughts within the compartment so that the extinguishing agent used can control any fire that may start within the compartment.

In order to identify how the declared shipments shall be segregated and loaded, operators can differentiate the shipments by way of an IATA Shipper's Declaration for Dangerous Goods and an air waybill (AWB), (if applicable).

For lithium batteries packed with equipment or contained in equipment, there are no specific regulatory requirements on segregation and loading. Operators may also choose to adopt the same restrictions mentioned above for these shipments if it fits the operational needs.

Operator Approval

The incidents that have occurred have usually been caused by non-compliance, but not all have been undeclared. They may have been accompanied by an IATA Shipper's Declaration for Dangerous Goods but may not have been adequately protected against short-circuit by the shipper / packer. Consequently, operators may wish to consider, as one of the available risk mitigation measures, accepting lithium batteries, especially batteries shipped alone (without the equipment) only from pre-approved shippers and freight forwarders. When establishing the approval process, operators can consider the following factors:

- whether or not the lithium batteries are of a type that have successfully passed the UN 38.3 tests*;

- if the lithium batteries are individually protected or not and how these are then packed inside the outer packaging;
- the credibility of the battery manufacturers, shippers and freight forwarders; and
- the dangerous goods qualification of shippers and freight forwarders.

Such approval process could then provide better visibility to the operator on what is being accepted.

*From 1 January 2020, manufacturers and subsequent distributors of cells or batteries manufactured after 30 June 2003 must make available the test summary as specified in the UN Manual of Tests and Criteria, Part III, sub-section 38.3, paragraph 38.3.5. This test summary can be made available electronically or in printed format, and is also applicable to cells and batteries that are contained in equipment. It is not required to accompany every shipment, but it can be one of the documents to be considered when approving the carriage of certain battery types.

General Cargo

Clearly, the above measures are not possible for lithium batteries that have not been declared to the operator. Therefore, efforts must be made to detect these undeclared batteries. These could include implementing:

- enhanced cargo acceptance processes and training to better detect non-compliant shipments. This could include greater scrutiny of the descriptions of goods on accompanying paperwork. For example, items described on an air waybill as "electrical / electronic equipment" or "film crew and media equipment" or "no battery" when the product described is an electronic device, may contain lithium batteries;
- establish a database to screen the description of goods shown on both the master air waybill data (FWB) and house manifest data (FHL), if applicable;
- additional training for ground handling agents and cargo terminal personnel to better detect undeclared shipments, raise awareness of the need to detect and remove damaged packages from the transport stream;
- carry out risk-based target or random screening, by means of x-ray technology or even physical hand searching of cargo, if applicable. Coordinate with the appointed security screening companies on the screening requirement for lithium battery shipments and jointly establish a seamless communication procedure;
- in cases where lithium battery related shipments are not accepted (for either regulatory or operators' policy), operators may want to consider other more restrictive measures, such as not allowing shipper-built units (BUP) and prohibiting the use of opaque plastic sheets covering cargo (at package level and skid level);
- coordinate closely with competent authorities, ensure that occasions of undeclared dangerous goods, including lithium batteries, are reported to the appropriate authority of the State of the operator and the State in which it occurred in accordance with DGR 9.6.5.

Outreach & Awareness

Engagement with Shippers

As the originators of cargo, shippers offering compliant shipments are first and foremost, they are the key entities for safety compliance. For most operators, they seldom have direct contact with shippers; however, should there be opportunities to interact with shippers, particularly on the shipping of lithium batteries, it is appropriate to ensure they have the relevant training and always only offer compliant shipments.

Engagement with Freight Forwarders

Freight forwarders are an important interface between shippers and operators but are largely unregulated. Engagement with freight forwarders, including advising them of the consequences of failure to comply with the requirements, can be very beneficial. Additionally, operators may also consider vetting freight forwarders on a regular basis to ensure that they also have a stringent acceptance procedure and processes aimed at detecting non-compliant shipments.

Engagement with Designated Postal Operators

Experience has shown that there is a great deal of ignorance among the general public about what dangerous goods can and, more importantly, cannot be sent in the mail. ICAO requires that the appropriate civil aviation authority of the State to review and approve the procedures of the Designated Postal Operator (DPO) to control the introduction of permitted dangerous goods into the mail.

For DPOs that have not been approved to accept any lithium batteries contained in equipment in mail, operators can consider visiting and understanding how the DPOs are isolating mail that potentially contains such unapproved items.

It is always beneficial for operators and DPOs to work together in developing awareness strategies.

Warning Notices

Sufficient notices must be prominently displayed at visible locations at cargo acceptance points to alert shippers and freight forwarders about any dangerous goods that may be contained in their shipments. As shippers do not tend to tender shipments to operators directly in traditional cargo operations, it is also worth of displaying similar notices in the premises of freight forwarders and integrators' drop-off counters or service points.



Figure 8 – Lithium battery warning notice

Websites

Operators can also remind shippers about their policy and develop their own guidance documents to assist their shippers in understanding regulatory requirements related to shipping lithium batteries as well as their own handling procedures.

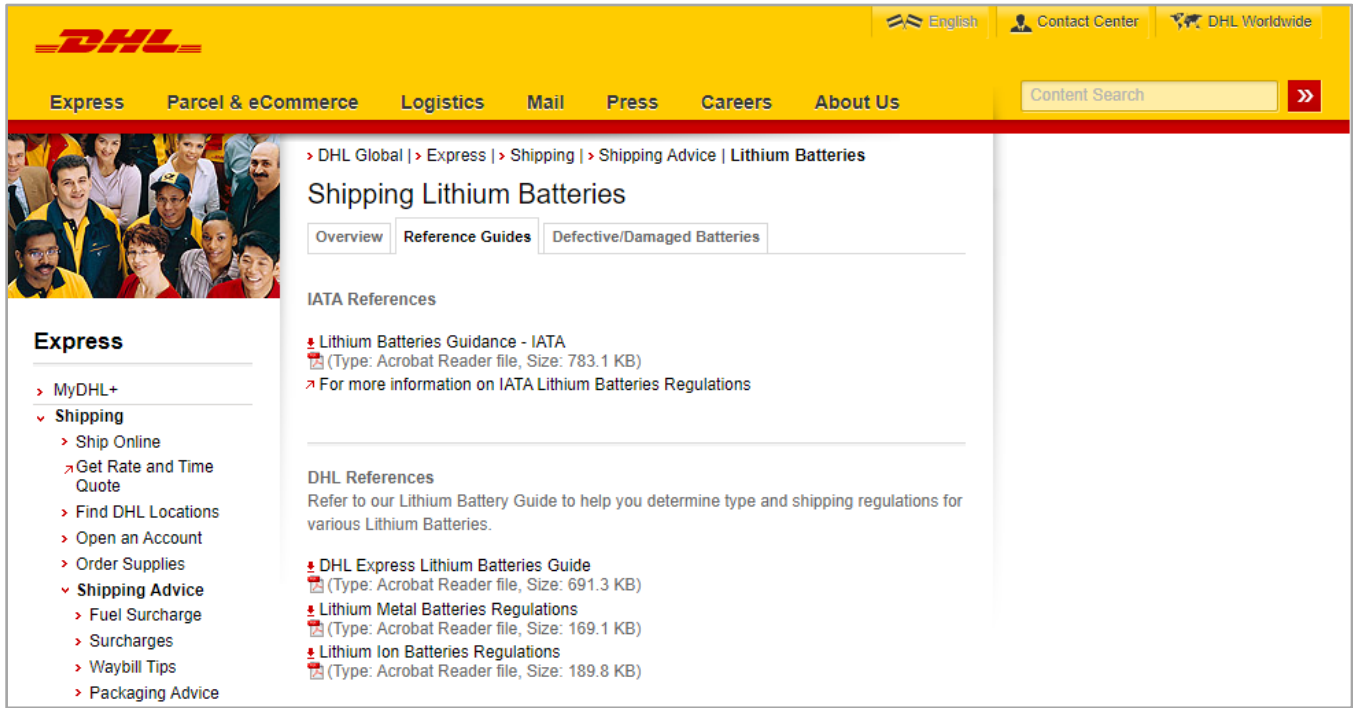


Figure 9 – Website showing additional lithium battery shipment related guidelines

(https://www.dhl.com/en/express/shipping/shipping_advice/lithium_batteries.html#guides_materials)

Seminars

Lithium battery transport requirements can be a subject that is very helpful to the industry, to be covered in seminars. Apart from the benefit of providing learning opportunities, seminars can bring together many interested parties who may not normally encounter one another, and therefore, facilitate an understanding of each other's perspectives.

Future Asset Investment

The incidents and accidents that have occurred where lithium batteries are known to have been a factor (or were present on board) have highlighted the vulnerability of cargo aircraft to main deck cargo compartment fires and, in particular, how quickly a situation can become catastrophic. Consequently, a number of technologies are being studied and developed by industry and regulators to enhance fire protection, particularly on cargo aircraft as these may not have the same level of fire suppression as passenger aircraft. However, it would be wrong to believe that such measures are necessary only when it is known that lithium batteries are being carried. Undeclared shipments are commonplace; therefore, such provisions should be applied even when no consignments of lithium batteries have been declared to an operator.

At a recent lithium battery workshop, several new and developing technologies were showcased. Some examples of these are shown in the following section.

Fire-Resistant Containers

Fire-resistant containers (FRC) can be made and used in the same way as certified aircraft containers. They are constructed of fire-resistant material, similar to that used in body armour. There are multiple suppliers on the market, and some FRCs have been demonstrated to be able to contain an internal fire of up to 650°C for at least four hours. Depending on the materials, some have the advantage of being lighter than conventional aluminium containers, offering a weight savings of as much as 30 kg per container. In terms of use, loading and tie-down, they are the same as the traditional certified aircraft containers.



Figure 10 – Main deck fire-resistant containers

Fire Containment Covers

Many shipments containing lithium batteries are loaded on open aircraft pallets, and consequently, fire resistant containers might not be appropriate for use, but rather, fire containment covers (FCC) that are deployed over the cargo but under the net may be used. There are different suppliers on the market and some operators have been deploying FCCs on palletised cargo for many years whilst others are considering their use. Some FCCs currently in production can contain a fire of up to 815°C for four hours or even more, which can potentially offer more time for flight crew to find the closest airport to land should an emergency situation arise.

In terms of deployment, FCCs can be more complex than FRCs. Depending on the design and make, they can weigh approximately 40 kg to 50 kg, and require at least two trained staff to deploy and remove the cover.



Figure 11 – Fire containment cover for lower deck and main deck deployment

Fire Containment Bags

The same materials used for the manufacture of fire containment covers are used to produce smaller size fire containment bags (FCB). Due to their smaller size, the deployment process of these bags is comparably simpler than that of fire containment covers, and can also be used over small packages. Once the FCBs are deployed, they can either be loaded on the aircraft pallets or in the aircraft containers or even loaded into non-containerised aircraft (bulk loaded).



Figure 12 – Fire containment bags loaded on a certified aircraft pallet and in a certified lower deck aircraft container

Smoke Displacement Systems

A smoke-filled cockpit can restrict or completely block a pilot's view of the outside world and essential cockpit instrumentation. Vision can be restored by smoke displacement systems, which use self-inflating transparent plastic envelopes to provide a clear space through which a pilot can see flight instruments and the outside world.



Figure 13 – Smoke displacement system (EVAS – Enhanced vision assurance system)

In February of 2015, the VisionSafe Corporation received Supplemental Type Certification (STC) for the Emergency Vision System (EVAS) Cockpit Smoke Displacement equipment applicable to the Boeing 777. The Boeing 777 is the latest aircraft to get FAA certified equipment and includes models 777-200, -200LR, -300, -300LR and the 777F. The company now has EVAS STC's for over 80 aircraft types.

The FAA recommends that aircraft meet higher standards for continuous cockpit smoke protection (FAA AC25.109). The U.S. Air Line Pilots Association's (ALPA) in-flight fire project reported more than 1,100 in-flight smoke and fire incidents over a period of 10 months, resulting in 360 emergency landings.

The FAA's concern about smoke events continues, and remains a serious problem with the statistics are essentially unchanged. The Flight Safety Foundation ranks smoke / fire emergencies as the 3rd highest cause of fatalities. Smoke is also a leading cause of diversions of ETOPS aircraft.

Quick-Donning Full-Face Oxygen Masks

Unlike traditional flight crew oxygen masks, which require two hands to don, new face masks can be donned with only one hand and in a couple of seconds. These new masks can be used in conjunction with smoke displacement systems.



Figure 14 – Quick-donning full-face oxygen mask

Performance-Based Packaging Standard

The SAE G-27 committee, consisting of battery manufacturers, regulators, operators and packaging manufacturers, was established at the request of ICAO to develop a performance-based packaging standard for standalone lithium batteries (AS 6413). The intent is to develop a test standard for designing a packaging for specific types of batteries prepared as for transport, so that when a lithium battery fails and goes into thermal runaway, the consequence of the event can be contained inside the packaging, so as to prevent hazardous flame, fragments or flammable gases from exiting the package and consequently causing damage to the aircraft or other cargo. While this will make compliant shipments even safer, it will have no effect on the arguably biggest risk (i.e. non-compliant or undeclared lithium battery shipments).

As of today, this standard is still under development.

Enhanced Security Screening

X-ray machines can also be an effective tool in identifying lithium batteries contained inside a shipment. However, the algorithms used by x-ray machines in security screening are traditionally set to detect explosives automatically. Furthermore, lithium batteries in small packages are more identifiable through visual x-ray compared to those in large consignments. For many years, the United Kingdom Civil Aviation Authority has been exploring the feasibility of detecting lithium batteries in cargo using existing x-ray technology, and in recent years, due to the rising demand to detect undeclared lithium battery shipments by using x-ray machines, some manufacturers are starting to review their technology to offer automated lithium battery detection.

Alkaline



Nickel Metal Hydride



Lithium



Figure 15 – X-ray images of different battery types

However, it is important to note that although the technology is available, authorised airport security companies traditionally and primarily focus on identifying security related items, such as an improvised explosive device (IED), rather than dangerous goods or lithium batteries. Therefore, if operators have expectations to detect undeclared lithium batteries in packages, they are encouraged to liaise with the security companies locally so as to ensure that expectations are well defined, communicated and executed.

Passenger Operations

Challenges

Very similar to one of the many challenges encountered by cargo operations, many counterfeit and substandard lithium batteries can also be found in passengers' baggage. With the rapid evolvement of technology and massive number of air travellers every day, the challenges in passenger operations can be even more onerous than those in cargo operations.

Safety Risk Assessment

Details on safety risk assessments and how a safety risk assessment should be carried out can be found under Cargo Operations in the previous [section](#).

Identify the hazards

Below are some examples of potential hazards that can be found in passenger operations:

- PEDs powered by a damaged / defective lithium battery is brought on board the aircraft (e.g. the user has been finding the lithium battery of the mobile phone is overheating);
- PEDs that are not switched off or in hibernation mode, and stowed in checked baggage;
- passengers not complying with the regulations and carry a large number of spare batteries and PEDs in their carry-on and checked baggage that are also not for personal use;
- spare batteries, e-cigarettes or power banks are placed in carry-on baggage but later on due to insufficient space in the overhead locker of the passenger cabin, the bag is moved to the cargo compartment without removing the spare batteries, e-cigarettes or power banks;
- power banks containing substandard lithium batteries and are being recharged during flight; and
- PEDs slipping into the seat and being crushed, resulting in a fire, when the passenger attempts to retrieve the device by adjusting the seat.

Example

Here is an example on conducting safety risk assessments with respect to lithium batteries carried by passengers.

An operator of passenger aircraft within Europe wishes to risk assess the carriage of portable electronic devices (PED) in the cabin of their aircraft.

Likelihood – Given the propensity for portable electronic devices (PED) to be carried by passengers, it would be reasonable to assume that such an incident might occur at some time, and so the likelihood would be Level 3.

Severity level – If a PED catches fire in the cabin, fire extinguishers will be readily available to cabin crew, who will have been trained in their use. Additionally, water, which is necessary to cool lithium batteries involved in an incident, will be on hand. Therefore, on the basis that an abnormal flight operations incident procedure would be applied (firefighting by cabin crew), with few other consequences, it may be appropriate to assign a severity level of major (C).

Therefore, the risk index would be likelihood (3) x severity (C) = 3C "Tolerable"

The following factors should be taken into account:

Preventative control – prohibition of spare lithium batteries in checked baggage.



Escalation factor – passenger’s ignorance of the requirement.

Escalation control – operator has a robust process to ensure that all passengers are made aware of the requirement (e.g. by questioning at check-in kiosks and / or counters).

Despite preventive controls being in place, there is always the possibility that an unsafe event (in this case a lithium battery fire / event) can occur. Consequently, recovery measures must be considered (i.e. what can be done to prevent the unsafe event developing into the ultimate negative consequence, the loss of life or the aircraft). However, as with preventive controls, recovery measures can also be weakened by escalation factors that need to be controlled.

In the example above, the following may apply:

Recovery measure – Halon fire extinguishers and water available to cabin crew;

Escalation factor – fire extinguishers out of date, insufficient water carried;

Escalation control – robust process in place to ensure an aircraft cannot depart with expired extinguisher or less than certain volume of water.

Risk Mitigation Measures

Whether for cargo or passenger operations, operators should always be mindful that threats may arise due to some external factors that are beyond their control. Not all safety risks can be eliminated entirely but operators can consider various approaches to mitigate the risks to as low as practicable and acceptable.

Below are some risk mitigation areas that operators can consider:

- training and competency;
- acceptance and handling procedures; and
- outreach and awareness.

Training & Competency

Due to the common use of lithium batteries for powering electronic devices, such as mobile phones, tablets, laptops and mobility aids, and the possibility of having substandard batteries on board, incidents may occur in both the cabin and baggage. The best mitigation measure may be appropriate training of all staff to be able to intervene and control an incident or even to prevent an incident from occurring.

According to the regulations, staff are required to be trained to carry out the functions for which they are responsible and it is important for operators to consider the extent to which staff need to be trained.

With respect to lithium batteries, training can be:

Preventative (i.e. to stop an incident from occurring) and is relevant to frontline passenger facing staff, especially before flight (e.g. ticketing staff, check-in counter staff and boarding gate agents). Training should concentrate on detection of:

- (any kinds of) spare batteries (including power banks) in checked baggage, and this should include questioning passengers when carry-on baggage is surrendered for carriage in the cargo compartment;
- excessive number of portable electronic devices and spare batteries in baggage;
- large capacity lithium batteries (e.g. more than 100 Wh but not exceeding 160 Wh) carried without an operator approval.

Reactive (i.e. respond to an incident involving fire, smoke or fumes) and is relevant to flight and cabin crew. It is essential that, in addition to general familiarisation training, flight and cabin crew receive comprehensive safety training to cover the hazards presented by lithium batteries, including safe handling and emergency procedures.

Safety Training for Cabin Crew

In addition to the items carried by passengers and crew members, there are many devices on the flight deck or in the passenger cabin that are powered by lithium batteries, such as electronic flight bags, emergency torches, or even the offline credit card machines. In the event of one of these items failing and causing a fire, it is understandable that there may be reluctance to introduce liquid onto the flight deck; however, if the battery is not cooled with water (or other non-flammable liquid), the fire may continue to propagate and worsen.

Cabin crew members are most likely to have to deal with an in-flight lithium battery fire and have a vital role to play in dealing with incidents. Because a fire in the cabin can quickly become uncontrollable, with potentially disastrous consequences, it is vital that cabin crew are trained to respond quickly, using the procedures and checklists published in the ICAO *Emergency Response Guidance for Aircraft Incidents Involving Dangerous Goods* (Doc 9481), (The "Red Book") and IATA's *Cabin Operations Safety Best*

Practices Guide. These procedures have been developed by the IATA Cabin Safety Task Force in conjunction with ICAO and have been incorporated into the "Red Book".

In order to ensure that all crew members are competent to deal with a lithium battery event from a damaged / defective portable electronic device, their competency should be verified by practical demonstration of dealing with a lithium battery incident in the cabin.

Below are some scenarios to be considered in the safety training programme for cabin crew:

Overheat Event

If an electrical burning smell from a portable electronic device (PED) is detected, or a PED is suspected of overheating, the passenger should be asked to turn off the device immediately. If the PED is plugged into the aircraft power supply, the power supply must be disconnected if safe to do so and the in-seat power should also be turned off. Although a PED may be "switched off," unstable / damaged batteries can still ignite and so the PED must remain off and be monitored closely for the remainder of the flight.

Fire Event



Figure 16 – A burning laptop

As with any fire occurring in the cabin, the use of personal protective equipment (PPE) such as fire gloves and portable breathing equipment should be considered, but it is important to note that this does not delay the response to the incident. Although following recommended procedures present a sequence of tasks, some of these actions occur simultaneously when carried out by multiple crew members.

1. Identify the item

It may not be possible to identify the item (source of fire) immediately, especially if the fire has started in a seat pocket or the device is not readily accessible. In this case, fire-fighting procedures should be applied as a first step. Once it is possible to do so, identify the item after the fire is under control. If the item is contained in baggage, the crew's actions would be similar to the actions for a device that is visible or readily accessible.

Caution: In order to avoid injury from a flash fire, it is not recommended to open the affected baggage when there is any indication of smoke or flames. However, in certain situations, cabin crew members may assess and deem it necessary to slightly open baggage to allow entry of the extinguishant and non-

flammable liquid. This should be done with extreme caution and only after donning appropriate protective equipment, available on the aircraft.

2. Apply fire-fighting procedure

Any occurrence concerning a fire in the cabin should be notified immediately to the pilot-in-command who should be kept informed of all actions taken and their effects. It is essential that the cabin crew and the flight crew coordinate their actions and that each are kept fully informed of the other's actions and intentions.

Appropriate fire-fighting and emergency procedures must be used to deal with any fire. In a multi-cabin crew operation, the actions detailed in the fire-fighting procedure should be coordinated and conducted simultaneously. On aircraft operated with only one cabin crew member, the aid of a passenger should be sought in dealing with the situation.

Halon, halon replacement or water extinguishers should be used to extinguish the fire and prevent its spread to other flammable materials. It is important to wear available protective equipment (e.g. protective breathing equipment, fire gloves) when fighting a fire.

If fire develops, cabin crew should take prompt action to move passengers away from the area involved and, if necessary, provide wet towels or cloths and give instructions for passengers to breathe through them. Minimising the spreading of smoke and fumes into the flight deck is critical for the continued safe operation of the aircraft. Therefore, it is always essential to keep the flight deck door closed. Crew communication and coordination is of utmost importance. The use of the interphone should be the primary means of communication unless the interphone system fails.

If fire or smoke is seen coming from a baggage compartment, such as a wardrobe or overhead locker, passengers should be moved and asked if they are carrying anything that could be the cause. The exact location of the fire should be determined carefully by checking for heat with the back of an un-gloved hand.



Figure 17 – Determining the location of a fire in an overhead locker

After first considering the use of PPE, a fire extinguisher should be discharged into the locker.



Figure 18 – Discharging a fire extinguisher into an overhead locker

The compartment should be closed for a few seconds to allow for the extinguishant to take effect. Further extinguishant should be discharged until it is safe to fully open the compartment, when the cause of the fire will be located.

3. Remove power

It is important to instruct the passenger to disconnect the device from any power supply, if it is deemed safe to do so. A battery has a higher likelihood of catching fire due to overheating during or immediately following a recharging cycle even though the effects may be delayed for a period of time. By removing the external power supply from the device, it will ensure that additional energy is not being fed to the battery to promote a fire.

Turn off the in-seat power to all the remaining electrical outlets until it can be established that a malfunctioning aircraft system does not result in additional failures of the passengers' portable electronic devices.

If the device was previously plugged in to in-seat power, visually check that power to the remaining electrical outlets remains off until the aircraft's system can be determined to be free of faults.

The removal of power may occur simultaneously to other cabin crew actions (e.g. obtaining water to immerse the device). Depending on the aircraft type, the in-seat power supply may have to be turned-off by the flight crew physically than remotely.

4. Immerse the device in water (or other non-flammable liquid)

If the incident device is not inside a bag or it is in a bag that is not intact, the device should not be moved but left in place and be flooded with water to prevent the spread of heat to other cells in the battery. Should water not be available, any non-flammable liquid may be used to cool the device.

If the incident device is contained in an intact bag and no flames can be seen, the bag should be removed and placed in a watertight container (or one made watertight by using a bin liner) and flooded with water.



Figure 19 – A laptop being doused with water from the galley



Figure 20 – Applying water to a burning device without removing it from the overhead locker. It is important to note that liquid may turn to steam when it is applied to heated batteries

Caution:

- do not attempt to pick-up or move the device; batteries may explode or burst into flames without warning. The device must not be moved if any of the following exist: flames / flaring, smoke, unusual sounds (such as crackling), debris or shards of material separating from the device;
- do not cover or enclose the device as it could cause the device to get hotter and overheat; and
- do not use ice or dry ice to cool the device. Ice or other materials will insulate the device, increasing the likelihood that additional battery cells will heat-up and reach thermal runaway.



Figure 21 – A demonstration of the effect of applying ice to a burning laptop

5. Leave the device in place and monitor for any reignition

A battery involved in a fire can reignite and emit flames multiple times when heat is transferred to other cells in the battery. Therefore, the device must be monitored regularly to identify if there is any indication that a fire risk may still exist. If there is any smoke or indication of fire, the device must be immersed in water (or other non-flammable liquid).

6. When the device has cooled, after approximately 10 – 15 minutes

The device can be moved with caution once it has cooled down and if there is no evidence of smoke, heat, or if there is a reduction in the crackling or hissing sound usually associated with a lithium battery fire (after approximately 10 – 15 minutes). The waiting period may vary, based on the device and its size. The different circumstances (e.g. types of devices and phase of flight) should be addressed in the operator's training programme.

A suitable empty container, such as a pot, jug, galley unit or waste bin (with a water-tight liner if needed), must be filled with sufficient water or non-flammable liquid to completely immerse the device. It is important to wear available protective equipment (e.g. protective breathing equipment and fire gloves), when moving any device involved in a fire. Once the device is completely submerged, the container used must be stowed (e.g. in a toilet or wardrobe), monitored and, if possible, secured to prevent spillage.



Figure 22 – A laptop in a bag being immersed in water inside a toilet waste bin



Figure 23 – The toilet waste bin with water holding the damaged device should be stowed and isolated in a toilet

As not all containers are watertight, so plastic bin liners should be used.



Figure 24 – A bar box made watertight by using a plastic bin liner

Lithium Battery Fire Prevention

There have been reported incidents on board by operators as a result of the inadvertent crushing or damage of a portable electronic device, and some of these crushed devices had even caught fire.



Figure 25 – A mobile phone crushed in an electrically adjustable seat



Figure 26 – The charred remains of a mobile phone

Due to the design of some electrically adjustable passenger seats, it is possible for small electronic devices, such as mobile phones, tablets, e-readers or MP3 players to slip under a seat covering and / or cushion, behind an armrest or down the side of a seat, and becoming a potential fire hazard. These types of seats are primarily installed in premium class cabins.

Passenger awareness on how to use and stow their devices while in flight can help mitigate these incidents.

To prevent crushing of the PED and reduce the potential fire hazard to the device and the surrounding area, cabin crew and / or passengers must not use the electrical or mechanical seat functions in an attempt to retrieve a lost PED. The seat movement may crush / damage the PED's lithium battery and potentially result in a lithium battery fire. Cabin crew should always advise the flight deck of such a situation. Ask the passenger concerned to identify the item, and where they suspect it may have dropped or slipped into, and if they have moved the seat since misplacing the PED. Arrange the passenger to leave the area temporarily, and, if applicable, also arrange the passenger seated next to the affected seat to be moved. If available, don fire gloves before trying to retrieve the item. Do not move the seat! If it is not possible to retrieve the item, it may be necessary to move the passenger to another seat and block the affected seat to be used.

In the event that the situation develops into a lithium battery fire, cabin crew should apply the following as per their respective operator procedures:

- lithium battery fire-fighting procedures;
- post-event procedures (on board);
- first point of landing offloading procedures.

After landing, the crew must inform ground staff where the device is stowed and make an appropriate entry in the aircraft technical log. The PED must be removed from the aircraft before it operates the forthcoming sector, as lithium batteries that are damaged are forbidden for carriage. Devices involved in a fire should be retained on the ground to enable investigation by competent authorities.

Small Aircraft Operations

The operational environment for small aircraft (e.g. narrow body aircraft) can be very different, with only one or two cabin crew on board the aircraft, and on some occasions, might even require assistance from passengers. Additionally, considerations will need to be given as to what items are available to use in the event of an incident. It is suggested that all aircraft, as a minimum, should carry the following equipment on top of that usually on board:

- fire / heat resistant gloves;
- heavy duty plastic bin liners; if the aircraft has no suitable container that something the size of a laptop can fit into, these can be filled with water before placing the damaged device in the bin liner;
- fire containment bags, which can be used to contain a damaged PED while it is being cooled off and isolated, and can be stowed conveniently;
- suitable receptacles, e.g. jugs to transfer water from the galley or toilet to the incident area should insufficient bottled water be carried.

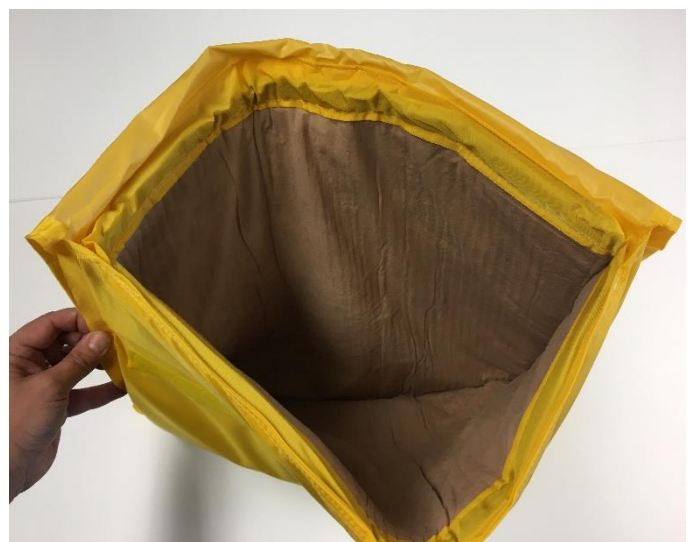


Figure 27 – Fire containment bag for damaged device in passenger cabin

Check-in & Handling Procedures

The wide use of portable electronic devices means that all passenger aircraft will be carrying lithium batteries in both carry-on and checked baggage. On a typical wide-body aircraft, the number of these devices on board could be in the hundreds. Although they are dangerous goods, certain types and quantities of these devices are permitted to be carried by passengers and crew.

Check-in

All spare batteries, not only lithium batteries but also dry batteries, are not permitted in checked baggage and must only be carried in the passenger cabin. Consequently, if there is a need for carry-on baggage to be loaded in the cargo compartment (e.g. due to shortage of overhead lockers for baggage), ground staff or cabin crew must alert the affected passengers to remove spare lithium batteries, including power banks and e-cigarettes, from the baggage before transferring it to the cargo compartment. Batteries removed from the baggage must only be carried in the passenger cabin.

Details of the check-in and handling procedures for mobility aids powered by lithium batteries can be found in [Battery Powered Wheelchair and Mobility Air Guidance Document \(www.iata.org/dgr-guidance\)](http://www.iata.org/dgr-guidance).

On Board the Aircraft

There have been a number of incidents where mobile phones have been dropped by passengers into the workings of their seat and were crushed when the seat was moved. This scenario is most likely to occur in electrically powered seats found in premium cabins. To reduce the likelihood of this happening, it is suggested that operators incorporate advice into the passenger pre-flight briefing, such as:

"If you are intending to sleep during the flight, please make sure any small electronic devices such as mobile phones, mp3 players and tablets are stowed safely either in seat pocket, a bag or in an overhead locker so that they don't fall into the seat mechanism where they may be damaged. If you do lose your electronic device in your seat, do not move the seat and inform a member of the crew."

Another occasion when lithium batteries could potentially cause an incident is when they are being replaced in on board equipment such as credit card readers. When this is being done, care must be taken to ensure that neither the old nor the new batteries are dropped into inaccessible locations, where if damaged, short-circuiting could occur and lead to a fire.

Outreach & Awareness

Warning Notices

Warning notices must be displayed at check-in counters at airports, warning passengers of the type of dangerous goods they must not carry. It should be noted that these warning notices are often generic in nature and some passengers may simply ignore them. However, it is essential to remind and raise the awareness of passengers to remove any of the prohibited items from their baggage, especially before they are checked in for carriage.

Operators should consider specific warnings at airports where there are known problems, such as the prevalence of counterfeit and substandard lithium batteries widely available for purchase in street markets. At those airports, displaying warning notices at the baggage reclaim areas to warn passengers can also be effective.



IS YOURS SAFE TO CARRY?

If in doubt, ASK!

Almost every passenger carries a portable electronic device (PED) with them whenever they travel. Some passengers require a portable medical electronic device (PMED). PED's and PMED's use batteries and the most common type are lithium batteries. There are specific limits covering the types and number of lithium batteries you may carry onboard an aircraft, and these limits are set based on the watt-hour (Wh) rating for lithium ion (rechargeable) batteries or the lithium content for lithium metal (non-rechargeable) batteries.

Passengers also carry spare batteries. The terminals on all spare batteries must be protected to prevent a short circuit. You can do this by taping the terminals, putting batteries individually into plastic bags or using the original battery packaging.

Which lithium batteries can I carry and how many can I take?

BATTERY TYPE Wh rating or lithium metal content	BATTERIES POSITION	CARRY-ON BAGGAGE	CHECKED BAGGAGE	NUMBER OF DEVICES/ SPARE BATTERIES
Rechargeable: up to 100 Wh Non-rechargeable: up to 2 grams • PED or PMED • mobile phones • laptops/tablets/phaslets/iPads • drones • cameras	Contained within the device	✓	Yes, but recommended in your carry-on baggage	Limits may apply. Check with your airline.
	Spare batteries and power banks	✓	✗	
Rechargeable: 101–160 Wh • PED or PMED • commercial cameras and video equipment • drones	Contained within the device	✓	Yes, but recommended in your carry-on baggage	Operator approval required—contact your airline.
	Spare batteries and power banks	✓	✗	Limit of two spare batteries: • in original packaging • or with terminals taped
Non-rechargeable: 2 to 8 grams • PMED only	Contained within the device	✓	Yes, but recommended in your carry-on baggage	Operator approval required—contact your airline.
	Spare batteries	✓	✗	Limit of two spare batteries: • in original packaging • or with terminals taped
Rechargeable: up to 2.7 Wh Non-rechargeable: up to 0.3 grams	Smart luggage Smart Bag Bag tag	✓	✓	Limit one per bag.

Watt hour (Wh) = Amp hour (Ah) x Voltage (V)



Portable electronic devices (PED)
PED include items such as cameras, mobile phones, laptop computers, tablets, phablets and many other devices that contain batteries. When carried by passengers for personal use, these should be carried in carry-on baggage. However, if a PED is carried in checked baggage:
• you must take measures to prevent unintentional activation and damage;
• your device must be completely switched off (not in sleep or hibernation mode).

DRONES—RPAS (Remotely Piloted Aircraft Systems)
The same conditions applying to PED's apply to drones. Additional protection from damage may be required for batteries and spare batteries used for drones as these are sometimes pillow-type batteries with thinner casings that make them lighter but at the same time they can be more easily damaged.

Spare lithium batteries—including 'power banks'
Spare batteries must be individually protected to prevent short circuits by placement in the original retail packaging or by otherwise insulating terminals: e.g. by taping over exposed terminals or placing each battery in a separate plastic bag or protective pouch.
Spare batteries must be carried in carry-on baggage only.
'Power banks' and similar articles containing lithium cells or batteries, the primary purpose of which is to provide power to another device, are 'spare batteries' and are restricted to carry-on baggage only.
Batteries and cells must be of a type that meets the requirements of the UN Manual of Tests and Criteria, Part III, subsection 38.3.

Portable electronic smoking devices containing batteries—'e-cigarettes, e-cigs, e-cigars, e-pipes, personal vaporisers, electronic nicotine delivery systems, etc.'
These devices containing batteries, when carried by passengers for personal use, must be in carry-on baggage only. Recharging of these devices and/or their batteries on board an aircraft is not permitted and the passenger must take measures to prevent accidental activation. Spares batteries for these devices are treated the same as all spare lithium batteries.

Baggage with integrated lithium batteries—'smart luggage'
Baggage with integrated lithium metal batteries with a lithium metal content exceeding 0.3 grams and/or lithium ion batteries with a watt-hour (Wh) rating exceeding 2.7 Wh are forbidden as checked baggage.
These devices could include integrated lithium batteries, power banks, motors, GPS, GSM, Bluetooth, RFID or Wi-Fi technology. The presence of the lithium batteries, such as non-removable power banks, can be a breach of various regulatory requirements.
Examples of 'smart' luggage include features such as:
• Lithium ion battery and motor allowing it to be used as a personal transportation device.
• Lithium ion battery power bank that allows charging of other electronic devices.
• GPS tracking devices with or without GSM capability.
• Bluetooth, RFID and Wi-Fi capability.
All PED's carried on an aircraft are subject to specific requirements to ensure that they do not pose a hazard to aircraft systems due to electromagnetic interference.
Baggage equipped with a lithium battery are subject to the following:
• If checked in, the lithium battery must be removed from the baggage and the lithium battery must be carried in the cabin; or
• The baggage must be carried in the cabin.
• If the baggage includes a lithium battery or power bank, designed to charge other devices and the battery cannot be removed, the baggage is forbidden in checked baggage and must be carried in the cabin.

[DG] dangerous goods, visit www.casa.gov.au/dg

[DG] dangerous goods, visit www.casa.gov.au/dg

Figure 28 – Warning notice aimed at passengers (http://www.casa.gov.au/wcmsw/ assets/main/dg/luggage/lithium_battery_poster.pdf)

In addition to the general warning notices, operators should also consider displaying topical warning notices based on the rising trend of certain items being carried by passengers.



Figure 29 – Warning notice on e-cigarettes and spare lithium batteries

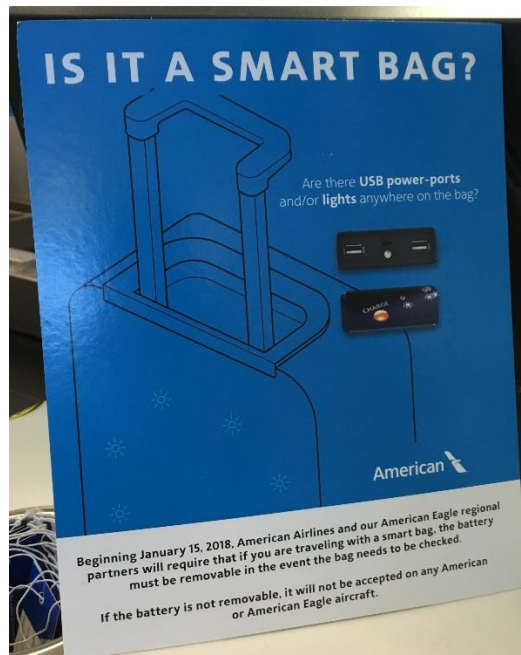


Figure 30 – Warning notice on smart bags at check-in counters

Websites

It is important to warn passengers about the restrictions that apply to baggage at the earliest opportunity, ideally before they leave home. There are regulatory requirements that online ticket purchases can only be completed once information about dangerous goods has been displayed and an acknowledgement by passengers made that this information has been read and understood. Similar requirements apply to online check-in. These requirements are not fool-proof, as the person purchasing the ticket or checking in may not necessarily be the person travelling or may click that they have read the information without actually reading it. Nevertheless, this information should include specific information about the carriage of lithium batteries.

Beyond these requirements, websites present other excellent opportunities to educate passengers on the limitations regarding dangerous goods in baggage.

It is very common for operators having alliances and code share flights, the general public can be ignorant about the baggage restrictions of different operators, especially if one is imposing a more restrictive policy based on their operational needs. Hence, it is valuable for customers that member operators in an alliance to include information of each other's policies and requirements.

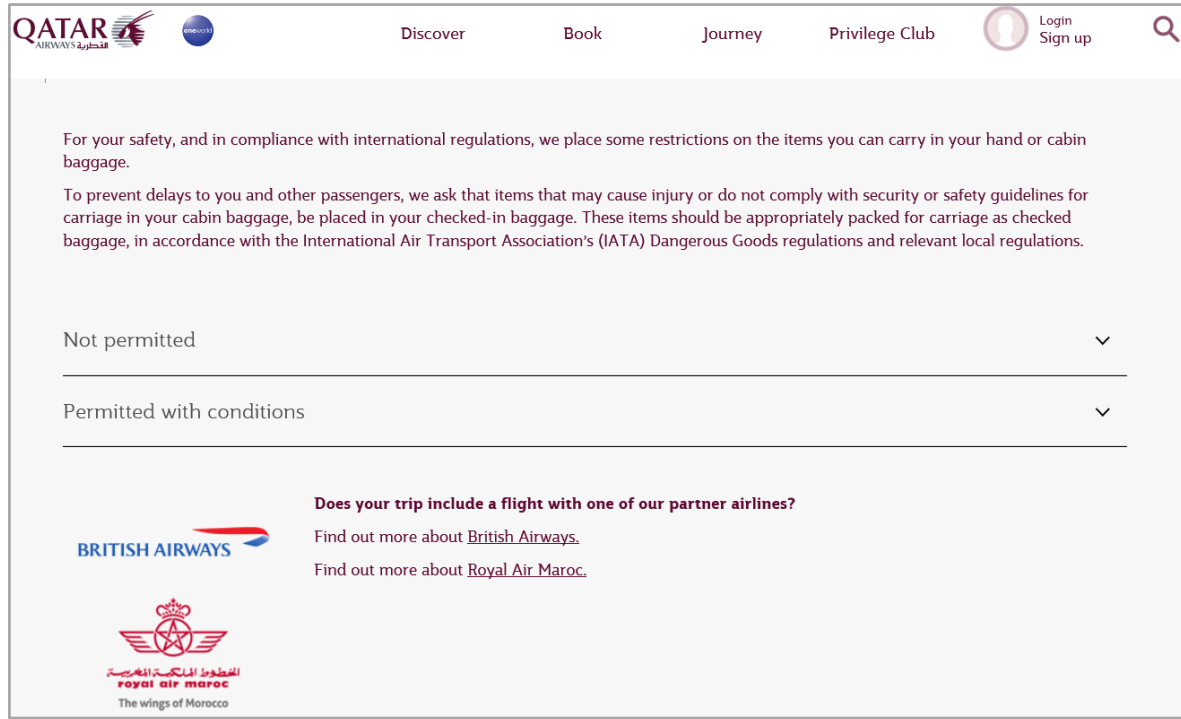


Figure 31 – A website including other operators' baggage restrictions (<https://www.qatarairways.com/en-gb/baggage.html>)

In-flight Magazines

Although it is too late to prevent batteries from being carried in a manner that does not comply with the regulatory requirements, an article in an in-flight magazine may help passengers pay more attention when packing their baggage for a subsequent flight.

Arrival Videos

At the end of a flight, passengers may be shown an information video about the city they are visiting. This provides a unique opportunity to inform a "captive" audience about the perils of purchasing cheap, possibly counterfeit and substandard lithium batteries from market stalls, and highlight the potential safety risks that these batteries can pose.

Recreational Press

Magazines produced for specific recreational activities involving lithium batteries (e.g. radio-controlled models) may publish articles provided by operators. Such magazines are guaranteed to reach the relevant audience.

Newspapers, Television and Radio Advertisements

Advertising in newspapers can be expensive; yet, potentially effective due to their reach to a very wide audience. Broadcasting on television and radio can also be an option for reaching out to the general public.

Schools

In some parts of the world, it is possible to cooperate with education authorities or individual institutes to conduct a brief session for students on what can and cannot be carried in baggage. Through this channel, it is not only that the students will be educated, the information is also likely to be passed on to their parents and friends.

Social Media

Operators can make use of social media, such as Facebook, Twitter and LinkedIn, to show tips and video clips about various items that can and cannot be brought in baggage.



Figure 32 – A Tweet on lithium batteries in cargo while promoting an exhibition booth

Tourism Conferences

There are many tourism conferences held around the world every year. Even if operators find it cost prohibitive to participate as an exhibitor to have a booth, partnering with the organisers or advertising in the conference magazine with information about the carriage of lithium batteries in baggage is also an option.



Figure 33 – An exhibition booth to promote the safe transport of dangerous goods, including lithium battery cargo

Collaborate with Regulators and Airport Authorities

There are different types of communication channels available at the airport, such as display cabinets, transit vehicles and airport magazines. However, in some locations, it may not be possible for operators to broadcast the information individually but rather collectively. Thus, it may be necessary to work closely with local regulators and airport authorities to deliver a collaborative message.

Other Publicity Materials

Small gadgets or giveaways, such as drinks coasters and baggage tags, can also be designed to promote flight safety information.



Figure 34 – Baggage tag and t-shirt to promote lithium battery safety

Conclusion

Experience has shown that compliant shipments of lithium batteries offered for air transport pose a very low risk. However, experience has also shown that there are many shippers that lack the requisite knowledge, and offer counterfeit and substandard batteries for transport as well as some that will deliberately mis-declare shipments of lithium batteries in an attempt to avoid complying with the regulations.

To ensure that the potential risks do not result in a dangerous goods accident, operators must develop and implement a comprehensive and robust safety risk assessment and risk mitigation process. There is no "one size fits all" for this. Each operator is unique based on the airports to which they operate, the aircraft types, passenger flights or freighters, and the operator's "risk appetite".

Therefore, it is essential for operators to conduct their own safety risk assessment based on their operational needs and environment, to identify various risk mitigation measures that will reduce the risks to as low as practicable to achieve an acceptable level of safety.

Supplementary Information

Cargo

Organisation	Subject	URL
Federal Aviation Administration	Lithium battery safety resources	https://www.faa.gov/hazmat/resources/lithium_batteries/
	Lithium battery basics	https://www.faa.gov/tv/?mediald=1951
	SafeCargo for Shippers & Startups	https://www.faa.gov/hazmat/safecargo/
IATA	Lithium batteries	https://www.iata.org/lithiumbatteries
Transport Canada	Shipping and importing devices containing lithium batteries	https://www.tc.gc.ca/eng/tdg/shipping-importing-devices-containing-lithium-batteries.html
	Safety alerts: transportation of lithium ion or lithium metal batteries as cargo on aircraft	https://www.tc.gc.ca/en/services/aviation/reference-centre/safety-alerts/transportation-lithium-ion-lithium-metal-batteries-cargo-aircraft.html
UK Royal Mail	Prohibited and restricted items	https://personal.help.royalmail.com/app/answers/detail/a_id/96
UK Civil Aviation Authority & Federal Aviation Administration	Posting lithium batteries in the mail	https://www.youtube.com/watch?v=nGhLA7brx44&list=PLig80S1opAEK_Ys1lmbatqCxNwEUUc0cB&index=4&t=0s
	Lithium batteries: guidance for cargo and ramp personnel	https://www.youtube.com/watch?v=UmESPM3U5T4&list=PLig80S1opAEK_Ys1lmbatqCxNwEUUc0cB&index=6

Passenger

Organisation	Subject	URL
Australian Civil Aviation Safety Authority	Least wanted dangerous goods	https://www.casa.gov.au/safety-management/dangerous-goods/least-wanted-dangerous-goods
	Travelling safely with batteries and portable power banks	https://www.casa.gov.au/standard-page/travelling-safely-batteries
	Before you pack your bags	https://www.casa.gov.au/safety-management/dangerous-goods/you-pack-your-bags
Federal Aviation Administration	Pack Safe	https://www.faa.gov/hazmat/packsafe/
IATA	Travelling with portable electronic devices (PEDs)	https://www.iata.org/ped
Transport Canada	Safety alerts: the possibility of smoke or fire from electronic flight bags (EFBs) or their lithium ion batteries	https://www.tc.gc.ca/en/services/aviation/reference-centre/safety-alerts/possibility-smoke-fire-electronic-flight-bags-lithium-ion-batteries.html
UK Civil Aviation Authority	One team one goal – guidance on the safe loading and transport of electric mobility aids	https://www.youtube.com/watch?v=IFyEVckQEjc
UK Civil Aviation Authority & Federal Aviation Administration	Lithium batteries: guidance for crew	https://www.youtube.com/watch?v=pOiwEW54xL8&list=PLig80S1opAEK_Ys1lmbatqCxNwEUUc0cB&index=4
	Lithium batteries: guidance for passenger handling staff	https://www.youtube.com/watch?v=cJ7r91IZYOc&list=PLig80S1opAEK_Ys1lmbatqCxNwEUUc0cB&index=5



2023 Lithium Battery Guidance Document

Transport of Lithium Metal and Lithium Ion Batteries

Revised for the 2023 Regulations

Introduction

△ This document is based on the provisions set out in the 2023-2024 Edition of the ICAO *Technical Instructions for the Safe Transport of Dangerous Goods by Air* (Technical Instructions) and the 64th Edition of the IATA Dangerous Goods Regulations (DGR).

The provisions of the DGR with respect to lithium batteries may also be found in the IATA lithium Battery Shipping Regulations (LBSR) 10th Edition. In addition to the content from the DGR, the LBSR also has additional classification flowcharts and detailed packing and documentation examples for lithium batteries.

Information on the DGR and LBSR can be found here:

<http://www.iata.org/dgr>

<http://www.iata.org/lbsr>

The purpose of this document is to provide guidance for complying with provisions applicable to the transport by air of lithium batteries as set out in the DGR. Specifically, the document provides information on:

- Definitions;
- Classification (including classification flowcharts);
- Prohibitions;
- Restrictions;
- Frequently Asked Questions
- Additional Information
- Abbreviations, Acronyms, Symbols

Definitions

Lithium Battery – The term “lithium battery” refers to a family of batteries with different chemistries, comprising many types of cathodes and electrolytes. For the purposes of the DGR they are separated into:

Lithium metal batteries. Are generally primary (non-rechargeable) batteries that have lithium metal or lithium compounds as an anode. Also included within lithium metal are lithium alloy batteries. Lithium metal batteries are generally used to power devices such as watches, calculators, cameras, temperature data loggers, car key fobs and defibrillators.

Note:

Lithium metal batteries packed by themselves (not contained in or packed with equipment) (Packing Instruction 968) are forbidden for transport as cargo on passenger aircraft. In accordance with Special Provision A201, lithium metal cells or batteries that meet the specified quantity limits may be shipped on a passenger aircraft under an approval issued by the authority of the State of Origin, State of Destination and State of the Operator. Or in the case of urgent medical need, one consignment of lithium batteries may be transported as Class 9 (UN 3090) on passenger aircraft with the prior approval of the authority of the State of Origin and with the approval of the operator, see Special Provision A201. All other lithium metal cells and batteries can only be shipped on a passenger aircraft under exemption issued by all States concerned.



Figure 1 - Example of Lithium Metal Cells and Batteries

Lithium-ion batteries (sometimes abbreviated Li-ion batteries) are a secondary (rechargeable) battery where the lithium is only present in an ionic form in the electrolyte. Also included within the category of lithium-ion batteries are lithium polymer batteries. Lithium-ion batteries are generally used to power devices such as mobile telephones, laptop computers, tablets, power tools and e-bikes.



Figure 2 - Example of Lithium Ion Cells and Batteries

Note:

Lithium ion batteries packed by themselves (Packing Instruction 965) (not contained in or packed with equipment):

- (a) *must be shipped at a state of charge (SoC) not exceeding 30% of their rated capacity. Cells and/or batteries at a SoC of greater than 30% may only be shipped with the approval of the State*

of Origin and the State of the Operator under the written conditions established by those authorities, see Special Provision A331; and

- (b) *in accordance with Special Provision A201, lithium ion cells or batteries that meet the specified quantity limits may be shipped as cargo on a passenger aircraft under an approval issued by the authority of the State of Origin, State of Destination and State of the Operator. Or in the case of urgent medical need, one consignment of lithium batteries may be transported as Class 9 (UN 3480) on passenger aircraft with the prior approval of the authority of the State of Origin and with the approval of the operator, see Special Provision A201. All other lithium ion cells and batteries can only be shipped as cargo on a passenger aircraft under exemption issued by all States concerned.*

Aggregate lithium content means the sum of the grams of lithium content contained by the cells comprising a battery.

The technical definition of a battery and cell, as indicated in the UN *Manual of Tests and Criteria*, is as follows:

Battery means two or more cells or batteries which are electrically connected together and fitted with devices necessary for use, for example, case, terminals, marking and protective devices. Units which have two or more cells that are commonly referred to as "battery packs", "modules" or "battery assemblies" having the primary function of providing a source of power to another piece of equipment are for the purposes of the UN Model Regulations and this guidance document treated as batteries. See definitions for "cell" and "single cell battery". (See also "Power Banks")

Button cell or battery means a round small cell or battery when the overall height is less than the diameter.

Cell means a single encased electrochemical unit (one positive and one negative electrode) which exhibits a voltage differential across its two terminals. Under the UN Model Regulations, UN *Manual of Tests and Criteria* and this guidance, to the extent the encased electrochemical unit meets the definition of "cell" herein, it is a "cell", not a "battery", regardless of whether the unit is termed a "battery" or a "single cell battery" outside of the UN Model Regulations, the UN *Manual of Tests and Criteria* and this guidance.

Consignment, one or more packages of dangerous goods accepted by an operator (airline) from one shipper at one time and at one address, receipted for in one lot and moving to one consignee at one destination address.

Net quantity, either:

- (a) the weight or volume of the dangerous goods contained in a package excluding the weight or volume of any packaging material; or
- (b) the weight of an unpackaged article of dangerous goods (e.g. UN 3166).

For the purposes of this definition "dangerous goods" means the substance or article as described by the proper shipping name shown in Table 4.2, e.g. for "Fire extinguishers", the net quantity is the weight of the fire extinguisher. For articles packed with equipment or contained in equipment, the net quantity is the net weight of the article, e.g. for "Lithium ion batteries contained in equipment", the net quantity is the net weight of the lithium ion batteries in the package.

Overpack means an enclosure used by a single shipper to contain one or more packages and to form one handling unit for convenience of handling and stowage. Dangerous goods packages contained in the overpack must be properly packed, marked, labelled and in proper condition as required by the IATA Dangerous Goods Regulations.

The overpack must not contain packages enclosing different substances which might react dangerously with each other or packages of dangerous goods which require segregation according

to Table 9.3.A. In addition, packages containing UN 3090, lithium metal batteries prepared in accordance with Section IA or Section IB of PI968 or UN 3480, lithium ion batteries prepared in accordance with Section IA or Section IB of PI 965 are not permitted in an overpack with packages containing dangerous goods classified in Class 1 other than Division 1.4S, Division 2.1, Class 3, Division 4.1 or Division 5.1.

Power bank (power pack, mobile battery, etc.), these are portable devices designed to be able to charge consumer devices such as mobile phones and tablets. For the purposes of this guidance document and the IATA Dangerous Goods Regulations, power banks are to be classified as batteries and must be assigned to UN 3480, lithium ion batteries, or UN 3090, lithium metal batteries, as applicable. For carriage by passengers, power banks are considered spare batteries and must be individually protected from short-circuit and carried in carry-on baggage only.

Rated capacity means the capacity, in ampere-hours or milliampere-hours, of a cell or battery as measured by subjecting it to a load, temperature and voltage cut-off point specified by the manufacturer.

Note:

The following IEC standards provide guidance and methodology for determining the rated capacity:

- (1) IEC 61960 (First Edition 2003-12): Secondary cells and batteries containing alkaline or other non-acid electrolytes -Secondary lithium cells and batteries for portable applications;*
- (2) IEC 62133 (First Edition 2002-10): Secondary cells and batteries containing alkaline or other non-acid electrolytes – Safety requirements for portable sealed secondary cells, and for batteries made from them, for use in portable applications;*
- (3) IEC 62660-1 (First Edition 2011-01): Secondary lithium-ion cells for the propulsion of electric road vehicles- Part 1: Performance testing.*

State of Origin, the country (State) in the territory of which the consignment is to first be loaded on an aircraft.

State of the Operator, the country (State) in which the operator's principal place of business is located or, if there is no such place of business, the operator's permanent residence.

Watt-hour rating, expressed in Watt-hours (Wh), the Watt-hour rating of a lithium cell or battery is calculated by multiplying the rated capacity in ampere-hours by the nominal voltage.

Classification (DGR 3.9.2.6)

Lithium batteries are classified in Class 9 – Miscellaneous dangerous goods as:

- UN 3090, **Lithium metal batteries**; or
- UN 3480, **Lithium ion batteries**

or, if inside a piece of equipment or packed separately with a piece of equipment to power that equipment as:

- UN 3091, **Lithium metal batteries contained in equipment**; or
- UN 3091, **Lithium metal batteries packed with equipment**; and
- UN 3481, **Lithium ion batteries contained in equipment**; or
- UN 3481, **Lithium ion batteries packed with equipment**.

△ Lithium battery test summary – except for button cells installed in equipment (including circuit boards), manufacturers and subsequent distributors of cells or batteries and equipment powered by cells and batteries manufactured after 30 June 2003 must make available the test summary as

specified in the UN *Manual of Tests and Criteria*, Revision 7. 1, Part III, sub-section 38.3, paragraph 38.3.5.

Note:

The requirement is for the manufacturer and subsequent distributors to make this test summary available. There are numerous ways this can be achieved, such as by listing the applicable summary document on the company website. There is no expectation for the shipper/distributor to provide paper copies with each consignment containing lithium batteries. The supply chain are encouraged to make use of technology to facilitate the availability of the test summary.

△ The following table provides details of the information required in the test summary:

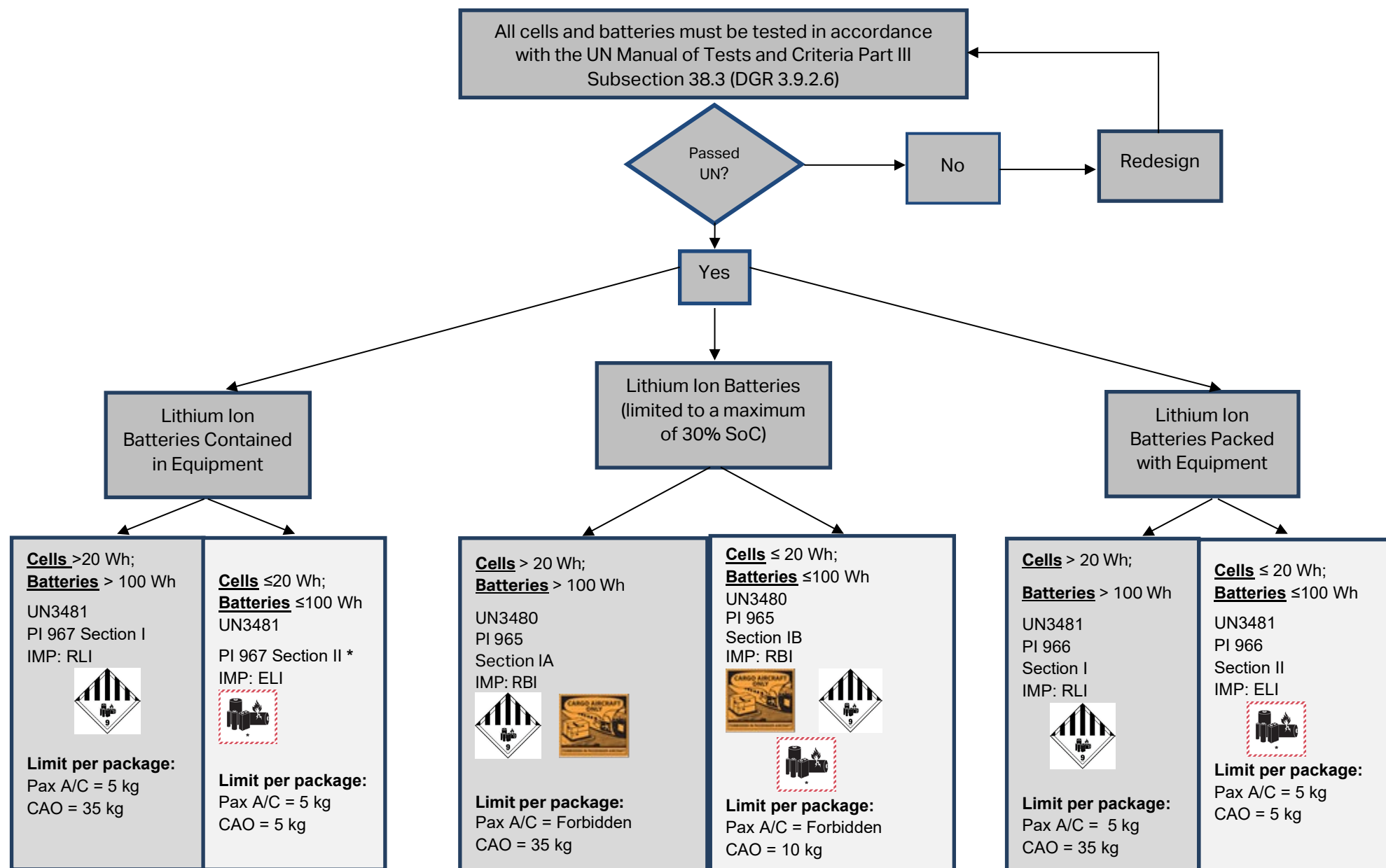
Lithium cell or battery test summary in accordance with sub-section 38.3 of Manual of Tests and Criteria
The following information shall be provided in this test summary: (a) Name of cell, battery, or product manufacturer, as applicable; (b) Cell, battery, or product manufacturer's contact information to include address, phone number, email address and website for more information; (c) Name of the test laboratory to include address, phone number, email address and website for more information; (d) A unique test report identification number; (e) Date of test report; (f) Description of cell or battery to include at a minimum: (i) Lithium ion or lithium metal cell or battery; (ii) Mass; (iii) Watt-hour rating, or lithium content; (iv) Physical description of the cell/battery; and (v) Model numbers. (g) List of tests conducted and results (i.e., pass/fail); (h) Reference to assembled battery testing requirements, if applicable (i.e. 38.3.3 (f) and 38.3.3 (g)); (i) Reference to the revised edition of the Manual of Tests and Criteria used and to amendments thereto, if any; and (j) Name and title of responsible person as an indication of the validity of information provided.

Further information on the test summary and FAQ's is available in [Part 4](#) of this guidance document.

△ **Classification Flowcharts**

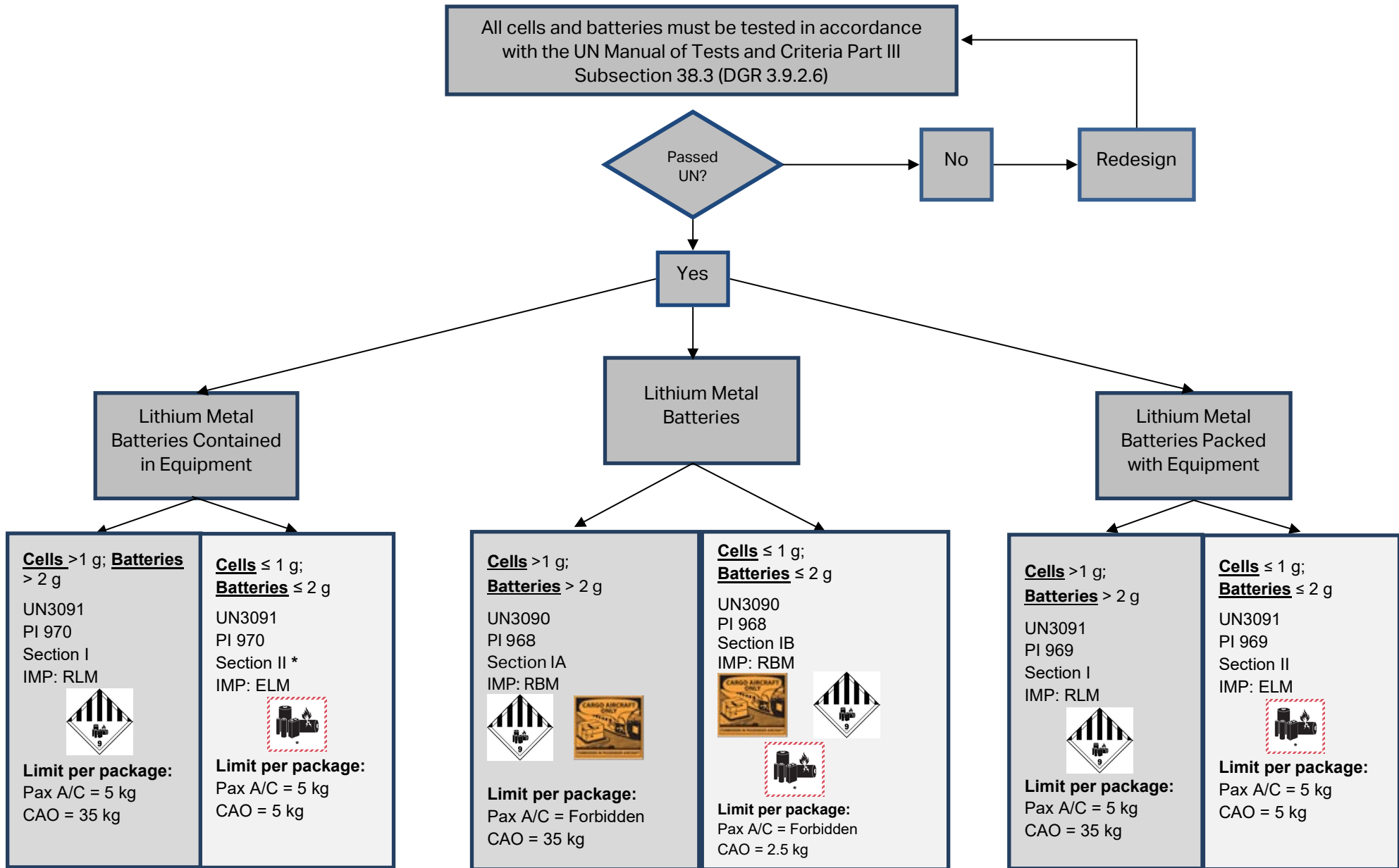
The following (2) classification flowcharts are intended to provide guidance on the classification for lithium ion and lithium metal batteries.

Classification Flowchart – Lithium Ion Batteries



* exceptions exist to the marking requirements
– see PI 967 Section II

Classification Flowchart – Lithium Metal Batteries



* exceptions exist to the marking requirements
– see PI 970 Section II

Prohibitions

Lithium ion batteries

All lithium ion cells and batteries shipped by themselves (UN 3480) are forbidden for transport as cargo on passenger aircraft. All packages prepared in accordance with Packing Instruction 965, Section IA and IB, must bear a Cargo Aircraft Only label, in addition to other required marks and/or labels.

Lithium metal batteries

All lithium metal cells and batteries shipped by themselves (UN 3090) are forbidden for transport as cargo on passenger aircraft. All packages prepared in accordance with Packing Instruction 968, Section IA and IB, must bear a Cargo Aircraft Only label, in addition to other required marks and/or labels.

Restrictions

Lithium ion batteries

All lithium ion cells and batteries (UN 3480 only) must be shipped at a state of charge (SoC) not exceeding 30% of their rated capacity. Cells and/or batteries at a SoC of greater than 30% may only be shipped with the approval of the State of Origin and the State of the Operator under the written conditions established by those authorities, see Special Provision A331.

Packing Restrictions

PI 965 & PI 968 Section IA & IB

UN 3090, lithium metal batteries prepared in accordance with Section IA or Section IB of PI 968 and UN 3480, lithium ion batteries prepared in accordance with Section IA or Section IB of PI 965 must not be packed in the same outer packaging with dangerous goods classified in Class 1 (explosives) other than Division 1.4S, Division 2.1 (flammable gases), Class 3 (flammable liquids), Division 4.1 (flammable solids) or Division 5.1 (oxidizers). Packages containing cells or batteries must not be placed in an overpack with packages containing dangerous goods classified in Class 1 other than Division 1.4S, Division 2.1, Class 3, Division 4.1 or Division 5.1.

Frequently Asked Questions

Part 1 – Questions Related to Definitions**A. What are the various types of lithium batteries?**

Lithium batteries fall into two broad classifications; lithium metal batteries and lithium ion batteries. Lithium metal batteries are generally non-rechargeable and contain metallic lithium. Lithium ion batteries contain lithium which is only present in an ionic form in the electrolyte and are rechargeable.

Within these two broad classifications there are many different chemistries. For example within lithium ion batteries there are lithium polymer, lithium iron phosphate (LiFePO₄), lithium air to name a few.

B. What is the difference between a lithium cell and a lithium battery?

A lithium cell is a single encased electrochemical unit consisting of one positive and one negative electrode that exhibits a voltage differential across the two terminals. A lithium battery is two or more cells electrically connected. A single cell battery is considered a cell and not a battery for the purposes of the limitations set out in the DGR.

Note:

Units that are commonly referred to as “battery packs” or “power banks” having the primary function of providing a source of power to another piece of equipment are for the purposes of these Regulations treated as batteries. This includes uninterruptible power supply (UPS) fitted with lithium ion batteries. Refer to the section on Definitions for complete details.

C. How are component cells connected to form a battery?

Cells in batteries may be connected in parallel, in series, or in a combination of the two. When cells are connected in series, the voltage of the battery increases but the capacity in ampere-hours (Ah) does not change. By contrast, when cells are connected in parallel the capacity in ampere-hours of the battery (Ah) increases but the voltage stays the same.

D. How do I determine the watt-hour rating for a particular lithium ion battery?

The Watt-hour (Wh) rating is a measure by which lithium ion batteries are regulated. Lithium ion batteries with a Watt-hour rating in excess of 100 Wh manufactured after 31 December 2011 and lithium ion batteries with a Watt-hour rating not exceeding 100 Wh manufactured after 1 January 2009 are required to be marked with the Watt-hour rating on the outside case.

You can also arrive at the number of Watt-hours your battery provides if you know the battery's nominal voltage (V) and capacity in ampere-hours (Ah):

$$\text{Ah} \times \text{V} = \text{Wh}$$

Note:

If only the milliampere-hours (mAh) are marked on the battery then divide that number by 1000 to get ampere-hours (Ah) (i.e. 4400 mAh / 1000 = 4.4. Ah).

Most lithium ion batteries marketed to consumers are below 100 Watt-hours. If you are unsure of the Watt-hour rating of your lithium ion battery, contact the manufacturer.

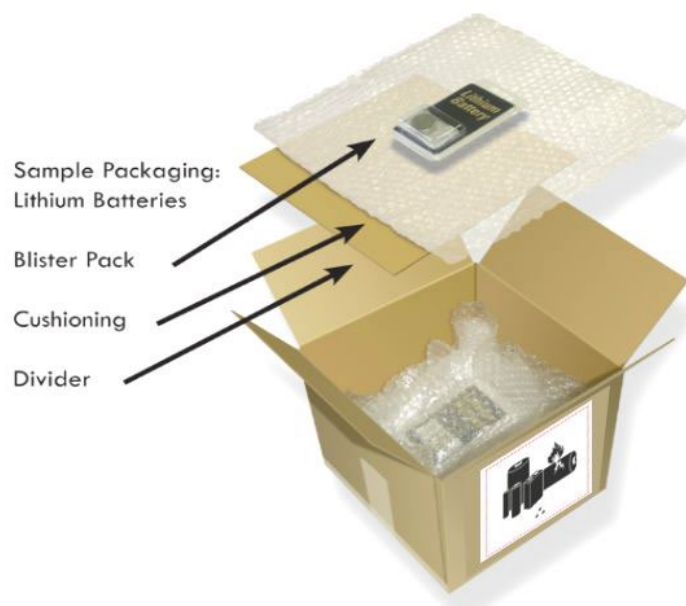
E. What is a button cell battery?

A button cell battery is a small round cell where the overall height is less than the diameter. Button cells are often referred to as “coin” cells.

Part 2 – Questions related to Packaging and Transport Provisions

A. How do I safely package lithium batteries for transport?

One of the major risks associated with the transport of batteries and battery-powered equipment is short-circuit of the battery as a result of the battery terminals coming into contact with other batteries, metal objects, or conductive surfaces. Packaged batteries or cells must be separated in a way to prevent short circuits and damage to terminals. They must be packed in a strong rigid outer packaging unless when contained in equipment, the battery is afforded equivalent protection by the equipment in which it is contained. Sample packaging meeting these requirements is shown below:



B. How can batteries be effectively protected against short circuit?

Methods to protect against short circuit include, but are not limited to, the following methods:

- Packing each battery or each battery-powered device when practicable, in fully enclosed inner packagings made of non-conductive material (such as a plastic bag);
- Separating or packing batteries in a manner to prevent contact with other batteries, devices or conductive materials (e.g. metal) in the packagings; and
- Ensuring exposed terminals or connectors are protected with non-conductive caps, non-conductive tape, or by other appropriate means.

If not impact resistant, the outer packaging must not be used as the sole means of protecting the battery terminals from damage or short-circuiting. Batteries should be securely cushioned and packed to prevent shifting which could loosen terminal caps or reorient the terminals to produce short circuits.

Terminal protection methods include but are not limited to the following:

- Securely attaching covers of sufficient strength to protect the terminals;
- Packaging the battery in a rigid plastic packaging; and
- Constructing the battery with terminals that are recessed or otherwise protected so that the terminals will not be subjected to damage if the package is dropped.

C. I'm shipping using Section II of the packing instructions, what constitutes "adequate instruction"?

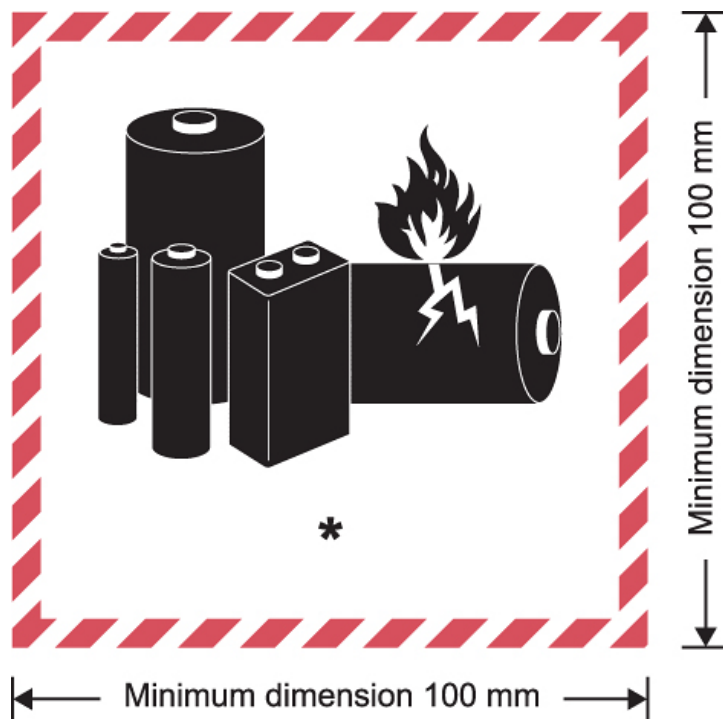
Shippers of lithium batteries prepared in accordance with Section II of the lithium battery packing instructions are not subject to the formal dangerous goods training requirements set out in DGR 1.5. However, persons preparing such shipments must be provided with "adequate instruction" as described in DGR 1.6.

The following is offered as a starting point for an employer on what could be considered as being adequate instruction:

1. The employer must identify the different configurations of lithium batteries that they ship, i.e. lithium batteries and/or lithium batteries packed with equipment and/or lithium batteries contained in equipment; lithium metal batteries and/or lithium ion batteries.
2. The employer must document the procedures that apply to the configurations and battery types that they ship as determined in 1, above.
3. The procedures should be written up as a clear work instruction or other information that is available to all employees responsible for the preparation of lithium battery shipments.
4. All employees that are involved in the process of preparing lithium battery shipments must be taken through the procedure to ensure that they understand and can demonstrate the correct application of documented procedures for the packing, labelling, marking and documentations requirements, as applicable to their job function.
5. A record must be maintained that identifies each applicable employee and the date(s) that this instruction was provided.
6. Employees should be given periodic refresher, or at least demonstrate that they remain "adequately" instructed on how to perform the task. This should be done at least every two years or whenever the procedure is revised, or regulations are changed, whichever is sooner.
7. Companies that are involved in reverse logistics, i.e. arranging for returns of lithium batteries, lithium batteries packed with equipment or lithium batteries contained in equipment must develop a clear instruction for consumers on the process to be followed for returning products. This instruction must include packaging materials and lithium battery marks, as necessary. The instruction must also include the transport method and mode of transport that must be followed; this must include a clear statement on applicable prohibitions.

△ D. What does the lithium battery mark look like and when is it required?

The lithium battery mark is required as specified in the additional requirements of Section II of Packing Instructions 966, 967, 969 and 970. It is also required as specified in the additional requirements of Section IB of Packing Instructions 965 and 968 in addition to the Class 9 lithium battery hazard label and Cargo Aircraft Only label. The mark (see below) is as shown in Figure 7.1.C of the IATA Dangerous Goods Regulations. The border of the mark must have red diagonal hatchings with a minimum width of 5 mm. The symbol (group of batteries, one damaged and emitting flame, above the UN number for lithium ion or lithium metal batteries or cells) must be black on white or suitable contrasting background. The lithium battery mark may be printed directly on the outer packaging provided that there is sufficient contrast between the elements of the lithium battery mark and the colour of the packaging material. The mark must be in the form of a rectangle or a square with minimum dimensions of 100 mm x 100 mm. If the size of the package so requires, the dimensions may be reduced to not less than 100 mm wide x 70 mm high, and all features must be in approximate proportion to those shown on the full-size mark.



* Place for UN number(s), i.e. UN 3090, UN 3091, UN 3480 and/or UN 3481, as applicable. The UN number(s) indicated on the mark should be at least 12 mm high.

⊗

E. If I have smaller packages, can I use a smaller lithium battery mark?

Where the packages are of dimensions such that they cannot bear the full-size lithium battery mark, the mark dimensions may be reduced to 100 mm wide × 70 mm high. The design specifications remain otherwise the same.

Where any face of a package is large enough to bear the full-size lithium battery mark, the full-size mark must be used.

F. When is a lithium battery mark not required on the package?

A lithium battery mark must not be affixed to packages prepared in accordance with Section IA of Packing Instructions 965 and 968 and Section I of Packing Instructions 966, 967, 969 and 970.

A lithium battery mark is **not required** for packages prepared in accordance with Section II of PI 967 or PI 970 containing only button cell batteries installed in equipment (including circuit boards) or consignments of two packages or less where each package contains no more than four cells, or two batteries installed in equipment.

Note:

The Air Waybill is required to contain the statements "Lithium [ion or metal] batteries in compliance with Section II of PI9XX" when the lithium battery mark is affixed to the package(s).

G. Section II in Packing Instructions 967 and 970 states that "the lithium battery mark is not required on consignments of two packages or less where each package contains no more than four cells, or two batteries installed in equipment." What is the intent of this provision?

This provision is to require, where there are more than two packages in the consignment, that each package bears the lithium battery mark, and therefore the air waybill has the compliance statement e.g. "Lithium [ion or metal] batteries in compliance with Section II of PI 9xx [67 or 70]".

The provision continues to allow for small consignments of one or two packages, containing no more than four cells or two batteries installed in equipment per package, to move without the lithium battery mark and therefore without the compliance statement on the air waybill.

Note:

A consignment is one or more packages of dangerous goods accepted by an operator (airline) from one shipper at one time and at one address, receipted for in one lot and moving to one consignee at one destination address.

H. I have a mobile (cell) phone that contains one single-cell lithium ion battery. Do I have to mark the shipping box that contains each mobile phone? What if I place five mobile phones in a shipping box? Does this require the lithium battery mark?

For packages of a single mobile phone, no lithium battery mark would be required since you can place up to 4 of these single-cell batteries in a box without applying the lithium battery mark on the outer box. In the case where 5 mobile phones are in a shipping package, a lithium battery mark on the shipping package is required.

- ☐ **I. If I pack three mobile phones each containing a single cell lithium ion battery, can I also pack a laptop with a lithium ion battery in the same package and not apply the lithium battery mark using the 4 cell, 2 battery exception?**

No, the exception is for 4 cells or 2 batteries. You cannot mix and match.

J. Can a single lithium battery mark be used to identify that both lithium metal and lithium ion batteries are contained inside the package?

Yes. The mark may bear all applicable UN numbers, e.g. UN 3091, UN 3481, to identify that the package contains lithium metal batteries packed with or contained in equipment and lithium ion batteries packed with, or contained in equipment.

⊗

K. Must the lithium battery mark be placed on the same face of the package with the Class 9 hazard label and/or Cargo Aircraft Only label?

No, the lithium battery mark does not have to be on the same face of the package with these labels. It may be placed on a different face. However, if the package is of sufficient size all required marks and labels should be applied to one face of the package.

L. For the purposes of the lithium battery packing instructions, what is considered the "package"?

The package is the complete product of the packing operation that satisfies the requirements of the packing instruction and in a manner ready to be presented for transport (shipper/consignee information, hazard communication, etc.). The package may contain multiple batteries or pieces of equipment provided the limitations set out in the applicable packing instruction are not exceeded. The package must be marked and labelled as required by the packing instruction. A single package may be offered for transport, or one or more packages may then be placed into an overpack for ease of handling or transport purposes. When an overpack is used, the package marks and labels must be duplicated on the overpack unless the marks and labels required on individual packages are visible or are not required by the packing instruction (i.e. not more than 4 cells or 2 batteries when contained in equipment and no more than two packages in the consignment).

M. Does the IATA DGR require a MSDS or SDS containing the UN test data?

No. The IATA DGR does not require a safety data sheet (SDS) when offering lithium batteries for transport.

Notes:

1. *A SDS is not a transport document. A SDS is only required for the supply and use of a substance or mixture meeting the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) classification criteria. GHS does not include provisions for manufactured articles.*

2. *Except for button cells installed in equipment (including circuit boards), manufacturers and subsequent distributors of lithium cells and batteries and equipment with installed lithium cells or batteries must make available a test summary that identifies that the cell and battery types have passed the applicable UN 38.3 tests, see Part 4 of this document.*

N. Under Packing Instructions 966 and 969, it states that "The maximum number of batteries in each package must not exceed the minimum number required to power the equipment, plus two spare sets. A "set" of cells or batteries is the number of individual cells or batteries that are required to power each piece of equipment". If a package contains 4 power tools (each tool contains 1 lithium ion battery), can 2 extra lithium ion batteries be placed in the package for each piece of equipment for a total of 12 batteries?

Yes, providing you do not exceed the maximum net quantity for the relevant section of the packing instruction and the chosen aircraft type. The 12 batteries reflect two spare sets (8) for each of the 4 power tools in the outer package plus one each to power the device (4).

O. May lithium battery packages be placed in an overpack in accordance with the IATA Dangerous Goods Regulations?

Yes, but there are segregation requirements that need to be considered for certain other classes of dangerous goods. UN 3090, lithium metal batteries prepared in accordance with Section IA or Section IB of PI 968 and UN 3480, lithium ion batteries prepared in accordance with Section IA or Section IB of PI 965 are not permitted in the same outer packaging with dangerous goods classified in Class 1 other than Division 1.4S, Division 2.1, Class 3, Division 4.1 or Division 5.1. The overpack may also contain goods not subject to the Regulations provided there are no packages enclosing different substances which might react dangerously with each other. An overpack must be marked with the word "overpack" and must be labelled with the lithium battery mark (DGR Figure 7.1.C), unless the mark(s) on the package(s) inside the overpack are visible or not required by the Packing Instruction.

P. Do the quantity limits shown in the lithium battery packing instructions apply to overpacks containing lithium batteries?

No. The quantity limits shown in the packing instructions refer to the maximum net weight of the lithium cells or batteries that is permitted in each package. Provided each package remains within the limit specified in the packing instruction, there are no limits specified for an overpack.

☐ **Q. Can I use a nylon bag to contain the individual packages prepared in accordance with Section II of Packing Instruction 967 to form an overpack?**

No, because the packages placed in an overpack must be secured within the overpack and that the intended function of each package must not be impaired by the overpack.

☐ **R. Packing Instructions 966 and 969 Section II specify that packages must be capable of withstanding a 1.2 metre drop test. What portion or portions of the package are subject to this test?**

The completed package containing batteries as prepared for transport in accordance with the relevant packing instruction must be capable of withstanding the 1.2 m drop test. This could apply to a package solely containing batteries that is packaged in full compliance with the provisions of the packing instruction (to include the 1.2 m drop test capability requirement) and is then packed with equipment in a strong rigid outer packaging and offered for transport. Or, it could apply to a package that includes batteries properly packed in inner packaging and equipment or other non-dangerous goods that are placed in a strong rigid outer packaging. The package that includes both the inner packaging containing batteries and the equipment must comply with the packing instruction to include meeting the capability to pass the 1.2 m drop test.

□ **S. Packing Instructions 965 and 968 Section IB specify that packages must be capable of withstanding a 3 metre stack test. Do I have to have my package tested?**

No, but the shipper must, if required, be able to demonstrate to the appropriate authority that they have determined the capability of the package to withstand a 3 m stack test for a period of 24 hours. One method could be that the shipper prepares a package containing batteries as tendered for transport in accordance with the relevant packing instruction and then places a weight equivalent to the weight of similar packages if stacked 3 m high and leaving that for 24 hours. This could be documented as evidence of demonstrating capability.

T. How do I transport prototype lithium cells and batteries that have not passed the UN 38.3 Tests?

Pre-production prototypes of lithium batteries or cells, when these prototypes are transported for testing, or low-production runs (i.e. annual production runs consisting of no more than 100 lithium cells and batteries) of lithium cells or batteries that have not been tested to the requirements in subsection 38.3 of the UN Manual of Tests and Criteria may be transported aboard cargo aircraft, if approved by the appropriate authorities of the State of Origin and the State of the Operator and the requirements in Packing Instruction 910 of the Supplement to the Technical Instructions are met (see Special Provision A88).

The appropriate authority of the State of Origin should provide details of PI 910 as part of the approval process.

U. Can I ship recalled, damaged or non-conforming cells or batteries?

Lithium batteries, identified by the manufacturer as being defective for safety reasons, or that have been damaged, that have the potential of producing a dangerous evolution of heat, fire or short circuit are forbidden for transport by air (e.g. those being returned to the manufacturer for safety reasons). This applies also to lithium cells or batteries installed inside equipment such as mobile phones, laptops or tablets where the devices are subject to recall due to the safety concerns of the lithium cell or battery installed in the device, see Special Provision A154 in the DGR.

Batteries which have some other defective feature (e.g. LEDs not showing charge, incorrect model number on label, or batteries not holding enough charge) could still be shipped by air. Also, laptops being returned may not have a defective battery, it may not meet the needs of the customer, may be defective itself (but not the battery), etc. In these situations air transport would be permitted. The battery or equipment manufacturer should be contacted to determine the appropriate shipping method.

V. How do I protect against “inadvertent activation”?

When batteries are contained in equipment, the equipment must be packaged in a manner that prevents unintentional activation or must have an independent means of preventing unintentional activation (e.g. packaging restricts access to activation switch, switch caps or locks, recessed switches, trigger locks, temperature sensitive circuit breakers, etc.). This requirement does not apply to devices which are intentionally active in transport (RFID transmitters, watches, sensors, etc.) and which are not capable of generating a quantity of heat sufficient to be dangerous to packaging or personal safety.

W. What is the maximum weight of batteries per package for fully regulated batteries contained in equipment (Section I)?

The maximum weight is 5 kg of lithium batteries per package for passenger and cargo aircraft and 35 kg of lithium batteries per package for cargo aircraft only. The net quantity shown excludes the weight of the equipment:

	Net Quantity per Package Passenger Aircraft	Net Quantity per Package Cargo Aircraft Only
Lithium Ion & Lithium Metal cells and batteries contained in equipment	5 kg	35 kg

X. Do I need to declare a gross weight or a net weight for lithium batteries (Section I)?

All lithium battery shipments, including when packed with or contained in equipment, must be declared by the net weight of lithium cells or batteries contained in the package.

The net weight that must be declared is the weight of the lithium cell or batteries contained in the package. This applies for both lithium ion cells and batteries and lithium metal cell and batteries.

Y. I am shipping Section IB lithium [ion or metal] batteries; do I need dangerous goods training?

Yes. All the applicable provisions of the Dangerous Goods Regulations apply to shipments of Section IB batteries. Therefore, dangerous goods training as indicated in Subsection 1.5 of the Dangerous Goods Regulations is required.

Z. What are the additional marking requirements for a package prepared under Section IB of Packing Instruction 965 and 968?

Because all of the requirements of the dangerous goods regulations apply other than the requirement to use UN specification packaging, each package must be marked with:

- the UN Number preceded by "UN" and the Proper Shipping Name (DGR 7.1.4.1 (a));
- the name and address of the shipper and consignee (DGR 7.1.4.1 (b));
- in addition, the net weight as required by (DGR 7.1.4.1(c)) must be marked on the package; and
- the lithium battery mark (see Part 2, D) in addition to the Class 9 lithium battery hazard label and Cargo Aircraft Only label.

Note:

When using an overpack, each package must be marked in accordance with the Regulations and then, when placed in an overpack, marked as required by DGR 7.1.7.

AA. I work for a pharmaceutical manufacturer that is shipping vaccines and other pharmaceutical products with lithium battery powered temperature or data loggers; do I need to follow the Dangerous Goods Regulations?

Yes. All the applicable provisions for lithium batteries will need to be followed by the shipper of such devices, including the limitations for devices that are "active" (on) during transport.

However, there are exceptions for packages containing only COVID-19 pharmaceuticals in Special Provision A220 that these packages containing cargo tracking devices containing lithium batteries are not subject to the marking and documentation requirements of Section II of Packing Instruction 967 or 970. This same exception is also applicable to the same package configuration, when consigned without the COVID-19 pharmaceutical for the purposes of use or re-use when prior arrangements have been made with the operator.

Note:

1. The IATA [Temperature Control Regulations](#) (TCR) also apply to such shipments.
2. Further information on active devices in the guidance document that is posted on the IATA website – www.iata.org/pharma

BB. Do I need to include an additional document or statement to certify that my lithium ion batteries are at no more than 30% SoC?

No. For lithium ion batteries shipped in accordance with Section IA or Section IB of PI 965, which must be on a Shipper's Declaration, the Shipper's Declaration includes a certification statement "I declare that all of the applicable air transport requirements have been met."

By signing the Shipper's Declaration the shipper is making a legal statement that all the applicable provisions of the DGR have been complied with, which includes that the lithium ion batteries are at no more than 30% SoC.

CC. I have lithium ion batteries packed with equipment (PI 966, Section I) where the lithium ion batteries are packed in a UN specification fibreboard (4G) box and then that box is packed with the equipment in a fibreboard outer packaging. Is this an overpack?

No, Section I of PI 966 (and also PI 969) allows two methods of having lithium batteries packed with equipment. Either:

- (a) the lithium batteries are packed into a UN specification packaging meeting Packing Group II performance standards and then packed with the equipment in a strong rigid outer packaging; or
- (b) the lithium batteries are packed into an inner packaging and then packed with the equipment into a UN specification packaging meeting Packing Group II performance standards.

In either case what is presented for transport is a "package" and not an overpack.

DD. Does the definition of "consignment" apply to the house air waybill (HAWB) or to the master air waybill (MAWB)?

The use of HAWB or MAWB has no direct relationship to what a "consignment" is. For example a MAWB may have multiple consignments where each of the consignments are from separate shippers, or are from one shipper but to separate consignees, or the MAWB may be just be a single consignment from one shipper to one consignee.

The following limitation applies to consignments:

1. a shipper is not permitted to consign more than two packages of lithium batteries contained in equipment under Section II of PI 967 and PI 970 where there are no more than 4 cells or 2 batteries in the package without the application of the lithium battery mark on the package.

The objective of this condition is to:

1. require appropriate hazard communication on packages and on the air waybill where a shipper has more than two packages of lithium batteries contained in equipment.

Notes:

1. *This does not mean that every retail "package" must bear the lithium battery mark. A shipper may place multiple retail boxes, each containing a lithium battery meeting Section II installed in equipment, into an outer packaging to form the package for air transport. There is no limit on the number of individual retail boxes that can be placed into the outer packaging, except that a "package" must not contain more than 5 kg net weight of lithium batteries. Each such package must bear the lithium battery mark and when an air waybill is used, the air waybill must show the applicable compliance statement, e.g. "lithium ion batteries in compliance with section II of PI 967".*

2. *Shippers or freight forwarders should not try to split a consignment across multiple air waybills to try to avoid the application of the lithium battery mark where there are more than two packages with lithium batteries contained in equipment under Section II in a consignment.*

EE. What is the correct classification where I want to ship 2 mobile phones in the same package with 2 power banks?

The power banks are classified as UN 3480, **Lithium ion batteries** and therefore must be shipped in accordance with Section IB of PI 965 if the power bank has a Watt-hour rating not exceeding 100 Wh or in accordance with Section IA of PI 965 if the Watt-hour rating exceeds 100 Wh. Under the provisions of PI 965 Section IA and IB other lithium battery-powered equipment may be packed in the same outer packaging provided that all applicable parts of the relevant packing instructions are followed, which includes the net weight of lithium batteries contained in the package. Therefore, the package must be classified as UN 3480, Lithium ion batteries. The power banks are also not considered as "spares" for the purposes of PI 966, Lithium ion batteries packed with equipment.

FF. What is the correct classification for hearing aids or Bluetooth® "earbuds" that are shipped in a charging case or with a charging case in the same package?

Bluetooth® earbuds or hearing aids that are shipped in or with a charging case should be classified as "UN3481, Lithium batteries packed with equipment" and packaged in accordance with PI 966. If the charging case is shipped without the earbuds, the case must be classified as "UN3480, Lithium ion batteries" and packaged in accordance with PI 965.

GG. Can a package containing an AC adaptor or charger and lithium ion batteries be classified as UN 3481, Lithium ion batteries packed with equipment?

No, for the purpose of Packing Instruction 966, "equipment" means the device or apparatus for which the lithium ion batteries will provide electrical power for its operation. When a package contains only the AC adaptor or charger and lithium ion batteries, the package must be classified as "UN 3480, Lithium ion batteries" and packaged in accordance with PI 965.

Part 3 – Questions Related to Design Type Testing Provisions

A. Where can I find requirements related to testing of battery design types?

The UN Manual of Tests and Criteria sets out specific tests that must be conducted on each lithium cell or battery design type. Each test is intended to either simulate a common transportation occurrence such as vibration or changes in altitude or to test the integrity of a cell or battery. You may obtain a copy of these testing requirements via the following website:

http://www.unece.org/trans/danger/publi/manual/manual_e.html

B. What constitutes a design change requiring renewed design type testing?

The following provisions are taken from the 7th revised edition of the UN Manual of Tests and Criteria, paragraph 38.3.2.2.

A cell or battery that differs from a tested design by:

- (a) For primary cells and batteries, a change of more than 0.1 g or 20% by mass, whichever is greater, to the cathode, to the anode, or to the electrolyte;
- (b) For rechargeable cells and batteries, a change in Watt-hours of more than 20% or an increase in voltage of more than 20%; or
- (c) A change that would materially affect the test results.

shall be considered a new type and shall be subjected to the required tests.

Note: the type of change that might be considered to differ from a tested type, such that it might lead to a failure of any of the test results, may include, but is not limited to:

- (a) A change in the material of the anode, the cathode, the separator or the electrolyte;*
- (b) A change of protective devices, including the hardware and software;*
- (c) A change of safety design in cells or batteries, such as a venting valve;*
- (d) A change in the number of component cells;*
- (e) A change in connection mode of component cells;*
- (f) For batteries which are to be tested according to T.4 with a peak acceleration less than 150 g_n, a change in the mass which could adversely impact the result of the T.4 test and lead to a failure.*

In the event that a cell or battery type does not meet one or more of the test requirements, steps shall be taken to correct the deficiency or deficiencies that caused the failure before such a cell or battery type is retested.

△ C. Which edition of the UN Manual of Tests and Criteria must be used when testing new lithium cell or battery designs

If a newly produced lithium cell or battery design is being tested for the first time, then the edition of the UN *Manual of Tests and Criteria* in effect at the time that the cell or battery designs are first tested must be used. For example, a new lithium ion battery design is produced for the first time in March 2023. This battery must be tested in accordance with the provisions of the 7th revised edition, amendment 1 of the UN *Manual of Tests and Criteria* as this is the edition in effect as of 1 January 2023, see Note under DGR 1.1.1 (1.1 of the LBSR).

Part 4 – Questions Related to the Lithium Battery Test Summary¹

△ A. Does the test summary apply to equipment containing lithium cells or batteries?

Except where the equipment, including circuit boards, contains only lithium button cells, the test summary applies to all lithium cells and batteries, irrespective of whether they are shipped alone or contained in equipment.

B. Can multiple batteries/manufacturers/products be listed on one report?

Yes, it is acceptable to have a single document that addresses multiple batteries / manufacturers / products, provided all required information is stated. For example, a tablet manufacturer may purchase lithium ion batteries from three different battery manufacturers. The test summary for the product will therefore list batteries and all related information (e.g. Watt-hours, test labs) from the three battery manufacturers without naming the manufacturer due to confidentiality issues.

C. Is it acceptable to list the various test houses, tests and range of revisions tested to for the UN 38.3 revision and amendments?

Yes, it is acceptable to have multiple test houses and their addresses, email information, etc. listed provided all required information is stated. The test house is not required to be aligned to a specific battery or product on the test summary when the test summary covers multiple batteries/products. It is required to have the test report number and date of test for each cell/battery/product listed on the test summary.

D. What is meant by physical description of cell or battery?

A physical description is intended to provide a check for the person requesting the test summary to know that it applies to the cell/battery/product covered by the test summary, i.e. if a cellular phone is the product being shipped, the invoice description or marketing name of the product as the physical description could be used on the test summary.

E. What does availability of report mean: "When requested?"

The test summary must be made available upon request. Any individual or entity in the supply chain may request the test summary, e.g. regulator, consumer, or transport provider.

F. Can the test summary provider require a requestor to obtain the document from a website?

Yes, it is acceptable for the provider to require the requestor to obtain a document electronically from a provider's website. The provider must ensure that the cell/battery/product has appropriate identifiers to align to the test summary.

G. If a manufacturer considers their suppliers, test house and battery data confidential and competitive information, how would test summary compliance be achieved?

All 10 data elements and listed subsets of information are required to be on the test summary. As indicated above, the test house information may be listed to cover a range of products.

H. If a test summary is requested by a dangerous goods enforcement agency, how quickly must the test summary be made available? For example, would a manufacturer be expected to immediately produce a test summary or provide it within a certain amount of time (e.g. 72 hours)

Due to the large volume of lithium batteries and lithium battery powered products that are shipped daily, manufacturers and distributors should not be expected to immediately provide a test summary for every product they ship. Manufacturers and distributors should be provided a reasonable amount of time to provide the required test summary.

I. Would manufacturers and distributors of battery powered vehicles (UN3171) and hybrid vehicles containing a lithium battery (UN3166) be expected to provide a test summary?

Yes. The test summary requirement applies to manufacturers and distributors of lithium cells and batteries. Therefore, a test summary must be made available for lithium battery-powered vehicles and other vehicles containing lithium batteries.

J. Is there a mandated format for the test summary that manufacturers and distributors must follow?

No. Manufacturers and distributors may compile the information required in the test summary using any format. Below are 3 examples of a test summary:

Example 1 of a Lithium Ion Battery Test Summary**LITHIUM CELLS OR BATTERIES TEST SUMMARY
IN ACCORDANCE WITH SUB-SECTION 38.3
OF UN MANUAL OF TESTS AND CRITERIA**

Revision Date: March 27, 2017 Revision Number: 001

Product Manufacturer: Beta Bell Phone Company
123 Beta Bell Lane
Bellweather, Arizona 99999

Telephone: 800-999-4545
Email: betabell@gmail.com
Web: www.betabell.com

Beta Bell's product lithium ion cells and batteries have been successfully tested and comply with the UN Model Regulations, Manual of Test and Criteria, Part III, subsection 38.3.

PERFORMED TESTS			RESULTS
38.3.4.1	T1	Altitude Simulation	Pass
38.3.4.2	T2	Thermal Test	Pass
38.3.4.3	T3	Vibration	Pass
38.3.4.4	T4	Shock	Pass
38.3.4.5	T5	External Short Circuit	Pass
38.3.4.6	T6	Impact / Crush	Pass
38.3.4.7	T7	Overcharge	Pass
38.3.4.8	T8	Forced Discharge	Pass

The UN38.3 tests were performed by one of the following test houses and were tested to UN Manual Test and Criteria Revision 3 Amendment 1 or subsequent revisions or amendments.

Test House A 123 Alpha Street Shanghai China E: testhousea@gmail.com T: 086-0310-04566 U: www.testhousea.com	Test House C 123 Chi Street Shanghai China E: testhouseC@gmail.com T: 086-0310-04588 U: www.testhousec.com
Test House B 123 Beta Street Shanghai China E: testhouseb@gmail.com T: 086-0310-04577 U: www.testhouseb.com	Test House D 123 Delta Street Shanghai China E: testhoused@gmail.com T: 086-0310-04599 U: www.testhoused.com

**LITHIUM CELLS OR BATTERIES TEST SUMMARY
IN ACCORDANCE WITH SUB-SECTION 38.3
OF UN MANUAL OF TESTS AND CRITERIA**

Product Test Information

Model numbers	Physical Description	Battery weight (kg) Mass	Wh rating	Test report number	Test report date
BB12389	Li ion polymer Cell phone Alpha A	0.035	6.25	RTS123, NMD456PO98 N4569-2 BN890A	03.02.2010 03.07.2010 03.10.2010 03.15.2010
BB12450	Li ion polymer Cell Phone Beta B	0.090	6.76	TYh765-KL-09 567-908HGT	08.09.2012 09.01.2012
BB67896	Li ion polymer Cell phone Chi C	0.026	5.25	89065RT-90 NHI-kl09	07.07.2010 07.04.2010
etc					
etc					
etc					
etc					
etc					
etc					

Signature _____

Name, Title

Example 2 of a Lithium Ion Battery Test Summary

	UN38.3 Lithium Battery Test Summary for GreenTech Tablet Model No. T54321
1	Battery Manufacturer <i>Confidential and Proprietary GreenTech Information</i>
2	Product Manufacturer GreenTech 123 Main Street Annapolis, MD 21012 888.111.2345 contact@greentech.com; www1.greentech.com
3	UN38.3 Test Lab Bob's Battery Test Lab 1600 Pennsylvania Avenue Smithfield, VA 12345 Phone: 211.789.2345 bob@testlab.org; www.testlab.org
4	Test Report Number Liion621345
5	Date of Test Report April 1, 2017
6	Description of Cell or Battery 7.4 V, 1800 mAh, 13.32 Wh Li ion battery, Model No. P1789 Small, rectangular plastic case, 100 grams
7	UN38.3 Tests Performed and Successfully Passed T.1, T.2, T.3, T.4, T.5, and T.7. (Note that T.6 and T.8 are not applicable to batteries.)
8	Assembled Battery Testing Requirements Not Applicable
9	Edition of UN Manual of Tests and Criteria Used Sixth Revised Edition
10	Name and Title of Signatory <i>Jason Alexander</i> Jason Alexander GreenTech Staff Engineer

Example 3 of a Lithium Metal Cell Test Summary

LITHIUM CELLS OR BATTERIES TEST SUMMARY IN ACCORDANCE WITH SUB-SECTION 38.3 OF MANUAL OF TESTS AND CRITERIA		
BATTERY TRANSPORTION INFORMATION		
Name of cell, battery or product manufacturer, as applicable: Item Number : 4A23123 Item Name : Battery Alpha Prime Item Description : Lithium Metal Battery (Primary)	Cell, battery or product manufacturer's contact information to include address, phone number, email address and website for more information: Manufacturer XYZ 3480 Lithium cells Rd Lithiumionville, CA 98765 United States (+1-987) 987-6543 email@xyz.com	
Name of the test laboratory to include address, phone number, email address and website for more information: Test Lab A 1919 Alpha St Testcity, IA 55555 USA (+1-333) 555-1122 email@testlab.com	A unique test report identification number: ABC12345	Date of the test report: 03-Apr-2013
Description of cell or battery to include at a minimum: Lithium ion or Lithium metal cell or battery; Mass; Watt-hour rating, or lithium content; Physical description of the cell/battery; and Model numbers: Battery used in consumer power tools Cell/battery Type : Lithium metal Cell or Battery : Cell LC or W/h rating : LC (g): >0.3 <= 1 Cell or Battery Weight : 12.00 Grams	List of tests conducted and results (i.e., pass/fail): Test T.1: Altitude Simulation : Pass Test T.2: Thermal Test : Pass Test T.3: Vibration : Pass Test T.4: Shock : Pass Test T.5: External short circuit : Pass Test T.6: Impact/Crush : Pass Test T.7: Overcharge : Not applicable Test T.8: Forced discharge : Pass Testing additional comments:	
Reference to assembled battery testing requirements, if applicable (i.e., 38.3.3(f) and 38.3.3(g)): Not applicable	Reference to the revised edition of the Manual of Tests and Criteria used and to amendments thereto, if any: Revision 5	For air transport only: Does the cell or battery comply with the 30% State of Charge? Not Applicable
PRODUCT CLASSIFICATION FOR TRANSPORT (According to UN - DGP)		
UN Classification: UN 3090	Proper Shipping Name: Lithium metal batteries	
Signature with name and title of signatory as an indication of the validity of information provided: Wayne Purple Testing Manager	This document remains valid as long as no changes, modifications, or additions are made to the model(s) described in this document, after being transported from a Manufacturer XYZ facility. The model(s) has (have) been classified according to the applicable transport regulations and the UN Manual of Tests and Criteria as of the date of the certification. The model(s) must be packaged, labeled, and documented according to country and other international regulations for transportation.	
Date document was generated: 04-Mar-2017 11:49 am		

Page 1 of 1

¹ Information in Part 4 kindly provided by PRBA – The Rechargeable Battery Association, RECHARGE the Advanced Rechargeable & Lithium Batteries Association and the Medical Device Battery Transport Council

Additional Information

Further information can be found here:

<http://www.iata.org/lithiumbatteries>

Information for passengers can be found here:

<http://www.iata.org/dgr-guidance>

www.faa.gov/go/safecargo

You may also contact the airline of your choice or your national civil aviation authority if you have any further concerns about travelling with lithium metal or lithium ion batteries.

You can also contact the IATA Dangerous Goods Support team if you have questions or concerns which may not have been addressed in this document: dangood@iata.org.

Abbreviations, Acronyms, Symbols

The following abbreviations, acronyms and symbols are used throughout the document.

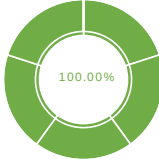
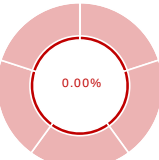
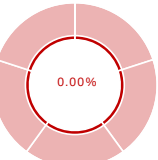
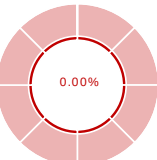
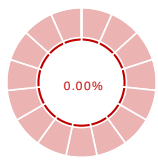
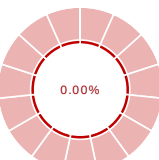
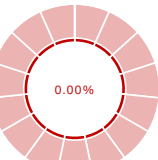
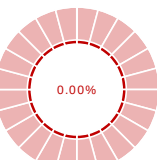
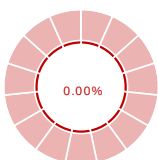
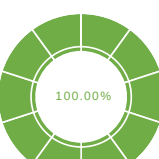
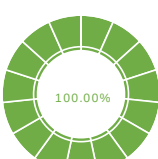
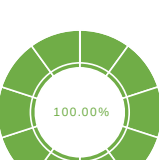
Abbreviation	Meaning
A/C	Aircraft
Li Ion (li-ion)	Lithium ion
Li batt.	Lithium battery
Pax	Passenger
Acronym	Meaning
CAO	Cargo Aircraft Only
DGD	Shipper's Declaration for Dangerous Goods
DGR	IATA Dangerous Goods Regulations
LBSR	IATA Lithium Battery Shipping Regulations
Symbol	Meaning
≥	Equal to or greater than
≤	Equal to or less than
>	Greater than
<	Less than
□	Addition of an item
△	Change to an item
⊗	Deletion of an item

APPENDIX 4J

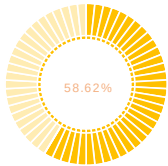
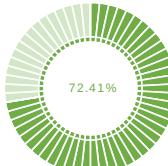
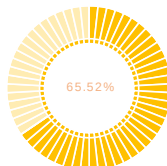
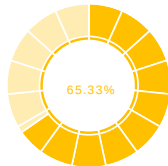
MID Region
Aerodromes Safety Dashboard

State	Country Code	Total # of AD (AOP Table I-I)	City	Aerodrome Name (AOP Table I-I)	Location Indicator (AOP Table I-I)	Designation (AOP Table I-I)	AD Certification Implementation		AD Local RST Establishment		AD Readiness for GRF Deployment		National GRF Implementation Plan Progress	Aerodrome Traffic Density		
							Certified	Level of Implementation	Established	Level of Implementation	Ready	Level of Deployment		Light	Medium	Heavy
Bahrain	BHR	1	Manama	Bahrain International Airport	OBBI	RS										
Egypt	EGY	7	Borg ElArab	BORG ELARAB INT AIRPORT	HEBA	RS										
			Aswan	ASWAN INT AIRPORT	HESN	RS										
			Cairo	CAIRO INT AIRPORT	HECA	RS										
			Hurghada	HURGHADA INT AIRPORT	HEGN	RS										
			Luxor	LUXOR INT AIRPORT	HELX	RS										
			Marsa Alam	MARSA ALAM INT AIRPORT	HEMA	RNS										
Iran	IRN	9	Sharm El Sheikh	SHARM EL SHEIKH INT AIRPORT	HESH	RS										
			Bander Abbas	Bandar Abbas International Airport	OIKB	RS										
			Esfahan	Shahid Beheshti International Airport	OIFM	RS										
			Mashhad	Shahid Hashemi Nejad International Airport	OIMM	RS										
			Shiraz	Shahid Dastghaib International Airport	OISS	RS										
			Tabriz	Tabriz International Airport	OITT	RNS										
			Tehran	Imam Khomeini International Airport	OIE	RS										
			Tehran	Mehrabad Intl/ OIII	OIII	RS										
			Yazd	Shahid Sadoghhi International Airport	OYYY	RS										
Iraq	IRQ	6	Zahedan	Zahedan International Airport	OIZH	RS										
			Al-Najaf	Al-Najaf Al-Ashraf International Airport	ORNI	RNS										
			Baghdad	Baghdad International Airport	ORBI	RS										
			Basrah	Basrah International Airport	ORMM	RS										
			Erbil	Erbil International Airport	ORER	RS										
			Mosul	Mosul International Airport	ORBM	RS										
Jordan	JHU	2	Sulaymaniyah	Sulaymaniyah International Airport	ORSU	RS										
			AMMAN	Queen Alia International Airport	OJAI	RS										
			AQABA	King Hussein International Airport	OIAQ	RS										

MID Region Aerodromes **Safety** Dashboard

State	Country Code	Total # of AD (AOP Table I-I)	City	Aerodrome Name (AOP Table I-I)	Location Indicator (AOP Table I-I)	Designation (AOP Table I-I)	AD Certification Implementation		AD Local RST Establishment		AD Readiness for GRF Deployment		National GRF Implementation Plan Progress	Aerodrome Traffic Density		
							Certified	Level of Implementation	Established	Level of Implementation	Ready	Level of Deployment		Light	Medium	Heavy
Kuwait	KWT	1	KUWAIT	Kuwait International Airport	OKBK	RS	✓		✓		✓					
Lebanon	LBN	1	BEIRUT	Rafic Hariri International Airport	OLBA	RS	✗		✗		✗					
Libya	LBY	3	BENGHAZI	Benina International Airport	HLLB	RS	✗		✗		✗					
			SEBHA	Sebha International Airport	HLLS	RS	✗		✗		✗					
			TRIPOLI	Tripoli International Airport	HLLT	RS	✗		✗		✗					
Oman	OMN	2	Muscat	Muscat International Airport	OOMS	RS	✓		✓		✓					
			Salalah	Salalah International Airport	OOSA	AS	✓		✓		✓					
Qatar	QAT	2	Doha	Doha International Airport	OTBD	RS	✓		✓		✓					
			Doha	Hamad International Airport	OTHH	RS	✓		✓		✓					

MID Region Aerodromes Safety Dashboard																
State	Country Code	Total # of AD (AOP Table I-I)	City	Aerodrome Name (AOP Table I-I)	Location Indicator (AOP Table I-I)	Designation (AOP Table I-I)	AD Certification Implementation		AD Local RST Establishment		AD Readiness for GRF Deployment		National GRF Implementation Plan Progress	Aerodrome Traffic Density		
							Certified	Level of Implementation	Established	Level of Implementation	Ready	Level of Deployment		Light	Medium	Heavy
Saudi Arabia	SAU	4	DAMMAM	King Fahd International Airport	OEDF	RS										
			JEDDAH	King Abdulaziz International Airport	OEJN	RS										
			MADINAH	Prince Mohammad Bin Abdulaziz International Airport	OEMA	RS										
			RIYADH	King Khalid International Airport	OERK	RS										
Sudan	SDN	4	EL OBEID	El Obeid International Airport	HSOB	AS										
			KHARTOUM	Khartoum International Airport	HSSS	RS										
			NYALA	Nyala International Airport	HSNN	AS										
			PORT SUDAN	Port Sudan International Airport	HSPN	RS										
Syria	SYR	3	ALEPPO	Aleppo International Airport	OSAP	RS										
			DAMASCUS	Damascus International Airport	OSDI	RS										
			LATTAKIA	Lattakia International Airport	OSLK	RS										
UAE	ARE	8	ABU DHABI	Zayed International Airport	OMAA	RS										
			ABU DHABI	Al Bateen International Airport	OMAD	RNS										
			AL AIN	Al Ain International Airport	OMAL	RS										
			DUBAI	Al Maktoum International Airport	OMDW	RS										
			DUBAI	Dubai International Airport	OMBD	RS										
			FUJAIRAH	Fujairah International Airport	OMFJ	RS										
			RAS AL KHAIMAH	Ras Al Khaimah International Airport	OMRK	RS										
			SHARJAH	Sharjah International Airport	OMSJ	RS										
Yemen	YEM	5	ADEN	Aden International Airport	OYAA	RS										
			HODEIDAH	Hodeidah International Airport	OYHD	RS										
			MUKALLA	Riyani International Airport	OYRN	RS										
			SANA'A	Sana'a International Airport	OYSN	RS										
			TAIZ	Taiz International Airport	OY TZ	RS										

MID Region Aerodromes Safety Dashboard												
State	Country Code	Total # of AD (AOP Table I-1)	AD Certification Implementation		AD Local RST Establishment		AD Readiness for GRF Deployment		National GRF Implementation Plan Progress	Aerodrome Traffic Density		
			Certified	Level of Implementation	Established	Level of Implementation	Ready	Level of Deployment		Light	Medium	Heavy
MID REGION AERODROMES SAFETY DASHBOARD	MID	58	34		42		38			38	17	3

General Guidance:

- **Country Code** : ISO 3-Letter Code of the Country
- **City/Aerodrome**: Name of the city and aerodrome, preceded by the location indicator.
- **Designation**: Operability of the aerodrome as indicated on the MID eANP Vol I (AOP Table I-1):

RS : international scheduled air transport, regular use;
 RNS : international non-scheduled air transport, regular use;
 AS : international scheduled air transport, alternate use;
 ANS : international non-scheduled air transport, alternate use.

Note 1 : when an aerodrome is needed for more than one type of use, normally only the use highest on the above list is shown.
 [Example : an aerodrome required for both RS and AS use would only be shown as RS in the list.]

Note 2 : when the aerodrome is located on an island and no particular city or town is served by the aerodrome, the name of the island is included instead of the name of a city.

- **Aerodrome certification process:**

Phase 1: Dealing with the expression of interest by an intending applicant for the aerodrome certificate;
Phase 2: Assessing the formal application, including evaluation of the aerodrome manual;
Phase 3: Assessing the aerodrome facilities and equipment;
Phase 4: Issuing or refusing an aerodrome certificate; and
Phase 5: Promulgating the certified status of an aerodrome and the required details in the AIP.

- **Aerodrome Traffic Density**

- Light.** The number of movements in the mean busy hour is not greater than 15 per runway or typically less than 20 total aerodrome movements.
- Medium.** The number of movements in the mean busy hour is of the order of 16 to 25 per runway or typically between 20 to 35 total aerodrome movements.
- Heavy.** The number of movements in the mean busy hour is of the order of 26 or more per runway or typically more than 35 total aerodrome movements.

Note 1. The number of movements in the mean busy hour is the arithmetic mean over the year of the number of movements in the daily busiest hour.

Note 2. Either a take-off or a landing constitutes a movement.

APPENDIX 4K

ANONYMOUS DATASET FOR AERODROME SAFETY

MINIMUM REPORTING AREAS OF NON-COMPLIANCES

AERODROMES OPERATIONS (AOP)									
	ICAO Reference	National Reference	Description	First reporting Date	Remarks/ Impact of non-implementation	STATE/ Concerned Aerodrome (s)	Corrective Action Plan _(s) (CAP _(s))		
							Document of the Corrective Action Plan accepted by the State for each concerned Aerodrome	Residual impediment(s)/obstacles faced during the implementation of each CAP and action thereon	Estimated Date for CAP completion / Status
AERODROME DESIGN									
1.	Annex 14 - Vol 1, Chapter 1 PANS- Aerodromes, Part 1, 2		Aerodrome Master Plan		The lack of airports master plans affect their short to medium term capacity and efficiency enhancement projects; restricting their ability to fulfil operational needs.				

MINIMUM REPORTING AREAS OF NON-COMPLIANCES

AERODROMES OPERATIONS (AOP)									
	ICAO Reference	National Reference	Description	First reporting Date	Remarks/ Impact of non-implementation	STATE/ Concerned Aerodrome (s)	Corrective Action Plan _(s) (CAP _(s))		
							Document of the Corrective Action Plan accepted by the State for each concerned Aerodrome	Residual impediment(s)/obstacles faced during the implementation of each CAP and action thereon	Estimated Date for CAP completion / Status
2.	Annex 14 - Vol 1, Chapter 2, 3 PANS-Aerodromes, Part 1, 2 MID ANP, Vol II - AOP		Runways		In view of the vital function of runways in providing for safe and efficient aircraft landings and take-offs, it is imperative that their design take into account the operational and physical characteristics of the aeroplanes expected to use the runway, as well as engineering considerations.				
3.	Annex 14 - Vol 1, Chapter 2, 3 PANS-Aerodromes, Part 1, 2		Taxiways		A properly designed taxiway system ensures a smooth, continuous flow of aircraft ground traffic, operating at the highest level of safety and efficiency and contributes to optimum aerodrome utilization				
4.	Annex 14 - Vol 1, Chapter 2, 3 PANS-Aerodromes, Part 1, 2		Aprons		Apron design should take into account safety procedures for aircraft manoeuvring and contribute to a high degree of efficiency for aircraft movements and dispensing apron services.				

MINIMUM REPORTING AREAS OF NON-COMPLIANCES

AERODROMES OPERATIONS (AOP)									
	ICAO Reference	National Reference	Description	First reporting Date	Remarks/ Impact of non-implementation	STATE/ Concerned Aerodrome (s)	Corrective Action Plan _(s) (CAP _(s))		
							Document of the Corrective Action Plan accepted by the State for each concerned Aerodrome	Residual impediment(s)/obstacles faced during the implementation of each CAP and action thereon	Estimated Date for CAP completion / Status
5.	Annex 14 - Vol 1, Chapter 2, 5, 6, 7 PANS- Aerodromes, Part 1 MID ANP, Vol II - AOP		Visual Aids		Visual aids contribute to the safety and operational efficiency of aircraft and vehicle movements. Design and Good maintenance of these aids is essential to ensure that the cues that they provide are available in all circumstances.				
6.	Annex 10 - Vol 1, Chapter 3		Radio Navigation Aids		Radio Navigation Aids contribute to the safety and operational efficiency of aircrafts. Good maintenance of these aids is essential to ensure that the cues that they provide are available in all				

MINIMUM REPORTING AREAS OF NON-COMPLIANCES

AERODROMES OPERATIONS (AOP)									
	ICAO Reference	National Reference	Description	First reporting Date	Remarks/ Impact of non-implementation	STATE/ Concerned Aerodrome (s)	Corrective Action Plan ^(s) (CAP ^(s))		
							Document of the Corrective Action Plan accepted by the State for each concerned Aerodrome	Residual impediment(s)/obstacles faced during the implementation of each CAP and action thereon	Estimated Date for CAP completion / Status
7.	Annex 14 - Vol 1, Chapter 8 PANS- Aerodromes, Part 1 MID ANP, Vol II - AOP		Electrical Systems		Electrical systems contribute to the safety and operational efficiency of aircraft and vehicle movements. Their design and good maintenance of these aids is essential to ensure that the cues that they provide are available in all circumstances				
8.	Annex 14 - Vol 1, Chapter 1		Terminals		Architectural and infrastructure-related requirements for the optimum implementation of international civil aviation security measures shall be integrated into the design and construction of new facilities and alterations to existing facilities at an aerodrome.				

MINIMUM REPORTING AREAS OF NON-COMPLIANCES

AERODROMES OPERATIONS (AOP)									
	ICAO Reference	National Reference	Description	First reporting Date	Remarks/ Impact of non-implementation	STATE/ Concerned Aerodrome (s)	Corrective Action Plan ^(s) (CAP ^(s))		
							Document of the Corrective Action Plan accepted by the State for each concerned Aerodrome	Residual impediment(s)/obstacles faced during the implementation of each CAP and action thereon	Estimated Date for CAP completion / Status
9.	Annex 14 - Vol 1, Chapter 9 PANS-Aerodromes, Part 1		Fencing		Lack of fences on an aerodrome could lead to the entrance to the movement area of animals large enough to be a hazard to aircraft.				
AERODROME OPERATIONS									
10.	Annex 14 - Vol 1, Chapter 2 PANS-Aerodromes, Part 1, 2 MID ANP, Vol II - AOP		Aerodrome Data		Determination and reporting of aerodrome-related aeronautical data shall be in accordance with the accuracy and integrity classification required to meet the needs of the end-users of aeronautical data				

MINIMUM REPORTING AREAS OF NON-COMPLIANCES

AERODROMES OPERATIONS (AOP)									
	ICAO Reference	National Reference	Description	First reporting Date	Remarks/ Impact of non-implementation	STATE/ Concerned Aerodrome (s)	Corrective Action Plan _(s) (CAP _(s))		
							Document of the Corrective Action Plan accepted by the State for each concerned Aerodrome	Residual impediment(s)/obstacles faced during the implementation of each CAP and action thereon	Estimated Date for CAP completion / Status
11.	Annex 14 - Vol 1, Chapter 9 PANS-Aerodromes, Part 1		Emergency planning		Lack of adequately effective emergency planning can seriously affect the effects of an emergency, particularly in respect of saving lives and maintaining aircraft operations.				
12.	Annex 14 - Vol 1, Chapter 2, 9 PANS-Aerodromes, Part 1 MID ANP, Vol II – AOP		Rescue and Firefighting		Lack of adequately effective rescue and firefighting service can affect capabilities to save lives in the event of an aircraft accident or incident occurring at, or in the immediate vicinity				

MINIMUM REPORTING AREAS OF NON-COMPLIANCES

AERODROMES OPERATIONS (AOP)									
	ICAO Reference	National Reference	Description	First reporting Date	Remarks/ Impact of non-implementation	STATE/ Concerned Aerodrome (s)	Corrective Action Plan ^(s) (CAP ^(s))		
							Document of the Corrective Action Plan accepted by the State for each concerned Aerodrome	Residual impediment(s)/obstacles faced during the implementation of each CAP and action thereon	Estimated Date for CAP completion / Status
13.	Annex 14 - Vol 1, Chapter 2, 9 PANS-Aerodromes, Part 1		Disable Aircraft Removal		Disabled aircraft can interfere with normal activity of an aerodrome. In addition, runway and taxiway closures can substantially reduce the number of arrivals and departures and restrict movement around the aerodrome, resulting in the reduction of the aerodrome capacity.				
14.	Annex 14 - Vol 1, Chapter 9 PANS-Aerodromes, Part 1		Wildlife Strike Hazard Reduction		Lack of measures (successful bird/wildlife control programme) on an airport and in its vicinity to minimize the likelihood of collisions between wildlife and aircraft will increase the risk to aircraft operations				

MINIMUM REPORTING AREAS OF NON-COMPLIANCES

AERODROMES OPERATIONS (AOP)									
	ICAO Reference	National Reference	Description	First reporting Date	Remarks/ Impact of non-implementation	STATE/ Concerned Aerodrome (s)	Corrective Action Plan _(s) (CAP _(s))		
							Document of the Corrective Action Plan accepted by the State for each concerned Aerodrome	Residual impediment(s)/obstacles faced during the implementation of each CAP and action thereon	Estimated Date for CAP completion / Status
15.	Annex 14 - Vol 1, Chapter 2, 9 PANS-Aerodromes, Part 1		Operational Area Management		Lack of appropriate airport operational services will affect the safety and efficiency of aircrafts operations.				
16.	Annex 14 - Vol 1, Chapter 9		Ground Servicing of Aircraft		Lack of appropriate Ground Servicing of Aircraft will affect the safety and efficiency of aircrafts operations.				
17.	Annex 14 - Vol 1, Chapter 4, 6 PANS-Aerodromes, Part 1		Control of obstacles		The airspace around aerodromes shall be maintained free from obstacles so as to permit the intended aeroplane operations at the aerodromes to be conducted safely and to prevent the aerodromes from becoming unusable by the growth of obstacles around the aerodromes				

MINIMUM REPORTING AREAS OF NON-COMPLIANCES

AERODROMES OPERATIONS (AOP)									
	ICAO Reference	National Reference	Description	First reporting Date	Remarks/ Impact of non-implementation	STATE/ Concerned Aerodrome (s)	Corrective Action Plan _(s) (CAP _(s))		
							Document of the Corrective Action Plan accepted by the State for each concerned Aerodrome	Residual impediment(s)/obstacles faced during the implementation of each CAP and action thereon	Estimated Date for CAP completion / Status
18.	Annex 14 - Vol 1, Chapter 10 PANS-Aerodromes, Part 1		Aerodrome Maintenance		A maintenance programme, shall be established at an aerodrome to maintain facilities in a condition which does not impair the safety, regularity or efficiency of air navigation				
19.	Annex 14 _ Vol1, Chapter 2 PANS-Aerodromes, Part 2		Global Reporting Format		Assessing and reporting the condition of the movement area and related facilities is necessary in order to provide the flight crew with the information needed for safe operation of the aeroplane. The runway condition report (RCR) is used for reporting assessed information.				

MINIMUM REPORTING AREAS OF NON-COMPLIANCES

AERODROMES OPERATIONS (AOP)									
	ICAO Reference	National Reference	Description	First reporting Date	Remarks/ Impact of non-implementation	STATE/ Concerned Aerodrome (s)	Corrective Action Plan ^(s) (CAP ^(s))		
							Document of the Corrective Action Plan accepted by the State for each concerned Aerodrome	Residual impediment(s)/obstacles faced during the implementation of each CAP and action thereon	Estimated Date for CAP completion / Status
20.	Annex 14 - Vol 1, Chapter 1 PANS-Aerodromes, Part 1		Safety Management		Implementation of SMS seeks to proactively mitigate safety risks before they result in aviation accidents/ incidents and improve operational efficiencies.				
AERODROME CERTIFICATION									
21.	Annex 14 - Vol 1, Chapter 1 to 10 PANS-Aerodromes, Part 1, 2		Aerodrome Certification		Lack of certification of an aerodrome means that aerodrome does not meet the specifications regarding the facility and its operation				

MINIMUM REPORTING AREAS OF NON-COMPLIANCES

AERODROMES OPERATIONS (AOP)									
	ICAO Reference	National Reference	Description	First reporting Date	Remarks/ Impact of non-implementation	STATE/ Concerned Aerodrome (s)	Corrective Action Plan ^(s) (CAP ^(s))		
							Document of the Corrective Action Plan accepted by the State for each concerned Aerodrome	Residual impediment(s)/obstacles faced during the implementation of each CAP and action thereon	Estimated Date for CAP completion / Status
22.	PANS-Aerodromes, Part 1		Safety assessments and Aerodrome Compatibility		The compatibility between aeroplane operations and aerodrome infrastructure and operations when an aerodrome accommodates an aeroplane that exceeds the certificated characteristics of the aerodrome should be assessed				

MINIMUM REPORTING AREAS OF NON-COMPLIANCES

Important Note:

* : Please include the reference of the CAP for each concerned Aerodrome with a hyperlink to the CAP Document as a [separate Attachment/Folder](#).

General Guidance on the minimum elements that any CAP should include:

Overall, establishing a CAP for each reported non-compliance is important for ensuring that safety concerns are addressed in a timely and effective manner. By investigating the non-compliance, **identifying the root causes and their related corrective measures, assigning responsibility, establishing timelines, monitoring progress, and evaluating effectiveness**, aerodrome operators and aviation authorities could ensure that safety risks are minimized, and that each aerodrome remains a safe environment for all users.

FOLLOW-UP ACTION PLAN ON MIDANPIRG/20 CONCLUSIONS & DECISIONS

No.	CONCLUSIONS AND DECISIONS	CONCERNS/ CHALLENGES (RATIONALE)	DELIVERABLE/ TO BE INITIATED BY		TARGET DATE	STATUS/REMARKS
C. 20/1	MID RVSM SMR 2022 That, the MID RVSM Safety Monitoring Report (SMR) 2022 at Appendix 5.2A , is endorsed.	RVSM Safety monitoring report	SMR2022	MIDRMA/States	2023	Completed
C. 20/2	MID RVSM SMR 2023 That, in order to support the MIDRMA in the timely development of the MID RVSM Safety Monitoring Report (SMR 2023): a) States are required to provide the MIDRMA with: - the FPL/traffic data for the period 1 – 30 June 2023 before 1 August 2023, and - LHD data for the period 1 January to 31 December 2023. b) only the appropriate “Traffic Data Sample” 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 final version of the MID RVSM SMR 2023 be ready for presentation to and endorsement by the MIDANPIRG/21 meeting.	RVSM Safety monitoring report	SMR2023	MIDRMA/States	2024	Actioned SL Ref.: AN 6/5.10.15A – 23/122, dated 5 June 2023 (WP/33 refers)
C.20/3	LACK OF HEIGHT MONITORING OF SYRIAN RVSM APPROVED AIRCRAFT That, a) ICAO MID Office to contact the Syrian Civil Aviation Authority and address the issue of lack of height Monitoring of their RVSM approved aircraft; and b) MIDRMA to circulate the status of the Syrian RVSM approved aircraft to all member States to advise all ATCUs regarding the updated status of the Syrian RVSM approved aircraft within their RVSM Airspace. In coordination with Syria and MIDRMA.	Monitoring the Syrian registered Aircraft				Completed

No.	CONCLUSIONS AND DECISIONS	CONCERNS/ CHALLENGES (RATIONALE)	DELIVERABLE/ TO BE INITIATED BY		TARGET DATE	STATUS/REMARKS
C. 20/4	AWARENESS AND TRAINING ON RVSM SAFETY ASSESSMENT RVSM safety monitoring activities and improve the knowledge of the States' regulators, MIDRMA Focal Points, 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 monitoring requirements be provided to concerned personnel; 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(s) related to the air operator(s) based in this State; and c) MIDRMA to issue on regular basis flyers and newsletters addressing trending and emerging challenges related to RVSM safety monitoring.	Raise the awareness related to the requirements for sustained RVSM safety monitoring activities	Briefings material and activities	MIDRMA	2023	Completed
C. 20/5	MID RVSM SAFETY ASSESSMENT SEMINAR That, with a view to raise awareness related to the requirements for sustained RVSM safety monitoring 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 MID RVSM Safety Assessment Seminar, in 2023.	Raise awareness related to the requirements for sustained RVSM safety monitoring and improve the knowledge of all involved parties	Seminar	MIDRMA	2022	Completed MID RVSM Safety Assessment Seminar was conducted
D. 20/6	MIDRMA SUSTAINABILITY ACTION GROUP That: a) the MIDRMA Sustainability Action Group is established to develop a Strategic Plan for the MIDRMA to ensure business continuity and sustainability; and b) the Action Group is composed of members designated by: i. Bahrain;	develop a succession plan for the MIDRMA addressing the staffing needs transfer of knowledge and	MIDRMA strategic plan	Sustainability action group	2024	On-going

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No.	CONCLUSIONS AND DECISIONS	CONCERNS/ CHALLENGES (RATIONALE)	DELIVERABLE/ TO BE INITIATED BY		TARGET DATE	STATUS/REMARKS
	ii. Jordan; iii. Oman; iv. UAE (Rapporteur); v. MIDRMA; and vi. ICAO MID	training, business continuity; to ensure the continued success of the MIDRMA project.				
C. 20/7	REVISED MID AIR NAVIGATION STRATEGY That, the Revised MID Air Navigation Strategy (Doc 002) is endorsed and be published by the ICAO MID Office	Identification of priority 1 ASBU threads/elements, their baseline and linked KPA/KPI, monitoring and reporting at Regional level	Revised MID Air Navigation Strategy (ICAO MID DOC 002)	ICAO	May. 2023	Completed MID Doc 002 posted on the web
C. 20/8	REVISED MID ANP VOL III That, the Revised MID ANP Vol III is endorsed and be published by the ICAO MID Office.	Need to update the ANP Vol III to align with the GANP and the Performance Based Approach	Revised MID ANP Vol III	ICAO	May. 2023	Completed MID ANP Vol III posted on the web
C. 20/9	DEVELOPMENT OF NANP That, in order to enable prioritization and optimum allocation of resources for all planned projects within States: a) States be urged to develop NANP based on a performance-based approach and the six-step performance management process six-step performance management process described in the Manual on Global Performance of the Air Navigation System (Doc 9883) and the Revised MID Air Navigation Strategy (Doc 002); and	To foster the implantation of NANP using the 6-step approach	Assistance missions/Workshop	MID States, ICAO MID	2023 – 2025	On-going Mission to Kuwait conducted, Kuwait develop the NANP. RANP/NANP TF/1 meeting conducted. (WP/29 refers)

No.	CONCLUSIONS AND DECISIONS	CONCERNS/ CHALLENGES (RATIONALE)	DELIVERABLE/ TO BE INITIATED BY		TARGET DATE	STATUS/REMARKS
	b) ICAO MID to conduct assistance missions/Workshops at National level on GANP/NANP in 2023-2024.					
C. 20/10	WEB- BASED MID AIR NAVIGATION REPORT (2022) That, the Web-based MID Air Navigation Report (2022) is endorsed.	To publish the status of ASBU implementation in the MID Region for 2022	MID Air Navigation report (2022)	ICAO MID	May 2023	Completed Air Navigation Report 2022 available on the web
C. 20/11	WEB-BASED MID REGION AIR NAVIGATION REPORT (2023) That, a) States be invited to provide the ICAO MID Office with the following data for the development of the MID Region Air Navigation Report (2023) by 1 December 2023: i. Status of ASBU Implementation; and ii. States' implementation of the Performance Based approach using the agreed Template as at Appendix 6.1A b) the MID Air Navigation Report (2023) be presented to the MIDANPIRG/21 for endorsement.	Monitoring and Reporting on ASBU and PBA implementation in the MID Region	State Letter Data for WEB-BASED AN Report 2023 WEB-BASED AN Report 2023	ICAO States ICAO	November 2023 Dec. 2023 January. 2024	On-going (WP/30 Refers)
D. 20/12	RANP/NANP TASK FORCE That, a) RANP/NANP Task Force be established to ensure alignment of the MID Region Air Navigation Strategy and MID ANP Vol III with the latest edition of the GANP and assist States developing NANPs;	Ensure alignment of the MID Region Air Navigation Strategy and MID ANP Vol III with the latest edition of the GANP and	Revised ANP Vol III	MID States, ICAO MID	2024	On-going The first meeting of the TF was conducted WP/29 refers)

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No.	CONCLUSIONS AND DECISIONS	CONCERNS/ CHALLENGES (RATIONALE)	DELIVERABLE/ TO BE INITIATED BY		TARGET DATE	STATUS/REMARKS
	b) the terms of reference of the RANP/NANP Task Force be developed during the first meeting of RANP/NANP Task Force; and c) States support the RANP/NANP Task Force through: i. assignment of Focal Point to contribute to the work of the Task Force; and ii. sharing states' experience and provision of required data in timely manner.	assist States developing NANPs				
C. 20/13	PROPOSAL FOR AMENDMENT TO THE MID eANP VOLUME I, TABLES ATM I-1 MID REGION FLIGHT INFORMATION REGIONS (FIRs)/UPPER INFORMATION REGIONS (UIRs) AND SAR I-1 MID REGION SEARCH AND RESCUE REGIONS (SRRs) That, the ICAO MID Office coordinate with the States concerned and process Proposal(s) for Amendment to the MID ANP Vol I, Tables ATM I-1 MID Region Flight Information Regions (FIRs)/ Upper Information Regions (UIRs) and SAR I-1 MID Region Search and Rescue Regions (SRRs) in accordance with standard procedure.	Support the ATM Contingency Planning within the MID Region	Revised version of MID Doc 003	ICAOMID, MID States	2022	On-going
C. 20/14	PROPOSAL FOR AMENDMENT TO THE MID eANP VOLUME II TO INCLUDE INFORMATION RELATED TO QATAR FACILITIES AND SERVICES That, the ICAO MID Office process the Draft Proposal for Amendment to the MID eANP Vol II, at Appendix 6.1B, in accordance with standard procedure.	Include the information related to Qatar inANP Vol II	Revised ANP Vol II, PfA process	Qatar, ICAO MID	2023	On-going
C. 20/15	INTENTIONALLY LEFT BLANK					
C. 20/16	IMPLEMENTATION OF C-DEC225: ESTABLISHMENT OF DOHA FOR/SRR					On-going

No.	CONCLUSIONS AND DECISIONS	CONCERNS/ CHALLENGES (RATIONALE)	DELIVERABLE/ TO BE INITIATED BY		TARGET DATE	STATUS/REMARKS
	That, a) the ICAO MID Office to monitor the implementation of the C-DEC225/10 and facilitate coordination between the States concerned, as required; b) States to carry out bilateral and multilateral coordination to finalize the operational and technical requirements, including the necessary letters of agreement; c) MIDRMA to conduct a safety Monitoring assessment for the RVSM airspace within Bahrain and Doha FIRs, highlighting bottlenecks, hotspots and areas of traffic congestion; d) Qatar to provide inputs for the development of the required proposal(s) for amendment to the MID ANP; e) States and other Stakeholders to provide implementation feedback and comments to the MID Office on a quarterly basis for review by the ATM SG; and f) the ATM SG to agree on necessary measures for the conduct of the technical study necessary to support the decision-making for the implementation of Phase 2 and develop a roadmap for the implementation of phase 2 to be presented to MIDANPIRG for endorsement.	Support the implementation of C-DEC 225/10	Develop a roadmap for the implementation of phase 2	Qatar, MIDRMA, Multilateral coordination group		
C. 20/17	WEBINAR ON AIM TRAINING MANUAL, FIRST EDITION, 2023 That, a Webinar on the new ICAO DOC 9991 – Training Manual and competency-based training and assessment (CBTA) methodology for AIS be organized in 2023.	To provide insights on the first edition (2023) of ICAO Doc 9991 Manual on Aeronautical Information Services Training	Webinar	ICAO	June 2023	Completed SL AN 8/3-23/080 (Webinar on the new ICAO DOC 9991 – Training Manual and competency based training and assessment CBTA) methodology for AIS (8 June 2023)
C. 20/18	NOTAM TEMPLATE FOR GNSS INTERFERENCE That, the NOTAM template at Appendix 6.2A be used to disseminate information on GNSS Interference.	To provide States with a standard NOTAM template	NOTAM template for GNSS RFI	ICAO	May 2023	Completed State Letter Ref.: AN 8/2.1-23/165 dated 10 August 2023

No.	CONCLUSIONS AND DECISIONS	CONCERNS/ CHALLENGES (RATIONALE)	DELIVERABLE/ TO BE INITIATED BY		TARGET DATE	STATUS/REMARKS
		to be used for GNSS Interference to facilitate operators in filtering and searching through the NOTAM on GNSS Interference				
C. 20/19	NOTAM TEMPLATE TO DISSEMINATE INFORMATION RELATED TO RISKS TO CIVIL AVIATION OVER OR NEAR CONFLICT ZONES That, the NOTAM template at Appendix 6.2B be used to disseminate information related to risks to civil aviation over or near conflict zones including the nature and extent of threats arising from the conflict and its consequences for civil aviation.					Completed
		To provide States with a standard NOTAM text template to be used to share threats information emanated from conflict zones within MID State’s airspace	NOTAM template to be used to disseminate information related to risks to civil aviation over or near conflict zones including the nature and extent of threats arising from the conflict and its consequences for civil aviation	ICAO	May 2023	State Letter Ref.: AN 8/2.1-23/165 dated 10 August 2023

No.	CONCLUSIONS AND DECISIONS	CONCERNS/ CHALLENGES (RATIONALE)	DELIVERABLE/ TO BE INITIATED BY		TARGET DATE	STATUS/REMARKS
C. 20/20	CCO/CDO PUBLICATION, CHARTING & DATABASE CODING That, the AIP CCO/CDO material, structure and content along with the Database coding and Charting at Appendix 6.2C are recommended for the dissemination of information on CCO/CDO.	To provide States with guidance on where to publish, what content to publish and the requisite information for airspace users to enable the further implementation of CCO/CDO in airspace under their jurisdiction	AIP CCO/CDO material, structure and content along with the Database coding and Charting	ICAO	May 2023	Completed State Letter Ref.: AN 8/2.1-23/166 dated 10 August 2023
D. 20/21	ESTABLISHMENT OF MID AIM FORUM That, MID AIM Forum: a) be established to improve collaboration aiming at improving the Quality of Aeronautical Information through identifying and addressing the availability, consistency and accuracy of published aeronautical information and sharing of best practices and challenges in the MID Region; and b) be composed of: – IATA, ICAO, IFAIMA and CANSO – MID States (CAA and ANSP) – Data users – Organizations, with interests in MID aeronautical information/data and who provide subject matter experts as may be required, such as, but not limited to ACI, EUROCONTROL / Group EAD, IFALPA, IFATCA and IFATSEA.	To strengthen and expand collaborative discussions and engagement on aeronautical information in MID Region	Forum	ICAO/IATA	May 2023	Actioned to be closed

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No.	CONCLUSIONS AND DECISIONS	CONCERNS/ CHALLENGES (RATIONALE)	DELIVERABLE/ TO BE INITIATED BY		TARGET DATE	STATUS/REMARKS
C. 20/22	MID REGIONAL IMPLEMENTATION PLAN FOR DIGITAL DATASETS That, a) the DDI Ad-hoc WG complete the Regional Implementation Plan for Digital Datasets by 31 December 2023; and b) the Regional Implementation Plan for Digital Datasets be reviewed by the AIM SG before submission to MIDANPIRG for endorsement.	Development of a Regional Implementation Plan for Digital Datasets	Regional Implementation Plan for AIM Digital Datasets;	MIDANPIRG/21	March 24	On-going
D. 20/23	WEBINAR ON THE UPDATES TO THE PBN MANUAL – 5TH EDITION That, ICAO MID organize a Webinar on the new edition of PBN Manual Doc 9613 (ED5) in 2023.	To provide insights on key changes to the edition 5 of the PBN manual Doc9613	Webinar on the new edition of PBN Manual Doc 9613 (ED5) in 2023	ICAO	November 2023	On-going The Webinar is postponed to October 2024
C. 20/24	PBN AIRSPACE DESIGN WORKSHOP That: a) ICAO MID in collaboration with the MID FPP, organize a PBN Airspace Design Workshop in 2023-2024, to provide necessary knowledge about PBN based solutions for airspace design to ensure an efficient, flexible, and dynamic airspace structure that meets Stakeholders requirements in terms of safety, flight efficiency and capacity in a cost-effective manner; and b) States and International Organizations are strongly encouraged to participate actively in this Workshop.	To provide States with a thorough understanding of airspace design requirements; focusing on PBN based solutions and to promote the sharing of good practices.	PBN Airspace Design Workshop	ICAO	December 2023	Completed File Ref.: ME 3/2.4 – 23/225 12 October 2023 and the PBN Airspace Design Workshop Conducted in Doha, Qatar, 10 – 11 December 2023.

No.	CONCLUSIONS AND DECISIONS	CONCERNS/ CHALLENGES (RATIONALE)	DELIVERABLE/ TO BE INITIATED BY		TARGET DATE	STATUS/REMARKS
C. 20/25	REVISED VERSION OF THE MID REGION PBN IMPLEMENTATION PLAN (DOC 007) That, the revised version of MID Region PBN Implementation Plan (Doc 007) at Appendix 6.3A is endorsed.	To keep pace with the developments, including the GANP 6th Edition and the MID Region Air Navigation Strategy (MID Doc 002, Edition February 2021);	Updated version of the MID Region PBN Implementation Plan (MID Doc 007)	ICAO	May 2023	Completed MID Doc 007 posted on the web
C. 20/26	PBN CAPACITY-BUILDING AND ASSISTANCE ACTIVITIES That, States are encouraged to inform the ICAO MID Office under the MEP framework of their needs in terms of PBN capacity-building and required assistance activities, including PBN National Workshops to provide specific guidance related to PBN planning, implementation, including improvement of practices in PBN Design, operational approval, and continuous oversight.	To identify MID States specific needs for technical support, capacity-building and required assistance activities	To inform the ICAO MID Office of specific needs in terms of PBN capacity-building and assistance activities	MID States	May 2023	Actioned State Letter Ref.: AN 6/28-23/167 dated 14 August 2023
C. 20/27	PROPOSAL FOR AMENDMENT TO THE MID eANP VOLUME II, TABLE ATM II-MID-I: MID REGION ATS ROUTE NETWORK That, the ICAO MID Office process the Proposal for Amendment to the MID ANP Vol II, Table ATM II-MID-I, at Appendix 6.5A , in accordance with standard PfA procedure.	To update the ATS route network to meet the regional and operational requirements	Revised ANP Vol II, PfA process	MID States, ICAO MID	2023	On-going

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No.	CONCLUSIONS AND DECISIONS	CONCERNS/ CHALLENGES (RATIONALE)	DELIVERABLE/ TO BE INITIATED BY		TARGET DATE	STATUS/REMARKS
C.20/28	PROPOSAL FOR AMENDMENT TO THE MID eANP VOLUME II, TABLE ATM II-MID-2: MID REGION SSR CMP That, the ICAO MID Office process the Proposal for Amendment to the MID eANP Vol II, Table ATM II-MID-2, at Appendix 6.5C, in accordance with standard PfA procedure.	Optimize the applications of SSR within the MID CMP	Revised CMP, PfA process	ICAO MID	2023	Completed
D. 20/29	DISSOLUTION OF THE FWC2022 TASK FORCE That, the FWC2022 Task Force is dissolved.					Completed
D. 20/30	MID ATM CONTINGENCY PLANNING AD-HOC ACTION GROUP That, a) the MID ATM Contingency Planning Ad-hoc Action Group to continue working on a comprehensive review of the MID Region ATM Contingency Plan (MID Doc 003), taking into considerations the lessons learnt from recent events specifically contingency of Khartoum FIR; b) the MID ATM Contingency Planning Ad-hoc Action Group be composed of: - the Chairpersons of the ATM SG; - Abdulla Al Qadhi (Bahrain); - Ahmad Abu Ghaleb (Saudi Arabia); - Sharron Caunt (IATA); - Faisal Al Assosi (Kuwait); - Ehab Raslan (Egypt); - Saleh Al Nesf (Qatar); - Nasser Salem Al Mazroe (Oman); - Saqr Marashdah (UAE); - Meisam Shaker Arani (Iran); - CANSO Javier Vanegas (CANSO);	Revised MID ATM Contingency Plan	Revised MID Doc 003	Ad hoc action group	2023	On-going

No.	CONCLUSIONS AND DECISIONS	CONCERNS/ CHALLENGES (RATIONALE)	DELIVERABLE/ TO BE INITIATED BY		TARGET DATE	STATUS/REMARKS
	- Fiebelkorn, Travis (FAA); and - ICAO MID Office (Secretariat); and c) present the revised version of the MID Region ATM Contingency Plan (MID Doc 003) to the ATM SG/9 for review and enhancement, before presentation to the MIDANPIRG/21 meeting for endorsement.					
C. 20/31	CONTINUATION OF THE CMC/FUA ACTION GROUP That, ICAO to organize a workshop to raise awareness among all stakeholders regarding the CMC implementation, including operations of due regard aircraft over high seas, and support State to develop the national CMC plan.	Implementation of ICAO guidance material available within Doc 10088	Implementation of National CMC/FUA	MID States	2023	On-going
C. 20/32	MID HIGH LEVEL AIRSPACE CONCEPT V2.0 That, the MID High Level Airspace Concept Version 2.0 at Appendix 6.5F is endorsed and be published as the MID High Level Airspace Concept V2.0.					Completed
D. 20/33	DISSOLUTION OF THE HIGH-LEVEL AIRSPACE CONCEPT ACTION GROUP (HLAC AG) That, the High Level Airspace Concept Action Group (HLAC AG) Action Group is dissolved.					Completed
C. 20/34	SAR WORKSHOP That, the ICAO MID Office organize a SAR Workshop in 2024, to address the challenges related to SAR in the MID Region.	Raise awareness related to newly introduced SAR services	Workshop	ICAO MID	2024	On-going
D. 20/35	REVIEW OF THE MID REGION ALLOTMENT PLAN That, in order to increase the amount of spectrum that can be used for Aeronautical Services, the FM WG should adopt the revised planning Principle for Aeronautical Frequency Bands of	Increase the amount of spectrum that can be used for ATC	Updated MID Region allotment plan	Frequency Management Working Group	31 March 2024	On-going

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No.	CONCLUSIONS AND DECISIONS	CONCERNS/ CHALLENGES (RATIONALE)	DELIVERABLE/ TO BE INITIATED BY		TARGET DATE	STATUS/REMARKS
	117.975-137 MHz and review and update, as deem necessary, the current MID allotment plan by Q1 2024.	Services		(FM WG)		
C. 20/36	OPTIMIZATION OF FREQUENCY ASSIGNMENT IN THE MID REGION That, in order to optimize the frequency assignment planning and mitigate VHF frequency congestion at regional level, States are urged to: a) coordinate with ICAO MID Office before assigning frequencies for aeronautical services (VHF COM, VHF NAV); b) perform an update/review of the data in the VHF-COM/NAV module; and c) Submit Frequency Requirements for the Period 2023 – 2030 using the Guidance Doc. at Appendix 6.6B by 1 August 2023.	optimize the frequency assignment planning and mitigate VHF frequency congestion at regional level	States Feedback as per the MINADPIRG Conclusion Outcomes	MID States	31 August 2024	Actioned SL Ref.: AN 7/5.7-23/170 dated 15 Aug. 2023 Reminder email on 31 Oct. 2023 3 replies received from UAE, Saudi Arabia and Egypt
C. 20/37	INTER-REGIONAL COMMUNICATION LINKS That, in order to enhance the AFS Network efficiency and performance, States are urged to: a) migrate inter-regional communication links to AMHS; and b) rationalize the inter-regional connections established on bilateral basis, taking into consideration the regional requirements set in the MID ANP Vol II and operational needs.	Enhance the AFS Network efficiency and performance	AMHS Migration and rationalized inter-regional connections	MID States	Not Defined	Actioned SL Ref.: AN 7/5 & ME 3-23/240 dated 19 Oct. 2023
C. 20/38	ACCREDITATION PROCEDURE FOR MID EXTERNAL COM OPERATORS That, Accreditation Procedure for MID External COM Operators at Appendix 6.6D is endorsed.					Completed

No.	CONCLUSIONS AND DECISIONS	CONCERNS/ CHALLENGES (RATIONALE)	DELIVERABLE/ TO BE INITIATED BY		TARGET DATE	STATUS/REMARKS
C. 20/39	UPDATE OF THE AMC ROUTING TABLES That, a) AMC Routing Table Action Group be established to review and update AMC Routing Directory by 1 November 2023; b) be composed of: - the MIDAMC Chairman - the MIDAMC Team Leader (Jordan) - Ali Darwish.(Bahrain) - Ali Jaber.(Saudi Arabia)	Update the AMC Routing Directory	updated AMC Routing Directory	AMC Routing Table Action Group	1 November 2023	On-going
C. 20/40	AMHS/AMC WORKSHOP That, in order to provide knowledge and hands-on experience on the use of AMS Web application for new AMC Users AMHS/AMC Workshop be organised for AMC users in 2024.	provide knowledge and hands-on experience on the use of AMS Web application for new AMC Users	ICAO	AMHS/AMC Workshop	back-to-back with the MIDAMC STG/9 in Feb,2024.	On-going
C. 20/41	VALIDATION ARINC ADDRESSEE That, in order to facilitate the implementation of AMHS/ARINC gateway, States Concerned are urged to validate the ARINC Users addressee by 1 August 2023.	facilitate the implementation of AMHS/ARINC gateway	Egypt, Libya, and Sudan	ARINC Addressee Validations	1 August 2023	Actioned SL Ref.: AN 7/5.1 & ME 3-23/241 dated 19 Oct. 2023
C.20/42	MID REGION GUIDANCE FOR THE IMPLEMENTATION OF AIDC/OLDI (ICAO MID Doc 006) That, the revised version of the MID Region Guidance for the	Development of	Doc 006	ICAO MID	2023	Completed MID Doc 006 posted on the web

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No.	CONCLUSIONS AND DECISIONS	CONCERNS/ CHALLENGES (RATIONALE)	DELIVERABLE/ TO BE INITIATED BY		TARGET DATE	STATUS/REMARKS
	Implementation of AIDC/OLDI as at Appendix 6.6E is endorsed and be published by ICAO MID.	guidance of AIDC/OLDI implementation				
C. 20/43	MID REGION ANS CYBERSECURITY ACTION PLAN That, in order to assist States achieving the objectives of ICAO Cyber Security Strategy seven pillars in ANS area in the MID Region: a) the MID Region ANS Cybersecurity actions plan at Appendix 6.6G is endorsed; b) urge States to implement identified actions in a timely manner; and c) ACS WG to develop a survey to establish how States have implemented the identified actions.	Assistance to States achieving the objectives of ICAO Cyber Security Strategy seven pillars in ANS area in the MID Region	MID Region ANS Cybersecurity actions plan Follow-up Survey on the MID Region ANS Cybersecurity actions plan	States ACS WG	Endorsed Q4 2024	On-going
C.20/44	ANS CYBERSECURITY CAPACITY BUILDING ACTIVITIES That, to assist States building capacity on ANS cybersecurity & resilience, capacity building activities on ANS Cybersecurity be organized in 2024.	assist States building capacity on ANS cybersecurity & resilience	ANS cybersecurity & resilience, capacity building activities	ICAO MID	Q4 2024	On-going
C.20/45	ENHANCEMENT ATM DATA CYBERSECURITY (ADCS) PORTAL That, States be urged to: a) review and update, as deem necessary, ANS Cyber Security focal point(s);	Enhance sharable experience related to cybersecurity though the ATM	States	Learning Lessons /experiences related to	1 October 2023	On-going

[illegible]

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No.	CONCLUSIONS AND DECISIONS	CONCERNS/ CHALLENGES (RATIONALE)	DELIVERABLE/ TO BE INITIATED BY		TARGET DATE	STATUS/REMARKS
C. 20/48	ANALYSIS OF CNS FACILITIES BRA WEBINAR That, in order to assist States in identifying the impact of physical presence of buildings on CNS signals in space, a Webinar on the Analysis of CNS facilities building restricted area be organized in 2024.	assist States in identifying the impact of physical presence of buildings on CNS signals in space	ICAO	CNS Facilities Building Restricted Areas Webinar	Q4 2024	On-going
C.20/49	GUIDANCE MATERIAL ON PROTECTING RADALT (ICAO MID Doc 015) That, the Guidance Material developed by the RADALT AG at Appendix 6.6H is endorsed and be published by the ICAO MID Office (ICAO MID Doc 015).	developed by the RADALT AG	RADALT AG	GUIDANCE MATERIAL ON PROTECTING RADALT	May 2023	Completed MID Doc 015 posted on the web
C.20/50	RADAR DATA SHARING IN THE MID REGION That, the Radar Data Sharing Action Group (RDS AG) be: a) established to assess the feasibility of Radar data sharing among MID States, identify challenge(s) and possible solution(s) and implementation by 1 January 2024; and b) composed of: Ibrahim Faraj (Jordan); Seyed Mirseed (Iran); Loay Beshawri (Saudi Arabia); Yousif Al Awadi (UAE); Jehad Faqir (IATA); and ICAO MID RO/CNS	established to assess the feasibility of Radar data sharing among MID States	Radar Data Sharing Action Group (RDS AG)	Assessment of the feasibility of Radar data sharing among MID States	1 January 2024	On-going
C. 20/51	MID REGION SURVEILLANCE PLAN (ICAO MID Doc 013) That, the revised version of the MID Region Surveillance plan as at Appendix 6.6I , is endorsed.	To revise the	States	MID Region Surveillance plan	May 2023	Completed

No.	CONCLUSIONS AND DECISIONS	CONCERNS/ CHALLENGES (RATIONALE)	DELIVERABLE/ TO BE INITIATED BY		TARGET DATE	STATUS/REMARKS
C.20/52	0.25-DEGREE WAFS HAZARD DATA That, the SADIS users integrate the new 0.25-degree WAFS hazard data into systems and software prior to November 2023, if they have not already done so.	Operators benefit by having the higher resolutions WAFS hazard data available for flight planning.	State Letter	ICAO	Sep. 2023	Completed SL AN 10/2 & AN 10/3 – 23/160 dated 10 August 2023
C.20/53	ANNEX 3 AMENDMENT 81 WAFS AND SADIS UPGRADES That, the SADIS users be invited to: a) familiarize themselves with the proposed WAFS and SADIS changes planned for November 2023 and 2024; b) discuss the upcoming changes with their technical departments about how their organization could adapt to these technological changes; and c) get involved in trying out the new Beta SADIS API's once they become available in late 2022 or 2023.	Prepare for future WAFS and SADIS upgrades in order to implement in a timely manner, which benefits operators in flight planning.	State Letter	ICAO	Sep. 2023	Completed SL AN 10/2 & AN 10/3 – 23/160 dated 10 August 2023
C. 20/54	MID REGION SIGMET GUIDE That, the updated <i>MID Region SIGMET Guide</i> (MID Doc 009) as provided at Appendix 6.7A be endorsed and posted on the ICAO MID Website.	To update the MID Region SIGMET Guide.	Updated MID Region SIGMET Guide is posted on the ICAO MID Office website	ICAO	Sep. 2023	Completed MID Doc 009 posted on the web

MIDANPIRG/21 & RASG-MID/11-REPORT
Appendix 5B

FIR	Published in AIP ENR 2.1	Coordinate	Coordinates status with respect of requirements					Remarks		
			Adjacent FIR (AIP)	ANP VOL I, Chart ATS 1	MID States publication based on Guideline					
					Clockwise Guideline item "1-a"	Back to beginning point Guideline item "1-b"	Coordinate in DMS Guideline item "1-c"		Delineation with arc Guideline item "1-e"	Follow sovereign boundary Guideline item "2"
Amman (OJAC)	Includes the territory of the H.K.J 29 21 26N 034 57 43E 29 11 03N 036 04 20E 29 30 03N 036 30 21E 29 52 03N 036 45 21E 30 00 03N 037 30 21E 30 20 03N 037 40 21E 30 30 03N 038 00 21E 31 30 03N 037 00 21E 32 00 02N 039 00 22E 32 09 15N 039 12 03E At Jordan, Saudi Arabia and Iraqi boundaries. Then the point 321349N 391804E At the Southern corner of the Jordanian- Iraqi boundaries SFC-UNL	292126N 0345743E	Cairo & Jeddah							
		291103N 0360420E	Jeddah							
		293003N 0363021E	Jeddah							
		295203N 0364521E	Jeddah							
		300003N 0373021E	Jeddah							
		302003N 0374021E	Jeddah							
		303003N 0380021E	Jeddah							
		313003N 0370021E	Jeddah							
		320002N 0390022E	Jeddah							
		320915N 0391203E	Jeddah & Baghdad (not issue)							
		321349N 0391804E	Baghdad (not issue)							
		Baghdad (ORBB)	Not Published	295100N 0484500E	Tehran & Kuwait					
295100N 0482500E	Kuwait									
300100N 0475500E	Kuwait									
300146N 0480434E	Kuwait									
295924N 0480042E	Kuwait									
300113N 0475528E	Kuwait									
300600N 0474200E	Kuwait									
300613N 0472217E	Kuwait									
300000N 0470900E	Kuwait									
295105N 0470454E	Kuwait									
294300N 0470000E	Kuwait									
291500N 0464200E	Kuwait									
290600N 0463300E	Kuwait & Jeddah									
290340N 0462534E	Jeddah									
291155N 0444318E	Jeddah									
310642N 0420508E	Jeddah									
312223N 0412627E	Jeddah									
315653N 0402447E	Jeddah									
320915N 0391203E	Jeddah & Amman									
321349N 0391804E	Amman									
332200N 0384800E	Damascus									
Bahrain (ORBB)	284400.00N 0494000.00E - F21:F23 - 265500.00N 0511000.00E - 264440.00N 0514359.00E - 261356.00N 0513849.00E - 262134.00N 0512301.00E - 262340.00N 0511220.00E - 262117.00N 0510420.00E - 261609.00N 0510016.00E - 261330.00N 0505513.00E - 261102.00N 0505503.00E then follow the limit of Qatar and Bahrain territorial waters then follow the sovereign boundary and limit of territorial waters between Qatar and Saudi Arabia to 243731N 0512406E 243747N 0512421E 243817N 0512608E 244247N 0513422E 244900N 0520000E 245046N 0522215E 240300N 0514700E then follow the sovereign boundary between Saudi Arabia and the United Arab Emirates to 224200N 0551200... And 250224N 0523054E - 245959N 0521837E - 245046N 0522215E - 250224N 0523054E SFC-UNL Bahrain FIR also includes the airspace defined by 260400.00N 0535700.00E - 254900.00N 0530600.00E - 253801.00N 0525744.00E - 261356.00N 0513849.00E - 264440.00N 0514359.00E FL245-UNL			284400N 0494000E	Kuwait (under review) & Tehran (not issued)					
				270500N 0505500E	Tehran					
		265500N 0511000E	Tehran							
		264440N 0514359E	Tehran (not issued) & Doha							
		261356N 0513849E	Doha							
		262134N 0512301E	Doha							
		262340N 0511220E	Doha							
		262117N 0510420E	Doha							
		261609N 0510016E	Doha							
		261330N 0505513E	Doha							
		261102N 0505503E	Doha							
		243731N 0512406E	Doha & Jeddah - no interface with Bahrain							
		243747N 0512421E	Doha & Jeddah - no interface with Bahrain							
		243817N 0512608E	Doha & Jeddah - no interface with Bahrain							
		244247N 0513422E	Doha & Jeddah							
		244900N 0520000E	Doha							
		245046N 0522215E	Doha & UAE (not issued)							
		240300N 0514700E	UAE							
		224200N 0551200E	Jeddah, UAE, Muscat							
		250224N 0523054E	Doha & UAE (not issued)							
		245959N 0521837E	Doha							
		260400N 0535700E	Doha, Tehran (not issued) & UAE							
		254900N 0530600E	Doha & UAE							
		253801N 0525744E	Doha & UAE (not issued)							
			343800N 0355700E	Damascus						
	343800N 0355700E then along the Lebanon territorial borders to 330600N									

Jeddah
(OEID)

SFC-UNL

292126N 0345743E - 291103N 0360420E - 293003N 0363021E - 295203N
0364521E - 300003N 0373021E - 302003N 0374021E - 303003N 0380021E -
313003N 0370021E - 320002N 0390022E - 320915N 0391203E - 315653N
0402447E - 312223N 0412627E - 310642N 0420508E - 291155N 0444318E -
290340N 0462534E - 290604N 0463311E then along KUWAIT NATL BDRY up
to 281500N 0485200E - 275000N 0490800E - 265234N 0500855E
- 263420N 0502759E - 263148N 0502315E - 262424N 0502219E
- 262217N 0502027E - 261515N 0501908E - 261018N 0501852E
- 260450N 0501611E - 255709N 0501735E - 255302N 0501807E
- 254908N 0502201E - 254228N 0502503E - 254057N 0502608E -
253544N 0503148E - 253111N 0503544E - 252828N 0503653E - 252510N
0503716E - 252336N 0503741E - 252144N 0503818E - 251849N
0503855E - 251522N 0503848E - 251355N 0503918E - 251153N 0503940E
- 250758N 0503951E - 250516N 0504101E - 250243N 0504239E - 245927N
0504329E - 245631N 0504438E - 245534N 0504543E - 245244N 0504738E -
244927N 0504804E - 244653N 0504828E - 244543N 0504828E - 244440N
0504842E - 244024N 0505134E - 243243N 0505544E - 243000N 0510000E -
242816N 0510555E - 242907N 0511849E - 243116N 0512154E - 243549N
0512449E - 243731N 0512406E - 243747N 0512421E - 243817N 0512608E -
244247N 0513422E - 241458N 0513526E - 240724N 0513526E - 225609N
0523452E - 223741N 0550814E - 224202N 0551210E - 224230N
0551230E - 220000N 0554000E - 200000N 0550000E - 190000N
0520000E - 184720N 0504700E - 183700N 0490700E - 181000N
0481100E - 172700N 0473600E - 170700N 0472800E - 165700N 0471100E
- 165700N 0470000E - 171700N 0464500E - 171400N 0462200E
- 171500N 0460600E - 172000N 0452400E - 172600N 0451300E
- 172600N 0443900E - 172420N 0443400E - 172600N 0442800E -
172600N 0442158E then along YAMEN NATL BDRY up to 162415N
0424620E - 162415N 0420900E - 161724N 0414700E - 160000N 0420000E
- 154700N 0415230E - 153955N 0413947E - 160000N 0410000E
- 200000N 0383000E - 220000N 0380000E - 280600N 0343500E
- 292126N 0345743E - 292126N 0345743E

315653N 0402447E	Baghdad (not issue)	
312223N 0412627E	Baghdad (not issue)	
310642N 0420508E	Baghdad (not issue)	
291155N 0444318E	Baghdad (not issue)	
290340N 0462534E	Baghdad (not issue)	
290604N 0463311E	Baghdad (not issue) & Kuwait	
281500N 0485200E	Kuwait & Bahrain (not issued)	
275000N 0490800E	Bahrain (not issued)	
265234N 0500855E	Bahrain (not issued)	
263420N 0502759E	Bahrain (not issued)	
263148N 0502315E	Bahrain (not issued)	
262424N 0502219E	Bahrain (not issued)	
262217N 0502027E	Bahrain (not issued)	
261515N 0501908E	Bahrain (not issued)	
261018N 0501852E	Bahrain (not issued)	
260450N 0501611E	Bahrain (not issued)	
255709N 0501735E	Bahrain (not issued)	
255302N 0501807E	Bahrain (not issued)	
254908N 0502201E	Bahrain (not issued)	
254228N 0502503E	Bahrain (not issued)	
254057N 0502608E	Bahrain (not issued)	
253544N 0503148E	Bahrain (not issued)	
253111N 0503544E	Doha (not issued)	
252828N 0503653E	Doha (not issued)	
252510N 0503716E	Doha (not issued)	
252336N 0503741E	Doha (not issued)	
252144N 0503818E	Doha (not issued)	
251849N 0503855E	Doha (not issued)	
251522N 0503848E	Doha (not issued)	
251355N 0503918E	Doha (not issued)	
251153N 0503940E	Doha (not issued)	
250758N 0503951E	Doha (not issued)	
250516N 0504101E	Doha (not issued)	
250243N 0504239E	Doha (not issued)	
245927N 0504329E	Doha (not issued)	
245631N 0504438E	Doha (not issued)	
245534N 0504543E	Doha (not issued)	
245244N 0504738E	Doha (not issued)	
244927N 0504804E	Doha (not issued)	
244653N 0504828E	Doha (not issued)	
244543N 0504828E	Doha (not issued)	
244440N 0504842E	Doha (not issued)	
244024N 0505134E	Doha (not issued)	
243243N 0505544E	Doha (not issued)	
243000N 0510000E	Doha (not issued)	
242816N 0510555E	Doha (not issued)	
242907N 0511849E	Doha (not issued)	
243116N 0512154E	Doha (not issued)	
243549N 0512449E	Doha (not issued)	
243731N 0512406E	Doha	
243747N 0512421E	Doha	
243817N 0512608E	Doha	
244247N 0513422E	Doha & Bahrain	
241458N 0513526E	Bahrain (not issued)	
240724N 0513526E	Bahrain (not issued)	
225609N 0523452E	UAE (not issued)	
223741N 0550814E	UAE (not issued)	
224202N 0551210E	UAE & Muscat	
224230N 0551230E	UAE & Muscat	
220000N 0554000E	Muscat (not issued)	
200000N 0550000E	Muscat (not issued)	
190000N 0520000E	Muscat & Sanaa	
184720N 0504700E	Sanaa (not issued)	
183700N 0490700E	Sanaa (not issued)	
181000N 0481100E	Sanaa (not issued)	
172700N 0473600E	Sanaa (not issued)	

		170700N 0472800E	Sanaa (not issued)						
		165700N 0471100E	Sanaa (not issued)						
		165700N 0470000E	Sanaa (not issued)						
		171700N 0464500E	Sanaa (not issued)						
		171400N 0462200E	Sanaa (not issued)						
		171500N 0460600E	Sanaa (not issued)						
		172000N 0452400E	Sanaa (not issued)						
		172600N 0451300E	Sanaa (not issued)						
		172600N 0443900E	Sanaa (not issued)						
		172420N 0443400E	Sanaa (not issued)						
		172600N 0442800E	Sanaa (not issued)						
		172600N 0442158E	Sanaa (not issued)						
		162415N 0424620E	Sanaa (not issued)						
		162415N 0420900E	Sanaa						
		161724N 0414700E	Sanaa						
		160000N 0420000E	Sanaa						
		154700N 0415230E	Sanaa						
		153955N 0413947E	Sanaa						
		160000N 0410000E	Asmara						
		200000N 0383000E	Asmara & Khartoum						
		220000N 0380000E	Khartoum & Cairo						
		280600N 0343500E	Cairo						
		220000N 0250000E	Cairo & Tripoli						
		220000N 0380000E	Cairo & Jeddah						
		200000N 0383000E	Jeddah & Asmara						
		130000N 0360000E	Addis Ababa						
		080000N 0330000E	Addis Ababa						
		040000N 0360000E	Addis Ababa & Nairobi						
		154212N 0235921E	N'djamena (confirmed by WACAF)						
		154227N 0240000E	N'djamena						
		193000N 0240000E	N'djamena (confirmed by WACAF) & Tripoli						
		200000N 0240000E	Tripoli						
		200000N 0250000E	Tripoli						
		290604N 0463311E	Jeddah & Baghdad (not issue)						
		291502N 0464211E	Baghdad (not issue)						
		294319N 0470024E	Baghdad (not issue)						
		295105N 0470454E	Baghdad (not issue)						
		300001N 0470920E	Baghdad (not issue)						
		300613N 0472217E	Baghdad (not issue)						
		300613N 0474228E	Baghdad (not issue)						
		300113N 0475528E	Baghdad (not issue)						
		295924N 0480042E	Baghdad (not issue)						
		300120N 0480952E	Baghdad (not issue)						
		295110N 0482451E	Baghdad (not issue)						
		295100N 0484500E	Baghdad (not issue)						
		295110N 0482451E	Baghdad (not issue)						
		295100N 0484500E	Baghdad (not issue)						
		291311N 0494003E	Tehran						
		290011N 0492703E	Tehran						
		284411N 0494003E	Tehran (not issued) & Bahrain						
		281500N 0485200	Bahrain & Jeddah						
		250000N 0563500E	UAE						
		253600N 0561300E	UAE						
		262100N 0560600E	UAE & Tehran (not issued)						
		264100N 0562700E	Tehran						
		261000N 0564500E	Tehran						
		253500N 0564500E	Tehran						
		250000N 0573000E	Tehran						
		244000N 0612000E	Tehran & Karachi						
		233000N 0612000E	Karachi						
		233000N 0643000E	Karach (not issued) & Mumbai						
		194800N 0600000E	Mumbai & Sanaa						
		174000N 0570000E	Sanaa						
		154000N 0533000E	Sanaa						
		163800N 0530400E	Sanaa						
		172200N 0524400E	Sanaa						
		190000N 0520000E	Sanaa & Jeddah						
		220000N 0250000E	Cairo & Tripoli						
		220000N 0380000E	Cairo & Jeddah						
		200000N 0383000E	Jeddah & Asmara						
		130000N 0360000E	Addis Ababa						
		080000N 0330000E	Addis Ababa						
		040000N 0360000E	Addis Ababa & Nairobi						
		154212N 0235921E	N'djamena (confirmed by WACAF)						
		154227N 0240000E	N'djamena						
		193000N 0240000E	N'djamena (confirmed by WACAF) & Tripoli						
		200000N 0240000E	Tripoli						
		200000N 0250000E	Tripoli						
		290604N 0463311E	Jeddah & Baghdad (not issue)						
		291502N 0464211E	Baghdad (not issue)						
		294319N 0470024E	Baghdad (not issue)						
		295105N 0470454E	Baghdad (not issue)						
		300001N 0470920E	Baghdad (not issue)						
		300613N 0472217E	Baghdad (not issue)						
		300613N 0474228E	Baghdad (not issue)						
		300113N 0475528E	Baghdad (not issue)						
		295924N 0480042E	Baghdad (not issue)						
		300120N 0480952E	Baghdad (not issue)						
		295110N 0482451E	Baghdad (not issue)						
		295100N 0484500E	Baghdad (not issue)						
		291311N 0494003E	Tehran						
		290011N 0492703E	Tehran						
		284411N 0494003E	Tehran (not issued) & Bahrain						
		281500N 0485200	Bahrain & Jeddah						
		250000N 0563500E	UAE						
		253600N 0561300E	UAE						
		262100N 0560600E	UAE & Tehran (not issued)						
		264100N 0562700E	Tehran						
		261000N 0564500E	Tehran						
		253500N 0564500E	Tehran						
		250000N 0573000E	Tehran						
		244000N 0612000E	Tehran & Karachi						
		233000N 0612000E	Karachi						
		233000N 0643000E	Karach (not issued) & Mumbai						
		194800N 0600000E	Mumbai & Sanaa						
		174000N 0570000E	Sanaa						
		154000N 0533000E	Sanaa						
		163800N 0530400E	Sanaa						
		172200N 0524400E	Sanaa						
		190000N 0520000E	Sanaa & Jeddah						
		220000N 0250000E	Cairo & Tripoli						
		220000N 0380000E	Cairo & Jeddah						
		200000N 0383000E	Jeddah & Asmara						
		130000N 0360000E	Addis Ababa						
		080000N 0330000E	Addis Ababa						
		040000N 0360000E	Addis Ababa & Nairobi						
		154212N 0235921E	N'djamena (confirmed by WACAF)						
		154227N 0240000E	N'djamena						
		193000N 0240000E	N'djamena (confirmed by WACAF) & Tripoli						
		200000N 0240000E	Tripoli						
		200000N 0250000E	Tripoli						
		290604N 0463311E	Jeddah & Baghdad (not issue)						
		291502N 0464211E	Baghdad (not issue)						
		294319N 0470024E	Baghdad (not issue)						
		295105N 0470454E	Baghdad (not issue)						
		300001N 0470920E	Baghdad (not issue)						
		300613N 0472217E	Baghdad (not issue)						
		300613N 0474228E	Baghdad (not issue)						
		300113N 0475528E	Baghdad (not issue)						
		295924N 0480042E	Baghdad (not issue)						
		300120N 0480952E	Baghdad (not issue)						
		295110N 0482451E	Baghdad (not issue)						
		295100N 0484500E	Baghdad (not issue)						
		291311N 0494003E	Tehran						
		290011N 0492703E	Tehran						
		284411N 0494003E	Tehran (not issued) & Bahrain						
		281500N 0485200	Bahrain & Jeddah						
		250000N 0563500E	UAE						
		253600N 0561300E	UAE						
		262100N 0560600E	UAE & Tehran (not issued)						
		264100N 0562700E	Tehran						
		261000N 0564500E	Tehran						
		253500N 0564500E	Tehran						
		250000N 0573000E	Tehran						
		244000N 0612000E	Tehran & Karachi						
		233000N 0612000E	Karachi						
		233000N 0643000E	Karach (not issued) & Mumbai						
		194800N 0600000E	Mumbai & Sanaa						
		174000N 0570000E	Sanaa						
		154000N 0533000E	Sanaa						
		163800N 0530400E	Sanaa						
		172200N 0524400E	Sanaa						
		190000N 0520000E	Sanaa & Jeddah						
		220000N 0250000E	Cairo & Tripoli						
		220000N 0380000E	Cairo & Jeddah						
		200000N 0383000E	Jeddah & Asmara						
		130000N 0360000E	Addis Ababa						
		080000N 0330000E	Addis Ababa						
		040000N 0360000E	Addis Ababa & Nairobi						
		154212N 0235921E	N'djamena (confirmed by WACAF)						
		154227N 0240000E	N'djamena						
		193000N 0240000E	N'djamena (confirmed by WACAF) & Tripoli						
		200000N 0240000E	Tripoli						
		200000N 0250000E	Tripoli						
		290604N 0463311E	Jeddah & Baghdad (not issue)						
		291502N 0464211E	Baghdad (not issue)						
		294319N 0470024E	Baghdad (not issue)						
		295105N 0470454E	Baghdad (not issue)						
		300001N 0470920E	Baghdad (not issue)						
		300613N 0472217E	Baghdad (not issue)						
		300613N 0474228E	Baghdad (not issue)						
		300113N 0475528E	Baghdad (not issue)						
		295924N 0480042E	Baghdad (not issue)						
		300120N 0480952E	Baghdad (not issue)						
		295110N 0482451E	Baghdad (not issue)						
		295100N 0484500E	Baghdad (not issue)						
		291311N 0494003E	Tehran						
		290011N 0492703E	Tehran						
		284411N 0494003E	Tehran (not issued) & Bahrain						

[illegible]

color code

implemented in accordance with GM
Not implemented Not in accordance with GM

GUIDELINES FOR THE PUBLICATION OF FIR BOUNDARY POINTS

- 1) Where FIR is a list of geographical coordinates:
 - a) The list of points and their coordinates must follow a clockwise sequence.
 - b) The list must have a beginning point and an ending point that are the same coordinate.
 - c) The latitude and longitude coordinates must be reported in **DMS (degrees, minutes and seconds)**.
 - d) Where an FIR shares a common point with another neighbouring FIR, coordinates should be mutually agreed.

***Note:** Transfer of Control Points, ATS route significant points or waypoints may not necessarily be aligned with boundaries delineation.*
 - e) Where delineation of FIR/UIR follows an arc of specific dimension, it should be defined as follows:

***[starting point of ARC]** following an arc of a circle at a **radius of [distance]** NM centered on **[coordinates in DMS]** and ending at point **[coordinates in DMS]**.*
- 2) Where FIR is described using “sovereign” boundaries
 - a) The description should be simple
 - i) *Follow sovereign boundary between [State 1] and [State 2]).¹*
 - b) Where delineation of FIR/UIR is made by reference to sovereign boundaries common to neighbouring FIR/UIR, the delineation shall be mutually agreed upon.
 - c) Where an FIR/UIR follows a sovereign boundary, the United Nations international boundary data set is referred to by ICAO.

¹ Use short names of States as shown at: <http://www.icao.int/about-icao/pages/member-states.aspx>

**TERMS OF REFERENCE (TOR) OF THE
MIDANPIRG RANP/NANP TASK FORCE
(RANP/NANP TF)**

I. TERMS OF REFERENCE

1.1 The terms of reference of the RANP/NANP Task Force are:

- a) monitor the status of implementation of the priority 1 ASBU Threads/Elements included in the MID Region Air Navigation Strategy;
- b) identify the difficulties and challenges associated with the implementation of the MID Region priority 1 ASBU Threads/Elements and provide progress reports, as required;
- c) consolidate the MID Region Annual Air Navigation Report prior to its submission to MIDANPIRG for endorsement;
- d) keep under review the MID Region Air Navigation Strategy, and considering global and regional developments and the inputs from States and the MIDANPIRG Sub-Groups, propose changes to the MID Region Air Navigation Strategy for final review and endorsement by MIDANPIRG;
- e) support the implementation of the GANP, its framework and timelines ensuring harmonization and coordination of efforts aimed at improving international civil aviation capacity and efficiency including establishment of priorities, targets and indicators consistent with globally-harmonized objectives, taking into account operational needs;
- f) provide a forum for discussion, coordination, cooperation and sharing of experiences and best practices amongst States and stakeholders, of subjects related to GANP implementation and development of National Air Navigation Plans (NANP);
- g) promote the implementation of the Performance Based Approach (PBA) and the six-step performance management process described in the Manual on Global Performance of the Air Navigation System (Doc 9883);
- h) support MID States in the development and maintenance of their National Air Navigation Plans (NANP) based on a Performance Based Approach (PBA) as described in the Manual on Global Performance of the Air Navigation System (Doc 9883) and the MID Air Navigation Plan (Volume III);
- i) promote the need for automated processes/tools for the collection of data and reporting related to the implementation of the Performance Based Approach (PBA), including the status of ASBU implementation by each member State;
- j) consolidate all feedback and proposed amendments/improvements received from MIDANPIRG Sub-Groups on the GANP implementation;
- k) report its activities/outcomes directly to MIDANPIRG; and
- l) review periodically its Terms of Reference and propose amendments, as necessary.

II. COMPOSITION

- 2.1 The Task Force is composed of:
- a) ANS regulatory, technical and operational experts from MIDANPIRG Member States;
 - b) concerned International and Regional Organizations, as observers; and
 - c) other representatives from provider States and Industry may be invited on ad hoc basis, as observers, when required.

III. WORKING ARRANGEMENTS

- 3.1 The Chairperson, in close coordination with the Secretariat, shall make all necessary arrangements for the most efficient working of the Task Force. The Task Force shall at all times conduct its activities in the most efficient manner possible with a minimum of formality and paperwork (paperless meetings). Permanent contact shall be maintained between the Chairpersons, Secretary and Members of the Task Force to advance the work. Best advantage should be taken of modern communications facilities, particularly videoconferencing (Virtual Meetings) and e-mails.
- 3.2 Face-to-face meetings for the review and coordination of deliverables will be conducted on annual basis.

RANP/NANP TASK FORCE

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INTERNATIONAL CIVIL AVIATION ORGANIZATION

**MIDDLE EAST AIR NAVIGATION PLANNING
AND IMPLEMENTATION REGIONAL GROUP
(MIDANPIRG)**

**MID REGION
AIR NAVIGATION STRATEGY**

EDITION MARCH, 2024

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AIR NAVIGATION PRIORITIES AND MONITORING OF THE STATUS OF IMPLEMENTATION

1. Introduction

1.1 As traffic volume increases throughout the world, the demands on air navigation service providers in a given airspace increase, and air traffic management becomes more complex.

1.2 It is foreseen that the implementation of the components of the ATM operational concept will provide sufficient capacity to meet the growing demand, generating additional benefits in terms of more efficient flights and higher levels of safety. Nevertheless, the potential of new technologies to significantly reduce the cost of services will require the establishment of clear operational requirements.

1.3 Taking into account the benefits of the ATM operational concept, it is necessary to make many timely decisions for its implementation. An unprecedented cooperation and harmonization will be required at both global and regional level.

1.4 ICAO introduced the Aviation System Block Upgrades (ASBU) framework as a systemic manner to achieve a harmonized implementation of the air navigation services. An ASBU designates a set of improvements that can be implemented globally from a defined point in time to enhance the performance of the ATM system.

1.5 In accordance, with the Resolutions of the 40th Session of the ICAO Assembly, particularly Resolution A40-1 "ICAO global planning for safety and air navigation", the ICAO Assembly urged States and PIRGs to utilize the guidance provided in the GANP for planning and implementation activities which establish priorities, targets and indicators consistent with globally-harmonized objectives, taking into account operational needs. In response to this, the MID Region developed the MID Region Air Navigation Strategy – Part 1, which is aligned with the GANP and ASBU Framework.

1.6 Stakeholders including service providers, regulators, airspace users and manufacturers are facing increased levels of interaction as new, modernized ATM operations are implemented. The highly integrated nature of capabilities covered by the block upgrades requires a significant level of coordination and cooperation among all stakeholders. Working together is essential for achieving global harmonization and interoperability.

2. Strategic Air Navigation Capacity and Efficiency Objective

2.1 The Strategic Objective related to Air Navigation Capacity and Efficiency is to realize sound and economically-viable civil aviation system in the MID Region that continuously increases in capacity and improves in efficiency with enhanced safety while minimizing the adverse environmental effects of civil aviation activities.

3. MID Air Navigation Objectives

3.1 The MID Region air navigation objectives are set in line with the global air navigation objectives and address specific air navigation operational improvements identified within the framework of the Middle East Regional Planning and Implementation Group (MIDANPIRG).

3.2 Blocks '0' and "1" feature Elements are characterized by operational improvements, which have already been developed and implemented in many parts of the world. The MID Region priority 1 Block 0 & 1 Elements are reflected in **Table 1** below.

3.3 The MID Region Air Navigation Strategy aims to maintain regional harmonisation. The States should develop their National Air Navigation Plan (NANP), including action plans for the implementation of relevant priority 1 ASBU Elements and other ASBU elements or non ASBU solutions based on the States' operational requirements and cost benefits analysis.

3.4 The implementation of the ASBU Block 0 Elements in the MID Region started before 2013 and is continuing. For the short and medium term, the MID Region priorities include identified ASBU Elements from Block 0 and Block 1.

4. MID Region ASBU Threads/Elements Prioritization and Monitoring

4.1 On the basis of operational requirements and taking into consideration the associated benefits, **Table 1** below shows the priority associated for each ASBU element from Block 0 and Block 1, as well as the MIDANPIRG subsidiary bodies that will be monitoring and supporting the implementation of these Threads/Elements:

Priority 1 ASBU Element: Elements that have the highest contribution to the improvement of air navigation safety and/or efficiency in the MID Region. These Elements should be implemented where applicable and will be used for the purpose of regional air navigation monitoring and reporting.

Priority 2 ASBU Element: Elements recommended for implementation based on identified operational needs and benefits by States.

Priority 1 Thread: Any Thread with at least one priority 1 element

Table 1. MID REGION ASBU THREADS & ELEMENTS (BLOCK 0 & 1) PRIORITIZATION AND MONITORING

Thread	Element code	Title	Priority	Start Date	Monitoring		Remarks
					Main	Supporting	
Information Threads							
DAIM							
DAIM	B1/1	Provision of quality-assured aeronautical data and information	1	2021	AIM SG	RANP/ NANP TF	
	B1/2	Provision of digital Aeronautical Information Publication (AIP) data sets	2				
	B1/3	Provision of digital terrain data sets	1	2021	AIM SG	RANP/ NANP TF	
	B1/4	Provision of digital obstacle data sets	1	2021	AIM SG	RANP/ NANP TF	
	B1/5	Provision of digital aerodrome mapping data sets	2				
	B1/6	Provision of digital instrument flight procedure data sets	2				
	B1/7	NOTAM improvements	2				
AMET							
AMET	B0/1	Meteorological observations products	1	2014	MET SG	RANP/ NANP TF	
	B0/2	Meteorological forecast and warning products	1	2014	MET SG	RANP/ NANP TF	
	B0/3	Climatological and historical meteorological products	1	2014	MET SG	RANP/ NANP TF	

Thread	Element code	Title	Priority	Start Date	Monitoring		Remarks
					Main	Supporting	
	B0/4	Dissemination of meteorological products	1	2014	MET SG	CNS SG RANP/ NANP TF	
	B1/1	Meteorological observations information	2				
	B1/2	Meteorological forecast and warning information	2				
	B1/3	Climatological and historical meteorological information	2				
	B1/4	Dissemination of meteorological information	2				
FICE							
FICE	B0/1	Automated basic inter facility data exchange (AIDC)	1	2014	CNS SG ATM SG	RANP/ NANP TF	
Operational Threads							
APTA							
APTA	B0/1	PBN Approaches (with basic capabilities)	1	2014	PBN SG	ATM SG AIM SG CNS SG RANP/ NANP TF	
	B0/2	PBN SID and STAR procedures (with basic capabilities)	1	2014	PBN SG	ATM SG AIM SG RANP/ NANP TF	
	B0/3	SBAS/GBAS CAT I precision approach procedures	2				
	B0/4	CDO (Basic)	1	2014	PBN SG	ATM SG RANP/ NANP TF	
	B0/5	CCO (Basic)	1	2014	PBN SG	ATM SG RANP/ NANP TF	
	B0/6	PBN Helicopter Point in Space (PinS) Operations	2				
	B0/7	Performance based aerodrome operating minima – Advanced aircraft	1	2021	PBN SG	AIM SG CNS SG ASPIG RANP/ NANP TF	
	B0/8	Performance based aerodrome operating minima – Basic aircraft	2				

Thread	Element code	Title	Priority	Start Date	Monitoring		Remarks
					Main	Supporting	
	B1/1	PBN Approaches (with advanced capabilities)	2				
	B1/2	PBN SID and STAR procedures (with advanced capabilities)	2				
	B1/4	CDO (Advanced)	2				
	B1/5	CCO (Advanced)	2				
FRT0							
FRT0	B0/1	Direct routing (DCT)	2				
	B0/2	Airspace planning and Flexible Use of Airspace (FUA)	1	2014	ATM SG	RANP/ NANP TF	
	B0/3	Pre-validated and coordinated ATS routes to support flight and flow	2				
	B0/4	Basic conflict detection and conformance monitoring	1	2014	ATM SG	CNS SG RANP/ NANP TF	
	B1/1	Free Route Airspace (FRA)	2				
	B1/2	Required Navigation Performance (RNP) routes	2				
	B1/3	Advanced Flexible Use of Airspace (FUA) and management of real time airspace data	2				
	B1/4	Dynamic sectorization	2				
	B1/5	Enhanced Conflict Detection Tools and Conformance Monitoring	2				
	B1/6	Multi-Sector Planning	2				
	B1/7	Trajectory Options Set (TOS)	2				
NOPS							
NOPS	B0/1	Initial integration of collaborative airspace management with air traffic flow management	1	2015	ATM SG	RANP/ NANP TF	
	B0/2	Collaborative Network Flight Updates	2				
	B0/3	Network Operation Planning basic features	2				

Thread	Element code	Title	Priority	Start Date	Monitoring		Remarks
					Main	Supporting	
	B0/4	Initial Airport/ATFM slots and A-CDM Network Interface	2				
	B0/5	Dynamic ATFM slot allocation	2				
	B1/1	Short Term ATFM measures	2				
	B1/2	Enhanced Network Operations Planning	2				
	B1/3	Enhanced integration of Airport operations planning with network operations planning	2				
	B1/4	Dynamic Traffic Complexity Management	2				
	B1/5	Full integration of airspace management with air traffic flow management	2				
	B1/6	Initial Dynamic Airspace configurations	2				
	B1/7	Enhanced ATFM slot swapping	2				
	B1/8	Extended Arrival Management supported by the ATM Network function	2				
	B1/9	Target Times for ATFM purposes	2				
	B1/10	Collaborative Trajectory Options Program (CTOP)	2				
ACAS							
ACAS	B1/1	ACAS Improvements	1	2014	ATM SG CNS SG	RANP/ NANP TF	
SNET							
SNET	B0/1	Short Term Conflict Alert (STCA)	1	2017	ATM SG	CNS SG RANP/ NANP TF	
	B0/2	Minimum Safe Altitude Warning (MSAW)	1	2017	ATM SG	CNS SG RANP/ NANP TF	
	B0/3	Area Proximity Warning (APW)	1	2020	ATM SG	CNS SG RANP/ NANP TF	
	B0/4	Approach Path Monitoring (APM)	2				
	B1/1	Enhanced STCA with aircraft parameters	2				
	B1/2	Enhanced STCA in complex TMA	2				
GADS							

Thread	Element code	Title	Priority	Start Date	Monitoring		Remarks
					Main	Supporting	
GADS	B1/1	Aircraft Tracking	2				
	B1/2	Operational Control Directory	1	2021	ATM SG	RANP/ NANP TF	
RSEQ							
RSEQ	B0/1	Arrival Management	1	2021	ATM SG	CNS SG ASPIG RANP/ NANP TF	
	B0/2	Departure Management	2				
	B0/3	Point merge	2				
	B1/1	Extended arrival metering	2				
SURF							
SURF	B0/1	Basic ATCO tools to manage traffic during ground operations	1	2014	ASPIG	ATM SG CNS SG RANP/ NANP TF	
	B0/2	Comprehensive situational awareness of surface operations	1	2014	ASPIG	ATM SG CNS SG RANP/ NANP TF	
	B0/3	Initial ATCO alerting service for surface operations	1	2021	ASPIG	ATM SG CNS SG RANP/ NANP TF	
	B1/1	Advanced features using visual aids to support traffic management during ground operations	2				
	B1/2	Comprehensive pilot situational awareness on the airport surface	2				
	B1/3	Enhanced ATCO alerting service for surface operations	2				
	B1/4	Routing service to support ATCO surface operations management	2				
	B1/5	Enhanced vision systems for taxi operations	2				
ACDM							
ACDM	B0/1	Airport CDM Information Sharing (ACIS)	1	2014	ASPIG	CNS SG, AIM SG, ATM SG, RANP/ NANP TF	
	B0/2	Integration with ATM Network function	1	2014	ASPIG	CNS SG, AIM SG, ATM SG, RANP/ NANP TF	

Thread	Element code	Title	Priority	Start Date	Monitoring		Remarks
					Main	Supporting	
CSEP	B1/1	Basic airborne situational awareness during flight operations (AIRB)	2				
	B1/2	Visual Separation on Approach (VSA)	2				
	B1/3	Performance Based Longitudinal Separation Minima	2				
	B1/4	Performance Based Lateral Separation Minima	2				
DATS	B1/1	Remotely Operated Aerodrome Air Traffic Services	2				
OPFL	B0/1	In Trail Procedure (ITP)	2				
	B1/1	Climb and Descend Procedure (CDP)	2				
TBO	B0/1	Introduction of time-based management within a flow centric approach	2				
	B1/1	Initial Integration of time-based decision making processes	2				
Technology Threads							
ASUR							
ASUR	B0/1	Automatic Dependent Surveillance – Broadcast (ADS-B)	1	2021	CNS SG	ATM SG, ASPIG, RANP/ NANP TF	
	B0/2	Multilateration cooperative surveillance systems (MLAT)	1	2021	CNS SG	ATM SG, ASPIG, RANP/NA NP TF	
	B0/3	Cooperative Surveillance Radar Downlink of Aircraft Parameters (SSR-DAPS)	1	2021	CNS SG	ATM SG, ASPIG, RANP/ NANP TF	
	B1/1	Reception of aircraft ADS-B signals from space (SB ADS-B)	2				
NAVS							
NAVS	B0/1	Ground Based Augmentation Systems (GBAS)	2				
	B0/2	Satellite Based Augmentation Systems (SBAS)	2				
	B0/3	Aircraft Based Augmentation Systems (ABAS)	1	2021	CNS SG	PBN SG, ATM SG, AIM SG,	

Thread	Element code	Title	Priority	Start Date	Monitoring		Remarks
					Main	Supporting	
						RANP/ NANP TF	
	B0/4	Navigation Minimal Operating Networks (Nav. MON)	1	2021	CNS SG	PBN SG, RANP/ NANP TF	
	B1/1	Extended GBAS	2				
COMI							
COMI	B0/1	Aircraft Communication Addressing and Reporting System (ACARS)	2				
	B0/2	Aeronautical Telecommunication Network/Open System Interconnection (ATN/OSI)	2				
	B0/3	VHF Data Link (VDL) Mode 0/A	2				
	B0/4	VHF Data Link (VDL) Mode 2 Basic	2				
	B0/5	Satellite communications (SATCOM) Class C Data	2				
	B0/6	High Frequency Data Link (HFDL)	2				
	B0/7	AMHS	1	2014	CNS SG	RANP/ NANP TF	
	B1/1	Ground-Ground Aeronautical Telecommunication Network/Internet Protocol Suite (ATN/IPS)	1	2021	CNS SG	RANP/ NANP TF	
	B1/2	VHF Data Link (VDL) Mode 2 Multi-Frequency	2				
	B1/3	SATCOM Class B Voice and Data	2				
	B1/4	Aeronautical Mobile Airport Communication System (AeroMACS) Ground-Ground	2				
COMS							
COMS	B0/1	CPDLC (FANS 1/A & ATN B1) for domestic and procedural airspace	2				

Thread	Element code	Title	Priority	Start Date	Monitoring		Remarks
					Main	Supporting	
	B0/2	ADS-C (FANS 1/A) for procedural airspace	2				
	B1/1	PBCS approved CPDLC (FANS 1/A+) for domestic and procedural airspace	2				
	B1/2	PBCS approved ADS-C (FANS 1/A+) for procedural airspace	2				
	B1/3	SATVOICE (incl. routine communications) for procedural airspace	2				

5. Implementation and Monitoring of the priority 1 ASBU Elements

5.1 The monitoring of air navigation performance and its enhancement is achieved, inter-alia, through identification of relevant air navigation Metrics and Indicators as well as the adoption and attainment of air navigation system Targets. The monitoring of the priority 1 ASBU Threads/Elements is carried out through the MID eANP Volume III.

5.2 MIDANPIRG through its activities under the various subsidiary bodies will continue to update and monitor the implementation of the ASBU Threads and elements to achieve the air navigation targets.

5.3 The priority 1 Threads/Elements along with the associated elements, applicability, performance Indicators, supporting Metrics, and performance Targets are shown in the **Table 2** below.

Note: Further details on the ASBU elements objectives, description, implementation requirements and performance impact assessment can be found on the ICAO GANP Portal <https://www4.icao.int/ganportal/ASBU>

6. Governance

6.1 Progress report on the status of implementation of the different priority 1 Threads/Elements should be developed by MIDANPIRG Subsidiary bodies. A consolidated MID Air Navigation Report showing the status of implementation of the different priority 1 ASBU Elements by Thread will be developed by the RANP/NANP TF on annual basis and presented to MIDANPIRG for endorsement.

6.2 The MIDANPIRG will be the governing body responsible for the review and update of the MID Region Air Navigation Strategy.

6.3 The MID Region Air Navigation Strategy will guide the work of MIDANPIRG and its subsidiary bodies and all its member States and partners.

6.4 Progress on the implementation of the MID Region Air Navigation Strategy and the achievement of the agreed air navigation targets will be reported to the ICAO Air Navigation Commission (ANC), through the review of the MIDANPIRG Reports, MID Air Navigation Reports, etc.; and to the stakeholders in the Region within the framework of MIDANPIRG.

**Table 2. MONITORING THE IMPLEMENTATION OF THE PRIORITY 1 ASBU
THREADS/ELEMENTS (Block 0 & 1) IN THE MID REGION**

Element		Applicability	Performance Indicators/ Supporting Metrics	Baseline	Target	Timeline	KPA/ KPI
<i>Information Threads</i>							
DAIM							
DAIM B1/1	Provision of quality-assured aeronautical data and information	All States	Indicator*: Regional average implementation status of DAIM B1/1 (provision of quality-assured aeronautical data and information). Supporting Metrics: 1. Number of States that have implemented an AIXM-based AIS database (AIXM V5.1+) 2. Number of States that have established formal arrangements with at least 50% of their AIS data originators.	(2023) 53%	80%	Dec 2024	N/A
DAIM B1/3	Provision of digital terrain data sets	All States	Indicator*: Regional average implementation status of DAIM B1/3(Provision of Terrain digital datasets). Supporting Metric: Number of States that provide required Terrain digital datasets.	(2022) 35%	60%	Dec 2024	N/A
DAIM B1/4	Provision of digital obstacle data sets	All States	Indicator*: Regional average implementation status of DAIM B1/4(Provision of obstacle digital datasets). Supporting Metric: Number of States that provide required obstacle digital datasets.	(2022) 35%	60 %	Dec 2024	N/A
AMET							
AMET B0/1	Meteorological observations products	All states	Indicator*: Regional average implementation status of B0/1 (Meteorological observations products). Supporting Metrics: Number of States that provide the following Meteorological observations products, as required: 1. Automatic Weather Observation System (AWOS) information	(2022) 65%	80%	Dec 2021	N/A

Element		Applicability	Performance Indicators/ Supporting Metrics	Baseline	Target	Timeline	KPA/ KPI
			(including real-time exchange of wind and RVR data) 2. Local reports (MET REPORT/SPECIAL) 3. Aerodrome reports (METAR/SPECI) 4. Lightning Information 5. Ground-based weather radar information. 6. Meteorological satellite imagery 7. Aircraft meteorological report (ie. ADS-B, AIREP, etc.) 8. Vertical wind and temperature profiles 9. Wind shear alerts				
AMET B0/2	Meteorological forecast and warning products	All states	Indicator*: Regional average implementation status of B0/2 (Meteorological forecasts and warning products) Supporting Metrics: Number of States that provides the following Meteorological forecast and warning products, as required: 1. World Area Forecast System (WAFS) gridded products. 2. Significant Weather (SIGWX) 3. Aerodrome Forecast (TAF) 4. Trend Forecast (TREND) 5. Take-off Forecast 6. SIGMET 7. Aerodrome Warning 8. Wind Shear Warning	(2022) 60%	90%	Dec 2021	N/A
AMET B0/3	Climatological and historical meteorological products	All states	Indicator: % of States that provide Climatological and historical meteorological products, as required. Supporting Metric: Number of States that provide Climatological and historical meteorological products, as required.	(2022) 60%	85%	Dec 2021	N/A
AMET B0/4	Dissemination of meteorological products	All states	Indicator: % of States disseminating Meteorological products using a variety of formats and means (TAC, Gridded, Graphical, BUFR code, IWXXM)	(2022) 60%	85%	Dec 2021	N/A

Element		Applicability	Performance Indicators/ Supporting Metrics	Baseline	Target	Timeline	KPA/ KPI
			Supporting Metric: Number of States disseminating Meteorological products using a variety of formats and means (TAC, Gridded, Graphical, BUFR code, IWXXM)				
FICE							
FICE B0/1	Automated basic inter facility data exchange (AIDC)	According to the MID Region AIDC/OLDI Priority 1 Applicability Area	Indicator*: % of priority 1 AIDC/OLDI Interconnection have been implemented. Supporting metric: Number of AIDC/OLDI interconnections implemented between adjacent ACCs.	(2023) 26%	70%	Dec 2026	N/A
Operational Threads							
APTA							
APTA B0/1	PBN Approaches (with basic capabilities)	All RWYs ENDs at International Aerodromes	Indicator: % of Runway ends at international aerodromes served by PBN approach procedures with basic functionalities - down to LNAV or LNAV/VNAV minima. Supporting metric: Number of Runways ends at international aerodromes served by PBN approach procedures with basic functionalities - down to LNAV or LNAV/VNAV minima.	(2017) 46.7%	100%	Dec 2018	Capacity/ KPI 10
APTA B0/2	PBN SID and STAR procedures (with basic capabilities)	All RWYs ENDs at International Aerodromes	Indicator: % of Runway ends at international aerodromes provided with PBN SID and STAR (basic capabilities). Supporting Metric: Number of Runway ends at international aerodromes provided with PBN SID and STAR (basic capabilities).	(2022) 55%	70%	Dec 2022	Efficiency Capacity/ KPI 10 KPI 11 KPI 17 KPI 19/
APTA B0/4	CDO (Basic)	OBBI, OIIE, OIKB, OIFM, OJAI, OLBA, OOMS, OTHH, TBD, OEJN, EMA, OEDF, ERK, HSSK,	Indicator*: % of International Aerodromes with CDO implemented and published as required. Supporting Metric: Number of International Aerodromes with CDO implemented and published as required.	(2022) 65%	100%	Dec 2022	Efficiency/ KPI 19

Element		Applicability	Performance Indicators/ Supporting Metrics	Baseline	Target	Timeline	KPA/ KPI
		HSPN, OMAA, MAL, OMAD, DW, OMDB, MSJ, OMRK and OMFJ	*As per the applicability area				
APTA B0/5	CCO (Basic)	OBBI, OIIE, OIKB, OIFM, OJAI, OLBA, OOMS, OTHH, TBD, OEJN, EMA, OEDEF, ERK, HSSK, HSPN, OMAA, MAL, OMAD,MDW, OMDB, MSJ, OMRK and OMFJ	Indicator*: % of International Aerodromes with CCO implemented and published as required. Supporting Metric: Number of International Aerodromes with CCO implemented and published as required. *As per the applicability area	(2022) 65%	100%	Dec 2022	Efficiency/ KPI 17
APTA B0/7	Performance based aerodrome operating minima – Advanced aircraft	All States	Indicator: % of States authorizing Performance-based Aerodrome Operating Minima for Air operators operating Advanced aircraft. Supporting Metric: Number of States 1- having provisions for operational credits to enable lower minima based on advanced aircraft capabilities. (Reference: Annex 6 Part I para. 4.2.8.2.1) 2- Number of States Putting in place an approval process for the operational credit to Aircraft operator conducting PBAOM operations for low visibility operations (Reference: Doc 9365 (AWO Manual)), as applicable.	(2022) 50%	80%	Dec 2025	Capacity/ KPI 10
FRT0							
FRT0 B0/2	Airspace planning and Flexible Use of Airspace (FUA)	Bahrain, Egypt, Jordan, Qatar, Saudi Arabia (2 ACCs), Sudan, UAE	Indicator*: % of ACCs using and implementing appropriate means (procedures and tools (automation)) to support Airspace planning and FUA and improve data exchange between Civil and Military to improve efficiency of Airspace. Supporting metric: Number of ACCs using and implementing appropriate means (procedures and tools (automation)) to support Airspace planning and FUA and improve data exchange	(2022) 63%	70%	Dec 2022	Efficiency Access and equity/ KPI 04 KPI 05 KPI 17 KPI 18/ KPI 19

Element		Applicability	Performance Indicators/ Supporting Metrics	Baseline	Target	Timeline	KPA/ KPI
			between Civil and Military to improve efficiency of Airspace. * As per the applicability area				
FRT0 B0/4	Basic conflict detection and conformance monitoring	Bahrain, Egypt, Iran, Iraq, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia (2 ACCs), Sudan, UAE	Indicator*: % States that implemented MTCD and MONA, for ACCs, as required. Supporting metric: The number of States that implemented MTCD and MONA for ACCs, as required. * As per the applicability area	(2022) 63%	100%	Dec 2022	Capacity/ KPI 06 Safety/ KPI 20 KPI 23
NOPS							
NOPS B0/1	Initial integration of collaborative airspace management with air traffic flow management	Bahrain, Egypt, Iran, Iraq, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Sudan, UAE	Indicator*: % of States implementing ASM/ATFM techniques, procedures and tools for the initial establishment of an integrated collaborative airspace management and air traffic flow and capacity management process. Supporting metric: number of States implementing ASM/ATFM techniques, procedures and tools for the initial establishment of an integrated collaborative airspace management and air traffic flow and capacity management process. * As per the applicability area	(2022) 42%	70%	Dec 2022	Efficiency Capacity/ KPI 04 KPI 05 KPI 17 KPI 18 KPI 19/
ACAS							
ACAS B1/1	ACAS Improvements Operational	All States	Indicator: % of States requiring carriage of ACAS (TCAS v 7.1) for aircraft with a max certificated take-off mass greater than 5.7 tons Supporting metric: Number of States requiring carriage of ACAS (TCAS v 7.1) for aircraft with a max certificated take-off mass greater than 5.7 tons	(2022) 87%	100%	Dec 2024	Safety/ KPI 20 KPI 23
SNET							
SNET B0/1	Short Term Conflict Alert (STCA)	Bahrain, Egypt, Iran, Iraq, Jordan, Kuwait, Lebanon, Oman,	Indicator*: % of States that have implemented Short-term conflict alert (STCA)	(2018) 100%	100%	Dec 2018	Safety/ KPI 20 KPI 23

Element		Applicability	Performance Indicators/ Supporting Metrics	Baseline	Target	Timeline	KPA/ KPI
		Qatar, Saudi Arabia, Sudan, UAE	Supporting metric: number of States that have implemented Short-term conflict alert (STCA) * As per the applicability area				
SNET B0/2	Minimum Safe Altitude Warning (MSAW)	Bahrain, Egypt, Iran, Iraq, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Sudan, UAE	Indicator*: % of States that have implemented Minimum safe altitude warning (MSAW) Supporting metric: number of States that have implemented Minimum safe altitude warning (MSAW) * As per the applicability area	(2018) 100%	100%	Dec 2018	Safety/ KPI 20
SNET B0/3	Area Proximity Warning (APW)	Bahrain, Egypt, Iran, Iraq, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Sudan, UAE	Indicator*: % of States that have implemented Area Proximity Warning (APW) for ACCs, as required. Supporting metric: number of States that have Implemented Area Proximity Warning (APW) for ACCs, as required. * As per the applicability area	(2022) 67%	100%	Dec 2022	Safety/ KPI 20
GADS							
GADS B1/2	Operational Control Directory	All States	Indicator: % of States that provided GADSS Point of Contact (PoC) information Supporting Metric: Number of States that provided GADSS Point of Contact (PoC) information.	(2022) 73%	100%	Dec 2022	N/A
RSEQ							
RSEQ B0/1	Arrival Management	OBBI, HECA, EBA, HELX, HESN, HESH, OTBD, THH, OEJN, OEDF, OEMA, ERK OMDB, MAA	Indicator*: % of Aerodromes that have implemented arrival manager (AMAN), where required/applicable. Supporting Metric: Number of Aerodrome that have implemented arrival manager (AMAN), where required/applicable. * As per the applicability area	(2022) 36%	80%	Dec 2024	Capacity Efficiency/ KPI 08 KPI 10 KPI 11 KPI 14/
SURF							
SURF-B0/1	Basic ATCO tools to manage traffic during ground operations	All International Aerodromes	Indicator: % of Aerodromes having implemented Basic ATCO tools to manage traffic during ground operations	(2022) 90%	100%	Dec 2022	Efficiency/ KPI 02 KPI 13

Element		Applicability	Performance Indicators/ Supporting Metrics	Baseline	Target	Timeline	KPA/ KPI
			Supporting metric: Number of Aerodromes having implemented Basic ATCO tools to manage traffic during ground operations				Safety/ KPI 20 KPI 21
SURF-B0/2	Comprehensive situational awareness of surface operations	OBBI, HECA, OIII, OOMS, OTBD, THH, OEDF, OEJN, OERK, EMA, OMDB, MAA.	Indicator*: % of Airports having implemented the surveillance service of A-SMGCS Supporting metric: Number of Airports having implemented the surveillance service of A-SMGCS * As per the applicability area	(2022) 61%	80%	Dec 2022	Safety/ KPI 20 KPI 21
SURF-B0/3	Initial ATCO alerting service for surface operations	OBBI, HECA, OIII, OOMS, OTBD, OTHH, OEDF, OEJN, OERK, OEMA, OMDB, OMAA.	Indicator*: % of Airports having implemented the A-SMGCS alerting service. Supporting metric: Number of Airports having implemented the A-SMGCS alerting service. * As per the applicability area	(2022) 74%	80%	Dec 2022	Safety/ KPI 20
ACDM							
ACDM B0/1	Airport CDM Information Sharing (ACIS)	HECA, OBBI, OIII, OKKK, OOMS, OTHH, OEJN, OERK, OMDB, OMAA	Indicator*: % of Airports having implemented ACIS. Supporting metric: number of Airports having implemented ACIS. * As per the applicability area	(2022) 75%	90%	Dec 2024	N/A
ACDM B0/2	Integration with ATM Network function	HECA, OBBI, OIII, OKKK, OOMS, OTHH, OEJN, OERK, OMDB, OMAA.	Indicator*: % of Airports having integrated ACDM with the ATM Network function. Supporting metric: Number of Airports having integrated ACDM with the ATM Network function * As per the applicability area	(2022) 25%	50%	Dec 2024	N/A
Technology Threads							
ASUR							
ASUR B0/1	Automatic Dependent Surveillance – Broadcast (ADS-B)	Bahrain, Iran, Iraq, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi	Indicator*: % of States that have implemented ADS-B to improve surveillance coverage/capabilities for provision of ATS.	(2022) 60%	80%	Dec 2022	N/A

Element		Applicability	Performance Indicators/ Supporting Metrics	Baseline	Target	Timeline	KPA/ KPI
		Arabia, , Sudan, UAE	Supporting Metric: Number of States that have implemented ADS-B to improve surveillance coverage/capabilities for provision of ATS. * As per the applicability area				
ASUR B0/2	Multilateration cooperative surveillance systems (MLAT)	Bahrain, , Kuwait, Oman, Qatar, Saudi Arabia, UAE	Indicator*: % of States that have implemented Multi-lateration (M-LAT) for provision of ATS. Supporting Metric: Number of States that have implemented Multi-lateration (M-LAT) for provision of ATS. Indicator*: % of States that have implemented ADS-B to improve surveillance coverage/capabilities for provision of ATS. Supporting Metric: Number of States that have implemented ADS-B to improve surveillance coverage/capabilities for provision of ATS. * As per the applicability area	(2022) 63%	80%	Dec 2022	N/A
ASUR B0/3	Cooperative Surveillance Radar Downlink of Aircraft Parameters (SSR-DAPS)	Bahrain, Egypt, Iran, Iraq, Kuwait, Lebanon, Jordan, Oman, Qatar, Saudi Arabia, Sudan and UAE	Indicator*: % of States that have implemented Downlink of Aircraft Parameters (SSR-DAPS) Supporting Metric: Number of States that have implemented Downlink of Aircraft Parameters (SSR-DAPS) * As per the applicability area	(2022) 83%	90%	Dec 2023	N/A
NAVS							
NAVS B0/3	Aircraft Based Augmentation Systems (ABAS)	All States	Indicator: % of States requiring Aircraft Based Augmentation System (ABAS) equipage for aircraft with a max certificated take-off mass greater than 5,700 Kg to enable PBN Operations Supporting metric: Number of States requiring Aircraft Based Augmentation System (ABAS) equipage for aircraft with a max certificated take-off mass greater than 5,700 Kg to enable PBN Operations	(2022) 40%	70%	Dec 2022	N/A

Element		Applicability	Performance Indicators/ Supporting Metrics	Baseline	Target	Timeline	KPA/ KPI
NAVS B0/4	Navigation Minimal Operating Networks (Nav. MON)	All States	Indicator: % of States that have developed a plan of rationalized conventional NAVAIDS network to ensure the necessary levels of resilience for navigation Supporting metric: Number of States that have developed a plan of rationalized conventional NAVAIDS network to ensure the necessary levels of resilience for navigation.	(2022) 47%	70%	Dec 2022	N/A
COMI							
COMI B0/7	ATS Message Handling System (AMHS)	All States	Indicator: % of States that have established AMHS interconnections with adjacent COM Centres Supporting metric: Number of States that have established AMHS interconnections with adjacent COM Centres	(2022) 73%	90%	Dec 2022	N/A
COMI B1/1	Ground-Ground Aeronautical Telecommunication Network/Internet Protocol Suite (ATN/IPS)	All States	Indicator: % of States that have established National IP Network for voice and data communication Supporting metric: Number of States that have established National IP Network for voice and data communication	(2022) 60%	80%	Dec 2022	N/A

AIR NAVIGATION REPORT

ICAO Middle East Region

2023





ICAO

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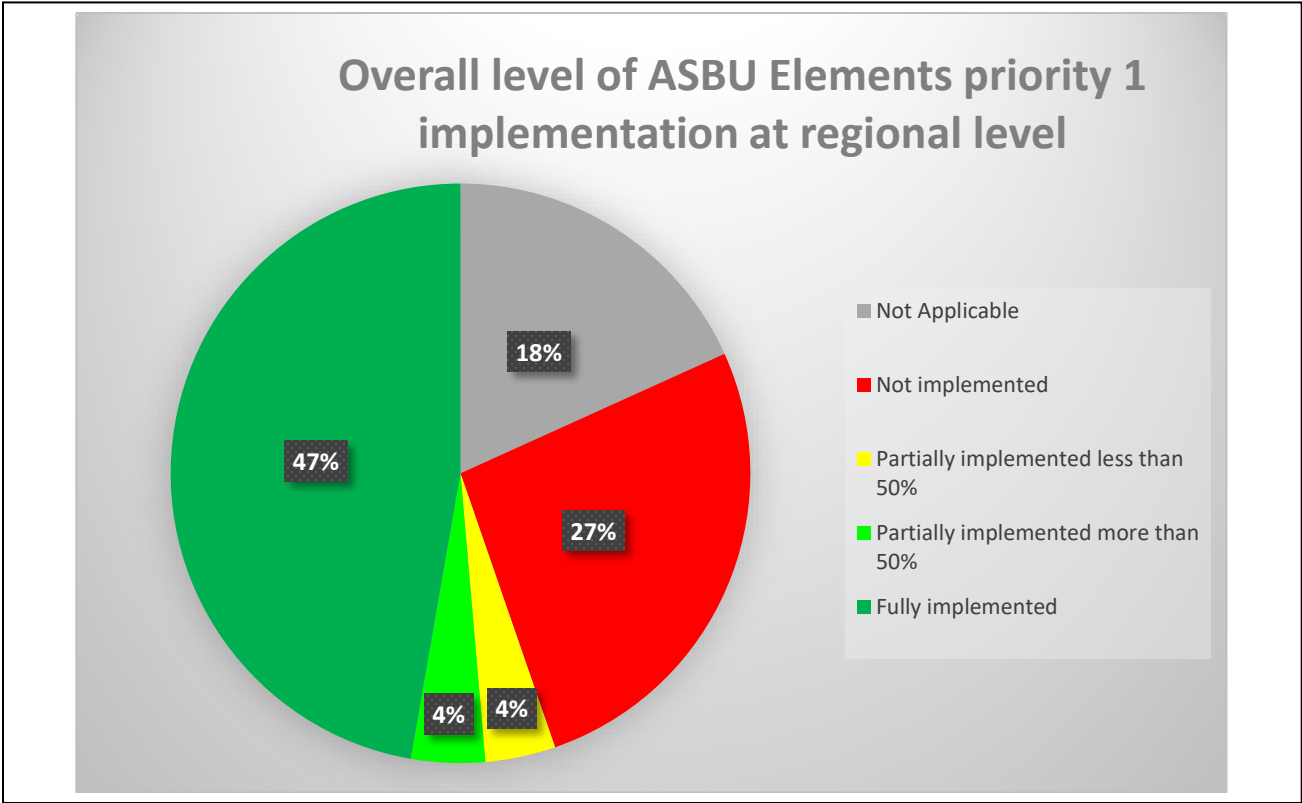
EXECUTIVE SUMMARY

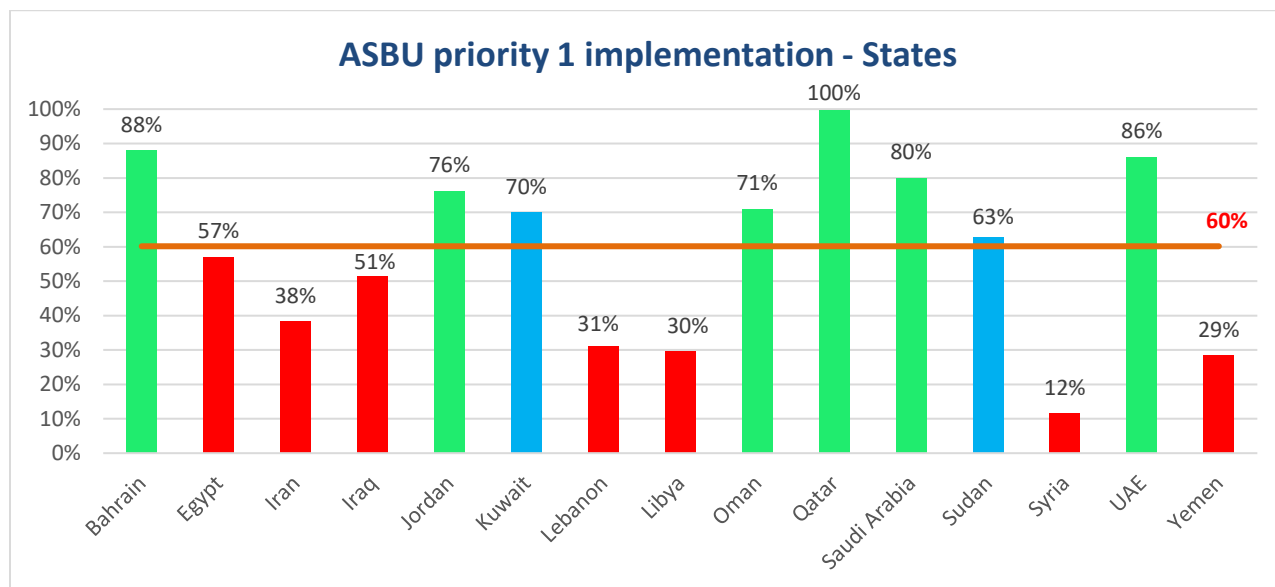
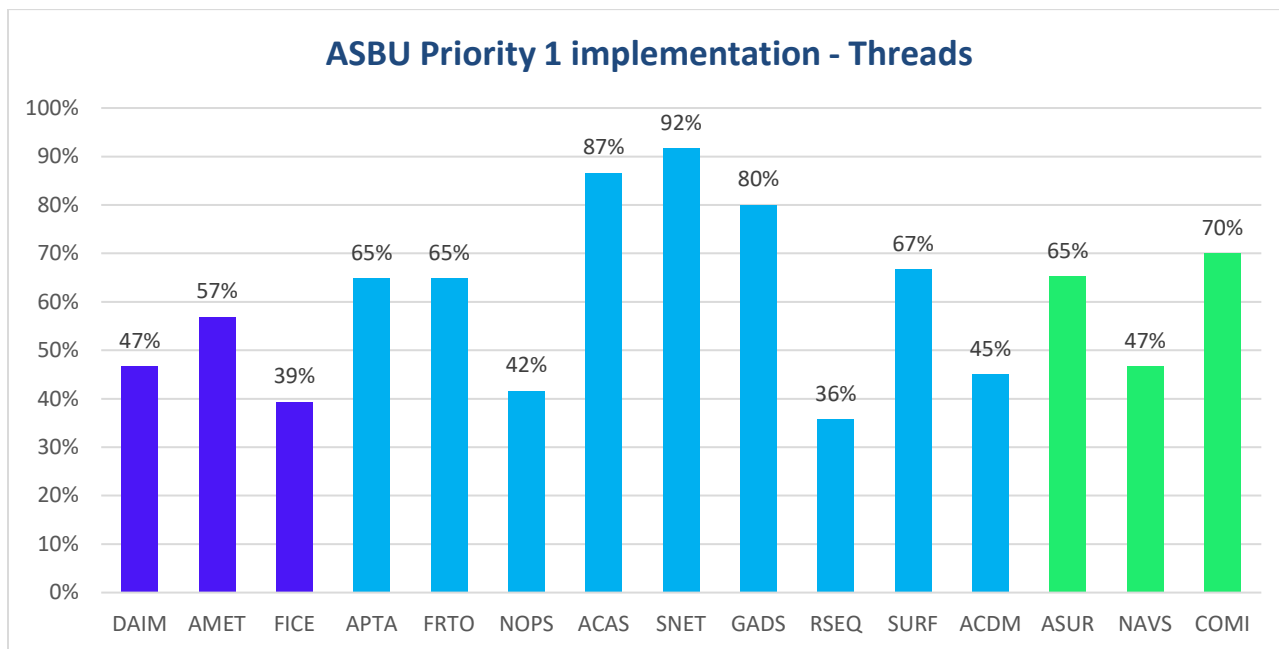
The ICAO MID Air Navigation Report - 2023 provides mainly an overview of the status of implementation of the Priority 1 ASBU Threads/ Elements in the MID Region.

The overall implementation of priority 1 ASBU Threads/Elements in the MID Region is around **60.14%** in 2023. The MID Air Navigation Strategy (Edition March 2023) includes new Threads/ Elements that have been classified as Priority 1 for implementation in the MID Region. The implementation of some ASBU Threads has been acceptable/good (More than 70% per applicability area); such as, ACAS, SNET, COMI and GADS. Nevertheless, some States are still facing challenges to implement the majority of the priority 1 Threads/Elements and are still below the target.

The Overall Priority 1 ASBU Implementation in the MID States is as shown in the map below. Some States (Bahrain, Jordan, Oman, Qatar, Saudi Arabia & UAE) have a good implementation Status (more than 70%).

To summarize the implementation status and progress of ASBU priority 1 ASBU Threads/Elements, the following Implementation Dashboards present status and progress achieved in the implementation of each Thread and Elements by State.





Note 1 – utmost care was taken in the calculation of percentages, figures and numbers, however the statistics and graphs in this report should be considered as approximate.

1. INTRODUCTION

1.1 Objectives

The ICAO MID Region Air Navigation Report 2023 presents an overview of the planning and implementation progress for the Priority 1 ASBU Threads/Elements within the ICAO MID Region during the reporting period January till December 2023.

The implementation status data covers the fifteen (15) ICAO MID States.

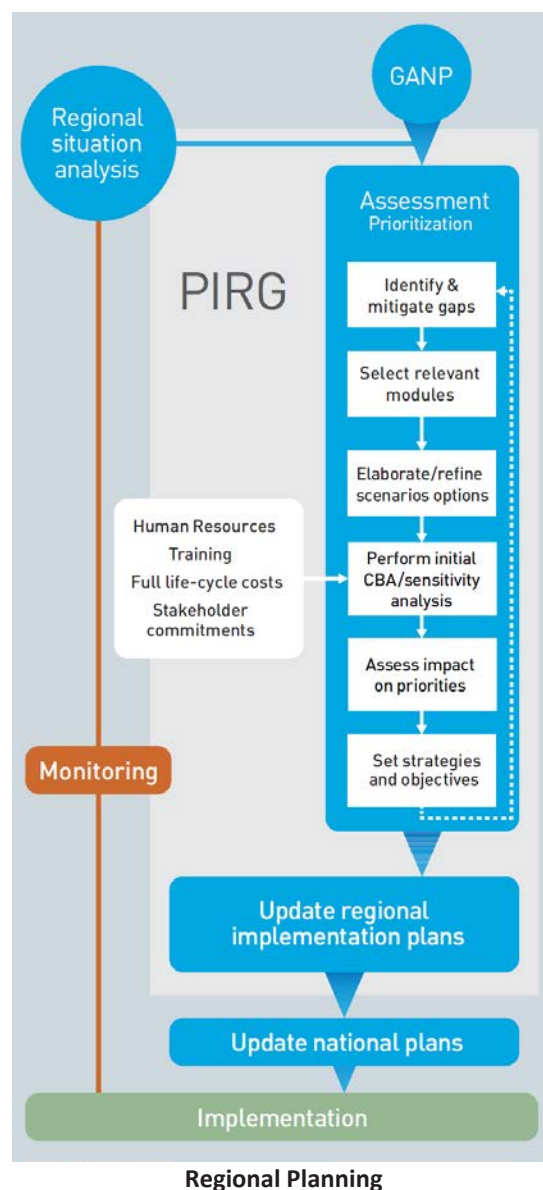
GANP states that the regional national planning process should be aligned and used to identify those Modules which best provide solutions to the operational needs identified. Depending on implementation parameters such as the complexity of the operating environment, the constraints and the resources available, regional and national implementation plans will be developed in alignment with the GANP. Such planning requires interaction between stakeholders including regulators, users of the aviation system, the air navigation service providers (ANSPs), aerodrome operators and supply industry, in order to obtain commitments to implementation.

Accordingly, deployments on a global, regional and sub-regional basis and ultimately at State level should be considered as an integral part of the global and regional planning process through the Planning and Implementation Regional Groups (i.e. MIDANPIRG). The PIRG process will further ensure that all required supporting procedures, regulatory approvals and training capabilities are set in place. These supporting requirements will be reflected in regional online Air Navigation Plan (MID eANPs) developed by MIDANPIRG, ensuring strategic transparency, coordinated progress and certainty of investment. In this way, deployment arrangements including applicability dates can also be agreed and collectively applied by all stakeholders involved in the Region. The MID Region Air Navigation Report 2023 contains information on the implementation progress of the Priority 1 ASBU Threads/Elements of the

1.2 Background

In accordance, with the Resolutions of the 40th Session of the ICAO Assembly, particularly Resolution A40-1 "ICAO global planning for safety and air navigation", the ICAO Assembly urged States and PIRGs to utilize the guidance provided in the GANP for planning and implementation activities which establish priorities, targets and indicators consistent with globally-harmonized objectives, taking into account operational needs. In response to this, the MID Region developed the MID Region Air Navigation Strategy,

MID Region Air Navigation Strategy (MID Doc 002 Edition March 2023) which is the key document for MIDANPIRG and its Subsidiary Bodies to monitor and analyze the implementation within the MID Region.



which is aligned with the GANP 7th Edition and ASBU Framework.

MIDANPIRG and its Subsidiary Bodies monitor the progress and the status of implementation of the following ASBU priority 1 Threads/Elements:

Thread	Element code	Title	Priority	Start Date	Monitoring		Remarks
					Main	Supporting	
Information Threads							
DAIM							
DAIM	B1/1	Provision of quality-assured aeronautical data and information	1	2021	AIM SG	RANP/ NANP TF	
	B1/3	Provision of digital terrain data sets	1	2021	AIM SG	RANP/ NANP TF	
	B1/4	Provision of digital obstacle data sets	1	2021	AIM SG	RANP/ NANP TF	
AMET							
AMET	B0/1	Meteorological observations products	1	2014	MET SG	RANP/ NANP TF	
	B0/2	Meteorological forecast and warning products	1	2014	MET SG	RANP/ NANP TF	
	B0/3	Climatological and historical meteorological products	1	2014	MET SG	RANP/ NANP TF	
	B0/4	Dissemination of meteorological products	1	2014	MET SG	CNS SG, RANP/ NANP TF	
FICE							
FICE	B0/1	Automated basic inter facility data exchange (AIDC)	1	2014	CNS SG ATM SG	RANP/ NANP TF	
Operational Threads							
APTA							
APTA	B0/1	PBN Approaches (with basic capabilities)	1	2014	PBN SG	ATM SG, AIM SG, CNS SG, RANP/ NANP TF	
	B0/2	PBN SID and STAR procedures (with basic capabilities)	1	2014	PBN SG	ATM SG, AIM SG, RANP/ NANP TF	
	B0/4	CDO (Basic)	1	2014	PBN SG	ATM SG, RANP/ NANP TF	
	B0/5	CCO (Basic)	1	2014	PBN SG	ATM SG, RANP/ NANP TF	
	B0/7	Performance based aerodrome operating minima – Advanced aircraft	1	2021	PBN SG	AIM SG, CNS SG, ASPIG, RANP/ NANP TF	
FRTO							

Thread	Element code	Title	Priority	Start Date	Monitoring		Remarks
					Main	Supporting	
	B0/2	Airspace planning and Flexible Use of Airspace (FUA)	1	2014	ATM SG	RANP/ NANP TF	
	B0/4	Basic conflict detection and conformance monitoring	1	2014	ATM SG	CNS SG, RANP/ NANP TF	
NOPS							
NOPS	B0/1	Initial integration of collaborative airspace management with air traffic flow management	1	2015	ATM SG	RANP/ NANP TF	
ACAS							
ACAS	B1/1	ACAS Improvements	1	2014	ATM SG CNS SG	RANP/ NANP TF	
SNET							
SNET	B0/1	Short Term Conflict Alert (STCA)	1	2017	ATM SG	CNS SG, RANP/ NANP TF	
	B0/2	Minimum Safe Altitude Warning (MSAW)	1	2017	ATM SG	CNS SG, RANP/ NANP TF	
	B0/3	Area Proximity Warning (APW)	1	2020	ATM SG	CNS SG, RANP/ NANP TF	
GADS							
GADS	B1/2	Contact directory service	1	2021	CNS SG ATM SG	RANP/ NANP TF	
RSEQ							
RSEQ	B0/1	Arrival Management	1	2021	ATM SG	CNS SG, ASPIG, RANP/ NANP TF	
SURF							
SURF	B0/1	Basic ATCO tools to manage traffic during ground operations	1	2014	ASPIG	ATM SG, CNS SG, RANP/ NANP TF	
	B0/2	Comprehensive situational awareness of surface operations	1	2014	ASPIG	ATM SG, CNS SG, RANP/ NANP TF	
	B0/3	Initial ATCO alerting service for surface operations	1	2021	ASPIG	ATM SG, CNS SG, RANP/ NANP TF	
ACDM							
ACDM	B0/1	Airport CDM Information Sharing (ACIS)	1	2014	ASPIG	CNS SG, AIM SG, ATM SG, RANP/ NANP TF	

Thread	Element code	Title	Priority	Start Date	Monitoring		Remarks
					Main	Supporting	
	B0/2	Integration with ATM Network function	1	2014	ASPIG	CNS SG, AIM SG, ATM SG, RANP/ NANP TF	
Technology Threads							
ASUR							
ASUR	B0/1	Automatic Dependent Surveillance – Broadcast (ADS-B)	1	2021	CNS SG	ATM SG, ASPIG, RANP/ NANP TF	
	B0/2	Multilateration cooperative surveillance systems (MLAT)	1	2021	CNS SG	ATM SG, ASPIG, RANP/ NANP TF	
	B0/3	Cooperative Surveillance Radar Downlink of Aircraft Parameters (SSR-DAPS)	1	2021	CNS SG	ATM SG, ASPIG, RANP/ NANP TF	
NAVS							
NAVS	B0/3	Aircraft Based Augmentation Systems (ABAS)	1	2021	CNS SG	PBN SG, ATM SG, AIM SG, RANP/ NANP TF	
	B0/4	Navigation Minimal Operating Networks (Nav. MON)	1	2021	CNS SG	PBN SG, RANP/ NANP TF	
COMI							
COMI	B0/7	AMHS	1	2014	CNS SG	RANP/ NANP TF	
	B1/1	Ground-Ground Aeronautical Telecommunication Network/Internet Protocol Suite (ATN/IPS)	1	2021	CNS SG	RANP/ NANP TF	

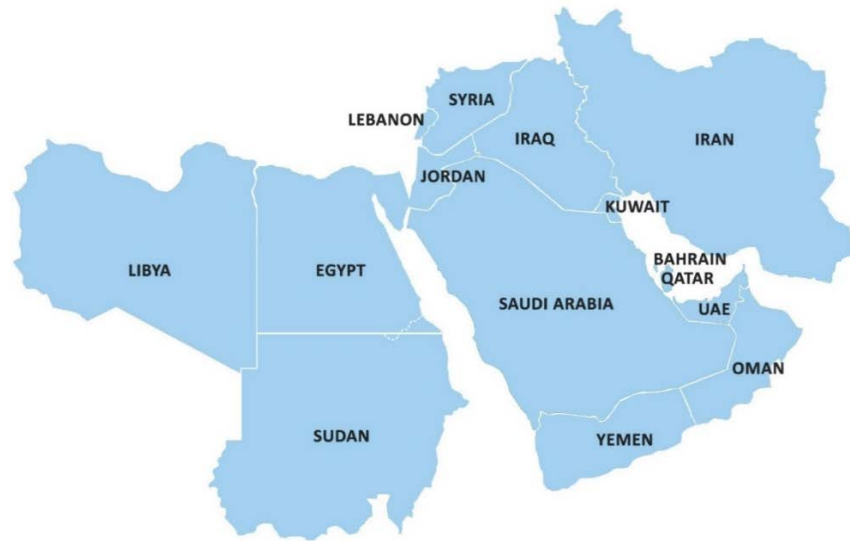
The MID Region Air Navigation Report is an integral part of the air navigation planning and implementation process in the MID Region; and the main tool for the monitoring and assessing the implementation of Air Navigation Systems and ASBUs in the MID Region.

1.3 Scope

This MID Air Navigation Report 2023 addresses the implementation status of the priority 1 ASBU Threads/Elements for the reference period January 2023 to December 2023.

The Report covers the fifteen (15) ICAO MID States: Bahrain, Egypt, Iran, Iraq, Jordan, Kuwait, Lebanon, Libya, Oman, Qatar, Saudi Arabia, Sudan, Syria, United Arab Emirates and Yemen.

ICAO MID Region



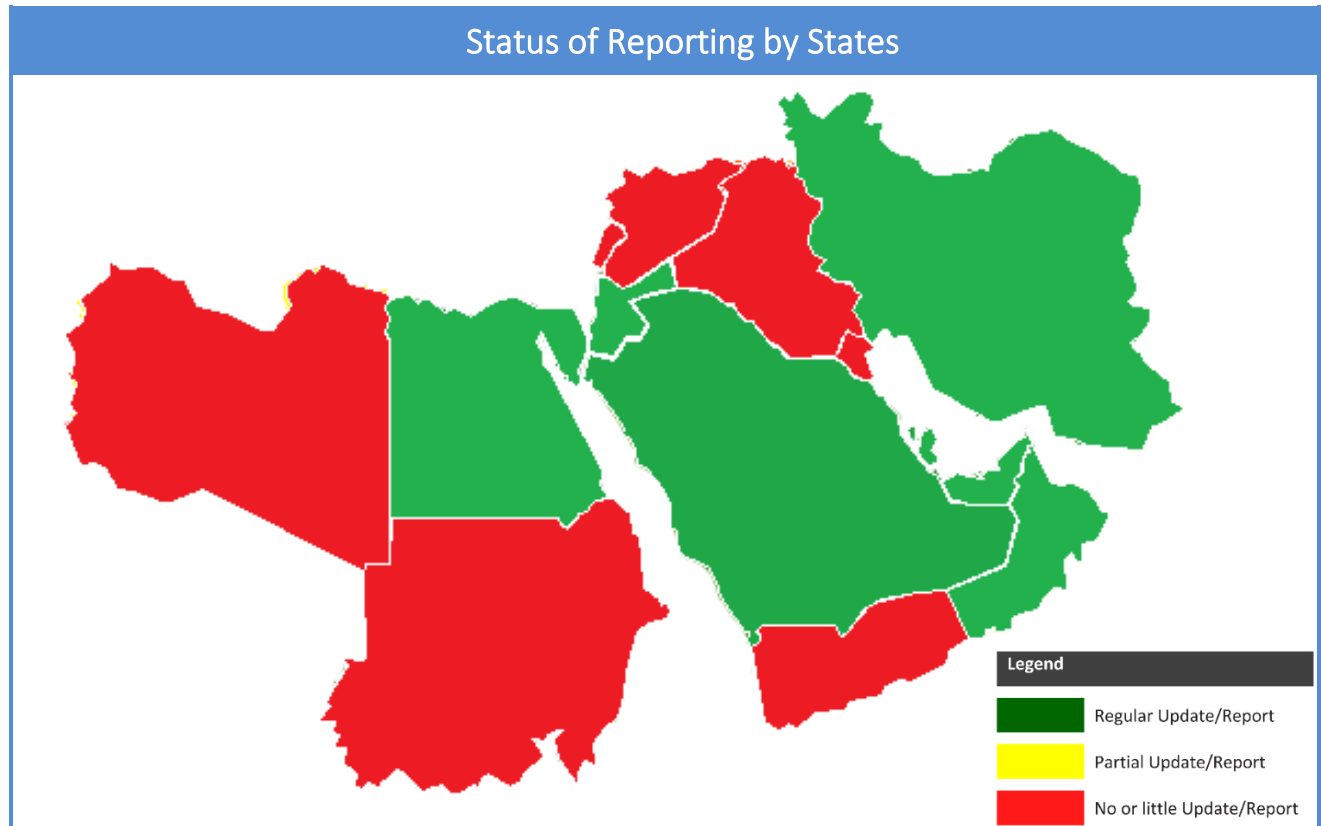
1.4 Collection of Data

For the purpose of collecting necessary data for the MID Air Navigation Report-2023, a State Letter Ref.: AN 1/7 – 23/270 was issued on 6 December 2023, to follow-up on the MIDANPIRG Conclusions 20/9 & 20/11, which urged States to provide relevant data necessary for the development of the MID Region Air Navigation Report-2023. However, some States did not respond to the State

Letter. The status of reporting by States is shown in the following map.

Data collected from States was complemented by some updates provided mainly through the MIDANPIRG Subsidiary Bodies and the MID ANP Volume III.

Where the required data was not provided, it is indicated in the Report by color coding (Missing Data) and the last update provided by the concerned States was considered.



1.5 Structure of the Report

- **Executive Summary** provides an overall review of the ASBU implementation in the MID Region.
- **Section 1** (Introduction) presents the objective and background of the report as well as the scope covered and method of data collection.
- **Section 2** lists the priority 1 ASBU Threads/Elements in the MID Region and presents the status of their

implementation and their progress in graphical and numeric form.

- **Success stories/best practices**

Iraq, Kuwait and UAE

- **Conclusion**

- **Appendix A** provides detailed status of the implementation of Priority 1 ASBU Threads for the MID States.



2. STATUS AND PROGRESS OF ASBU IMPLEMENTATION

This chapter of the report gives an overview of the implementation progress for each of the Priority 1 ASBU Elements belonging to a particular ASBU Thread.

The following color scheme is used for illustrating the status of implementation:

Legend	
	Completed
	Partially Completed (50%+)
	Partially Completed/Late (50%-)
	Not Started/Not Implemented
	Not Applicable
	Missing Data

Note – Missing data is excluded in the calculation of the average regional status of implementation.

2.1 ASBU Implementation Status and Progress in the MID Region

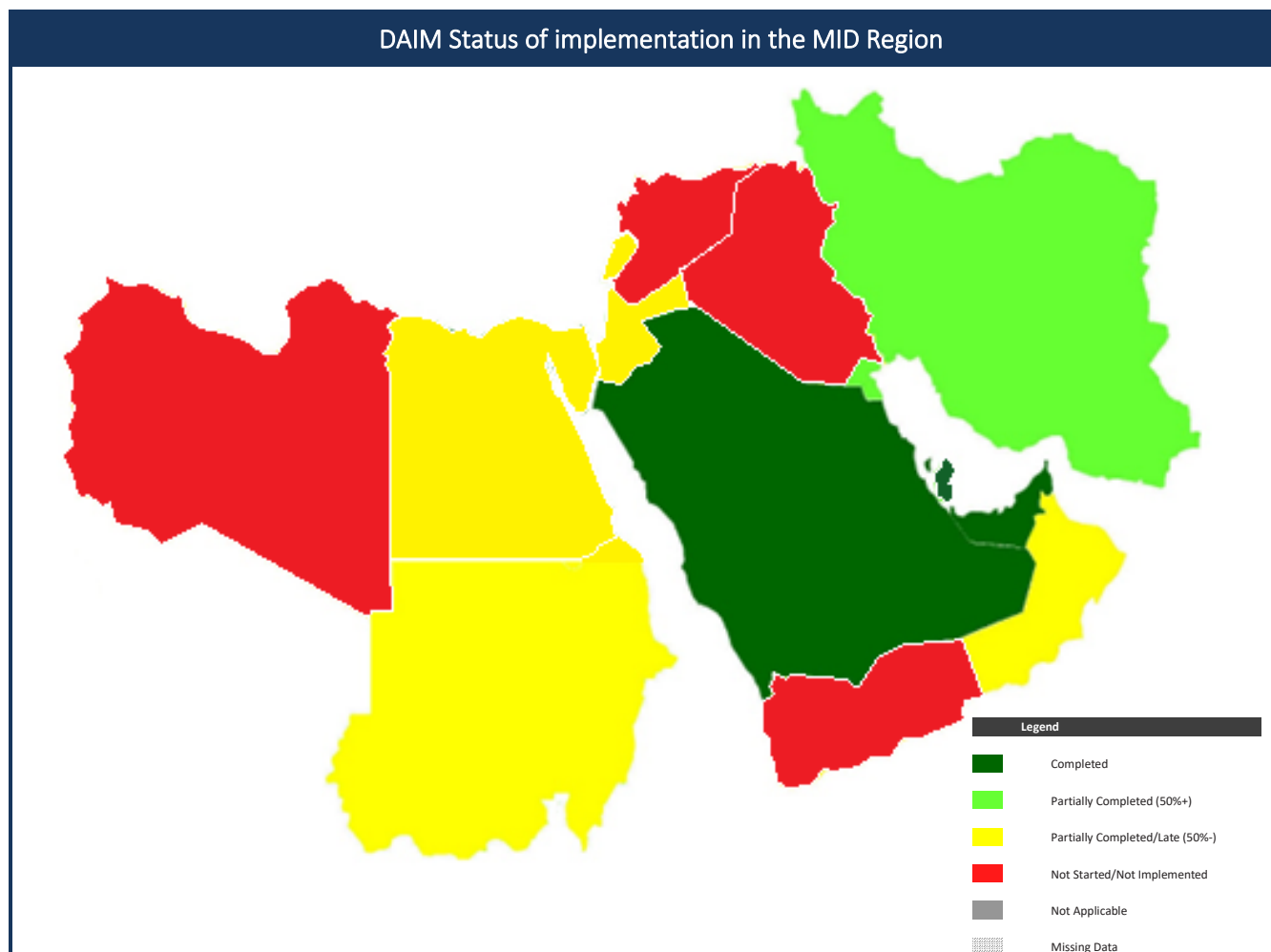
2.1.1 B1-DAIM

Improved aeronautical information based on enhanced data quality (accuracy, resolution, integrity, timeliness, traceability, completeness, format) to support Performance-Based Navigation (PBN), airborne computer-based navigation systems and ground automation. In addition, digital exchange and processing of aeronautical information allows a more efficient management of information by avoiding reliance on manual processing and manipulation.

Element		Applicability	Performance Indicators/ Supporting Metrics	Baseline	Target	Timeline	KPA/ KPI
Information Threads							
DAIM							
DAIM B1/1	Provision of quality-assured aeronautical data and information	All States	Indicator*: Regional average implementation status of DAIM B1/1 (provision of quality-assured aeronautical data and information). Supporting Metrics: 1. Number of States that have implemented an AIXM-based AIS database (AIXM V5.1+) 2. Number of States that have established formal arrangements with at least 50% of their AIS data originators.	(2023) 53%	80%	Dec 2024	N/A
DAIM B1/3	Provision of digital terrain data sets	All States	Indicator*: Regional average implementation status of DAIM B1/3(Provision of Terrain digital datasets). Supporting Metric: Number of States that provide required Terrain digital datasets	(2022) 35%	60%	Dec 2024	N/A
DAIM B1/4	Provision of digital obstacle data sets	All States	Indicator*: Regional average implementation status of DAIM B1/4(Provision of obstacle digital datasets). Supporting Metric: Number of States that provide required obstacle digital datasets.	(2022) 35%	60 %	Dec 2024	N/A

Module	Elements	Bahrain	Egypt	Iran	Iraq	Jordan	Kuwait	Lebanon	Libya	Oman	Qatar	Saudi Arabia	Sudan	Syria	UAE	Yemen
B1-DAIM	B1/1	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	B1/3	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	B1/4	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■

Average Regional Implementation is **46.73%**.



2.1.2 B0-AMET

Global, regional and local meteorological information to support flexible airspace management, improved situational awareness, collaborative decision-making and dynamically optimized flight trajectory planning.

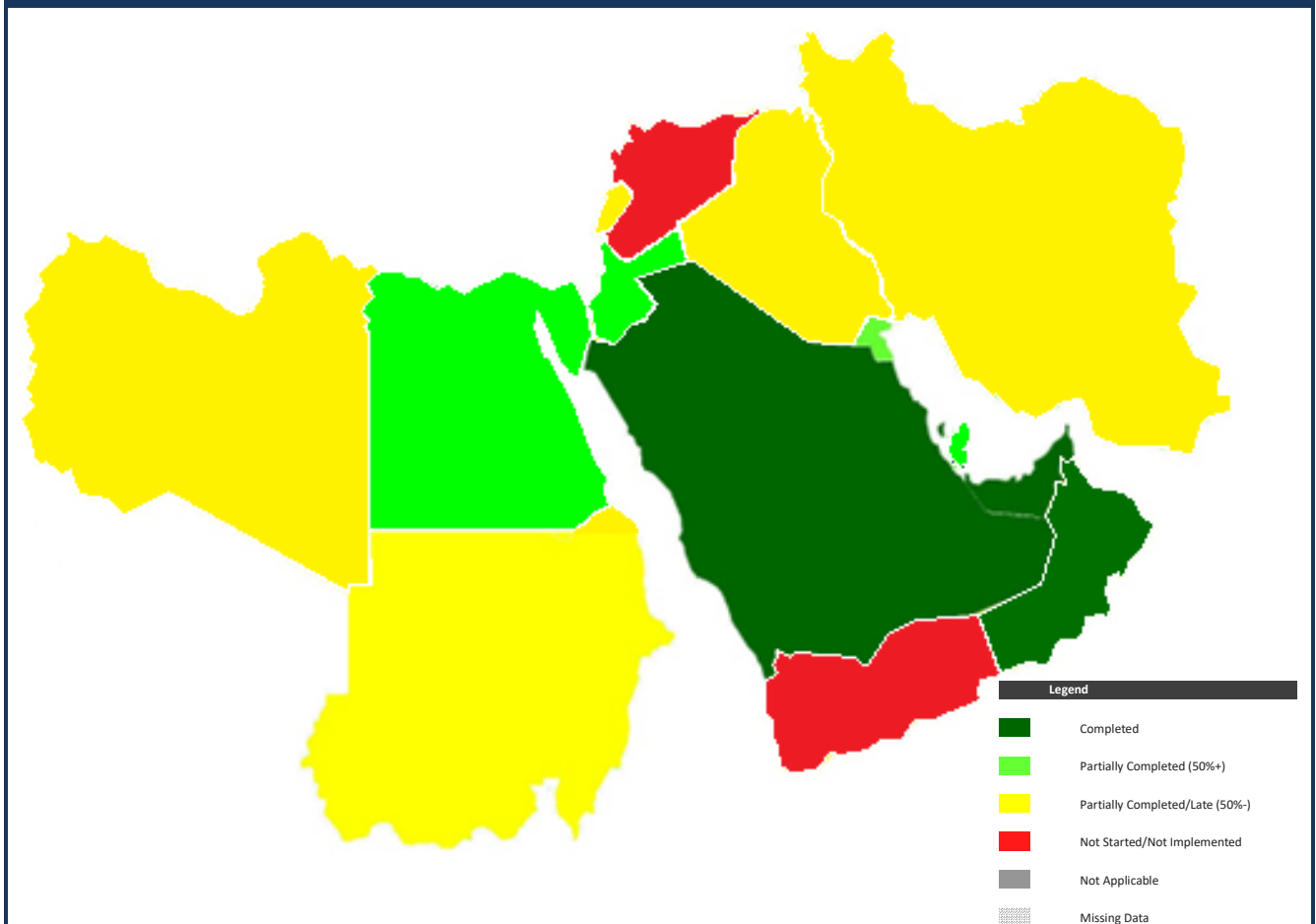
Element	Applicability	Performance Indicators/ Supporting Metrics	Baseline	Target	Timeline	KPA/ KPI	
Information Threads							
AMET							
AMET B0/1	Meteorological observations products	All states	Indicator*: Regional average implementation status of B0/1 (Meteorological observations products). Supporting Metrics: Number of States that provide the following Meteorological observations products, as required: 1. Automatic Weather Observation System (AWOS) information (including real-time exchange of wind and RVR data) 2. Local reports (MET REPORT/SPECIAL) 3. Aerodrome reports (METAR/SPECI) 4. Lightning Information 5. Ground-based weather radar information. 6. Meteorological satellite imagery 7. Aircraft meteorological report (ie. ADS-B, AIREP, etc.) 8. Vertical wind and temperature profiles 9. Wind shear alerts	(2022) 65%	80%	Dec 2021	N/A
AMET B0/2	Meteorological forecast and warning products	All states	Indicator*: Regional average implementation status of B0/2 (Meteorological forecasts and warning products) Supporting Metrics: Number of States that provides the following Meteorological forecast and warning products, as required:	(2022) 60%	90%	Dec 2021	N/A

Element		Applicability	Performance Indicators/ Supporting Metrics	Baseline	Target	Timeline	KPA/ KPI
			1. World Area Forecast System (WAFS) gridded products. 2. Significant Weather (SIGWX) 3. Aerodrome Forecast (TAF) 4. Trend Forecast (TREND) 5. Take-off Forecast 6. SIGMET 7. Aerodrome Warning 8. Wind Shear Warning				
AMET B0/3	Climatological and historical meteorological products	All states	Indicator: % of States that provide Climatological and historical meteorological products, as required. Supporting Metric: Number of States that provide Climatological and historical meteorological products, as required.	(2022) 60%	85%	Dec 2021	N/A
AMET B0/4	Dissemination of meteorological products	All states	Indicator: % of States disseminating Meteorological products using a variety of formats and means (TAC, Gridded, Graphical, BUFR code, IWXXM) Supporting Metric: Number of States disseminating Meteorological products using a variety of formats and means (TAC, Gridded, Graphical, BUFR code, IWXXM)	(2022) 60%	85%	Dec 2021	N/A

Module	Elements	Bahrain	Egypt	Iran	Iraq	Jordan	Kuwait	Lebanon	Libya	Oman	Qatar	Saudi Arabia	Sudan	Syria	UAE	Yemen
B0-AMET	B0/1															
	B0/2															
	B0/3															
	B0/4															

Average Regional Implementation is **56.92%**.

AMET Status of implementation in the MID Region



2.1.3 B0-FICE

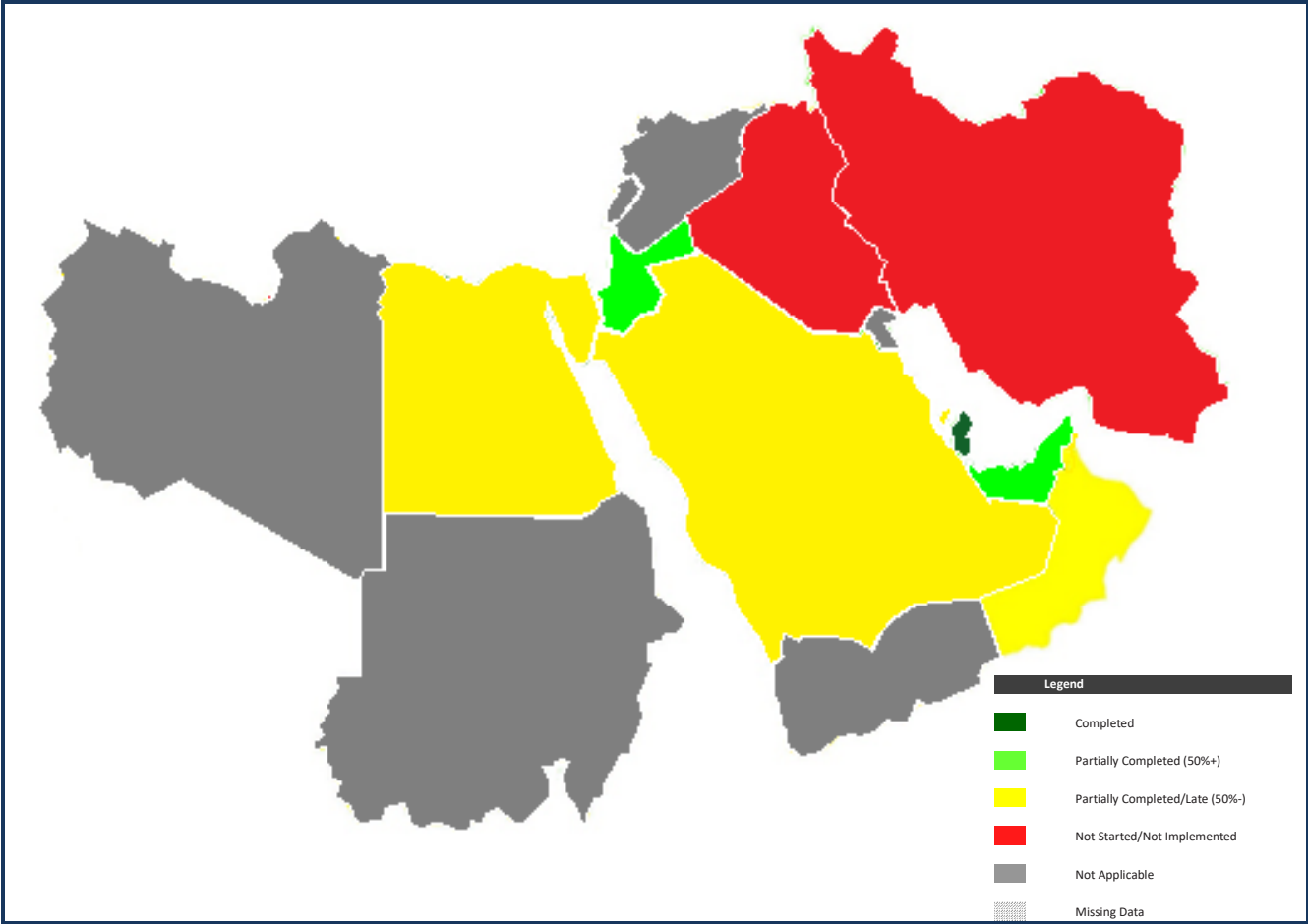
To improve coordination between air traffic service units (ATSUs) by using ATS interfacility flight data communication. The benefit is the improved efficiency through digital transfer of flight data.

Element		Applicability	Performance Indicators/ Supporting Metrics	Baseline	Target	Timeline	KPA/ KPI
Information Threads							
FICE							
FICE B0/1	Automated basic inter facility data exchange (AIDC)	According to the MID Region AIDC/OLDI Priority 1 Applicability Area	Indicator*: % of priority 1 AIDC/OLDI Interconnection have been implemented. Supporting metric: Number of AIDC/OLDI interconnections implemented between adjacent ACCs.	(2023) 26%	70%	Dec 2026	N/A

Module	Elements	Bahrain	Egypt	Iran	Iraq	Jordan	Kuwait	Lebanon	Libya	Oman	Qatar	Saudi Arabia	Sudan	Syria	UAE	Yemen
B0-FICE	B0/1															

Average Regional Implementation is **39.39%**.

FICE Status of implementation in the MID Region



2.1.4 B0-APTA

Procedures implemented as STARS in terminal airspace provide lateral path guidance to support improving the efficiency in the descent phase of flight by enabling near idle power operations from top of descent, to a point where the aircraft transitions to approach operations. For takeoff, SIDS provide a lateral path that can support continuous climb operations to the top of climb where the cruise phase of flight starts.

Enhanced STARS and SIDS with altitude constraints along the lateral path improve ATC management, and further support operational efficiency by providing vertical profiles that all aircraft can follow.

Performance based aerodrome operating minima (PB AOM) allows for implementation of vertically guided approaches at a wider range of aerodromes, and facilitates a phased approach to improvement in approach capabilities. Advanced aircraft with technology such as Enhanced Vision Systems (EVS) benefit from operational credits to continue operations below normal minima.

Element		Applicability	Performance Indicators/ Supporting Metrics	Baseline	Target	Timeline	KPA/ KPI
Operational Threads							
APTA							
APTA B0/1	PBN Approaches (with basic capabilities)	All RWYs ENDs at International Aerodromes	Indicator: % of Runway ends at international aerodromes provided with Baro-VNAV approach procedures (LNAV/VNAV) Supporting metric: Number of Runways ends at international aerodromes provided with Baro-VNAV approach procedures (LNAV/VNAV)	(2017) 46.7%	100%	Dec 2018	Capacity/ KPI 10
APTA B0/2	PBN SID and STAR procedures (with basic capabilities)	All RWYs ENDs at International Aerodromes	Indicator: % of Runway ends at international aerodromes provided with PBN SID and STAR (basic capabilities). Supporting Metric: Number of Runway ends at international aerodromes provided with PBN SID and STAR (basic capabilities).	(2022) 55%	70%	Dec 2022	Efficiency Capacity/ KPI 10 KPI 11 KPI 17 KPI 19/
APTA B0/4	CDO (Basic)	OBBI, OIIE, OIKB, OIFM, OJAI, OLBA, OOMS, OTHH,	Indicator*: % of International Aerodromes with CDO implemented as required. Supporting Metric:	(2022) 65%	100%	Dec 2022	Efficiency/ KPI 19

Element		Applicability	Performance Indicators/ Supporting Metrics	Baseline	Target	Timeline	KPA/ KPI
		OTBD, OEJN, OEMA, OEDE, OERK, HSSK, HSPN, OMAA, OMAL, OMAD, OMDW, OMDB, OMSJ, OMRK and OMFJ	Number of International Aerodromes with CDO implemented as required. *As per the applicability area				
APTA B0/5	CCO (Basic)	OBBI, OIIE, OIKB, OIFM, OJAI, OLBA, OOMS, OTHH, OTBD, OEJN, OEMA, OEDE, OERK, HSSK, HSPN, OMAA, OMAL, OMAD, OMDW, OMDB, OMSJ, OMRK and OMFJ	Indicator*: % of International Aerodromes with CCO implemented as required. Supporting Metric: Number of International Aerodromes with CCO implemented as required. *As per the applicability area	(2022) 65%	100%	Dec 2022	Efficiency/ KPI 17
APTA B0/7	Performance based aerodrome operating minima – Advanced aircraft	All States	Indicator: % of States authorizing Performance-based Aerodrome Operating Minima for Air operators operating Advanced aircraft. Supporting Metric: Number of States authorizing Performance-based Aerodrome Operating Minima for Air operators operating Advanced aircraft.	(2022) 50%	80%	Dec 2025	Capacity/ KPI 10

Module	Elements	Bahrain	Egypt	Iran	Iraq	Jordan	Kuwait	Lebanon	Libya	Oman	Qatar	Saudi Arabia	Sudan	Syria	UAE	Yemen
B0-APTA	B0/1															
	B0/2															
	B0/4															
	B0/5															
	B0/7															

Average Regional Implementation is **64.83%**.

APTA Status of implementation in the MID Region

Legend

- Completed
- Partially Completed (50%+)
- Partially Completed/Late (50%-)
- Not Started/Not Implemented
- Not Applicable
- Missing Data

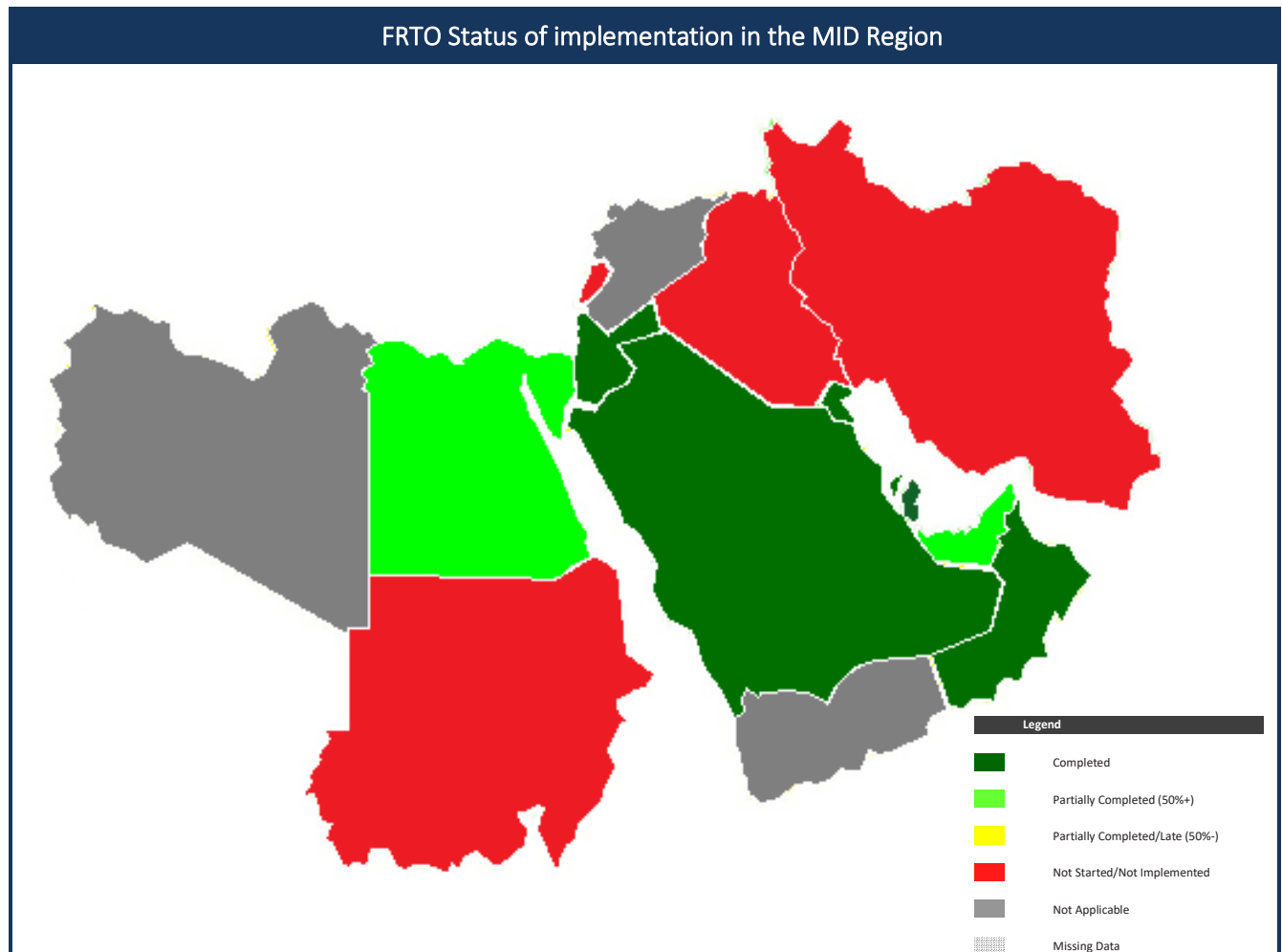
2.1.5 B0-FRTO

En-route trajectories are enhanced by using more direct routings, and collaborative airspace management process and tools. ATCOs are assisted by tools for the conflict identification and conformance monitoring.

Element	Applicability	Performance Indicators/ Supporting Metrics	Baseline	Target	Timeline	KPA/ KPI
Operational Threads						
FRTO						
FRTO B0/2	Airspace planning and Flexible Use of Airspace (FUA)	Bahrain, Egypt, Jordan, Qatar, Saudi Arabia (2 ACCs), Sudan, UAE Indicator*: % of ACCs using and implementing appropriate means (procedures and tools (automation)) to support Airspace planning and FUA and improve data exchange between Civil and Military to improve efficiency of Airspace. Supporting metric: Number of ACCs using and implementing appropriate means (procedures and tools (automation)) to support Airspace planning and FUA and improve data exchange between Civil and Military to improve efficiency of Airspace. * As per the applicability area	(2022) 63%	70%	Dec 2022	Efficiency Access and equity/ KPI 04 KPI 05 KPI 17 KPI 18/ KPI 19
FRTO B0/4	Basic conflict detection and conformance monitoring	Bahrain, Egypt, Iran, Iraq, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia (2 ACCs), Sudan, UAE Indicator*: % States that implemented MTCD and MONA, for ACCs, as required. Supporting metric: The number of States that implemented MTCD and MONA for ACCs, as required. * As per the applicability area	(2022) 63%	100%	Dec 2022	Capacity/ KPI 06 Safety/ KPI 20 KPI 23

Module	Elements	Bahrain	Egypt	Iran	Iraq	Jordan	Kuwait	Lebanon	Libya	Oman	Qatar	Saudi Arabia	Sudan	Syria	UAE	Yemen
B0-FRTO	B0/2	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	B0/4	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■

Average Regional Implementation is **64.88%**.



2.1.6 B0-NOPS

The Air Traffic Flow Management (ATFM) is used to manage the flow of traffic in a way that minimizes delay and optimises the use of the entire airspace and available capacity. The management of airspace starts to be integrated with the management of the traffic flows. Some main processes are automated, however substantial procedural support is still required to balance demand with available capacity. Collaborative ATFM can manage traffic flows by:

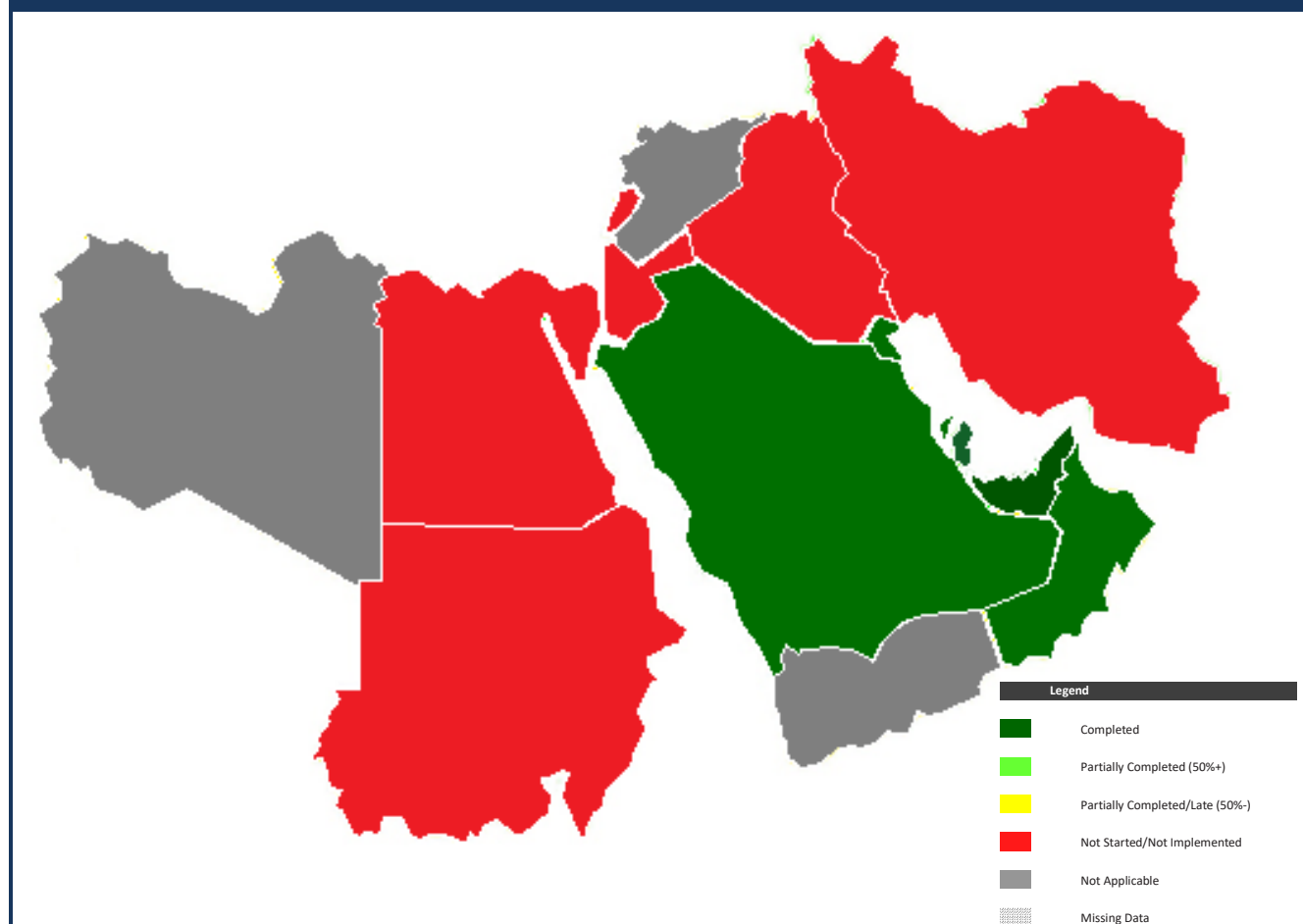
- smoothing flows and managing rates of sector entry;
- re-route traffic to avoid flow constraint areas;
- level capping;
- collaborative airspace management;
- ATFM slot management including departure information planning;
- adjust flow measures by use of enhanced collaborative flight planning and enhanced tactical flow management.

Element	Applicability	Performance Indicators/ Supporting Metrics	Baseline	Target	Timeline	KPA/ KPI	
Operational Threads							
NOPS							
NOPS B0/1	Initial integration of collaborative airspace management with air traffic flow management	Bahrain, Egypt, Iran, Iraq, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Sudan, UAE	Indicator*: % of States implementing ASM/ATFM techniques, procedures and tools for the initial establishment of an integrated collaborative airspace management and air traffic flow and capacity management process Supporting metric: Number of States implementing ASM/ATFM techniques, procedures and tools for the initial establishment of an integrated collaborative airspace management and air traffic flow and capacity management process. * As per the applicability area	(2022) 42%	70%	Dec 2022	Efficiency Capacity/ KPI 04 KPI 05 KPI 17 KPI 18 KPI 19/

Module	Elements	Bahrain	Egypt	Iran	Iraq	Jordan	Kuwait	Lebanon	Libya	Oman	Qatar	Saudi Arabia	Sudan	Syria	UAE	Yemen
B0-NOPS	B0/1															

Average Regional Implementation is **41.67%**

NOPS Status of implementation in the MID Region



2.1.7 B1-ACAS

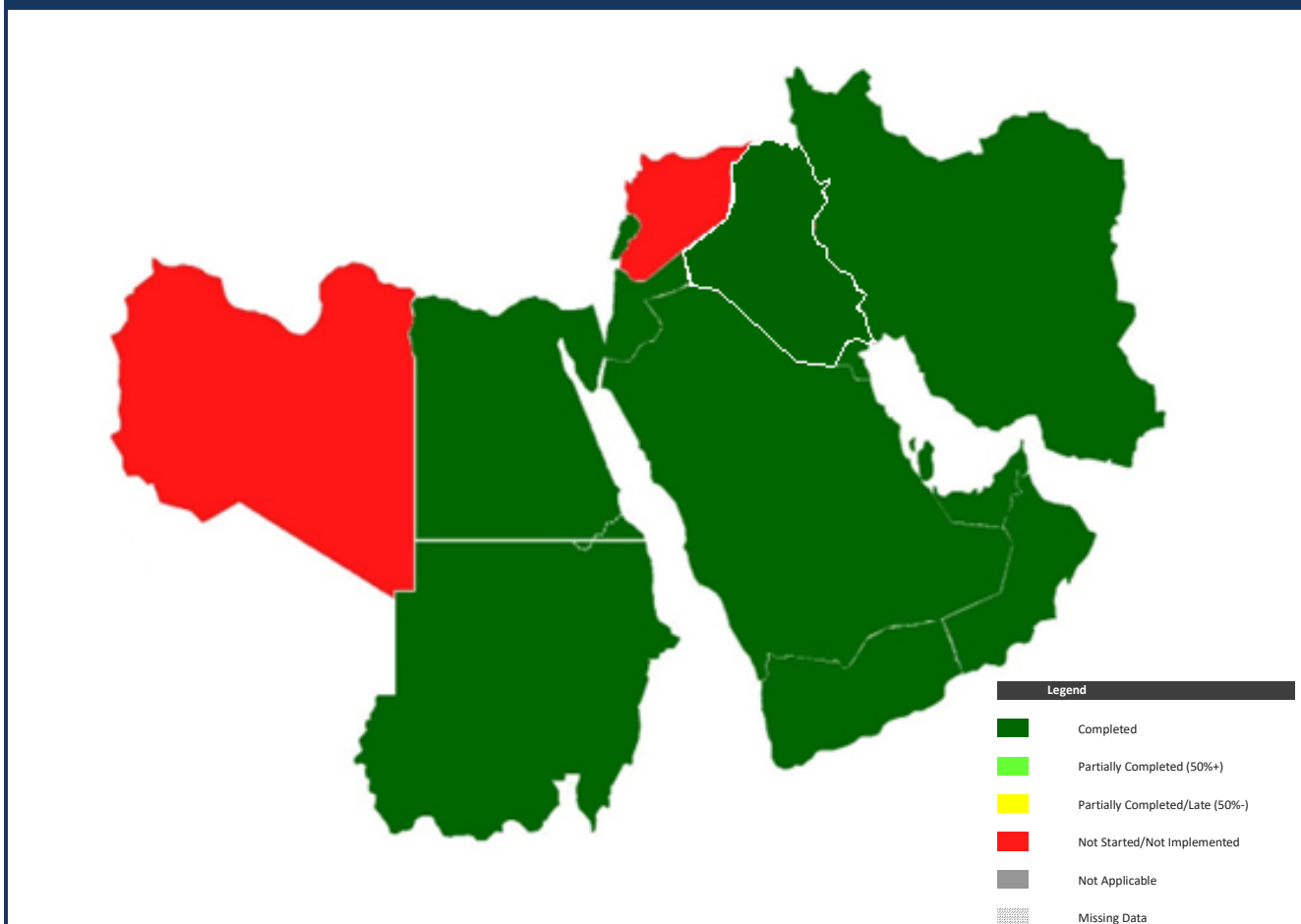
The traffic alert and collision avoidance system (TCAS) version 7.1 provides short-term improvements to existing airborne collision avoidance systems (ACAS) to reduce nuisance alerts as well as enhancing the logic for some geometries (i.e., Uberlingen accident). This will reduce trajectory deviations and increase safety in cases where there is a breakdown of separation.

Element		Applicability	Performance Indicators/ Supporting Metrics	Baseline	Target	Timeline	KPA/ KPI
Operational Threads							
ACAS							
ACAS B1/1	ACAS Improvements Operational	All States	Indicator: % of States requiring carriage of ACAS (TCAS v 7.1) for aircraft with a max certificated take-off mass greater than 5.7 tons Supporting metric: Number of States requiring carriage of ACAS (TCAS v 7.1) for aircraft with a max certificated take-off mass greater than 5.7 tons	(2022) 87%	100%	Dec 2024	Safety/ KPI 20 KPI 23

Module	Elements	Bahrain	Egypt	Iran	Iraq	Jordan	Kuwait	Lebanon	Libya	Oman	Qatar	Saudi Arabia	Sudan	Syria	UAE	Yemen
B1-ACAS	B1/1															

Average Regional Implementation is **86.67%**.

ACAS Status of implementation in the MID Region



2.1.8 B0-SNET

Ground Based Safety Nets are an integral part of the ATM system using primarily ATS surveillance data with warning times of up to two minutes. Upon receiving an alert, air traffic controllers are expected to immediately assess the situation and take appropriate action if necessary.

The goal of current Ground Based Safety Nets is collision avoidance, or the avoidance of collision with terrain or obstacles, or to warn the controllers of the unauthorized penetration of an airspace.

Alerts from short- term conflict alert (STCA), area proximity warnings (APW), minimum safe altitude warnings (MSAW) and approach path monitoring (APM) are proposed.

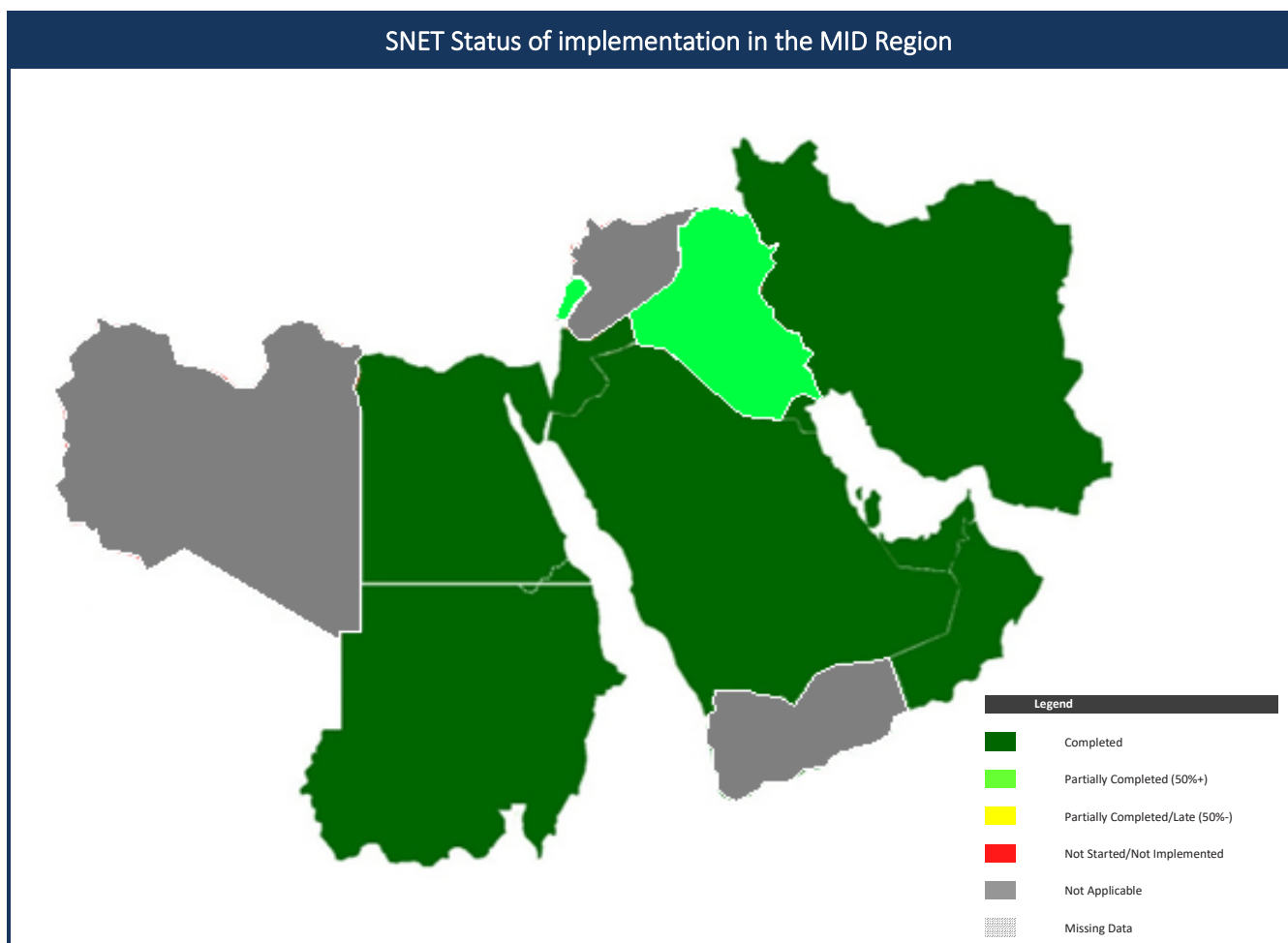
Ground-Based Safety Nets do not change the way air traffic controllers perform their work and have no influence on the calculation of the sector capacity.

Element		Applicability	Performance Indicators/ Supporting Metrics	Baseline	Target	Timeline	KPA/ KPI
Operational Threads							
SNET							
SNET B0/1	Short Term Conflict Alert (STCA)	Bahrain, Egypt, Iran, Iraq, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Sudan, UAE	Indicator*: % of States that have implemented Short-term conflict alert (STCA) Supporting metric: Number of States that have implemented Short-term conflict alert (STCA) * As per the applicability area	(2018) 100%	100%	Dec 2018	Safety/ KPI 20 KPI 23
SNET B0/2	Minimum Safe Altitude Warning (MSAW)	Bahrain, Egypt, Iran, Iraq, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Sudan, UAE	Indicator*: % of States that have implemented Minimum safe altitude warning (MSAW) Supporting metric: Number of States that have implemented Minimum safe altitude warning (MSAW) * As per the applicability area	(2018) 100%	100%	Dec 2018	Safety/ KPI 20
SNET B0/3	Area Proximity Warning (APW)	Bahrain, Egypt, Iran, Iraq, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Sudan, UAE	Indicator*: % of States that have implemented Area Proximity Warning (APW) for ACCs, as required Supporting metric: Number of States that have Implemented Area	(2022) 67%	100%	Dec 2022	Safety/ KPI 20

Element		Applicability	Performance Indicators/ Supporting Metrics	Baseline	Target	Timeline	KPA/ KPI
			Proximity Warning (APW) for ACCs, as required. * As per the applicability area				

Module	Elements	Bahrain	Egypt	Iran	Iraq	Jordan	Kuwait	Lebanon	Libya	Oman	Qatar	Saudi Arabia	Sudan	Syria	UAE	Yemen
B0-SNET	B0/1															
	B0/2															
	B0/3															

Average Regional Implementation is **91.67%**.



2.1.9 B1-GADS

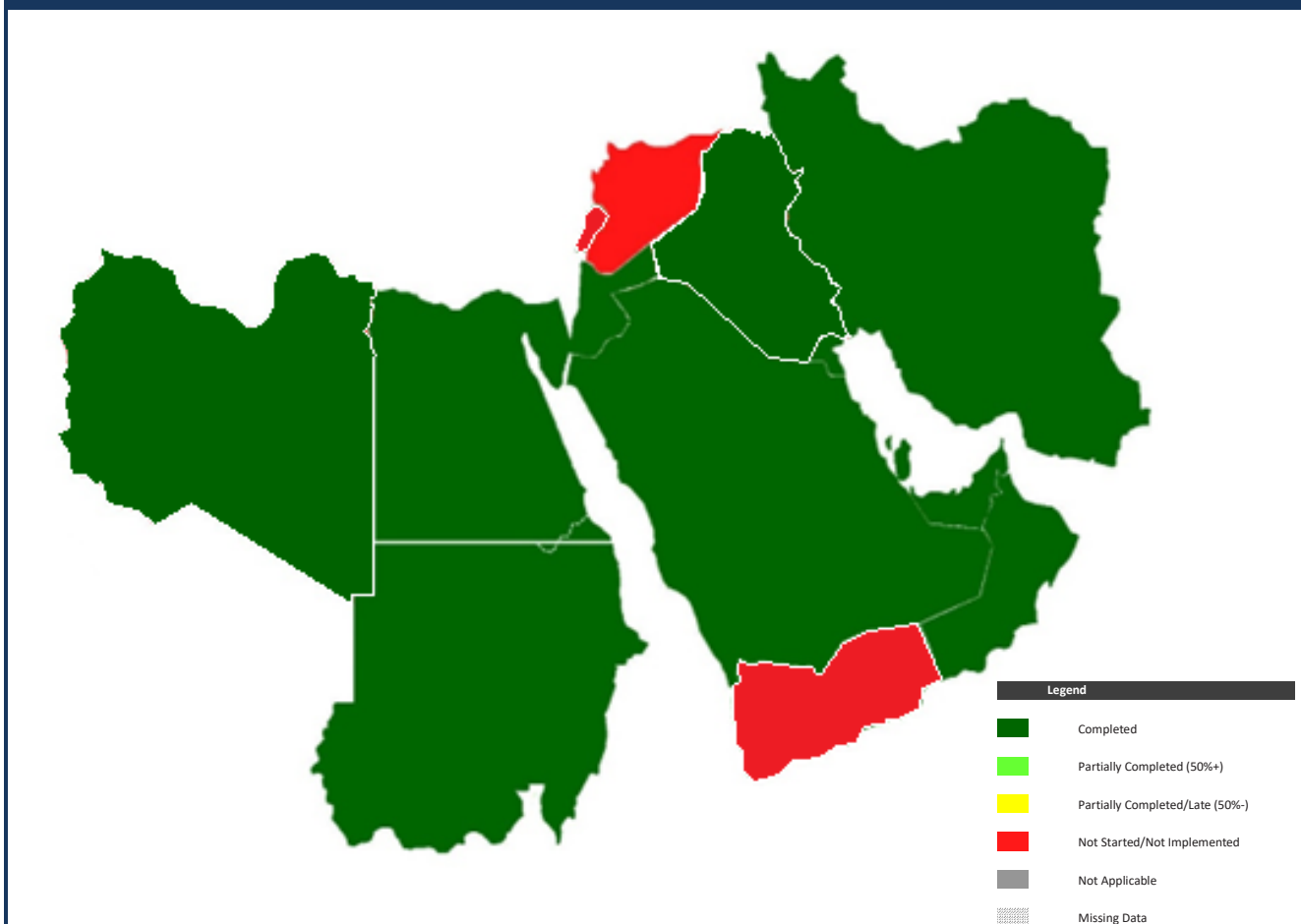
In oceanic areas without automatic surveillance, ATSU Alerting Service is supported with aircraft tracking capability implemented by the aircraft operator. Point of Contact (PoC) information is provided to facilitate establishing contact between relevant Stakeholders in emergency situations.

Element		Applicability	Performance Indicators/ Supporting Metrics	Baseline	Target	Timeline	KPA/ KPI
Operational Threads							
GADS							
GADS B1/2	Operational Control Directory	All States	Indicator: % of States that provided GADSS Point of Contact (PoC) information Supporting Metric: Number of States that provided GADSS Point of Contact (PoC) information.	(2022) 73%	100%	Dec 2022	N/A

Module	Elements	Bahrain	Egypt	Iran	Iraq	Jordan	Kuwait	Lebanon	Libya	Oman	Qatar	Saudi Arabia	Sudan	Syria	UAE	Yemen
B0-GADS	B1/2															

Average Regional Implementation is **80%**.

GADS Status of implementation in the MID Region



2.1.10 B0-RSEQ

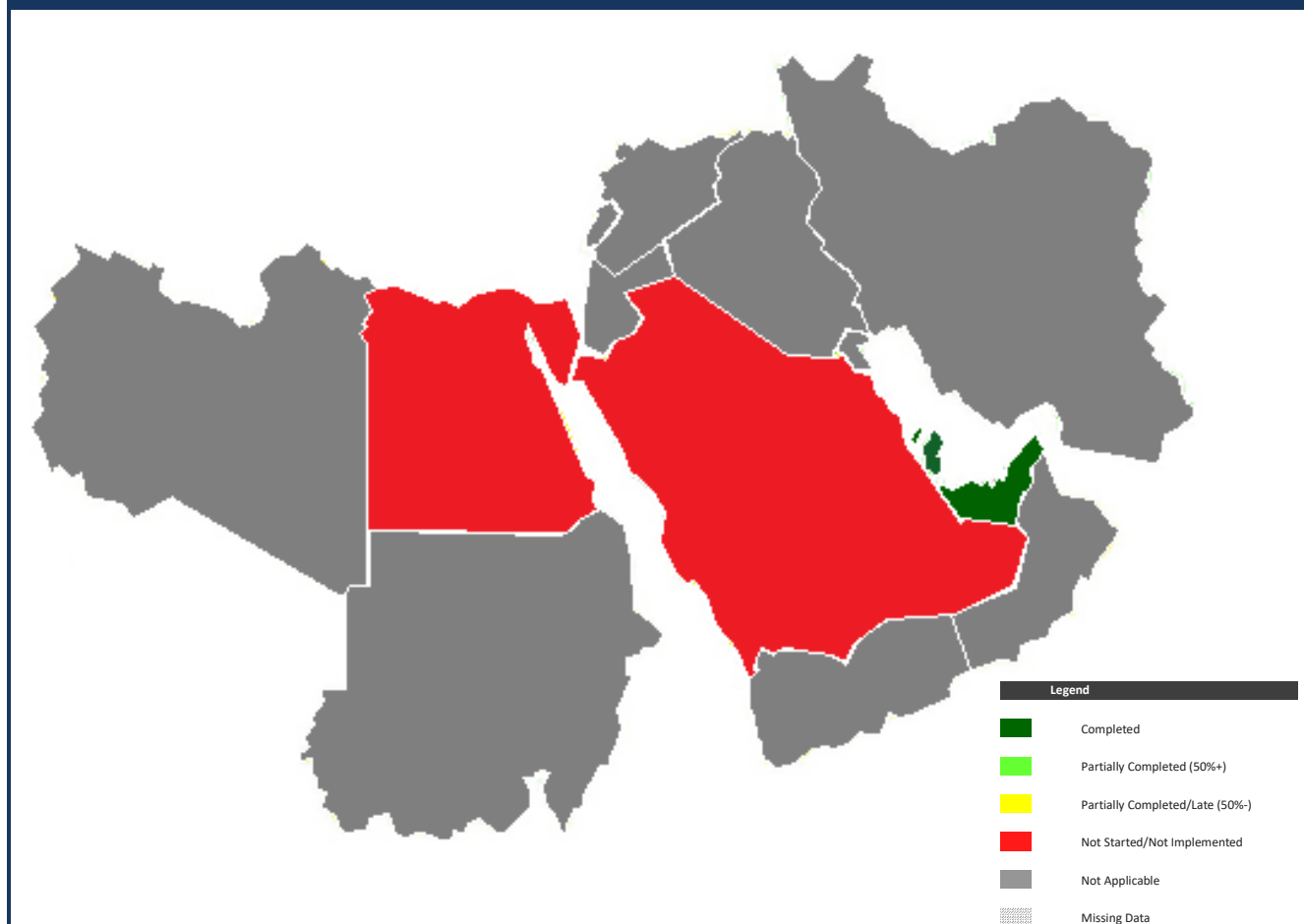
Arriving flights are “metered” and sequenced by arrival ATC based on inbound traffic predication information, optimizing runway utilization. Also departures are sequenced allowing improved start/push-back clearances, reducing the taxi time and ground holding, delivering more efficient departure sequences and reduce surface congestion.

Element	Applicability	Performance Indicators/ Supporting Metrics	Baseline	Target	Timel ine	KPA/ KPI	
Operational Threads							
RSEQ							
RSEQ B0/1	Arrival Management	OBBI, HECA, HEBA, HELX, HESN, HESH, OTBD, OTHH, OEJN, OEDF, OEMA, OERK OMDB, OMAA	Indicator*: % of Aerodromes that have implemented arrival manager (AMAN), where required/applicable Supporting Metric: Number of Aerodrome that have implemented arrival manager (AMAN), where required/ applicable. * As per the applicability area	(2022) 36%	80%	Dec 2024	Capacity Efficiency/ KPI 08 KPI 10 KPI 11 KPI 14/

Module	Elements	Bahrain	Egypt	Iran	Iraq	Jordan	Kuwait	Lebanon	Libya	Oman	Qatar	Saudi Arabia	Sudan	Syria	UAE	Yemen
B0-RSEQ	B0/1															

Average Regional Implementation is 35.71%.

RSEQ Status of implementation in the MID Region



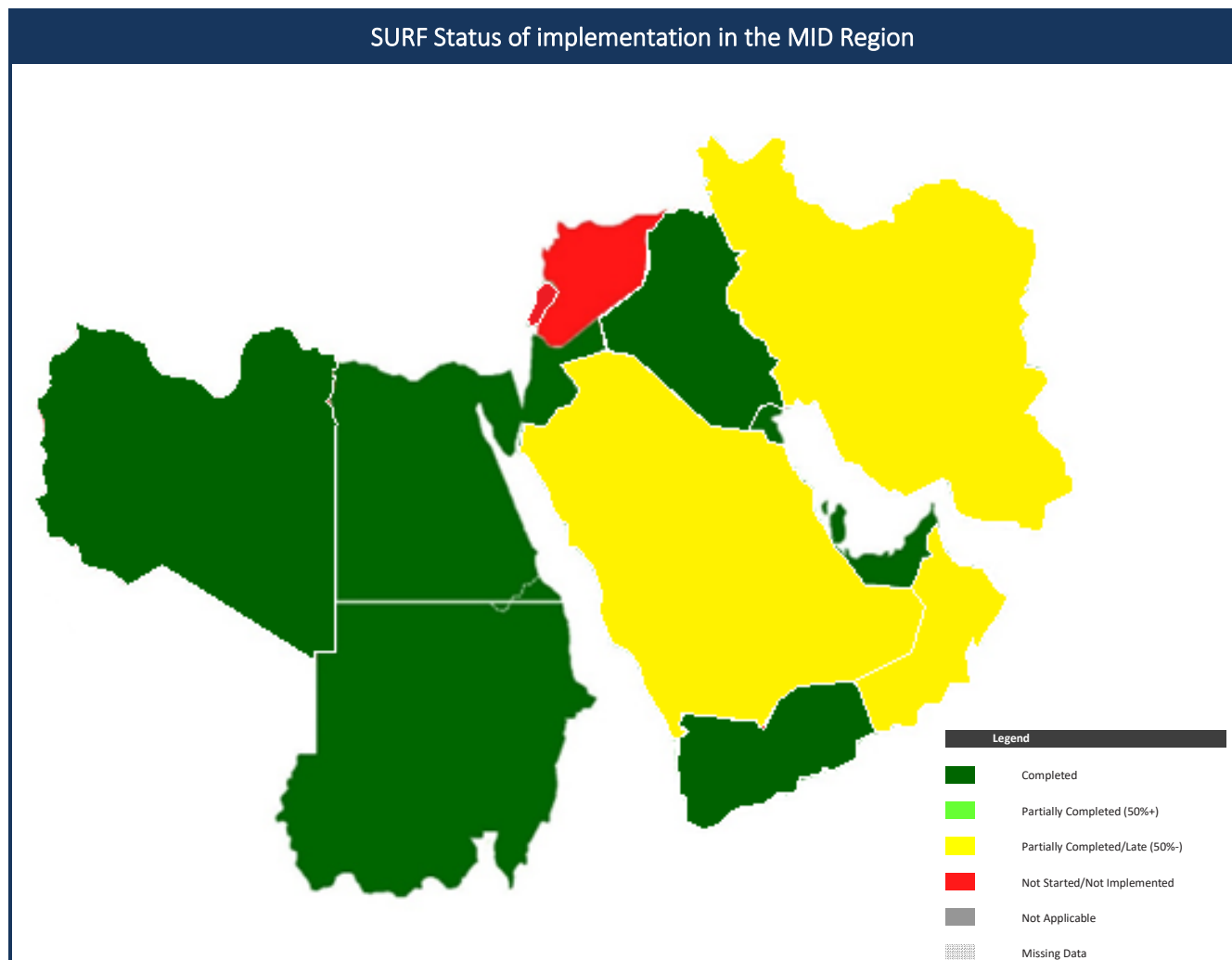
2.1.11 B0-SURF

This module aims to enhance the situational awareness of Air Traffic Controllers and pilots during ground operations by the provision of the aerodrome surface situation on their respective displays being A-SMGCS for the controller or electronic maps in the cockpit. Some initial alerting services for prevention of runway incursions are proposed to the controller.

Element	Applicability	Performance Indicators/ Supporting Metrics	Baseline	Target	Timeline	KPA/ KPI
Operational Threads						
SURF						
SURF-B0/1	Basic ATCO tools to manage traffic during ground operations	All International Aerodromes	Indicator: % of Aerodromes having implemented Basic ATCO tools to manage traffic during ground operations Supporting metric: Number of Aerodromes having implemented Basic ATCO tools to manage traffic during ground operations	(2022) 90%	100%	Dec 2022 Efficiency/ KPI 02 KPI 13 Safety/ KPI 20 KPI 21
SURF-B0/2	Comprehensive situational awareness of surface operations	OBBI, HECA, OIII, OOMS, OTBD, OTHH, OEDF, OEJN, OERK, OEMA, OMDB, OMAA.	Indicator*: % of Airports having implemented the surveillance service of A-SMGCS Supporting metric: Number of Airports having implemented the surveillance service of A-SMGCS *As per the applicability area	(2022) 61%	80%	Dec 2022 Safety/ KPI 20 KPI 21
SURF-B0/3	Initial ATCO alerting service for surface operations	OBBI, HECA, OIII, OOMS, OTBD, OTHH, OEDF, OEJN, OERK, OEMA, OMDB, OMAA.	Indicator*: % of Airports having implemented the A-SMGCS alerting service. Supporting metric: Number of Airports having implemented the A- SMGCS alerting service. * As per the applicability area	(2022) 74%	80%	Dec 2022 Safety/ KPI 20

Module	Elements	Bahrain	Egypt	Iran	Iraq	Jordan	Kuwait	Lebanon	Libya	Oman	Qatar	Saudi Arabia	Sudan	Syria	UAE	Yemen
B0-SURF	B0/1															
	B0/2															
	B0/3															

Average Regional Implementation is **66.67%**.



2.1.12 B0 & 1-ACDM

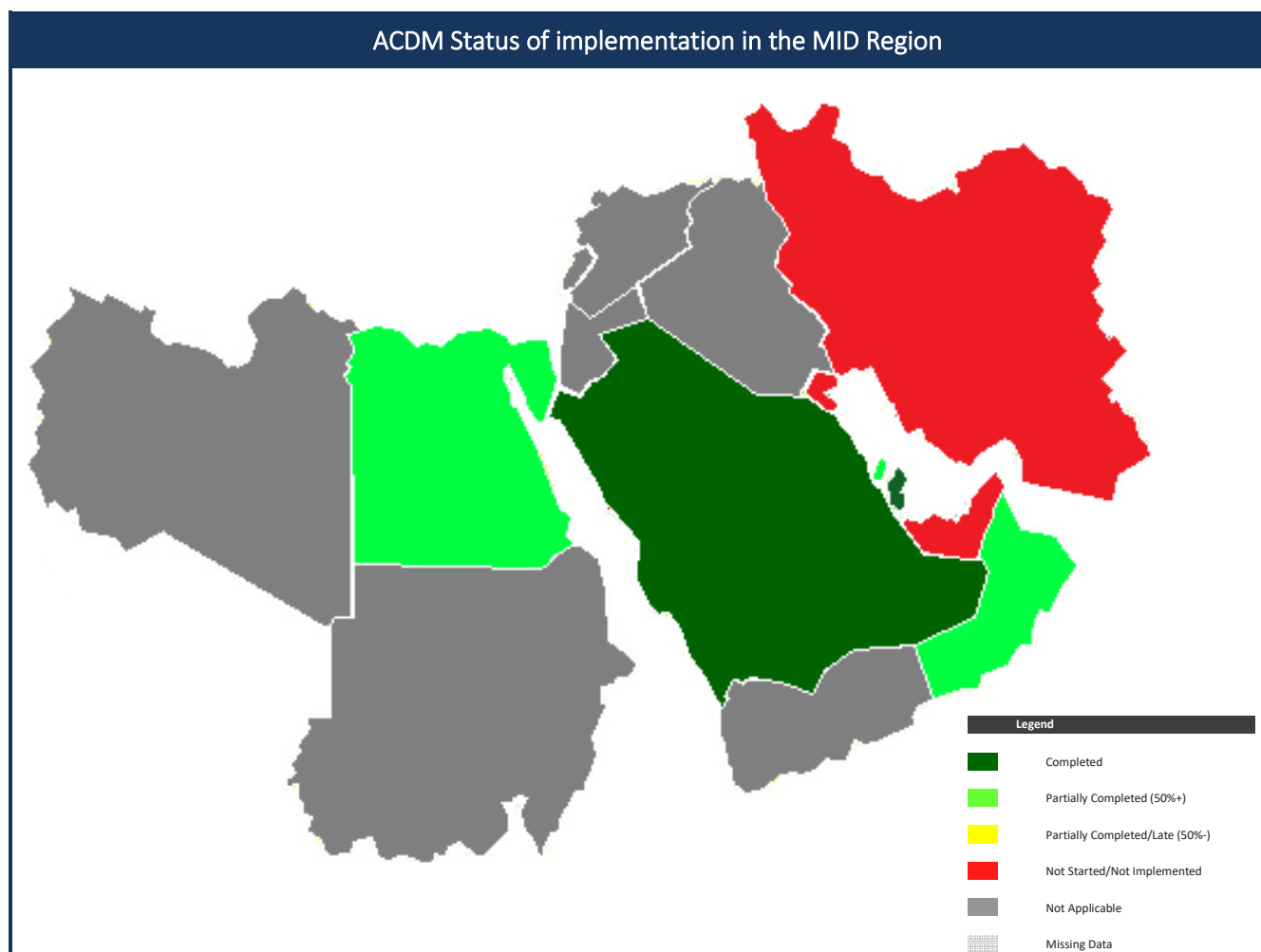
B0: Aerodrome operators, aircraft operators, air traffic controllers, ground handling agents, pilots and air traffic flow managers share live information that may be dynamic, in order to make better and coordinated decisions. This applies notably in day to day operations and also in case of severe weather conditions or in case of emergencies of all kinds; for these cases A-CDM procedures are referred to in the snow plan, the aerodrome emergency response plan and the aerodrome manual. In some cases, aerodromes are connected to the ATM network via the ATFM function or to ATC through data exchange.

B1: Aerodromes are integrated within the ATM Network, from the strategic through all tactical phases. Situational awareness and decision support information is made available to affected stakeholders to establish a common understanding of the various needs and capabilities and make adjustments to assets in order to cope with these needs. Support mechanisms include an Airport Operations Planning (AOP) and an Airport Operations Centre (APOC).

Element	Applicability	Performance Indicators/ Supporting Metrics	Baseline	Target	Timeline	KPA/ KPI
Operational Threads						
ACDM						
ACDM B0/1	Airport CDM Information Sharing (ACIS)	HECA, OBBI, OIII, OKKK, OOMS, OTHH, OEJN, OERK, OMDB, OMAA	Indicator*: % of Airports having implemented ACIS Supporting metric: Number of Airports having implemented ACIS. * As per the applicability area	(2022) 75%	90%	Dec 2024 N/A
ACDM B0/2	Integration with ATM Network function	HECA, OBBI, OIII, OKKK, OOMS, OTHH, OEJN, OERK, OMDB, OMAA.	Indicator*: % of Airports having integrated ACDM with the ATM Network function. Supporting metric: Number of Airports having integrated ACDM with the ATM Network function * As per the applicability area	(2022) 25%	50%	Dec 2024 N/A

Module	Elements	Bahrain	Egypt	Iran	Iraq	Jordan	Kuwait	Lebanon	Libya	Oman	Qatar	Saudi Arabia	Sudan	Syria	UAE	Yemen
B0-ACDM	B0/1															
	B0/2															

Average Regional Implementation is **45%**.



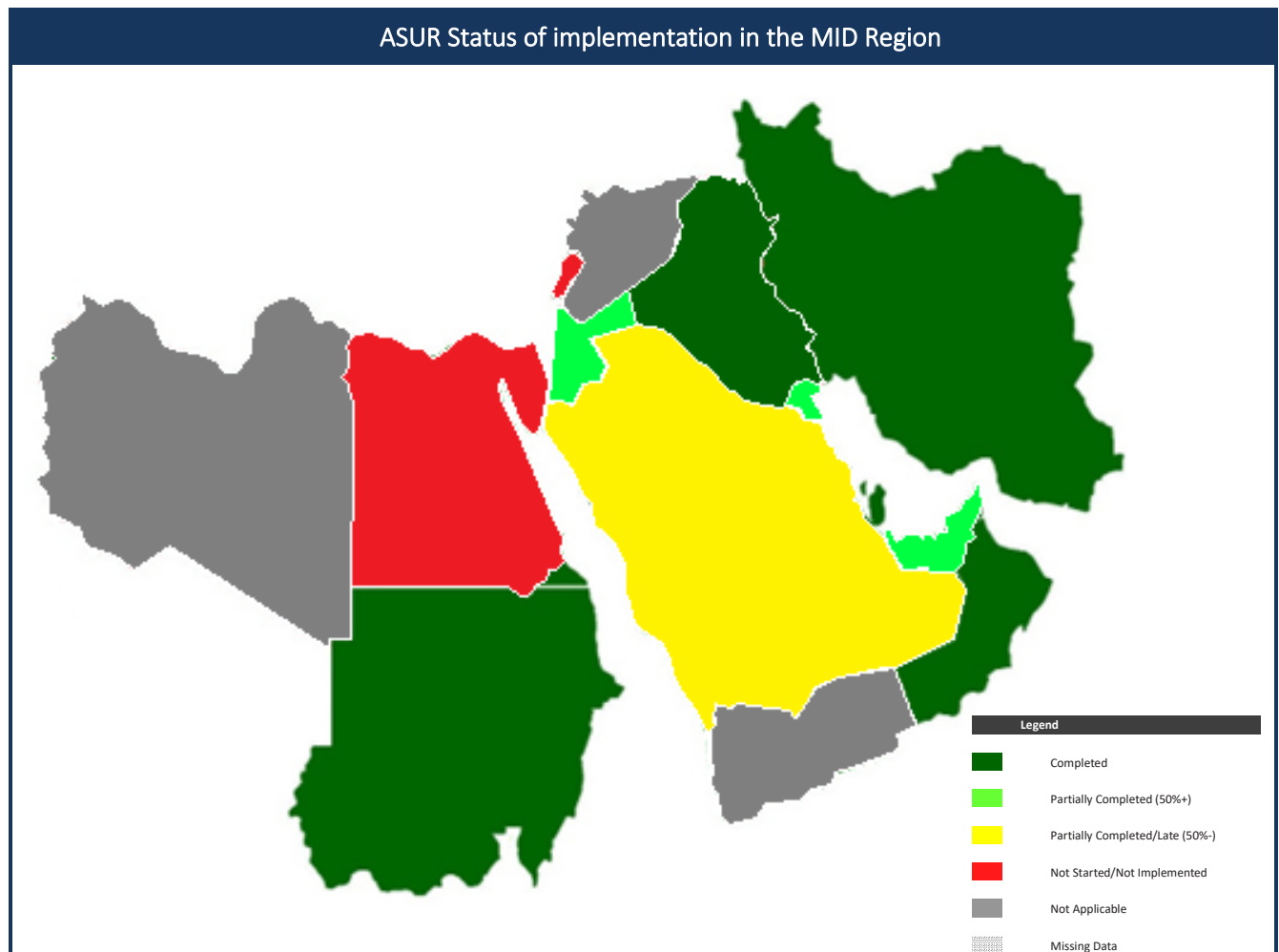
2.1.13 B0-ASUR

Surveillance is provided supported by new technologies such as ADS-B OUT and wide area multilateration (MLAT) systems. These capabilities will be used in various ATM services, e.g., traffic information, search and rescue, and separation provision. ADS-B OUT and MLAT systems complement existing cooperative surveillance radar and may be deployed independently or together. Depending on local airspace needs, ADS-B or MLAT may replace cooperative radar.

Element		Applicability	Performance Indicators/ Supporting Metrics	Baseline	Target	Timeline	KPA/ KPI
Technology Threads							
ASUR							
ASUR B0/1	Automatic Dependent Surveillance – Broadcast (ADS-B)	Bahrain, , Iran, Iraq, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, , Sudan, UAE	Indicator*: % of States that have implemented ADS-B to improve surveillance coverage/capabilities Supporting Metric: Number of States that have implemented ADS-B to improve surveillance coverage/capabilities. * As per the applicability area	(2022) 60%	80%	Dec 2022	N/A
ASUR B0/2	Multilateration cooperative surveillance systems (MLAT)	Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, UAE	Indicator*: % of States that have implemented Multi-lateration (M-LAT) Supporting Metric: Number of States that have implemented Multi-lateration (M-LAT) * As per the applicability area	(2022) 63%	80%	Dec 2022	N/A
ASUR B0/3	Cooperative Surveillance Radar Downlink of Aircraft Parameters (SSR-DAPS)	Bahrain, Egypt, Iran, Iraq, Kuwait, Lebanon, Jordan, Oman, Qatar, Saudi Arabia, Sudan and UAE	Indicator*: % of States that have implemented Downlink of Aircraft Parameters (SSR-DAPS) Supporting Metric: Number of States that have implemented Downlink of Aircraft Parameters (SSR-DAPS) * As per the applicability area	(2022) 83%	90%	Dec 2023	N/A

Module	Elements	Bahrain	Egypt	Iran	Iraq	Jordan	Kuwait	Lebanon	Libya	Oman	Qatar	Saudi Arabia	Sudan	Syria	UAE	Yemen
B0-ASUR	B0/1															
	B0/2															
	B0/3															

Average Regional Implementation is **65.28%**.



2.1.14 B0-NAVS

GBAS is provided to support precision approach and landing operations at a specific airport, in particular Category I operation utilizing GBAS Approach Service Type C (GAST-C), with the improved accuracy, integrity, and availability of satellite navigation.

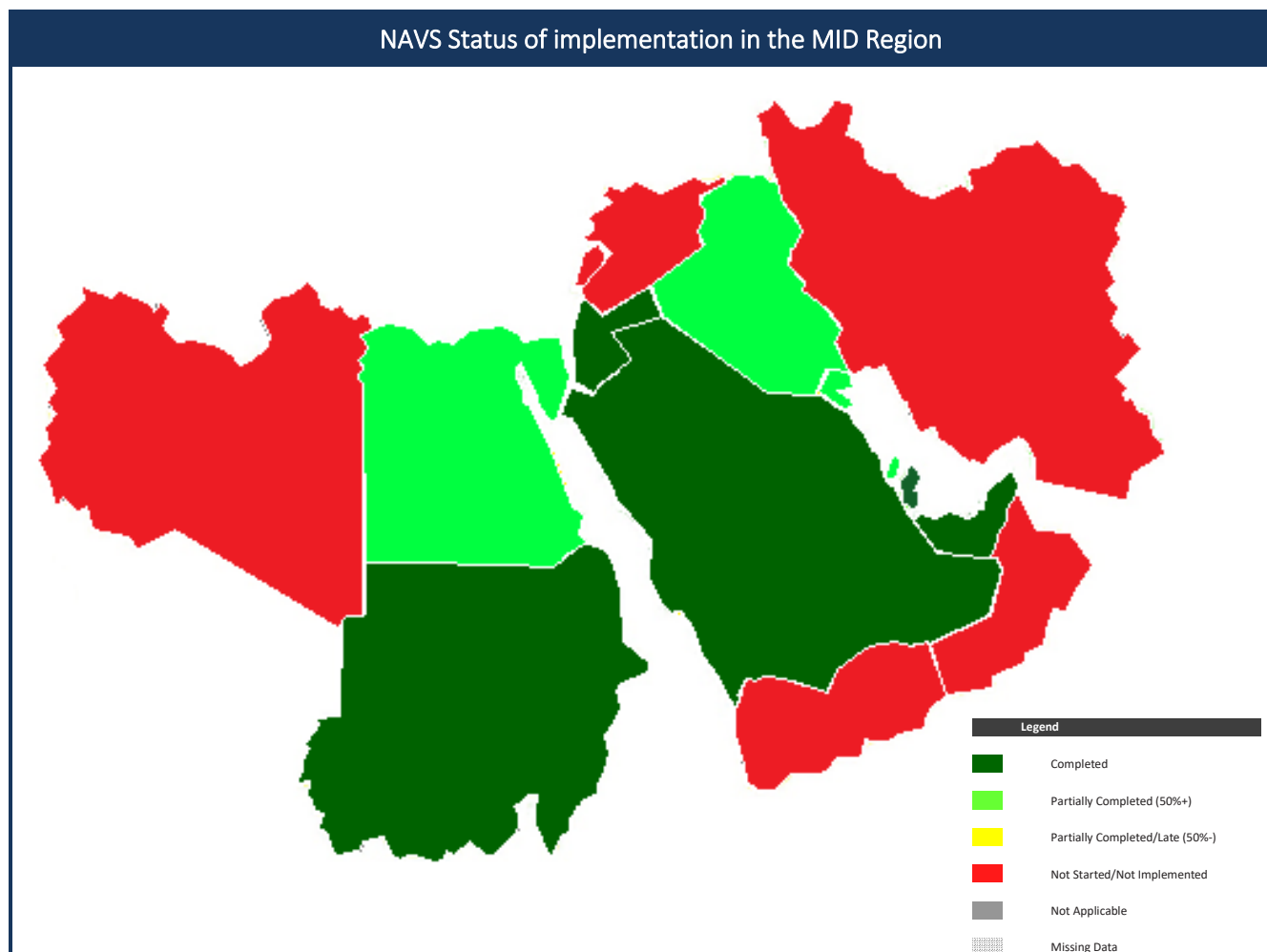
SBAS and ABAS are implemented as a mean to comply with ICAO Assembly Resolution A37-11 regarding Vertically-Guided Approach. SBAS is provided to support PBN in all phases of flight with increased accuracy and integrity. ABAS is provided to support non-precision (LNAV) and vertically-guided approach with Baro-VNAV as well as other terminal and en-route navigations.

Rationalization of conventional navigation aid infrastructure through Minimal Operating Networks starts to happen and supports a reduction in the number of NDBs, VORs, and, where appropriate in some States, ILS. Alternative Positioning, Navigation, and Timing is based upon a combination of existing ground navaids, airborne inertial systems and ATC procedures.

Element		Applicability	Performance Indicators/ Supporting Metrics	Baseline	Target	Timeline	KPA/ KPI
Technology Threads							
NAVS							
NAVS B0/3	Aircraft Based Augmentation Systems (ABAS)	All States	Indicator: % of States requiring Aircraft Based Augmentation System (ABAS) equipage for aircraft with a max certificated take-off mass greater than 5,700 Kg to enable PBN Operations Supporting metric: Number of States requiring Aircraft Based Augmentation System (ABAS) equipage for aircraft with a max certificated take-off mass greater than 5,700 Kg to enable PBN Operations	(2022) 40%	70%	Dec 2022	N/A
NAVS B0/4	Navigation Minimal Operating Networks (Nav. MON)	All States	Indicator: % of States that have developed a plan of rationalized conventional NAVAIDS network to ensure the necessary levels of resilience for navigation Supporting metric: Number of States that have developed a plan of rationalized conventional NAVAIDS network to ensure the necessary levels of resilience for navigation.	(2022) 47%	70%	Dec 2022	N/A

Module	Elements	Bahrain	Egypt	Iran	Iraq	Jordan	Kuwait	Lebanon	Libya	Oman	Qatar	Saudi Arabia	Sudan	Syria	UAE	Yemen
B0-NAVS	B0/3															
	B0/4															

Average Regional Implementation is **46.67%**.



2.1.15 B0-COMI

B0: Air-Ground

VHF, HF and SATCOM \Communications:

- VHF Voice Communications remains the primary means of information exchange in most regions.
- Continued use of the ACARS Network to support the distribution of ATS message sets (FANS)
- Introduction of the ATN/OSI Network to support B1
- Continued use of VDL Mode 2 to support ATN/OSI and FANS.
- Continued use of SATCOM Class C, VDL Mode0/A and VDL Mode 2 as Datalinks to support Terrestrial, Oceanic and Remote Airspace and as a complement to voice and in order to reduce voice channel congestion and increase capacity.
- Continued use of HF DL as the Datalink to support Oceanic Airspace as a complement to voice and in order to reduce voice channel congestion and increase capacity.

Ground-Ground

Deployment of IP based AMHS linked service:

- as an improvement over AFTN in term of bandwidth and length of the message,
- as a mean to enhance traffic transfer between ANSPs by expanding the use of ATS Inter-Facility Communication Data (AIDC) to improve efficiency of air traffic management by reducing the use of ATS voice service.

B1: Air-Ground

Improved Terrestrial Data Communications:

- VHF Voice Communications remains the primary means of information exchange in most regions.
- Introduction of the VDL Mode 2 Multi-Frequency design to accommodate increased capacity and reduce interference.
- Introduction of the New SATCOM Class B Satellite Datalinks to increase performance and deliver increased ATN/OSI and ACARS network connectivity.

Ground-Ground

Introduction of IP based network to replace point-to-point circuits:

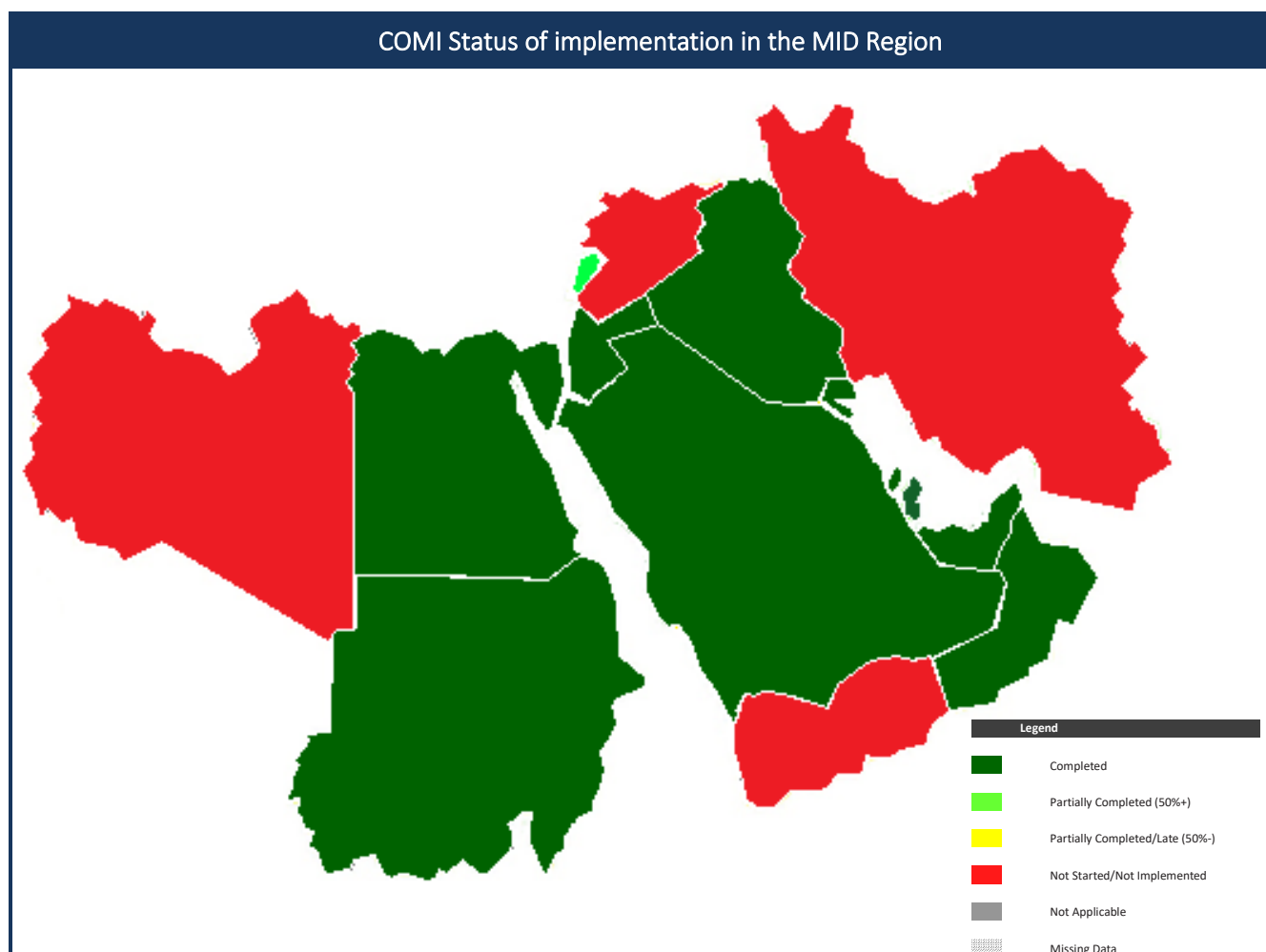
- AMHS with extension service to support XML, FTBP (IWXMM).
- Expansion of AIDC to enhance efficiency and safety.
- Implement regional IP networks.
- AeroMACS circuits for airport local communications.

Element		Applicability	Performance Indicators/ Supporting Metrics	Baseline	Target	Timeline	KPA/ KPI
Technology Threads							
COMI							
COMI B0/7	ATS Message Handling System (AMHS)	All States	Indicator: % of States that have established AMHS interconnections with adjacent COM Centres Supporting metric: Number of States that have established AMHS interconnections with adjacent COM Centres	(2022) 73%	90%	Dec 2022	N/A
COMI B1/1	Ground-Ground Aeronautical Telecommunication Network/Internet Protocol Suite (ATN/IPS)	All States	Indicator: % of States that have established National IP Network for voice and data communication	(2022) 60%	80%	Dec 2022	N/A

Element		Applicability	Performance Indicators/ Supporting Metrics	Baseline	Target	Timeline	KPA/ KPI
			Supporting metric: Number of States that have established National IP Network for voice and data communication				

Module	Elements	Bahrain	Egypt	Iran	Iraq	Jordan	Kuwait	Lebanon	Libya	Oman	Qatar	Saudi Arabia	Sudan	Syria	UAE	Yemen
B0-COMI	B0/7															
B1-COMI	B1/1															

Average Regional Implementation is 70%.



3. SUCCESS STORIES/BEST PRACTICES

Iraq

3.1 Establishment of Air Traffic Flow Management (ATFM) unit

3.1.1 The ATFM unit in GCAAN - Iraq has seen remarkable success and growth since its inception in 2018, paving the way for efficient air traffic flow management in the region.

Capacity Calculation and Analysis:

The unit implemented a robust system to calculate sector capacity and introduced half-yearly analyses to gauge the effectiveness of their strategies. Data collection from controllers, categorized by their level of experience, enabled a comprehensive understanding of operational dynamics.

Continuous Learning Initiatives:

Recognizing the importance of staying updated, the unit encouraged self-study among team members and integrated GCANS local training for ATFM members, following the guidelines from document 014 version 2.

National ATFM Plan Implementation:

A strategic milestone was achieved with the formulation and execution of a comprehensive National ATFM plan, aligning operations with international standards and best practices.

Collaborative Decision Making (CDM):

The unit initiated CDM practices, fostering collaboration with stakeholders through the daily sharing of ATFM plans and regular teleconferences. This ensured transparency and alignment of goals among all involved parties.

Traffic Prediction Technology:

Leveraging locally developed software using Python, the unit achieved accurate predictions of overflight traffic on an hourly basis, enhancing operational efficiency and resource allocation.

Airport Traffic Forecasting:

By integrating software predictions with local approval lists, the unit successfully forecasted airport traffic, allowing for proactive management and optimization of resources.

ACDM Implementation Plan:

While not yet initiated, the unit laid down a comprehensive plan for the introduction of Airport Collaborative Decision Making (ACDM), further streamlining airport operations, and enhancing overall efficiency.

Slot Coordination during Religious Events:

Recognizing the unique challenges posed by religious events, particularly in regions like ORNI, the AFTM unit implemented slot coordination strategies. By effectively managing air traffic flow during these high-demand periods, the unit ensured seamless operations, mitigated congestion, and maintained safety standards, further enhancing the overall efficiency and reliability of air travel in the region.

3.1.2 Through concerted efforts and meticulous planning, the AFTM unit witnessed a remarkable transformation, reflected in the significant improvement from a zero score to 68.4 in the latest ICAO MID-office survey. This success story stands as a testament to the dedication and proficiency of the team, showcasing Iraq's commitment to excellence in air traffic management.

3.2 Development of Kuwait National Air Navigation Plan (KNANP)

3.2.1 Kuwait has achieved great success in implementing its aviation air navigation plan in cooperation with the ICAO MID Office. By following the guidelines and standards set by the International Civil Aviation Organization, Kuwait has been able to enhance the safety and efficiency of its air navigation services. Through collaboration and partnership with the ICAO MID Office, Kuwait has made significant advancements in modernizing its aviation infrastructure and ensuring compliance with international regulations. This successful collaboration has not only improved the overall aviation system in Kuwait but also strengthened its reputation as a responsible member of the global aviation community.

3.3 Tower 3D Simulator

3.3.1 Kuwait DGCA launched its first 360 3D Tower simulator since it established. The Simulator was designed and delivered by Indra. The project was delivered to DGCA in Q4 2023 and since then it has been running perfectly. AND rely on the Simulator to do the annual ATCOs competence check (rating and endorsement). Further to the competency check, AND using the simulator to train the new ATCOs and provide them pre OJT sessions. Having such a Simulator reduced the coast and the time spent in training and maintaining the level of competence required.



3.4 Implementation of Free Route Airspace (FRA)

3.4.1 During July 2023, the UAE General Civil Aviation Authority launched the Free Route Airspace Project in the Emirates FIR, in a step that enhances the position of the UAE's air navigation sector in the region. This transformative project aims to enhance air navigation efficiency, utilizes resources optimally, and harnesses modern concepts in air traffic management. The project will have a positive impact on both the air sector and the environment.

3.4.2 The Implementation of free route airspace, which the UAE is the first country to apply in the Middle East, aims to improve the efficiency of air navigation by providing freedom of movement for over-flying aircraft without the restrictions of conventional air routes.

3.4.3 This transformational project will provide the Emirates FIR with high flexibility, which encourages air operators to use it more, as it will reduce airspace congestion, contribute to shortening flight times and increasing the efficiency of flights. It will also lead to achieving significant environmental benefits, by reducing flown miles and shortening flight paths. Aircraft will consume less fuel and reduce carbon emissions and environmental pollution, which will reflect positively on environmental sustainability.

3.4.4 The launch of this transformative project coincided with UAE's declaration of 2023 as the year of sustainability, as it reinforces the goal of the UAE General Civil Aviation Authority represented in its commitment to national priorities and the new government work methodology for the UAE, in line with the broader concept of transformational projects, which aims to advance the path of development in the country for the next ten years, forthcoming and beyond.

3.4.5 The implementation of Free Route Airspace is expected to enable more than 55,000 annual flights to benefit from its use, and will lead to an annual fuel saving of more than 30 million kg, and operational savings. Annual benefits for airlines exceeding 50 million Dirhams, in addition to indirect operating benefits.

3.4.6 The number of flights benefiting from the project will increase continuously, according to the GCAA's expectations for an increase in air traffic in the coming years, in addition to the development of the stages of applying free route airspace to include a segment of new users that exceeds the current application, and it will constitute a factor of attraction for all airlines.

3.4.7 These positive expectations come to enhance the benefits of this pioneering project in the economic aspect for airlines, as companies will benefit from reducing fuel costs and improving flight efficiency, and thus will lead to improving the financial performance of airlines, enhancing their economy, and enhancing happiness and quality of life.

3.4.8 The air navigation sector in the UAE was on the rise in 2023, where the UAE has scored the highest daily movements ever in the history of aviation with 2848 air traffic movements during November 2023. That the UAE is one of the first countries to recover to pre-pandemic levels traffic levels, pointing to an air traffic growth to that exceeded 931,000 air movements by the end of 2023, an increase of more than 17% from pre-pandemic levels.

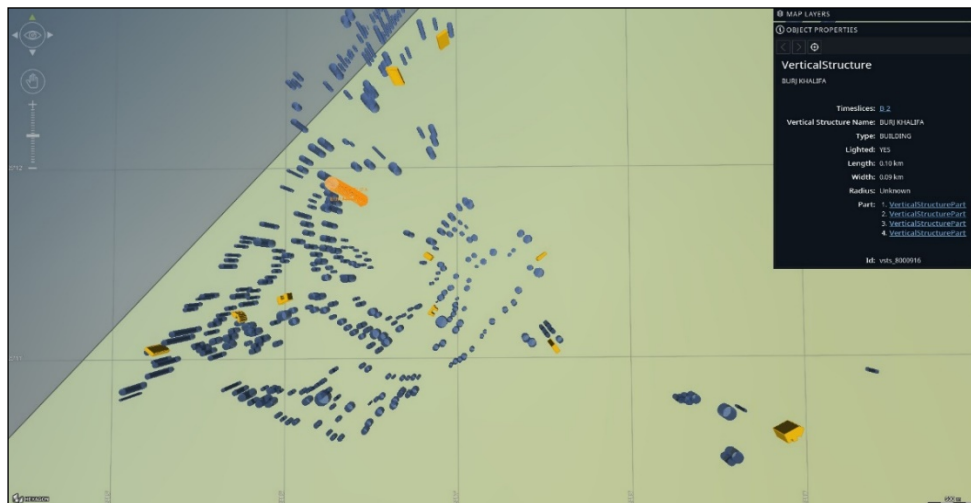
3.4.9 Free Route Airspace implementation is a pioneering leap which is a first step in an integrated plan to apply free route airspace on a larger scale, according to carefully studied stages with the aim of improving the airspace infrastructure.

3.4.10 The maximum benefit from this concept is achieved when this transformative project is implemented on a larger scale at the level of neighboring countries to connect with the Gulf and regional air navigation networks, which comes as testament of the airspace restructuring project that the GCAA completed in 2017 with the aim of continuing to improve the airspace, ensuring smooth air traffic and to handle the expected traffic growth until 2040.

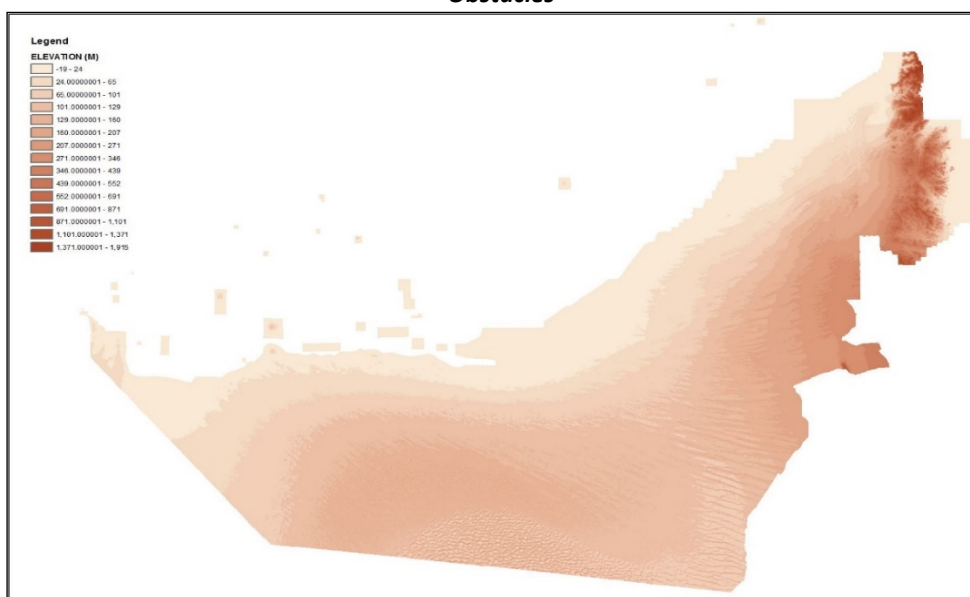
3.4.11 The application of UAE GCAA free route airspace, is an exceptional achievement that enhances the efficiency of air navigation, supports the economy of airlines, and contributes positively to enhancing sustainability in aviation.

3.5 Data-driven charts migration progress

3.5.1 UAE GCAA AIM Department created intermediate and long-term plan for implementation of Database Driven Charting System. The plan is aligned with UAE GCAA Strategic Objectives; UAE Local Regulations and ICAO SARP's, Global



Obstacles



Terrain

3.7 Aeronautical Information Data Integrity

3.7.1 UAE GCAA AIM implemented cryptographic technology hash function for data integrity monitoring and assurance for Aeronautical Information Management Products.

3.7.2 UAE is continuously seeking ways for improvements in order to assure its data integrity level; that no data will be either altered or lost. The hash function is introduced based on the standards of Annex 15 and Doc 10066 for data integrity.

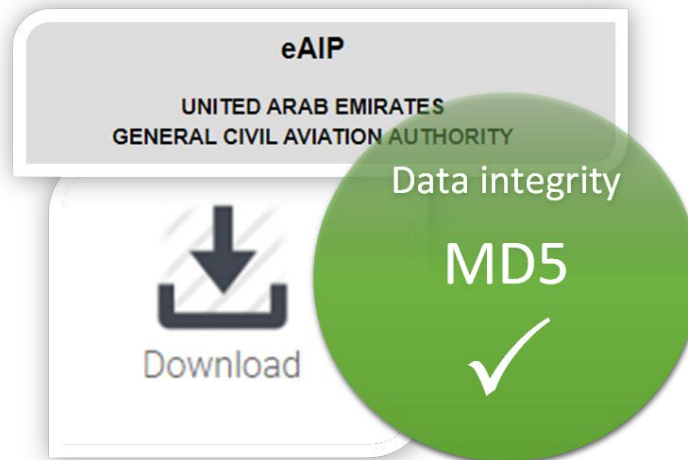
3.7.3 With reference to DOC 10066 PANS – Aeronautical Information Management and Annex 15 – Aeronautical Information Services, the implementation of cryptographic technologies should be utilized to ensure the integrity of data is maintained at all stages of the data chain - from its inception to distribution to the next intended user. The cryptographic technologies could be in the form of for e.g. hash functions, message authentication codes, asymmetric and symmetric encryption, and digital certificates.

3.7.4 To ensure Data integrity assurance UAE researched, identified, and introduced that MD5 (message-digest 5 cryptographic hash algorithm) the hash function, can be used to authenticate files, detection of errors and data manipulation.

3.7.5 Hash functions (MD5 checksum) for the AIP.zip file is provided along with each AIP update notification email, with clear instruction how to generate the hash at the users' end to verify.

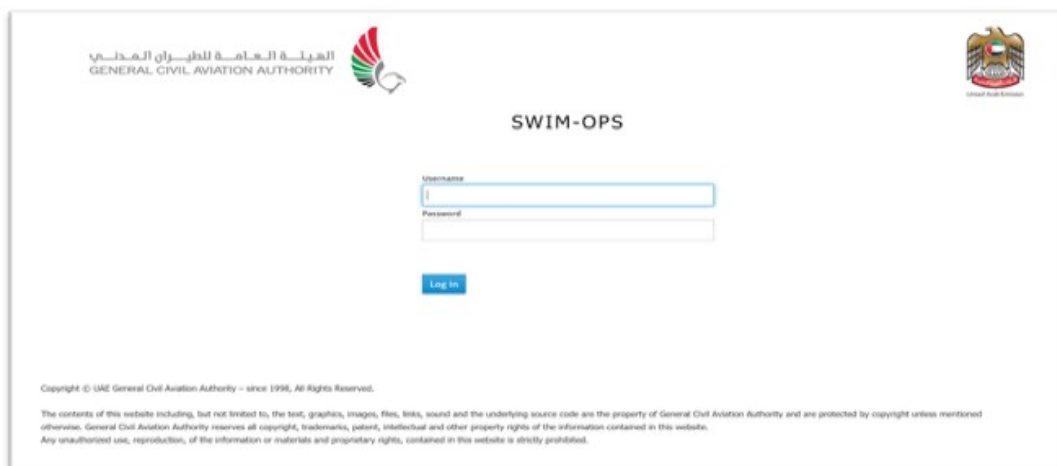
3.7.6 Hash functions (MD5 checksum) for each file within the AIP Package is provided in an excel file along with Windows shell command for generating the codes for comparison, of each file in the package. Instructions and guidance material are provided within the package.

3.7.7 The hash function satisfies the requirement of data integrity for published aeronautical information, furthermore; provides UAE AIP users a high degree of assurance.

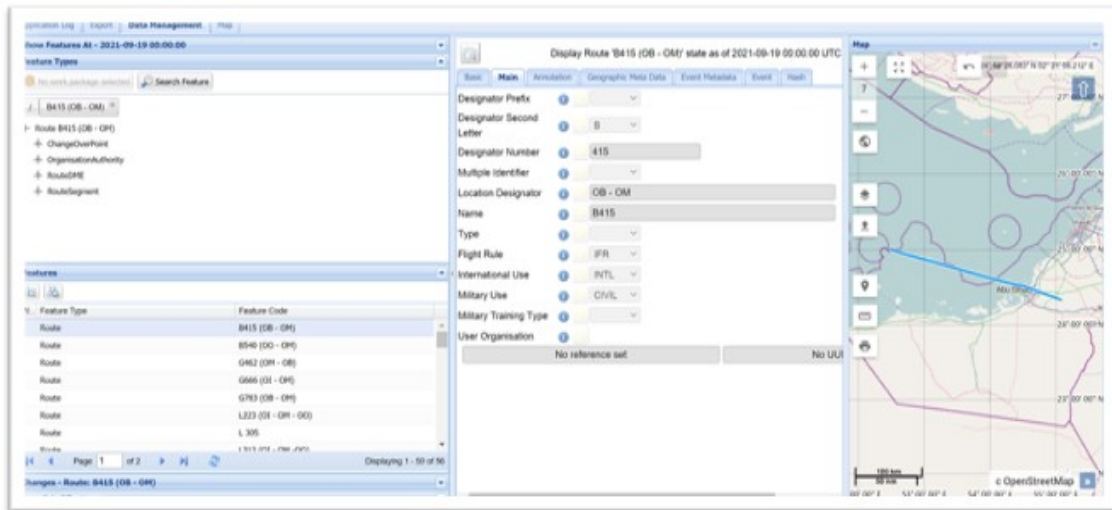


3.8 AIM System Wide Information Management (SWIM)

3.8.1 UAE GCAA AIM has implemented System Wide Information Management “AIM – SWIM” which is part of ICAO’s Aviation System Block Upgrade (ASBU) and a milestone specified in ICAO MID Region Plan “DOC.008 2.2”.

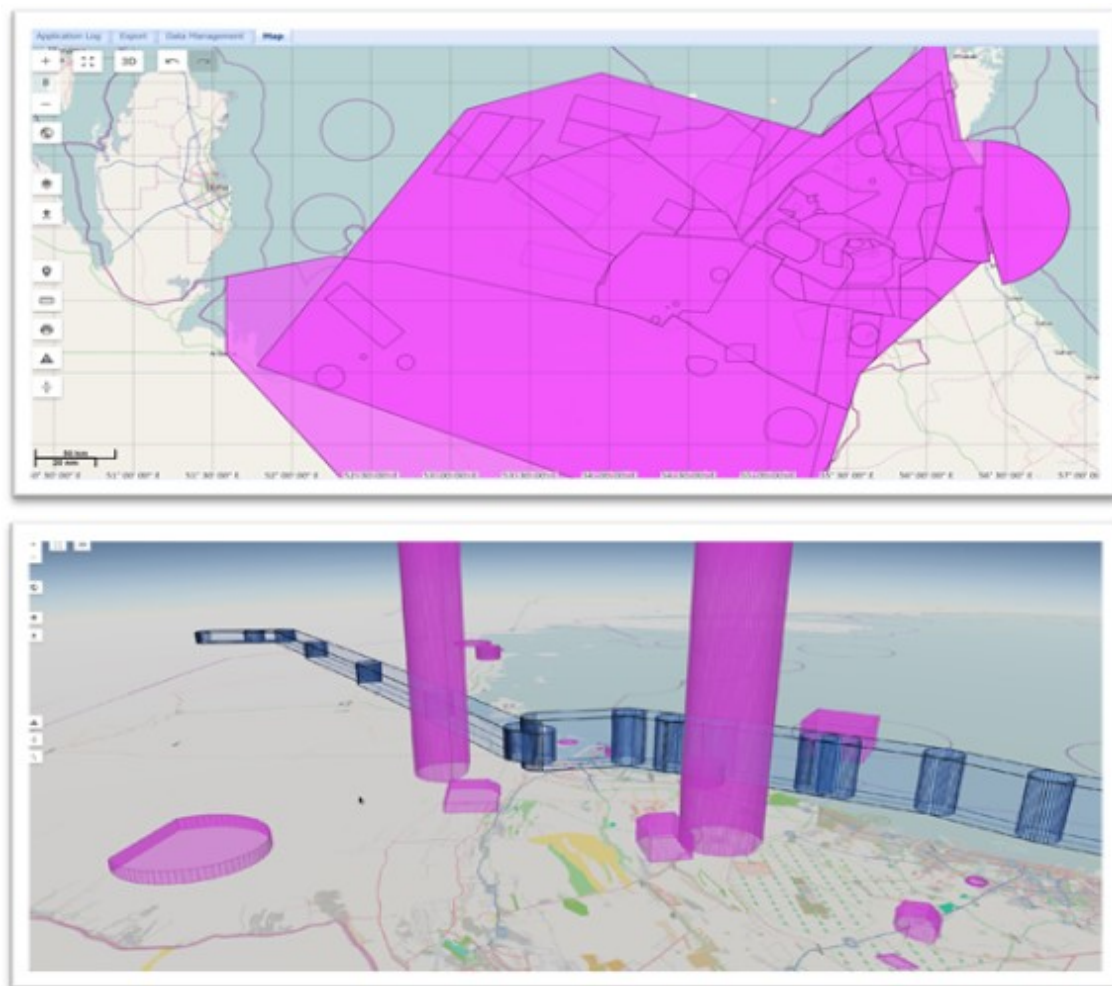


GCAA AIM SWIM Service Login Page

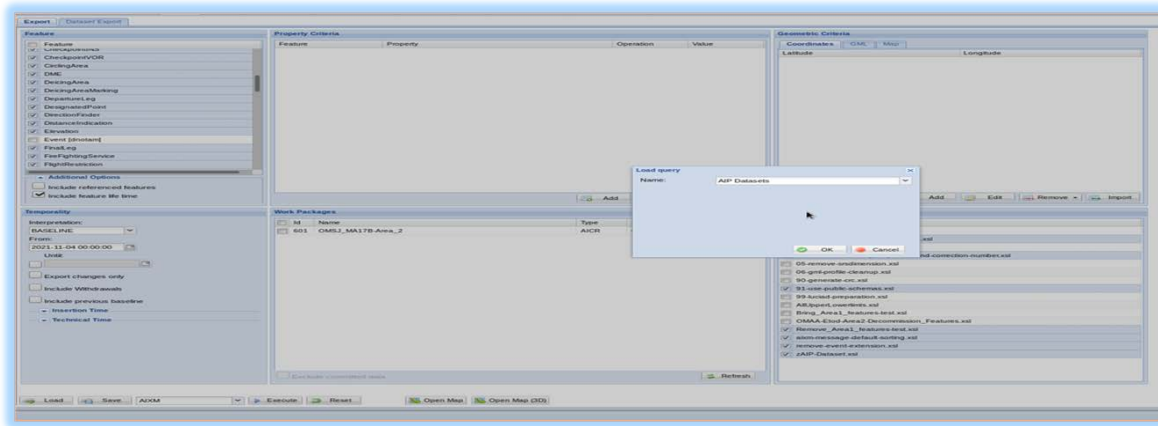


GCAA AIM SWIM Service Human Machine Interface (HMI)

3.8.2 The aim of SWIM is to provide information to users in relevant and commonly understandable format. It does not refer to a single solution or technology, but rather a global level of interoperability and standardization that enables users and providers to exchange data without having to use different interfaces or protocols. It is based on service-oriented architecture and open standard technologies.



GCAA AIM SWIM Enhanced Feature – Graphical Visualization 2D & 3D



GCAA AIM SWIM Service – AIP & ETOD Dataset

3.9 Provision of UAE AIP Digital Dataset

3.9.1 One of the AIM high-level plan and continuous development process is the provision of UAE AIP Dataset. This forward step within the Aeronautical Information Management Services is to assure meeting the ICAO MID Region Planned Roadmap specified in “MID DOC 008 – 2.2” ahead of time.

3.9.2 The GCAA AIM has studied the requirement, understood the challenges, identified the gaps and drew a roadmap with different milestones to assure the readiness of its AIP Data set i.e. dividing the project into two main phases with different sub-tasks. The first phase was “setting the stage phase” where in this the stage the GCAA AIM has worked on different subject and mitigated different challenges to end up accomplishing a detailed implementation plan, writing the operational and technical specification, mapping AIP to PANS-AIM, creating a test sample file and testing the sample. The Second phase was “The Operational Phase” which was the provision of the AIP Dataset in parallel with the full eAIP at the same time.

3.9.3 UAE AIP Dataset Specification and Implementation Plan & UAE AIP Dataset Technical Specifications



AIP Dataset Sample in AIXM Format

4. CONCLUSION

The overall implementation of priority 1 ASBU Threads/Elements in the MID Region is around **60.14%** compared to 57% in 2022. The implementation of some modules has been acceptable/good (more than 70%); such as ACAS, SNET and GADS. Nevertheless, some States are still facing challenges to implement the majority of the priority 1 ASBU Elements.

The status of implementation of the priority 1 ASBU Elements also shows that Bahrain, Jordan, Oman, Qatar, Saudi Arabia & UAE made a good progress (more than 70%).

For an improved quality and accuracy of the future MID Air Navigation Reports, States are strongly encouraged to provide the ICAO MID Office in a timely manner with the necessary data related to the planning, implementation and monitoring of the performance of their air navigation system, including the status of implementation of the ASBU Threads/Elements identified as priority 1 either at Regional or National Level. States are also strongly encouraged to implement the performance-based approach (6 step approach) and integrate the implementation of the priority 1 ASBU elements in their overall planning for the improvement of their air navigation system performance. States are requested to report to the ICAO MID Office the implementation of the identified performance objectives using the following Template available in the MID ANP Volume III.

MID Region Air Navigation Systems Performance Based Framework/Template							
Column							
(1)	Scope of Performance Improvement						
(2)	KPA (from the ICAO defined 11 Key Performance Areas (KPAs))						
(3)	Performance Objectives (ambition/expectations)						
(4)	KPIs based on the ICAO list of KPIs and associated variant						
(5)	The Baseline of each KPI						
(6)	The target of the KPI						
(7)	Selected ASBU element(s) /Enabler(s) and/or Non ASBU solution(s) for each operational improvement						
(8)	Target Implementation date						
Scope/ Applicability	KPA & Focus Area	Performance Objective	KPI/ Variant	KPI Baseline	KPI Target	Operational Improvements (ASBU Elements/Enablers & Non ASBU)	Target Date
1	2	3	4	5	6	7	8

APPENDIX A: OVERALL STATUS OF PRIORITY 1 ASBU THREADS

	DAIM			AMET				FICE	APTA					FRTO	NOPS	ACAS	SNET			GADS	RSEQ	SURF			ACDM	ASUR	NAVS	COMI	Average State Implementation
Bahrain	100.00%			100.00%				40.00%	80.00%					100.00%	100.00%	100.00%	100.00%			100.00%	100.00%	100.00%			50.00%	100.00%	50.00%	100.00%	88.00%
Egypt	27.77%			87.50%				25.00%	65.33%					50.00%	0.00%	100.00%	100.00%			100.00%	0.00%	100.00%			50.00%	0.00%	50.00%	100.00%	57.04%
Iran	61.11%			18.75%				0.00%	24.17%					0.00%	0.00%	100.00%	100.00%			100.00%	NA	33.33%			0.00%	100.00%	0.00%	0.00%	38.38%
Iraq	0.00%			45.49%				0.00%	5.56%					0.00%	0.00%	100.00%	66.67%			100.00%	NA	100.00%			NA	100.00%	50.00%	100.00%	51.36%
Jordan	16.67%			97.25%				50.00%	60.00%					100.00%	0.00%	100.00%	100.00%			100.00%	NA	100.00%			NA	66.67%	100.00%	100.00%	76.20%
Kuwait	83.33%			78.13%				0.00%	100.00%					100.00%	0.00%	100.00%	100.00%			100.00%	NA	100.00%			0.00%	66.67%	50.00%	100.00%	69.87%
Lebanon	16.67%			18.75%				NA	20.00%					0.00%	0.00%	100.00%	66.67%			0.00%	NA	100.00%			NA	0.00%	0.00%	50.00%	31.01%
Libya	0.00%			3.13%				NA	33.33%					NA	NA	0.00%	NA			100.00%	NA	100.00%			NA	NA	0.00%	0.00%	29.56%
Oman	16.67%			100.00%				33.33%	60.00%					100.00%	100.00%	100.00%	100.00%			100.00%	NA	33.33%			50.00%	100.00%	0.00%	100.00%	70.95%
Qatar	100.00%			97.25%				100.00%	96.67%					100.00%	100.00%	100.00%	100.00%			100.00%	100.00%	100.00%			100.00%	100.00%	100.00%	99.59%	
Saudi Arabia	100.00%			100.00%				33.33%	100.00%					100.00%	100.00%	100.00%	100.00%			100.00%	0.00%	33.33%			100.00%	33.33%	100.00%	100.00%	80.00%
Sudan	33.33%			32.64%				NA	20.00%					0.00%	0.00%	100.00%	66.67%			100.00%	NA	100.00%			NA	100.00%	100.00%	100.00%	62.72%
Syria	0.00%			0.00%				NA	4.17%					NA	NA	0.00%	NA			0.00%	NA	100.00%			NA	NA	0.00%	0.00%	11.57%
UAE	100.00%			100.00%				75.00%	100.00%					50.00%	100.00%	100.00%	100.00%			100.00%	100.00%	100.00%			0.00%	66.67%	100.00%	100.00%	86.11%
Yemen	0.00%			0.00%				NA	28.00%					NA	NA	100.00%	NA			0.00%	NA	100.00%			NA	NA	0.00%	0.00%	28.50%
Average regional implementation	46.73%			56.92%				39.39%	64.83%					64.88%	41.67%	86.67%	91.67%			80.00%	35.71%	66.67%			45.00%	65.28%	46.67%	70.00%	60.14%





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MID REGION ROUTE CHALLENGES

No.	ATS route and Challenge Description	Target date	Action	Champion and relevant FIR(s)	Supported by	Status / remarks
1.	A418 was from PAPAR to KUMUN deleted		Subject to MANDDD	ATM SG, Iran, UAE	MID AIM SG	
2.	A424 was from LOVEK to LOTAN deleted		Subject to MANDDD	ATM SG, KSA, Iraq	MID AIM SG	
3.	B15 is from BALMA (FIR boundary) to KRD It's not in Regional ATS route table		To add ANP	ATM SG, Lebanon	MID AIM SG	
4.	G2 is from ELIKA to KAD It's not in Regional ATS route table		To add ANP	ATM SG, Lebanon	MID AIM SG	
5.	G202 was from DAM to KAD entirely deleted. The segment between ELIKA to KAD was renamed		Subject to MANDDD	ATM SG, Syria, Lebanon	MID AIM SG	
6.	G665 segment between AAR to ABD is not available		Subject to MANDDD	ATM SG, Iraq	MID AIM SG	
7.	G667, segment between ABD and ALSAM was removed in Baghdad FIR (it's a deficiency against Iraq)		Subject to MANDDD	ATM SG, Iraq	MID AIM SG	
8.	G795 was from BSR to RAF deleted		Subject to MANDDD	ATM SG, Iraq	MID AIM SG	
9.	L53 is established from GENEX (FIR boundary) extended inside of Israel and beyond		To add ANP	ATM SG, Jordan, Saudi Arabia	MID AIM SG	
10.	L417 is established from VUSEB to MUTAG which entirely located in Baghdad FIR MUTAG-NADOX was deleted		Change the ATS route designator (non-regional) Deletion from ANP Regional ATS route table	ATM SG, Iraq	MID AIM SG	
11.	L513 Waypoints MALLA, ADRAA, RDIMA, SWIDA		Such 5LNCs do not exist in ICARD and apparently are invented points. They shall not be used in official ICAO	ATM SG, Syria	AIM SG	

No.	ATS route and Challenge Description	Target date	Action	Champion and relevant FIR(s)	Supported by	Status / remarks
			documentation as never reserved for Syria.			
12.	L602, this has the following segments: GEPAP-ELEXI (Baghdad/Damascus FIR boundary) has been suspended in Baghdad FIR			ATM SG, Syria, Iraq	MID AIM SG	
13.	L715 is established from GIBUX to LOVEK which entirely located in Baghdad FIR		Change the ATS route designator (non-regional)	ATM SG, Iraq	MID AIM SG	
14.	L718 is established from ALPET to INB (Two FIRs)		To add ANP	ATM SG, Iraq	MID AIM SG	
15.	M203 is established from PUSTO to ILMAP which entirely located in Baghdad FIR		Change the ATS route designator (non-regional)	ATM SG, Iraq	MID AIM SG	
16.	M703 is established from GADSI to PASIP (FIR boundary)		To add ANP	ATM SG, Iraq	MID AIM SG	
17.	M861 was from ELEXI to DRZ removed			ATM SG, Syria	MID AIM SG	
18.	P134 (PfA by EUR/NAT) from MON (Tunis) to MTG (Libya) Mitiga – NAZDE [340000N 0122235E] - RISER [342000N 0120603E] – (BIRSA) – (Monastir)		To establish and add ANP	ATM SG, Libya	MID AIM SG	Requested by EUR/NAT office and coordinated between Malta and Libya,
19.	P574 was from PAPAR to KUMUN FIR boundary deleted		- Subject to MANDD	ATM SG, Iran, UAE	MID AIM SG	
20.	P751, this route divided in two parts: - BRN to TOKAR (FIR boundary) - DEKRA (FIR boundary) ANGAL (FIR boundary)		Change the ATS route designator	ATM SG, Eritrea, Ethiopia	MID AIM SG	

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No.	ATS route and Challenge Description	Target date	Action	Champion and relevant FIR(s)	Supported by	Status / remarks
	The deleted segment is named as A451/UA451 in Asmara FIR					
21.	T800 is from DOH to ULDUN (Two FIRs)		To add ANP Change the ATS route designator	ATM SG, Bahrain, Iran, Qatar,	MID AIM SG	
22.	Jordan QAA1 instead of QAA AMN01 instead of AMN QTR01 instead of QTR		5LNC should be changed	ATM SG	AIM SG	
23.	Syria Non-compliant SIDs/STARs such as NOVEMBER, KILO, LIMA, GOLF, DELTA, etc. ... Damascus STARs named BRAVO, LIMA, KILO, SIERRA, TANGO SID to TAN (TANF) is named TANF		5LNC should be changed	ATM SG	AIM SG	
24.	B535 5LNC TAMIM duplicated with B411 in Jordan		Change 5LNC	Change 5LNC	Change 5LNC	



MID RVSM SAFETY MONITORING REPORT 2023 (SMR 2023)

Prepared by the Middle East Regional Monitoring Agency (MIDRMA)

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, all safety objectives set out in the MID RVSM Safety Policy in accordance with ICAO Doc 9574 (2nd Edition) continue to be met in operational services within the Middle East RVSM airspace.

1.1 Results of the MID RVSM SMR 2023:

1.1.1 Implementation of RVSM should be based on a safety assessment that demonstrates the continued fulfillment of all RVSM safety objectives outlined in the MID-RVSM Safety Policy, in accordance with ICAO Doc 9574, within the operational services of the Middle East RVSM airspace.

1.1.2 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 1.012×10^{-10} 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.

The value computed for the overall risk is estimated 6.530×10^{-10} this is below the ICAO overall TLS.

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 **1.012×10^{-10}** and meets the ICAO TLS of **2.5×10^{-9}** fatal accidents per flight hour (RVSM Safety Objective 1).
- (ii) The estimated overall risk of collision due to all causes which includes the technical risk and all risk due to operational errors and in-flight contingencies is **6.530×10^{-10}** this value is below the ICAO overall TLS of **5×10^{-9}** fatal accidents per flight hour (RVSM Safety Objective 2)
- (iii) based on currently available information (Except for Tripoli, Khartoum, and Beirut FIRs), there is no evidence available to MIDRMA that the continued operations of RVSM adversely affects the overall vertical risk of collision during the SMR reporting cycle.
- (iv) 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 limited by the continued NIL reporting of Large Height Deviations (LHDs) from some member states which does not support a high confidence in the results, the MIDRMA is reiterating the importance of submitting such reports especially from FIRs with high volume of traffic.

1.2 Considerations on the Safety Objectives for MID RVSM SMRs

1.2.1 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 is a number of assumptions that must be verified to ensure the reliability of the risk assessment. Verifying these assumptions deals primarily with monitoring of aircraft performance issues.
- 2- 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 compliant with RVSM technical requirements using a common compliance method. Monitoring group analysis is necessary to verify that the Minimum Aviation System Performance Standards (MASPS) for that group are valid. Aircraft that are made compliant with RVSM technical requirements on an individual basis are termed non-group.

- 3- 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 human factors and the assessment of this parameter relies on adequate reporting of Large Height Deviation (LHD) Reports and the correct interpretation of events for input for CRM analysis.
- 4- RVSM Safety Objective 3 requires the RMA to monitor long-term trends and to identify potential future safety issues. This involves comparing the level of incidents that pose a risk for the current reporting period and highlighting any issues that should be carried forward as recommendations for future reports.

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 1.012×10^{-10} 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.

The value computed for the overall risk is estimated 6.530×10^{-10} this is below the ICAO overall TLS.

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.

Middle East RVSM Airspace			
Average Aircraft Speed = 440.3 kts			
Risk Type	Risk Estimation	ICAO TLS	Remarks
Technical Risk	1.012×10^{-10}	2.5×10^{-9}	Below ICAO TLS
Overall Risk	6.530×10^{-10}	5×10^{-9}	Below ICAO TLS

2. Scope:

2.1 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	Doha
Emirates	Jeddah	Kuwait	Khartoum*	Muscat	Sana'a	Tehran
			Tripoli*			

FIRs/UIRs of the Middle East RVSM Airspace

***Note:** Beirut and Khartoum FIRs were excluded from the RVSM safety analysis due to lack of TDS, while Tripoli FIR excluded due to lack of their routing options.

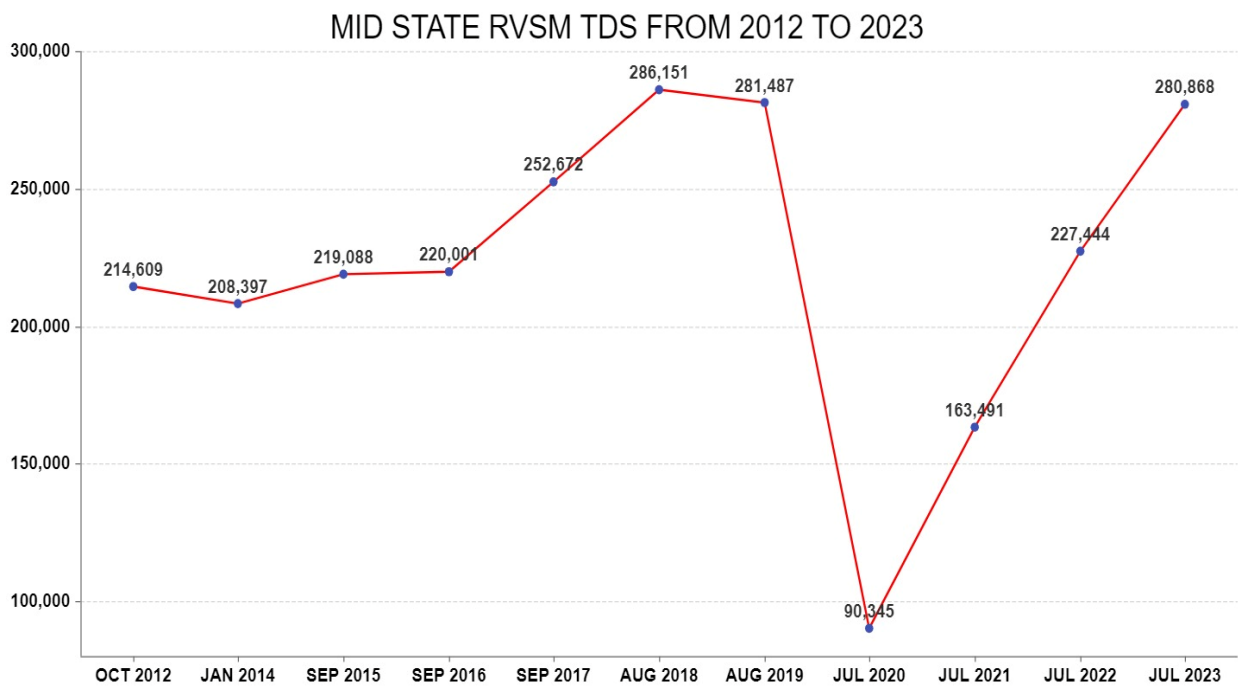
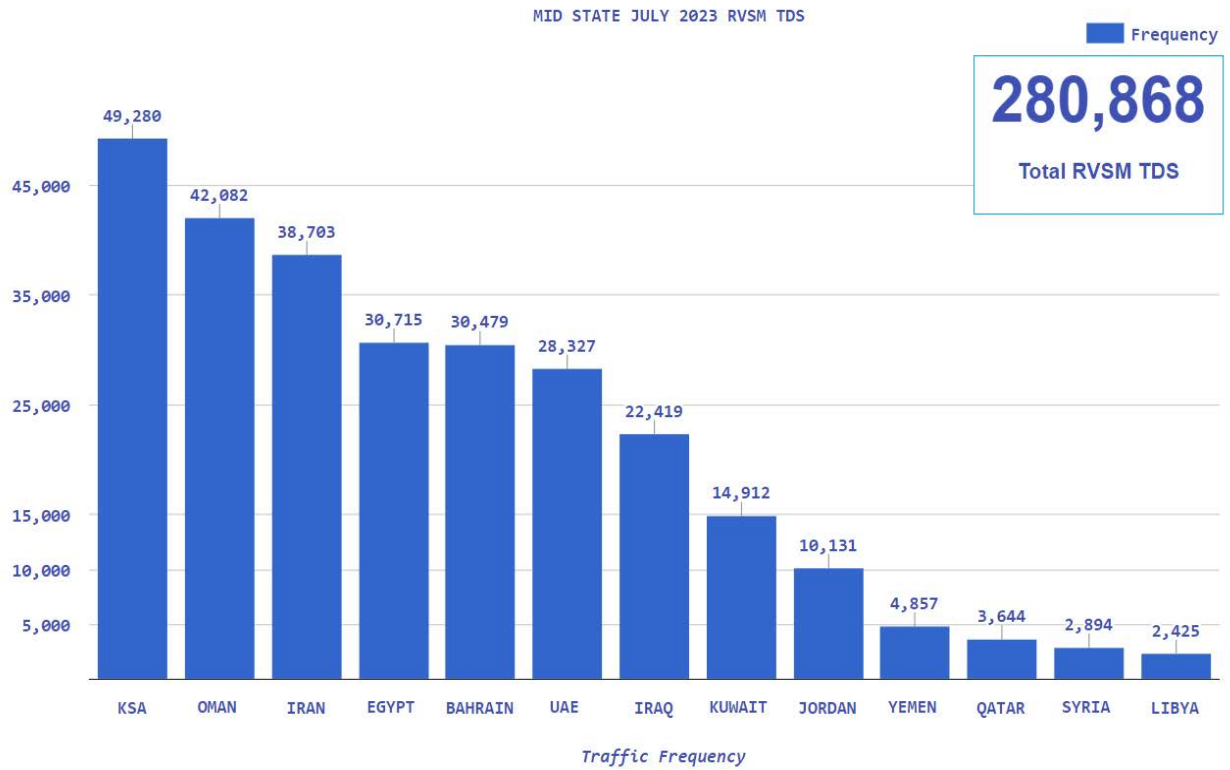
2.2 The Data Sampling periods covered by SMR 2023 are as displayed in the below table.

Report Elements	Time Period
Traffic Data Sample	01/06/2023 - 30/06/2023
Operational & Technical Errors	01/01/2023 - 31/12/2023

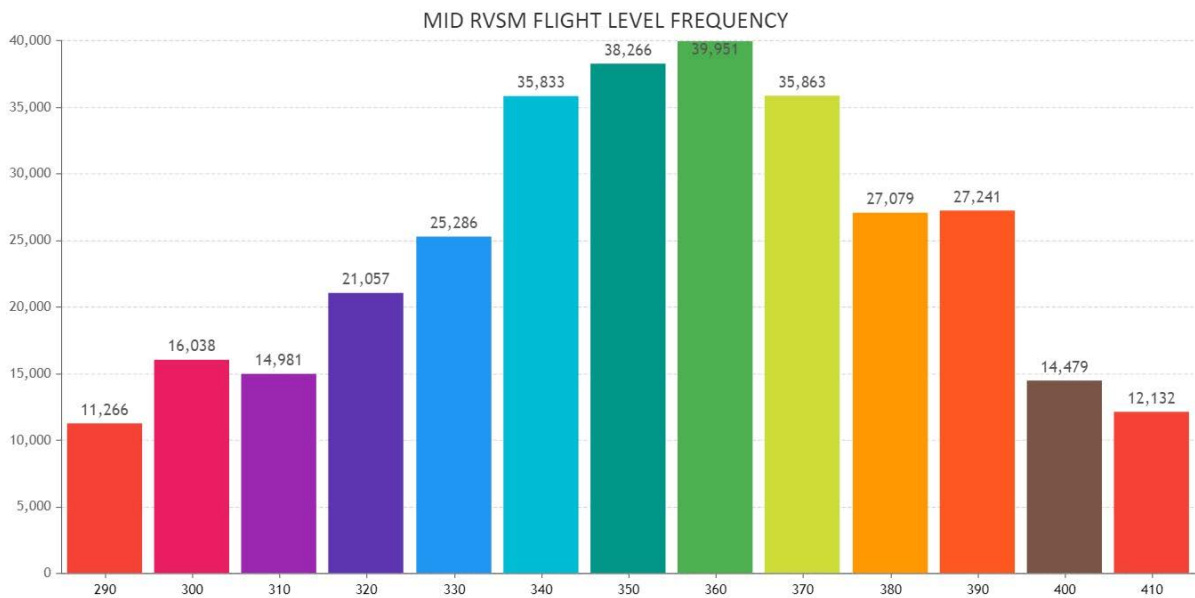
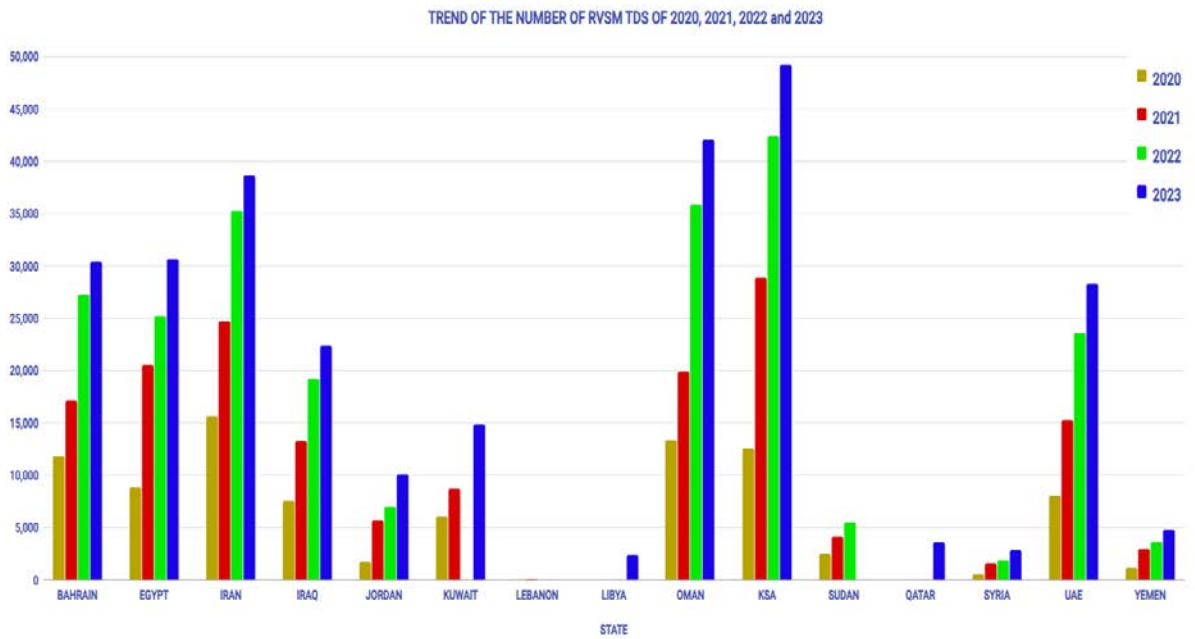
2.3 The descriptions of the traffic data collected from each MIDRMA Member State are depicted in table below:

MID States	No. of Flights	Received Date	Status
BAHRAIN	30479	2023-07-09	
EGYPT	30715	2023-08-06	
IRAN	38703	2023-09-25	
IRAQ	22419	2023-07-07	
JORDAN	10131	2023-07-05	
KUWAIT	14912	2023-07-03	
LEBANON			No Data Submitted
LIBYA	2425	2023-08-01	
OMAN	42082	2023-07-30	
KSA	49280	2023-08-01	
QATAR	3644	2023-08-07	
SUDAN			No Data Submitted
SYRIA	2894	2023-07-12	
UAE	28327	2023-07-25	
YEMEN	4857	2023-08-02	
Total	280,868		

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#	WAYPOINT	FIR	FREQ
1	TASMI	BAGHDAD/KUWAIT	9943
2	DAVUS	BAHRAIN/KUWAIT	8280
3	NINVA	BAGHDAD/ANKARA	7388
4	SIDAD	BAGHDAD/KUWAIT	7018
5	TUMAK	BAHRAIN/EMIRATES	6781
6	RATVO	BAGHDAD/ANKARA	6670
7	ULINA	CAIRO/AMMAN	5761
8	ULADA	BAHRAIN/JEDDAH	5701
9	GABKO	EMIRATES/TEHRAN	5591
10	PASAM	CAIRO/JEDDAH	5440
11	ALPOB	BAHRAIN/EMIRATES	5359
12	BONAM	TEHRAN/ANKARA	4820
13	DEESA	AMMAN/JEDDAH	4792
14	RASKI	MUSCAT/MUMBAI	4737
15	DAROR	BAHRAIN/JEDDAH	4531
16	NALPO	BAHRAIN/EMIRATES	4507
17	SODEX	EMIRATES/MUSCAT	4418
18	MENSA	EMIRATES/MUSCAT	4409
19	DASIS	TEHRAN/ANKARA	4278
20	KITOT	CAIRO/JEDDAH	3996

Table 1 - Top 20 Busiest Points in the ICAO Middle East RVSM Airspace

2.4 Technical Vertical Collision Risk Assessment – Safety Objective 1

- 2.4.1 Technical vertical risk represents the risk of a collision between aircraft on adjacent flight levels due to normal or typical height deviations of RVSM approved aircraft. It is attributable to the height-keeping errors that result from the combination of altimetry system errors (ASE) and autopilot performance in the vertical dimension.
- 2.4.2 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.
- 2.4.3 The value computed for technical height risk is estimated 1.019×10^{-10} this meets RVSM Safety Objective 1.
- 2.4.4 From June 2023 TDS, the following were calculated:
 - Average Aircraft Diameter (lambda xy): 0.028105 NM 170.77 ft
 - Average Aircraft Wingspan (lambda y): 0.025974 NM 157.82 ft
 - Average Aircraft Height (lambda z): 0.0080583 NM 48.963 ft
 - Number of Flights involved: 280,868.
 - Flying Time: 200,254 hours
 - Flying Distance: 91,279,794 NM
 - Average Speed: 440.45 kts
 - Average Passing Frequency: 1.34738E-001

2.4.5 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 **2.053×10^{-9}** valid and is less than the ICAO requirement of **1.7×10^{-8}** .
- c. The monitoring target for the MID RVSM height-monitoring programme is an on-going process.
- d. The input data used by the CRM is valid.
- e. An adequate process is in place to investigate and correct problems in aircraft technical height-keeping performance.

2.5 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 $P_y(0)$ for the SMR 2021 has the following to consider:

- a. The MIDRMA continued to calculate the probability of lateral overlap **$P_y(0)$** 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 probability of lateral overlap **$P_y(0)$** for each MIDRMA Member State and found all the results are valid :

1- Bahrain FIR

Passing Frequency (n_{equiv}): 1.512E-002
 Probability of Lateral Overlap ($P_y(0)$): 0.16965

2- Cairo FIR

Passing Frequency (n_{equiv}): 2.979E-001
 Probability of Lateral Overlap ($P_y(0)$): 0.16139

3- Baghdad FIR

Passing Frequency (n_{equiv}): 2.787E-002
 Probability of Lateral Overlap ($P_y(0)$): 0.17396

4- Doha FIR:

Passing Frequency (n_{equiv}): 0.00000E+000
 Probability of Lateral Overlap ($P_y(0)$): 0.14947

5- Tehran FIR

Passing Frequency (n_{equiv}): 1.041E-001
 Probability of Lateral Overlap ($P_y(0)$): 0.16325

6- Amman FIR

Passing Frequency (n_{equiv}): 4.597E-002
 Probability of Lateral Overlap ($P_y(0)$): 0.14495

7- Muscat FIR

Passing Frequency (n_equiv): 3.406E-001
Probability of Lateral Overlap (Py(0)): 0.1699

8- Jeddah FIR

Passing Frequency (n_equiv): 5.274E-002
Probability of Lateral Overlap (Py(0)): 0.15326

9- Kuwait FIR

Passing Frequency (n_equiv): 7.257E-003
Probability of Lateral Overlap (Py(0)): 0.18248

10- Damascus FIR

Passing Frequency (n_equiv): 1.743E-001
Probability of Lateral Overlap (Py(0)): 0.12272

11- Emirates FIR

Passing Frequency (n_equiv): 2.010E-002
Probability of Lateral Overlap (Py(0)): 0.16256

12- Sana'a FIR

Passing Frequency (n_equiv): 2.961E-001
Probability of Lateral Overlap (Py(0)): 0.18051

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

Average Passing Frequency: **1.3474E-001**

Note: MIDRMA's assessment has identified Muscat FIR as the most complex and congested FIR within the ICAO Middle East RVSM airspace. Despite its complexity and congestion, no discernible upward trend in risk values has been observed.

2.6 Pz(1000) Compliance

3.6.1 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 **2.053 x 10⁻⁹**

3.6.2 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 **1.7x10⁻⁸**.

3.6.3 The MIDRMA continues to issue the minimum monitoring requirements (MMRs) through the automated MMR software which is programmed to address the MIDRMA member states with their updated monitoring requirements according to the latest RVSM approvals received, the MMR table valid for 12th February 2024 can be found in **Attachment D** of the SMR.

Note: All member states are required to check and comply with their MMR through the MIDRMA website (www.midrma.com).

2.7 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, $P_z(1000)$, 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).

2.7.1 Recommendations for Safety Objective 1:

- a. The MIDRMA shall continue to review the content and structure of its aircraft monitoring groups (on going task).
- b. The MIDRMA will continue to keep the methods of calculating the technical CRM parameters and the risk due to technical height keeping errors under review and update all parameters and data used in the MID Risk Analysis Software (MIDRAS AI) this is included the parameters for the new Doha FIR.

Note: New Upgraded MIDRAS AI is fully operational and used by the MIDRMA for the risk analysis

- c. The MIDRMA shall carry out continuous height monitoring survey and investigation concerning aircraft flying within the MID RVSM airspace by collecting the TDS from member states offered to submit their RVSM TDS on a monthly basis.
- d. More MIDRMA Member states other than Bahrain, Iraq and UAE are encouraged to send their monthly RVSM traffic data to explore more possible violations to the MID RVSM airspace.

2.8 Assessment of overall risk due to all causes against the TLS of 5×10^{-9} fatal accidents per flight hour **RVSM Safety Objective 2**

2.8.1 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.

2.8.2 The value computed for the overall risk is estimated 6.530×10^{-10} this is below the ICAO overall TLS.

2.9 Large Height Deviation Reports (LHDs) 2023

2.9.1 The estimation of the total risk, encompassing Safety Objective 2, integrates the outcomes of Safety Objective 1 with the evaluation of risks originating from various other factors. This secondary component, often referred to as operational risk, is contingent on a multitude of factors, including airspace configuration, traffic density, ATC procedures, individual controller and pilot actions, and specific operational characteristics of sectors. The assessment of operational risk relies on the analysis of event magnitude and duration extracted from operational incident reports, which are subsequently transformed into Large Height Deviation reports.

2.9.2 MIDRMA has observed a decrease in Large Height Deviation (LHD) reporting from certain member states, particularly those with high traffic volumes, despite the continuous issuance of monthly reminders to all member states. The level of reporting has remained exceedingly low. The table below illustrates the reports received from all member states for the period from January 1st to December 31st, 2023.

MID FIRs	No. of Reported LHDs	No. of Related LHDs
Bahrain	6	5
Baghdad	1	-
Amman	1	2
Tehran	-	3
Cairo	27	9
Damascus	-	1
Khartoum	1	4
Kuwait	-	4
Muscat	90	48
Jeddah/ Riyadh	9	77
Tripoli	-	1
Emirates	4	5
Sana'a	181	11
Doha	6	-

Large Height Deviation Received from Member States from 01st Jan 2023 until 31st Dec 2023

Note 1: In reference to the table above, there are member states that didn't report any LHD for a long time, such as Kuwait, and Iran, while Iraq ATC reported only ONE LHD during the reporting cycle of SMR 2023.

2.9.3 Some MIDRMA Member States with large volume of traffic have submitted a small number of LHD reports during the SMR 2023 reporting cycle which is a continuous problem addressed in the previous SMRs, the MIDRMA can't see much improvement in the level of reporting LHDs especially with critical categories such as A, and B.

Note 2: the deficiency in reporting, especially in high-traffic states, raises doubts about the accuracy of safety data and diminishes confidence in the overall risk value assessment. MIDRMA urge immediate action to address and rectify reporting issues, ensuring transparency and upholding the credibility of safety assessments.

Note 3: The extreme majority of the received LHD reports are related to ATC transfer of control coordination errors due to human factors (Cat. E) and did not have severe impact on the RVSM airspace operations.

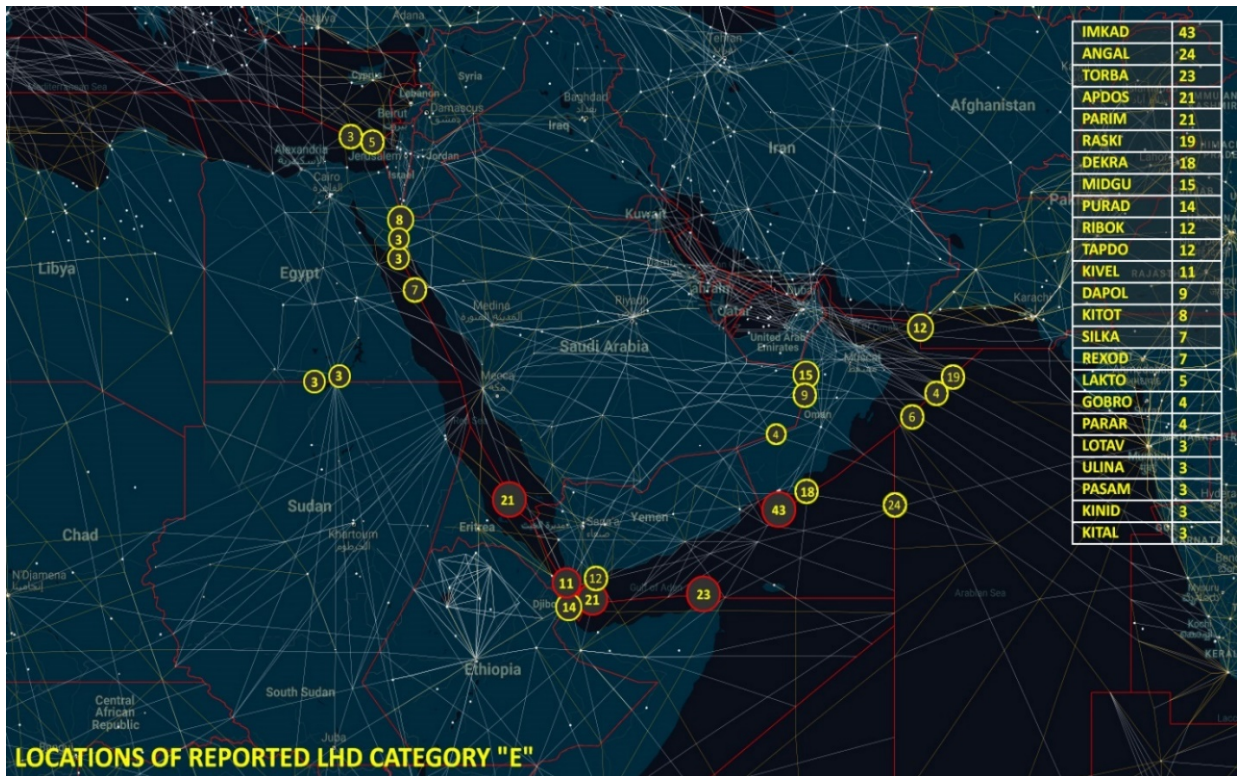
2.9.4 The table below provides a summary of operational risk associated with Large Height Deviation (LHD) reports, categorized by LHD categories. These reports are used to calculate the overall vertical collision risk, which is presented for Safety Objective No. 2.

LHD Cat.	Large Height Deviation (LHD) Categories	No. of LHDs	LHD Duration (Sec.)
A	Flight crew fails to climb or descend the aircraft as cleared	-	-
B	Flight crew climbing or descending without ATC clearance	-	-
C	Incorrect operation or interpretation of airborne equipment	4	65
D	ATC system loop error	-	-
E	ATC transfer of control coordination errors due to human factors	5	360
F	ATC transfer of control coordination errors due to technical issues	-	-
G	Aircraft contingency leading to sudden inability to maintain level	-	-
H	Airborne equip. failure and unintentional or undetected FL change	-	-
I	Turbulence or other weather-related cause	3	70
J	TCAS resolution advisory and flight crew correctly responds	-	-
K	TCAS resolution advisory and flight crew incorrectly responds	-	-
L	ACFT being provided with RVSM separation is not RVSM approved	-	-
M	Other		
	Total	12	495

Summary of Operational Risk associated with Large Height Deviation Reports

2.9.5 During MIDRMA Board/19 meeting, MIDRMA highlighted the issue of non-responsiveness to the received Large Height Deviation (LHD) reports, particularly in relation to the feature allowing direct responses to the reporting unit. This feature is crucial for ensuring that all responses are properly documented and can be readily referenced when necessary. Regrettably, the vast majority of Member States persist in neglecting the utilization of this feature and do not make the effort to investigate and provide replies to the LHD reports they receive.

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3 Safety Protocols

3.1 RVSM Safety Protocol for Muscat and Mumbai FIRs and the Increased Number of LHD reports Submitted by Mumbai ATCU Related to Muscat ATCU:

3.1.1 MIDRMA has maintained its vigilance in monitoring the Large Height Deviation (LHD) reports along the eastern boundaries of Muscat FIR, as filed by Mumbai and Muscat ACCs. The ongoing status of the Muscat/Mumbai RVSM safety protocol, which has remained open since 2017. It is imperative that a decision be made to close this protocol, given that the associated risks should either be eliminated or reduced to the absolute minimum. Regrettably, MIDRMA does not perceive this happening without confirmation of the installation of OLDI/AIDC systems in both ACCs.

3.1.2 Oman reported during MIDRMA Board/19 meeting that LHD filed by Mumbai were received late at Muscat ACC, as the mechanism of reporting through Monitoring Agency of Asia Region (MAAR) and the MIDRMA; This delay hindered the prompt investigation of LHD events and timely corrective actions. However, Oman CAA called for ATM coordination meeting in Aug 2023, Mumbai ACC is now sending monthly LHD report via email directly to Muscat ACC, which enabled a timely response to mitigate the raising issues. Additionally, Oman CAA has developed and implemented an internal mechanism for investigating LHD reports on a regular basis and is also following up on corrective actions with the relevant parties. Reference to the AIDC connection implementation between Mumbai and Muscat ACCs; AIDC tests were conducted in September 2019, March 2021, February 2023, and August 2023.

3.1.3 The most recent test (involved testing ABI, EST, TOC, and AOC parameters) was reported success in all parameters tested except ABI. Next for AIDC test is pending the readiness of Mumbai ACC. Successful implementation of AIDC connection for flight information exchange between Muscat and Mumbai ATS units is considered effective in reducing such LHDs. Oman CAA and Airports Authority of India (AAI) agreed to organize coordination meetings in regular basis, to be address the LHD events in timely manner and to mitigate he route cause in timely manner.

3.1.4 a comprehensive account of Large Height Deviation (LHD) reports, as filed by both Air Traffic Control Units (ATCUs), from January 1st to December 31st, 2023 is at **Attachment A**, is provided. It is noteworthy that a significant and abrupt surge in LHD reporting from Mumbai related to Muscat, has been observed during this period.

Note 4: MIDRMA Board/19 Decided to keep the RVSM Safety Protocol open until the installation of OLDI/AIDC between the two ACCs.

3.1.5 The table below provides a comparison of the number of LHD reports submitted by Mumbai and Muscat ATCUs in 2022 and 2023.

YEAR	LHD Reported by Muscat	LHD Reported by Mumbai
2022	16	41
2023	40	142

3.2 RVSM Safety Protocol for Sanaa and Mogadishu FIRs.

3.2.1 The MIDRMA Board/18 has decided to open an RVSM Safety Protocol between Sanaa and Mogadishu FIRs in response to the increasing number of LHD reports submitted by Sana'a ACC related to Mogadishu and to its neighbouring FIRs. It's worth noting that the first coordination meeting, organized by ICAO MID and attended by ICAO ESAF ARMA, MIDRMA, IATA and relevant ATM representatives near the Horn of Africa, discussed the surge in LHD reports from Sana'a ACC concerning its neighbouring FIRs. During this meeting, the ATM representatives attended this meeting were briefed of the escalating risk associated with the rising number of LHD reports and their impact on the overall ICAO TLS within the MID region. They were urged to promptly implement corrective measures to resolve this problem as soon as possible.

3.2.2 No LHD reports were filed by Sanaa related to Mogadishu from January 1st until December 31st, 2023. Therefore, MIDRMA sees no reason to keep the safety protocol open and requests to close it, however MIDRMA Board/19 meeting decided to keep this protocol open because of the continuous increase in the LHD reports by the other surrounding FIRs.

3.2.3 The table below displays all the LHD reports filed by Sanaa ACC related to its neighbouring ACCs, indicating a significant decrease in the number of reports compared to the year 2022 especially related to Mogadishu FIR.

Months	Addis Ababa	Asmara	Djibouti	Jeddah	Mogadishu	Mumbai	Muscat	Total
1-2023	1	0	2	1	0	1	9	14
2-2023	2	1	0	3	0	4	3	13
3-2023	0	1	4	3	0	0	16	24
4-2023	2	2	2	1	0	3	2	12
5-2023	2	2	2	1	0	0	0	7
6-2023	2	5	2	5	0	1	0	15
7-2023	3	10	2	6	0	4	0	25
8-2023	4	3	5	3	0	3	0	18
9-2023	4	1	2	4	0	1	4	16
10-2023	1	3	2	2	0	3	4	15
11-2023	0	2	1	2	0	3	3	11
12-2023	1	1	0	4	0	2	3	11
Total	22	31	24	35	0	25	44	181

4 Assessment of Non-RVSM Approved Aircraft 2023

4.1 The MIDRMA, in accordance with its role as a Regional Monitoring Agency (RMA), as specified in ICAO Doc 9937 and 9574, conducts systematic reviews to assess operator compliance with State RVSM approvals within the ICAO Middle East Region. This essential function is carried out to safeguard the safety of the RVSM airspace by identifying aircraft that operate within it without the required approvals.

4.2 While it would be ideal to conduct daily compliance monitoring across the entire ICAO Middle East airspace, challenges in collecting traffic information render this impractical. In alignment with the guidelines set forth in ICAO Doc 9937, the responsible RMA is mandated to monitor full airspace compliance for a minimum of 30 days annually. In fulfilling this obligation, MIDRMA conducts monthly assessments.

4.3 MIDRMA relies on RVSM traffic data from Bahrain, Baghdad, and Emirates FIRs as the primary source for monitoring non-RVSM approved aircraft within its area of responsibility. This approach is necessitated by the challenge of obtaining monthly traffic data from all Member States. In light of this, MIDRMA wishes to express its sincere appreciation to the Bahrain Civil Aviation Authority, the Iraq Civil Aviation Authority, and the UAE General Civil Aviation Authority for their unwavering commitment to providing their FIRs' RVSM traffic data on a monthly basis. The data received from these Member States is consistently comprehensive and conforms to the required format.

4.4 The tables in **Attachment B** of the SMR reflect the MIDRMA Bulletin of Non-RVSM Approved aircraft observed operating within the ICAO MID RVSM airspace and within the RVSM airspace of other RMAs. The expectation derived from this analysis is that States exercising operational authority will take proactive steps to address approval issues well in advance, ensuring that approved aircraft operate within the RVSM airspace. This proactive approach aims to prevent undesirable actions against legitimate operators. Furthermore, it is expected that States encountering such aircraft operating within their airspace will take appropriate measures.

5 Status Report on the Monitoring the Syrian RVSM approved Aircraft (OFAC License)

5.1 Due to the recently escalating number of operations of the RVSM-approved aircraft registered by the Syrian Civil Aviation Authority within the ICAO Middle East Region, MIDRMA formally submitted a request on September 2021 for an OFAC License to both the FAA and the US Department of Treasury. This license is sought for the purpose of conducting RVSM height monitoring using Enhanced GMU equipment. Successfully, this license application was approved in September 2023 and the MIDRMA granted a permission to use the EGMU equipment to monitor the Syrian RVSM approved aircraft.

Note: the proactive step taken by the Syrian Civil Aviation Authorities to ensure the timely monitoring of their registered aircraft by sending them to overfly HMUs (Height Monitoring Units) available in Europe to obtain height monitoring results. This pragmatic approach enabled the certificate holders to renew their RVSM Approvals without waiting for the OFAC license, the timing of which remained uncertain. Nevertheless, we express our profound gratitude to the FAA for their invaluable assistance and unwavering support in obtaining this license which is valid for two years.

6 Status Report on the Monitoring the Iranian RVSM approved Aircraft (OFAC License)

6.1 The process of securing an OFAC License from the Department of the US Treasury, specifically for the utilization of EGMU Equipment to monitor the Iranian RVSM approved aircraft, was initiated in October 2021. It is important to note that by January 2021, the OFAC license had already received approval, and the request for its renewal was diligently submitted well in advance of the impending expiration date, which was scheduled for January 31, 2023. Despite the early request, MIDRMA faced significant challenges in obtaining updates regarding the license. Over the course of nearly 22 months, the MIDRMA continually inquires the FAA representative for updated information about the status of the license. This prolonged delayed communication led to growing concerns within the MIDRMA about the risk associated with the impending expiration of the license.

6.2 The subject was formally addressed during MIDRMA Board/18 meeting held in Doha, Qatar, 19 - 20 September 2022 and MIDRMA Board/19 held in Bahrain 10-11 October 2023. The primary agenda was the renewal request made by MIDRMA for the OFAC License and impending expiration of the license for the Iranian aircraft by the end of January 2023, and the status of the application pending since October 2021. During MIDRMA Board/18 meeting, exhaustive discussions took place to explore potential solutions to the problem. The FAA representative was invited to facilitate an urgent meeting with OFAC to convey the critical nature of the situation and the risks associated with the lack of known height monitoring. However, despite several attempts, MIDRMA did not receive any update. While Iran Civil Aviation Authority (ICAA) has displayed a positive stance and readiness to conduct height monitoring for all their RVSM-approved aircraft, the MIDRMA remains unable to respond positively to the Iran Civil Aviation Authority request due to the absence of the OFAC license.

6.3 The table below illustrates the current Minimum Monitoring Requirements for Iran CAA RVSM approved aircraft. Currently, 45% of their approved aircraft don't meet the height monitoring requirements, and this figure is expected to increase to 79% by the end of May 2024. However, this represents a significant percentage of non-compliant aircraft in RVSM operations, posing a serious threat to other approved aircraft within the RVSM airspace.

STATE	RVSM APPROVED A/C	HAVE RESULTS OR COVERED	NOT COVERED	NOT COVERED IN %	Number of ACFT Required Monitoring
Iran MMR – February 2024	168	93	75	45%	49
Iran MMR – May 2024	168	36	132	79%	78

Status of Iran RVSM Minimum Monitoring Requirement

7 Conclusions for Achieving Safety Objective 2:

- ICAO Compliance to the Overall Risk :** Meeting the ICAO overall TLS of 5×10^{-9} fatal accidents per flight hour demonstrates full compliance with international aviation standards, affirming the commitment to safety at a global level.
- Enhanced Operational Safety:** The accomplishment of Safety Objective 2 directly translates to enhanced operational safety, ensuring that the risk of collisions due to all causes, including technical aspects and operational errors, is maintained within globally accepted safety thresholds. Nevertheless, there are apprehensions regarding certain Flight Information Regions (FIRs) characterized by high traffic volume, as they may not consistently report the necessary LHD categories such as A, B, C, and D. This inconsistency poses a challenge to fostering high confidence in the overall risk estimation.
- Reduction in Collision Risk:** Meeting the ICAO TLS signifies a tangible reduction in the overall risk of collision within the MID RVSM airspace, providing a safer environment for air traffic operations.

4. **Safety Assurance for Stakeholders:** The achievement of the safety objective assures stakeholders, including aviation authorities, airlines, and passengers, that safety is a top priority, fostering confidence in the reliability of air travel in the RVSM airspace.
5. **Improved Airspace Management:** The successful outcome of Safety Objective 2 reflects positively on the effectiveness of airspace management practices, demonstrating the ability to balance air traffic density while maintaining a high standard of safety.
6. **Continuous Improvement Culture:** The achievement of Safety Objective 2 fosters a culture of continuous improvement, where safety standards are not just met but actively monitored and refined over time to adapt to evolving aviation landscapes.

Overall, the positive conclusions drawn from achieving RVSM Safety Objective 2 highlight the successful management of collision risks and the establishment of a high standard of safety in the MID RVSM airspace.

8 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.

8.1 Recommendations for Safety Objective 3

- 1- Member States with the capability to submit their RVSM traffic data on a monthly basis are strongly encouraged to fulfill this request. This action will assist MIDRMA in scrutinizing the data for potential violations of RVSM airspace by non-approved aircraft and in calculating monthly risk values to identify any emerging trends for future assessment.
- 2- Member States employing ADS-B for surveillance are urged to share their archived ADS-B data with MIDRMA to facilitate trials for RVSM height monitoring. This request is applicable to all aircraft equipped with ADS-B Out operating within the RVSM airspace.
- 3- To enhance the reporting of Large Height Deviations and address various aspects related to RVSM implementation within the ICAO Middle East RVSM airspace, MIDRMA conducted an RVSM Seminar. Representatives from Member States, focal points for ATC and Airworthiness, as well as Airline Operators and neighboring Regional Monitoring Agencies, were invited to participate. The goal was to raise awareness regarding RVSM implementation and its requirements.

Note: MIDRMA requests any member state interested in conducting a similar seminar privately within their country to contact the ICAO MID office and MIDRMA for the coordination and arrangement of this event.

9 Conclusions of Achieving Safety Objective 3:

1. **Improved Risk Management Processes:** Demonstrating improvements in risk management processes, such as enhanced identification, assessment, and mitigation of potential safety hazards, showcases a proactive approach to ensuring the safety of RVSM operations.
2. **Enhanced Reporting and Communication:** Improved reporting mechanisms and communication channels regarding safety issues signify a positive shift towards a more transparent and collaborative safety culture, facilitating timely responses to potential risks.
3. **Regulatory Compliance:** Verification of compliance with relevant aviation regulations and standards associated with RVSM operations confirms that the safety enhancements align with industry requirements, promoting confidence in the overall safety framework.

By addressing the recommendations in 2.4.1 and showcasing these positive conclusions, Safety Objective 3 has been achieved, leading to a safer and more secure RVSM operational environment.

Attachment A

LHD Reports Submitted by Muscat related to Mumbai

#	ID	Date of Occ	Reported By	Related to	Location	Nature of the occurrence:	Category
1	11226	03-Mar-23	Muscat	Mumbai	PARAR	Revised FL Not Coordinated	E
2	11227	03-Mar-23	Muscat	Mumbai	PARAR	Revised FL Not Coordinated	E
3	11228	04-Apr-23	Muscat	Mumbai	RASKI	Revised FL Not Coordinated	E
4	11229	04-Apr-23	Muscat	Mumbai	RASKI	Revised FL Not Coordinated	E
5	11230	04-Apr-23	Muscat	Mumbai	RASKI	Revised FL Not Coordinated	E
6	11231	07-Apr-23	Muscat	Mumbai	KITAL	ACFT Entered FIR Without Coordination	E
7	11232	12-Apr-23	Muscat	Mumbai	RASKI	Revised FL Not Coordinated	E
8	11375	03-Aug-23	Muscat	Mumbai	RASKI	Revised FL Not Coordinated	E
9	11376	04-Aug-23	Muscat	Mumbai	PARAR	Revised FL Not Coordinated	E
10	11377	05-Aug-23	Muscat	Mumbai	RASKI	ACFT Entered FIR Without Coordination	E
11	11378	06-Aug-23	Muscat	Mumbai	RASKI	Revised FL Not Coordinated	E
12	11379	07-Aug-23	Muscat	Mumbai	REXOD	Revised FL Not Coordinated	E
13	11380	08-Aug-23	Muscat	Mumbai	RASKI	Revised FL Not Coordinated	E
14	11381	09-Aug-23	Muscat	Mumbai	RASKI	Revised FL Not Coordinated	E
15	11382	09-Aug-23	Muscat	Mumbai	REXOD	ACFT Entered FIR Without Coordination	E
16	11383	10-Aug-23	Muscat	Mumbai	RASKI	ACFT Entered FIR Without Coordination	E
17	11384	12-Aug-23	Muscat	Mumbai	REXOD	Revised FL Not Coordinated	E
18	11385	16-Aug-23	Muscat	Mumbai	RASKI	ACFT Entered FIR Without Coordination	E
19	11386	18-Aug-23	Muscat	Mumbai	RASKI	Revised FL Not Coordinated	E
20	11387	19-Aug-23	Muscat	Mumbai	REXOD	ACFT Entered FIR Without Coordination	E
21	11388	22-Aug-23	Muscat	Mumbai	RASKI	ACFT Entered FIR Without Coordination	E
22	11389	28-Aug-23	Muscat	Mumbai	PARAR	ACFT Entered FIR Without Coordination	E
23	11390	30-Aug-23	Muscat	Mumbai	REXOD	ACFT Entered FIR Without Coordination	E
24	11391	30-Aug-23	Muscat	Mumbai	RASKI	ACFT Entered FIR Without Coordination	E
25	11392	30-Aug-23	Muscat	Mumbai	REXOD	ACFT Entered FIR Without Coordination	E
26	11432	03-Sep-23	Muscat	Mumbai	RASKI	Revised FL Not Coordinated	E
27	11433	03-Sep-23	Muscat	Mumbai	RASKI	Revised FL Not Coordinated	E
28	11484	03-Oct-23	Muscat	Mumbai	REXOD	Revised FL Not Coordinated	E
29	11485	04-Oct-23	Muscat	Mumbai	LOTAV	Revised FL Not Coordinated	E
30	11486	08-Oct-23	Muscat	Mumbai	TOTOX	Revised FL Not Coordinated	E
31	11487	08-Oct-23	Muscat	Mumbai	LOTAV	Revised FL Not Coordinated	E

MIDANPIRG/21 & RASG-MID/11-REPORT
Appendix 5I

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32	11496	02-Nov-23	Muscat	Mumbai	KITAL	Revised FL Not Coordinated	E
33	11497	02-Nov-23	Muscat	Mumbai	KITAL	Revised FL Not Coordinated	E
34	11498	04-Nov-23	Muscat	Mumbai	RASKI	ACFT Entered FIR Without Coordination	E
35	11521	05-Nov-23	Muscat	Mumbai	PARAR	Revised FL Not Coordinated	E
36	11524	07-Nov-23	Muscat	Mumbai	TOTOX	ACFT Entered FIR Without Coordination	E
37	11525	07-Nov-23	Muscat	Mumbai	KITAL	Revised FL Not Coordinated	E
38	11526	11-Nov-23	Muscat	Mumbai	RASKI	Revised FL Not Coordinated	E
39	11527	11-Nov-23	Muscat	Mumbai	RASKI	ACFT Entered FIR Without Coordination	E
40	11528	13-Nov-23	Muscat	Mumbai	RASKI	ACFT Entered FIR Without Coordination	E

LHD Reports Submitted by Mumbai related to Muscat

#	ID	Date of Occ	Reported By	Related to	Location	Nature of the occurrence	Category
1	LHD001819	06/01/2023	Mumbai	Muscat	KITAL	No or late estimate time revision	E
2	LHD001820	15/01/2023	Mumbai	Muscat	TOTOX	No or late FL revision	E
3	LHD001859	02/02/2023	Mumbai	Muscat	BIBGO	No transfer information	E
4	LHD001863	08/02/2023	Mumbai	Muscat	RASKI	No or late FL revision	E
5	LHD001864	14/02/2023	Mumbai	Muscat	PARAR	No or late FL revision	E
6	LHD001865	16/02/2023	Mumbai	Muscat	KITAL	No or late FL revision	E
7	LHD001866	19/02/2023	Mumbai	Muscat	PARAR	No transfer information	E
8	LHD001867	10/03/2023	Mumbai	Muscat	PARAR	No or late FL revision	E
9	LHD001868	14/03/2023	Mumbai	Muscat	PARAR	No or late FL revision	E
10	LHD001869	16/03/2023	Mumbai	Muscat	LOTAV	No or late FL revision	E
11	LHD001870	16/03/2023	Mumbai	Muscat	LOTAV	No or late FL revision	E
12	LHD001877	16/03/2023	Mumbai	Muscat	TOTOX	No or late FL revision	E
13	LHD001878	19/03/2023	Mumbai	Muscat	KITAL	No or late FL revision	E
14	LHD001879	20/03/2023	Mumbai	Muscat	LOTAV	No transfer information	E
15	LHD001880	24/03/2023	Mumbai	Muscat	PARAR	No or late route revision	E
16	LHD001881	24/03/2023	Mumbai	Muscat	PARAR	No or late route revision	E
17	LHD001882	24/03/2023	Mumbai	Muscat	RASKI	No or late FL revision	E
18	LHD001883	24/03/2023	Mumbai	Muscat	RASKI	No or late FL revision	E
19	LHD001884	24/03/2023	Mumbai	Muscat	LOTAV	No or late FL revision	E
20	LHD001885	26/03/2023	Mumbai	Muscat	PARAR	No or late FL revision	E
21	LHD001886	29/03/2023	Mumbai	Muscat	KITAL	No or late FL revision	E
22	LHD001887	31/03/2023	Mumbai	Muscat	REXOD	No or late FL revision	E
23	LHD001963	08/04/2023	Mumbai	Muscat	RASKI	No or late FL revision	E
24	LHD001964	17/04/2023	Mumbai	Muscat	SAPNA	No transfer information	E
25	LHD001965	18/04/2023	Mumbai	Muscat	PARAR	No or late FL revision	E
26	LHD001966	27/04/2023	Mumbai	Muscat	RASKI	No or late FL revision	E
27	LHD001967	30/04/2023	Mumbai	Muscat	TOTOX	No or late FL revision	E
28	LHD002011	04/05/2023	Mumbai	Muscat	RASKI	No transfer information	E
29	LHD002012	13/05/2023	Mumbai	Muscat	RASKI	No or late FL revision	E
30	LHD002013	18/05/2023	Mumbai	Muscat	ANGAL	No or late FL revision	E
31	LHD002014	23/05/2023	Mumbai	Muscat	TOTOX	No or late FL revision	E
32	LHD002015	25/05/2023	Mumbai	Muscat	TOTOX	No or late FL revision	E
33	LHD002016	25/05/2023	Mumbai	Muscat	TOTOX	No or late FL revision	E
34	LHD002017	30/05/2023	Mumbai	Muscat	KITAL	No or late FL revision	E
35	LHD002018	31/05/2023	Mumbai	Muscat	LOTAV	No or late FL revision	E
36	LHD002019	06/06/2023	Mumbai	Muscat	RASKI	No or late FL revision	E
37	LHD002020	19/06/2023	Mumbai	Muscat	KITAL	No or late FL revision	E
38	LHD002021	23/06/2023	Mumbai	Muscat	RASKI	No or late FL revision	E
39	LHD002022	26/06/2023	Mumbai	Muscat	LOTAV	No or late FL revision	E

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40	LHD002038	04/07/2023	Mumbai	Muscat	LOTAV	No or late FL revision	E
41	LHD002039	05/07/2023	Mumbai	Muscat	TOTOX	No or late FL revision	E
42	LHD002040	21/07/2023	Mumbai	Muscat	PARAR	No transfer information	E
43	LHD002041	26/07/2023	Mumbai	Muscat	PARAR	No or late FL revision	E
44	LHD002042	29/07/2023	Mumbai	Muscat	ORLID	No or late estimate time revision	E
45	LHD002043	29/07/2023	Mumbai	Muscat	ORLID	No or late estimate time revision	E
46	LHD002091	05/08/2023	Mumbai	Muscat	RASKI	No or late FL revision	E
47	LHD002092	07/08/2023	Mumbai	Muscat	RASKI	No or late FL revision	E
48	LHD002093	08/08/2023	Mumbai	Muscat	REXOD	No or late FL revision	E
49	LHD002094	10/08/2023	Mumbai	Muscat	RASKI	No or late FL revision	E
50	LHD002095	13/08/2023	Mumbai	Muscat	REXOD	No or late FL revision	E
51	LHD002096	14/08/2023	Mumbai	Muscat	PARAR	No transfer information	E
52	LHD002097	15/08/2023	Mumbai	Muscat	TOTOX	No or late estimate time revision	E
53	LHD002098	15/08/2023	Mumbai	Muscat	REXOD	No or late FL revision	E
54	LHD002099	16/08/2023	Mumbai	Muscat	ORLID	No transfer information	E
55	LHD002101	17/08/2023	Mumbai	Muscat	RASKI	No or late FL revision	E
56	LHD002102	17/08/2023	Mumbai	Muscat	REXOD	No or late FL revision	E
57	LHD002103	18/08/2023	Mumbai	Muscat	PARAR	No or late FL revision	E
58	LHD002104	19/08/2023	Mumbai	Muscat	ORLID	No or late estimate time revision	E
59	LHD002105	20/08/2023	Mumbai	Muscat	RASKI	No or late estimate time revision	E
60	LHD002106	20/08/2023	Mumbai	Muscat	RASKI	No or late FL revision	E
61	LHD002107	20/08/2023	Mumbai	Muscat	LOTAV	No or late FL revision	E
62	LHD002108	21/08/2023	Mumbai	Muscat	KITAL	No or late estimate time revision	E
63	LHD002109	22/08/2023	Mumbai	Muscat	ANGAL	No transfer information	E
64	LHD002110	23/08/2023	Mumbai	Muscat	KITAL	No or late FL revision	E
65	LHD002111	23/08/2023	Mumbai	Muscat	PARAR	No or late FL revision	E
66	LHD002112	23/08/2023	Mumbai	Muscat	RASKI	No or late FL revision	E
67	LHD002113	23/08/2023	Mumbai	Muscat	TOTOX	No or late FL revision	E
68	LHD002114	24/08/2023	Mumbai	Muscat	ORLID	No or late FL revision	E
69	LHD002115	24/08/2023	Mumbai	Muscat	RASKI	No or late FL revision	E
70	LHD002116	24/08/2023	Mumbai	Muscat	ORLID	No or late FL revision	E
71	LHD002117	24/08/2023	Mumbai	Muscat	RASKI	No or late FL revision	E
72	LHD002118	25/08/2023	Mumbai	Muscat	KITAL	No or late FL revision	E
73	LHD002119	25/08/2023	Mumbai	Muscat	LOTAV	No or late FL revision	E
74	LHD002120	25/08/2023	Mumbai	Muscat	RASKI	No or late estimate time revision	E
75	LHD002121	27/08/2023	Mumbai	Muscat	PARAR	No or late FL revision	E
76	LHD002122	29/08/2023	Mumbai	Muscat	LOTAV	No or late FL revision	E
77	LHD002123	29/08/2023	Mumbai	Muscat	PARAR	No or late FL revision	E
78	LHD002124	31/08/2023	Mumbai	Muscat	RASKI	No or late FL revision	E

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79	LHD002125	31/08/2023	Mumbai	Muscat	KITAL	No or late estimate time revision	E
80	LHD002192	01/10/2023	Mumbai	Muscat	REXOD	No or late estimate time revision	E
81	LHD002193	02/10/2023	Mumbai	Muscat	RASKI	No or late FL revision	E
82	LHD002194	04/10/2023	Mumbai	Muscat	RASKI	No or late FL revision	E
83	LHD002195	05/10/2023	Mumbai	Muscat	RASKI	No or late FL revision	E
84	LHD002196	08/10/2023	Mumbai	Muscat	TOTOX	No or late FL revision	E
85	LHD002197	20/10/2023	Mumbai	Muscat	LOTAV	No or late estimate time revision	E
86	LHD002198	22/10/2023	Mumbai	Muscat	TOTOX	No or late FL revision	E
87	LHD002199	23/10/2023	Mumbai	Muscat	RASKI	No or late FL revision	E
88	LHD002200	23/10/2023	Mumbai	Muscat	LOTAV	No or late FL revision	E
89	LHD002201	24/10/2023	Mumbai	Muscat	LOTAV	No or late FL revision	E
90	LHD002203	24/10/2023	Mumbai	Muscat	RASKI	No or late FL revision	E
91	LHD002204	26/10/2023	Mumbai	Muscat	RASKI	No or late FL revision	E
92	LHD002205	26/10/2023	Mumbai	Muscat	LOTAV	No or late FL revision	E
93	LHD002206	26/10/2023	Mumbai	Muscat	PARAR	No or late FL revision	E
94	LHD002207	26/10/2023	Mumbai	Muscat	RASKI	No or late FL revision	E
95	LHD002208	28/10/2023	Mumbai	Muscat	KITAL	No or late FL revision	E
96	LHD002209	29/10/2023	Mumbai	Muscat	PARAR	No transfer information	E
97	LHD002210	30/10/2023	Mumbai	Muscat	KITAL	No or late FL revision	E
98	LHD002292	03/11/2023	Mumbai	Muscat	ORLID	No or late FL revision	E
99	LHD002293	03/11/2023	Mumbai	Muscat	PARAR	No or late FL revision	E
100	LHD002294	04/11/2023	Mumbai	Muscat	PARAR	No or late FL revision	E
101	LHD002295	05/11/2023	Mumbai	Muscat	ORLID	No or late FL revision	E
102	LHD002296	07/11/2023	Mumbai	Muscat	PARAR	No or late FL revision	E
103	LHD002297	08/11/2023	Mumbai	Muscat	PARAR	No or late FL revision	E
104	LHD002298	09/11/2023	Mumbai	Muscat	TOTOX	No or late estimate time revision	E
105	LHD002299	12/11/2023	Mumbai	Muscat	TOTOX	No or late FL revision	E
106	LHD002300	12/11/2023	Mumbai	Muscat	RASKI	No or late FL revision	E
107	LHD002301	13/11/2023	Mumbai	Muscat	ANGAL	No transfer information	E
108	LHD002302	14/11/2023	Mumbai	Muscat	KITAL	No transfer information	E
109	LHD002303	17/11/2023	Mumbai	Muscat	RASKI	No or late FL revision	E
110	LHD002304	19/11/2023	Mumbai	Muscat	LOTAV	No or late FL revision	E
111	LHD002305	20/11/2023	Mumbai	Muscat	PARAR	No or late FL revision	E
112	LHD002306	23/11/2023	Mumbai	Muscat	RASKI	No or late FL revision	E
113	LHD002307	23/11/2023	Mumbai	Muscat	RASKI	No or late FL revision	E
114	LHD002308	24/11/2023	Mumbai	Muscat	PARAR	No or late FL revision	E
115	LHD002309	26/11/2023	Mumbai	Muscat	PARAR	No or late FL revision	E
116	LHD002310	26/11/2023	Mumbai	Muscat	TOTOX	No or late FL revision	E

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117	LHD002311	28/11/2023	Mumbai	Muscat	RASKI	No or late FL revision	E
118	LHD002353	03/12/2023	Mumbai	Muscat	REXOD	No or late FL revision	E
119	LHD002354	05/12/2023	Mumbai	Muscat	RASKI	No or late FL revision	E
120	LHD002355	07/12/2023	Mumbai	Muscat	TOTOX	No or late FL revision	E
121	LHD002356	07/12/2023	Mumbai	Muscat	LOTAV	No or late FL revision	E
122	LHD002359	10/12/2023	Mumbai	Muscat	PARAR	No or late FL revision	E
123	LHD002360	11/12/2023	Mumbai	Muscat	TOTOX	No or late FL revision	E
124	LHD002361	11/12/2023	Mumbai	Muscat	TOTOX	No or late FL revision	E
125	LHD002362	11/12/2023	Mumbai	Muscat	REXOD	No transfer information	E
126	LHD002363	11/12/2023	Mumbai	Muscat	REXOD	No transfer information	E
127	LHD002364	12/12/2023	Mumbai	Muscat	REXOD	No or late FL revision	E
128	LHD002365	15/12/2023	Mumbai	Muscat	RASKI	No or late FL revision	E
129	LHD002366	15/12/2023	Mumbai	Muscat	RASKI	No or late FL revision	E
130	LHD002367	16/12/2023	Mumbai	Muscat	TOTOX	No or late FL revision	E
131	LHD002368	18/12/2023	Mumbai	Muscat	RASKI	No or late FL revision	E
132	LHD002369	19/12/2023	Mumbai	Muscat	PARAR	No or late FL revision	E
133	LHD002370	19/12/2023	Mumbai	Muscat	LOTAV	No or late FL revision	E
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135	LHD002372	23/12/2023	Mumbai	Muscat	RASKI	No or late FL revision	E
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137	LHD002374	24/12/2023	Mumbai	Muscat	RASKI	No or late FL revision	E
138	LHD002375	25/12/2023	Mumbai	Muscat	ASPUX	No or late FL revision	E
139	LHD002376	28/12/2023	Mumbai	Muscat	LOTAV	No or late FL revision	E
140	LHD002377	30/12/2023	Mumbai	Muscat	RASKI	No or late FL revision	E
141	LHD002378	30/12/2023	Mumbai	Muscat	RASKI	No or late FL revision	E
142	LHD002379	31/12/2023	Mumbai	Muscat	RASKI	No or late FL revision	E

Attachment B

NON-RVSM approved aircraft – Responsibility of MIDRMA Member States

#	Observed RVSM in	Operating	ACFT Reg.	ICAO Type	First Observed on	Responsible State
1	Jeddah		STALL	CRJ1	11-06-2022	SUDAN
2	EURRMA		5ALEX	BE200	09-07-2022	LIBYA

NON-RVSM approved aircraft – Responsibility of other RMAs

#	ACFT Reg.	ICAO Type	First Observed on	Responsible RMA
1	PKSJH	A320	06-11-2022	AAMA
2	PKLSW	B739	08-03-2023	AAMA
3	PKBGZ	B738	13-12-2022	AAMA
4	PKSTD	A320	19-01-2023	AAMA
5	PKLVF	B739	20-01-2023	AAMA
6	PKLSV	B739	21-12-2022	AAMA
7	40001A	C17	25-01-2020	AAMA
8	PKLSU	B739	27-11-2022	AAMA
9	PKSTH	A320	27-11-2022	AAMA
10	60208A	C17	30-03-2020	AAMA
11	PKBKM	A320	30-11-2022	AAMA
12	ZSCQP	CRJ9	07-07-2020	AFIRMA
13	ETATF	B350	08-07-2020	AFIRMA
14	5YWBH	C56X	14-07-2020	AFIRMA
15	5YFAN	CRJ2	15-07-2020	AFIRMA
16	5NBOD	GLF4	28-01-2022	AFIRMA
17	CCBGV	B789	08-06-2022	CARSAM
18	FAB2857	KC39	22-05-2022	CARSAM
19	21140	IL76	19-06-2022	CHINARMA
20	URAZN	B753	01-02-2022	EURRMA
21	URAZO	B753	01-02-2022	EURRMA
22	URSQO	B738	02-12-2021	EURRMA
23	URAZR	B77W	03-02-2022	EURRMA
24	EW550TH	IL76	04-12-2021	EURRMA
25	URFSC	IL76	05-12-2021	EURRMA
26	URFSA	IL76	09-05-2021	EURRMA
27	URFSE	IL76	11-12-2022	EURRMA
28	ICJSN	C25C	15-05-2023	EURRMA
29	UR11316	AN12	22-07-2020	EURRMA
30	URFSD	IL76	24-12-2021	EURRMA

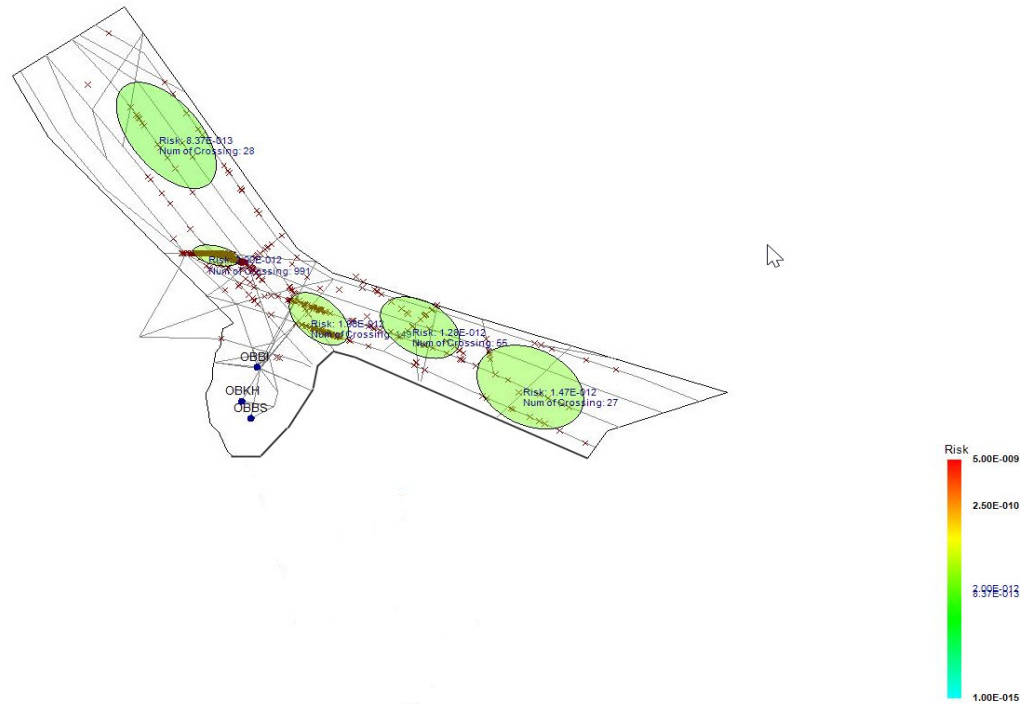
5I-27

31	KJ3452	IL76	03-08-2020	MAAR
32	IN307	IL38	03-12-2020	MAAR
33	KJ3454	IL76	16-03-2020	MAAR
34	K3604	E35L	17-07-2020	MAAR
35	80002A	C17	23-07-2020	MAAR
36	CB8004	C17	24-07-2020	MAAR
37	CB8001	C17	29-07-2020	MAAR
38	N411VP	EA50	01-05-2022	NAARMO
39	N267LG	GLF4	02-01-2023	NAARMO
40	N981DB	H25B	05-04-2022	NAARMO
41	N980BA	GLEX	05-11-2022	NAARMO
42	N44UA	CL60	07-06-2020	NAARMO
43	N685MF	GLF4	08-12-2021	NAARMO
44	N800AJ	CL60	10-02-2023	NAARMO
45	N605AS	PC12	11-04-2022	NAARMO
46	N866G	GALX	14-02-2022	NAARMO
47	N298RB	GLF4	14-05-2021	NAARMO
48	N28JV	PRM1	15-05-2023	NAARMO
49	N1112B	B350	16-07-2020	NAARMO
50	XAASP	CL60	17-11-2022	NAARMO
51	N920SA	F2TH	18-02-2021	NAARMO
52	N651CV	C650	21-11-2022	NAARMO
53	N145DB	E35L	22-01-2022	NAARMO
54	N46HB	F9000	22-08-2022	NAARMO
55	N320MK	GLF3	24-09-2022	NAARMO
56	N890DA	GLF5	25-02-2023	NAARMO
57	N604DT	CL60	26-02-2022	NAARMO
58	XAAYL	GLEX	26-04-2023	NAARMO
59	N405LL	H25B	29-05-2022	NAARMO

5I-28

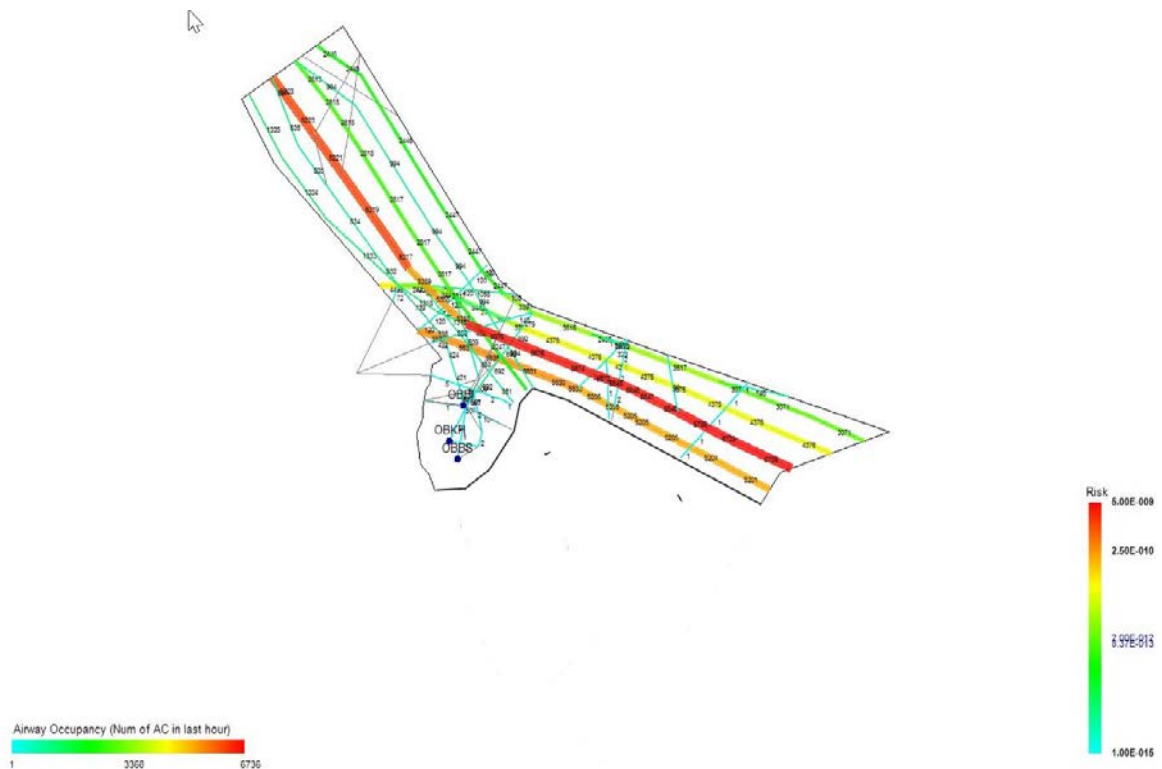
Attachment C

MID FIRs RVSM Airspace Hotspots & AWYs Occupancy



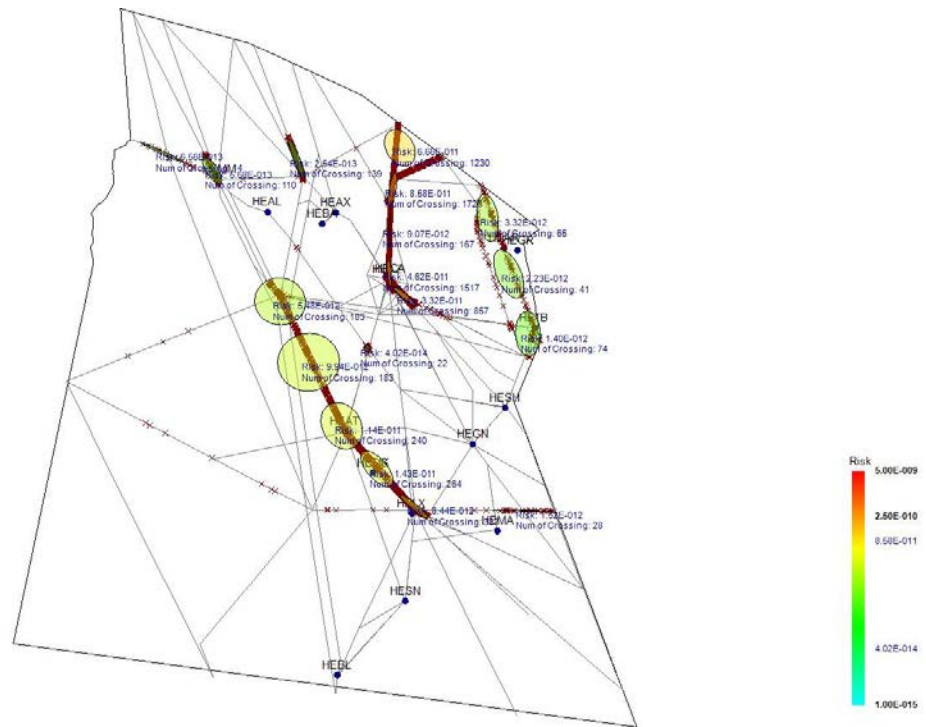
Bahrain FIR Hotspots – MID RVSM SMR 2023

Note: Bahrain's southern FIR boundaries drawn by MIDRMA in approximate locations

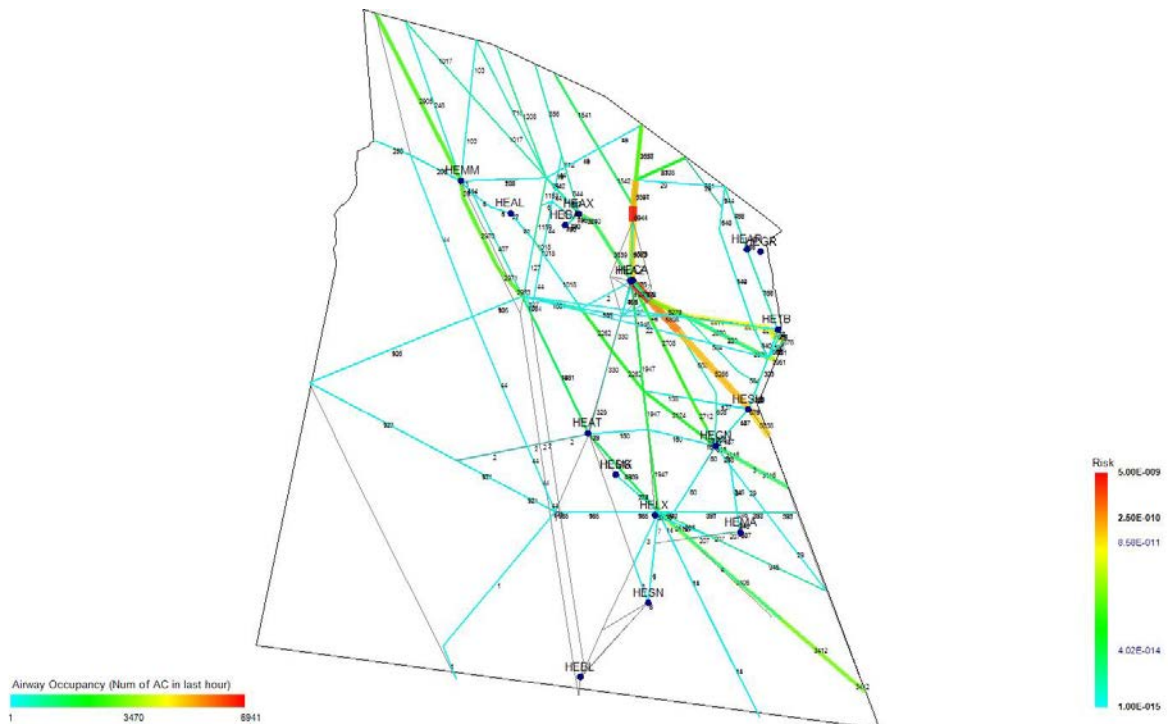


Bahrain FIR AWYs Occupancy – MID RVSM SMR 2023

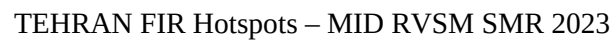
5I-29



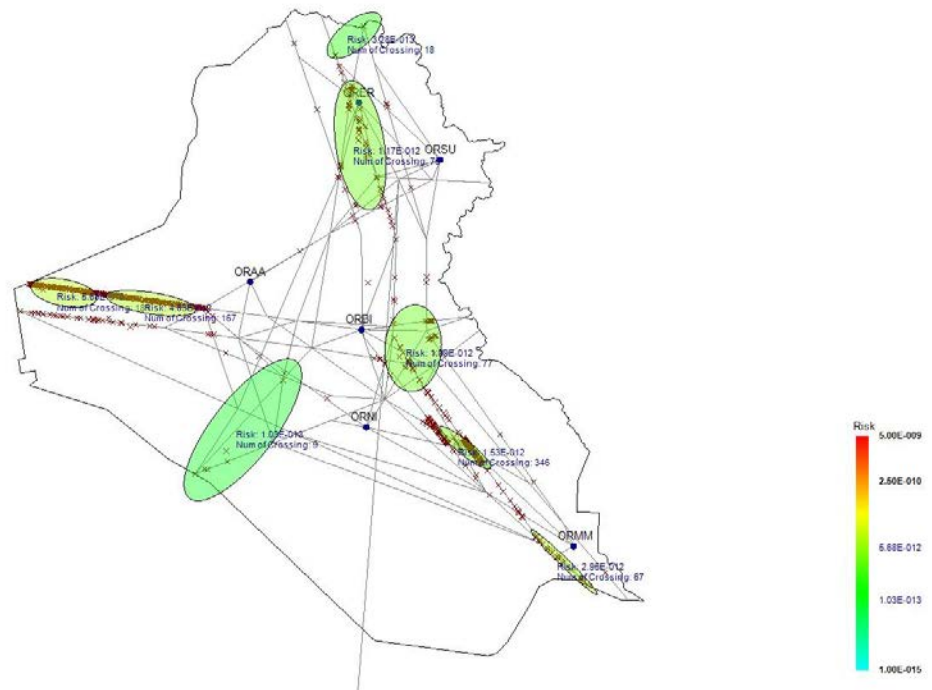
CAIRO FIR Hotspots – MID RVSM SMR 2023



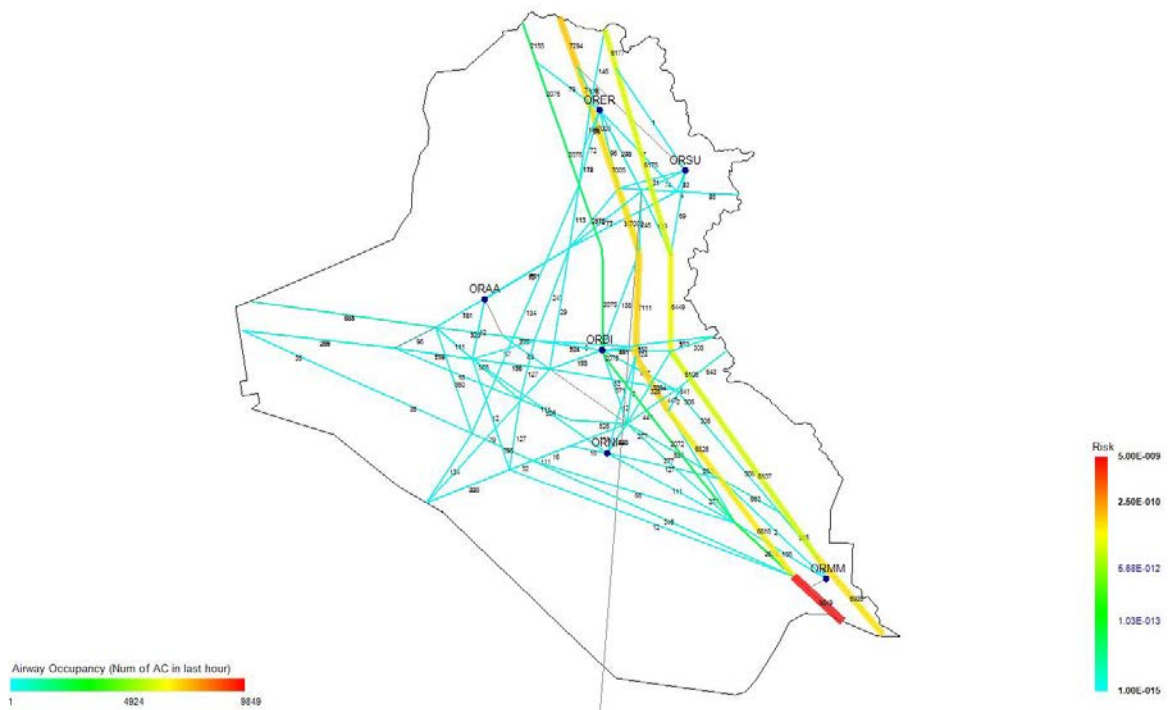
CAIRO FIR AWYs Occupancy – MID RVSM SMR 2023



5I-31

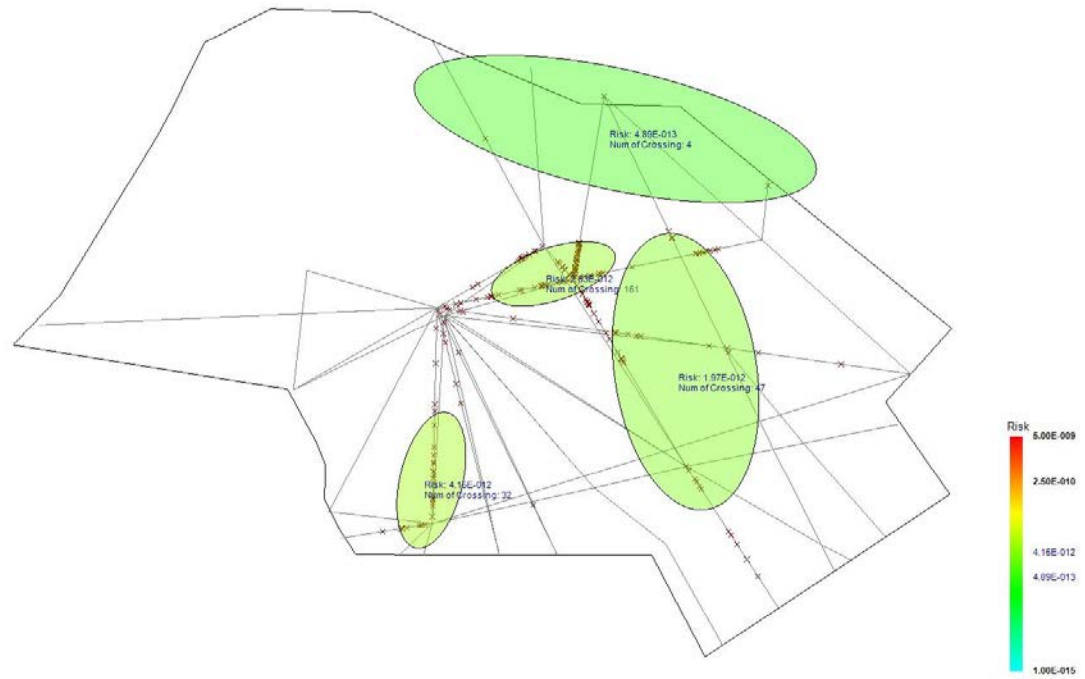


BAGHDAD FIR Hotspots – MID RVSM SMR 2023

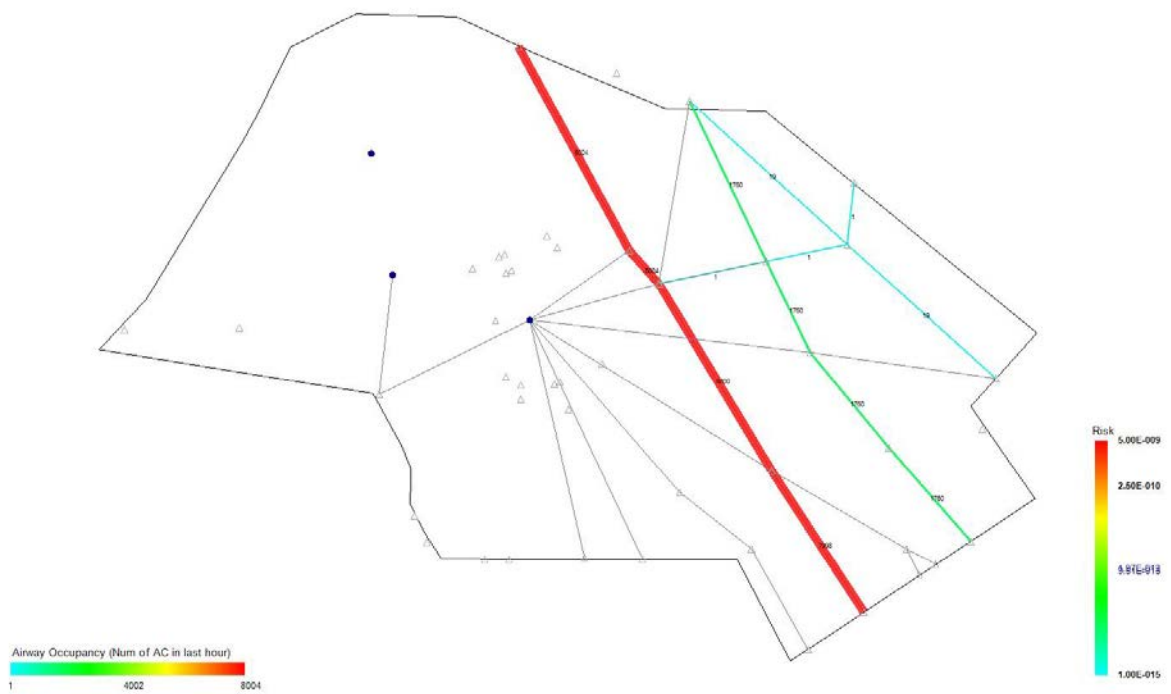


BAGHDAD FIR AWYs Occupancy – MID RVSM SMR 2023

5I-32

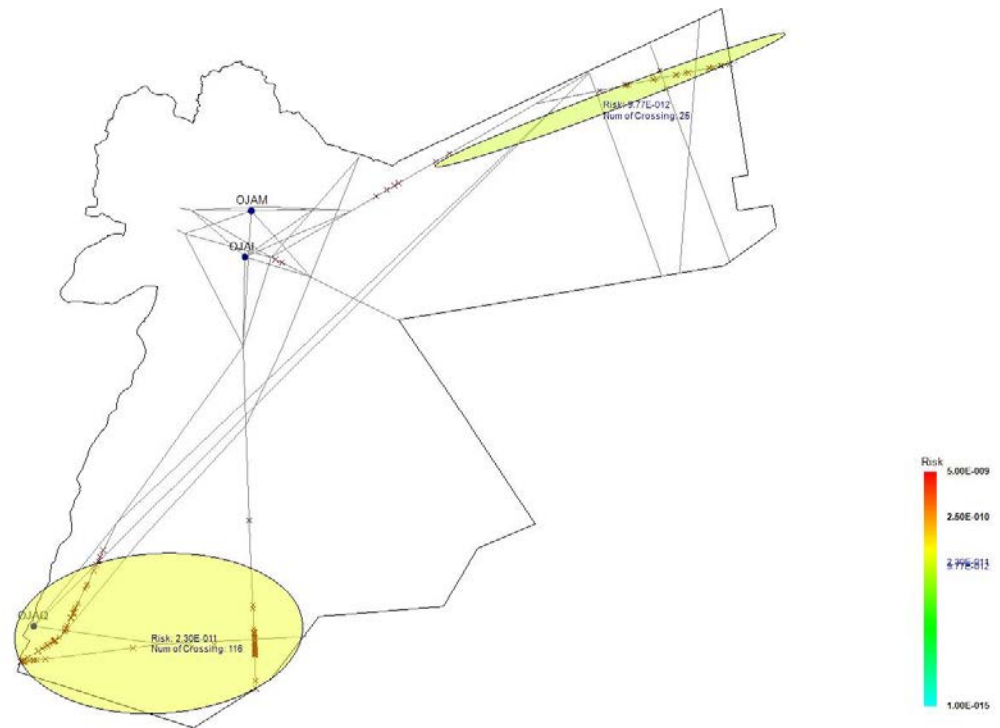


KUWAIT FIR Hotspots – MID RVSM SMR 2023

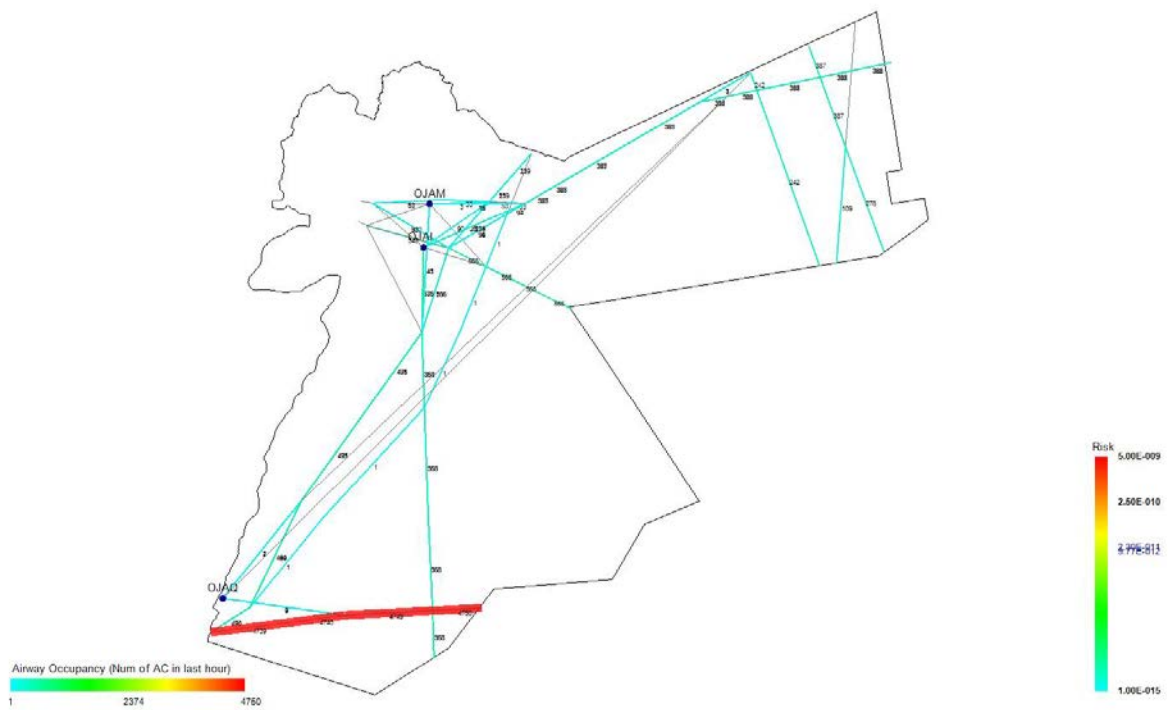


KUWAIT FIR AWYs Occupancy – MID RVSM SMR 2023

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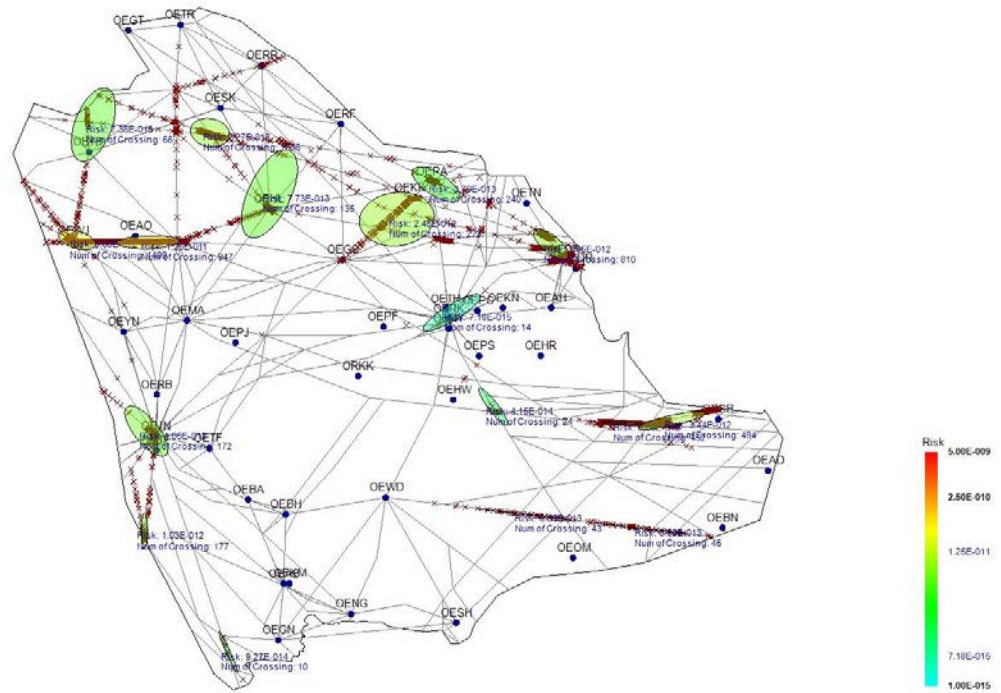


AMMAN FIR Hotspots – MID RVSM SMR 2023

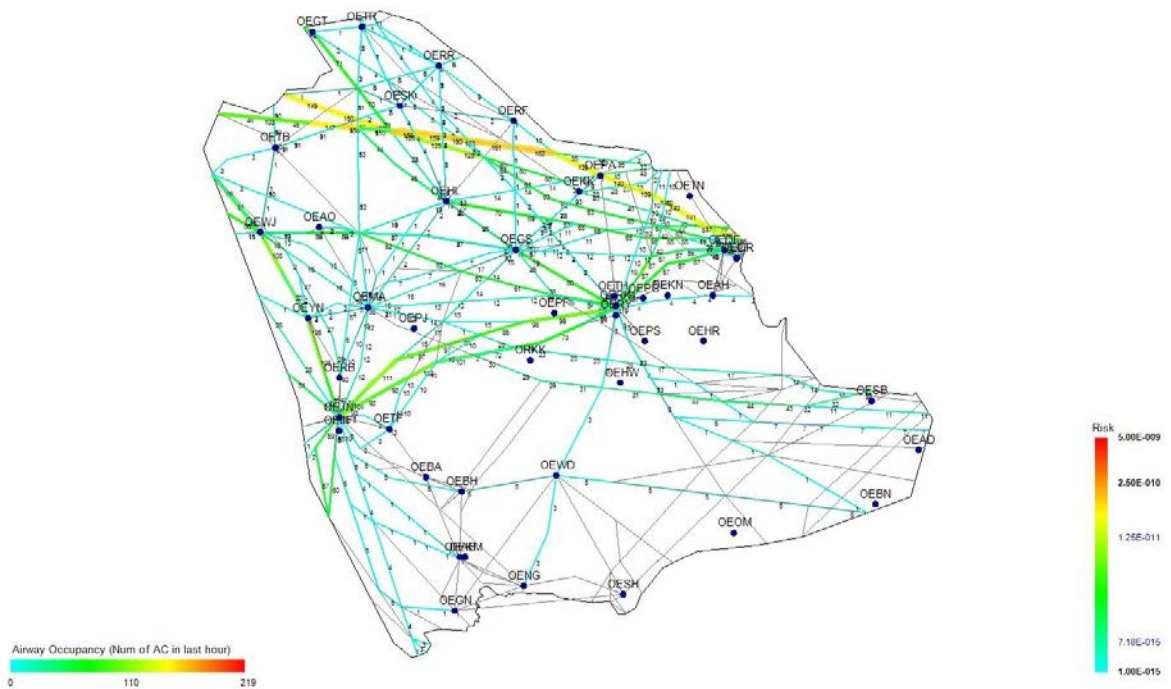


AMMAN FIR AWYs Occupancy – MID RVSM SMR 2023

5I-34

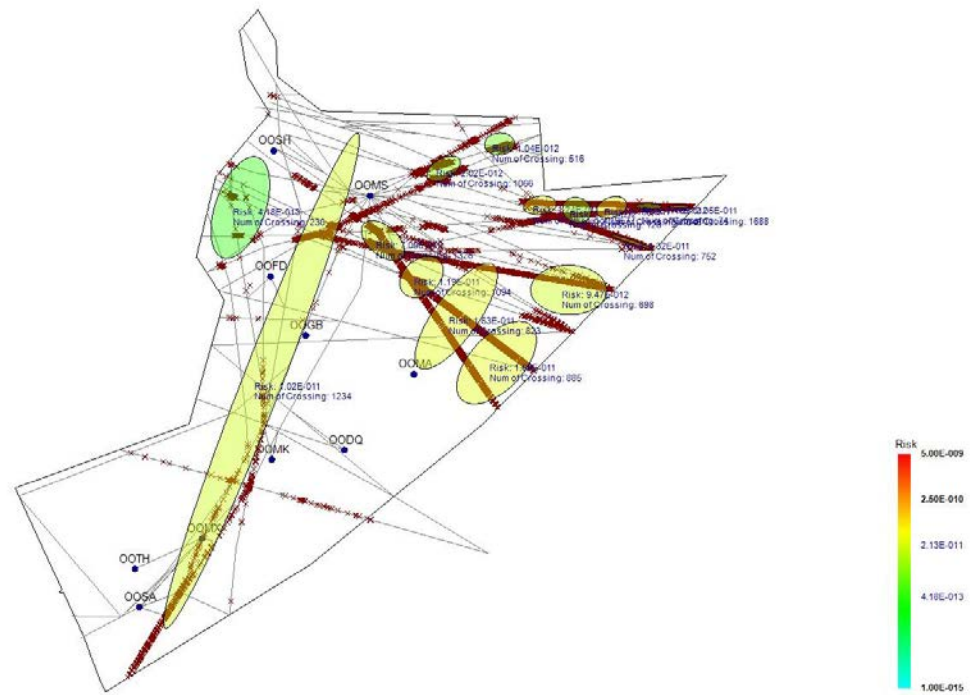


JEDDAH FIR Hotspots – MID RVSM SMR 2023

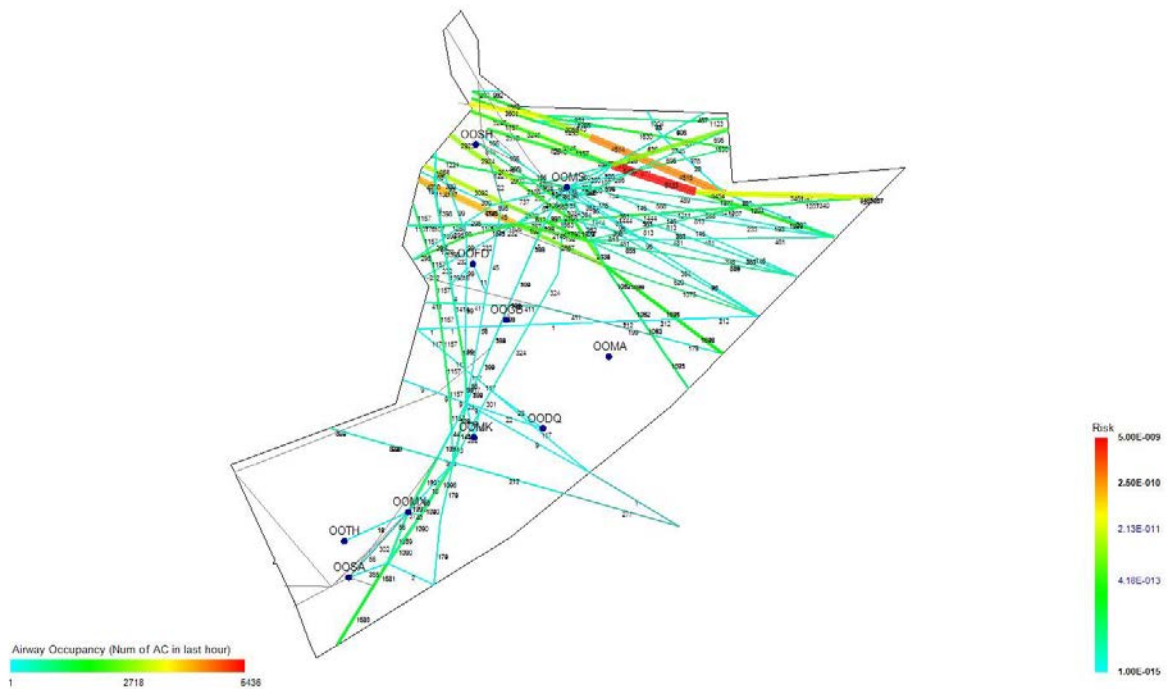


JEDDAH FIR AWYs Occupancy – MID RVSM SMR 2023

5I-35



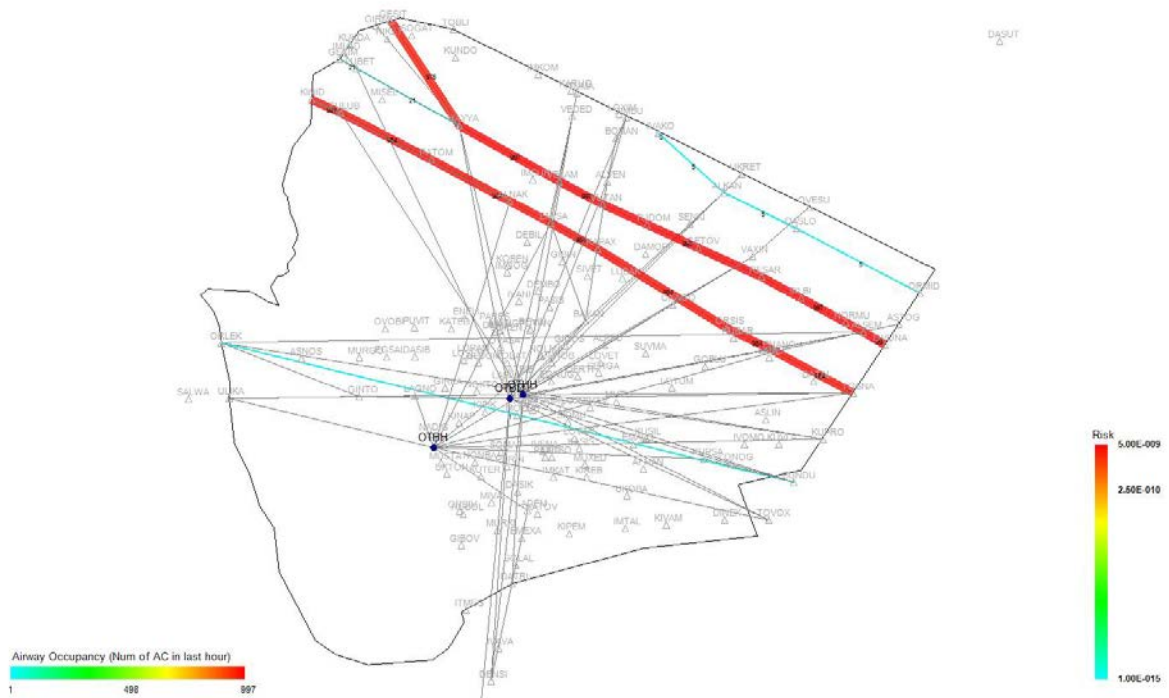
MUSCAT FIR Hotspots – MID RVSM SMR 2023



MUSCAT FIR AWYs Occupancy – MID RVSM SMR 2023

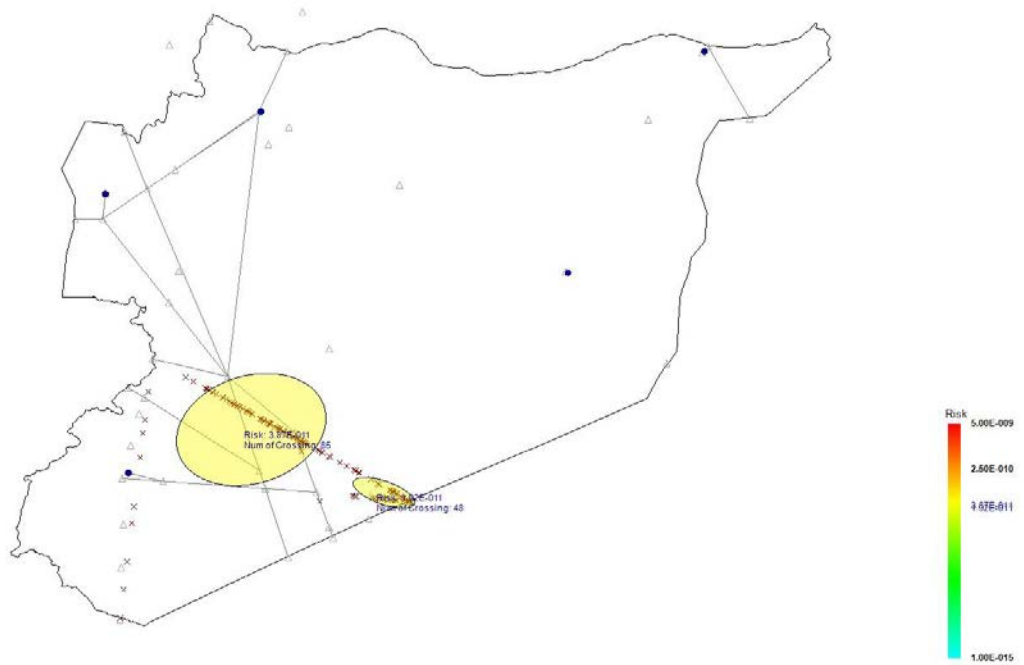
5I-36

No Observation of Hotspots within the RVSM Airspace of DOHA FIR

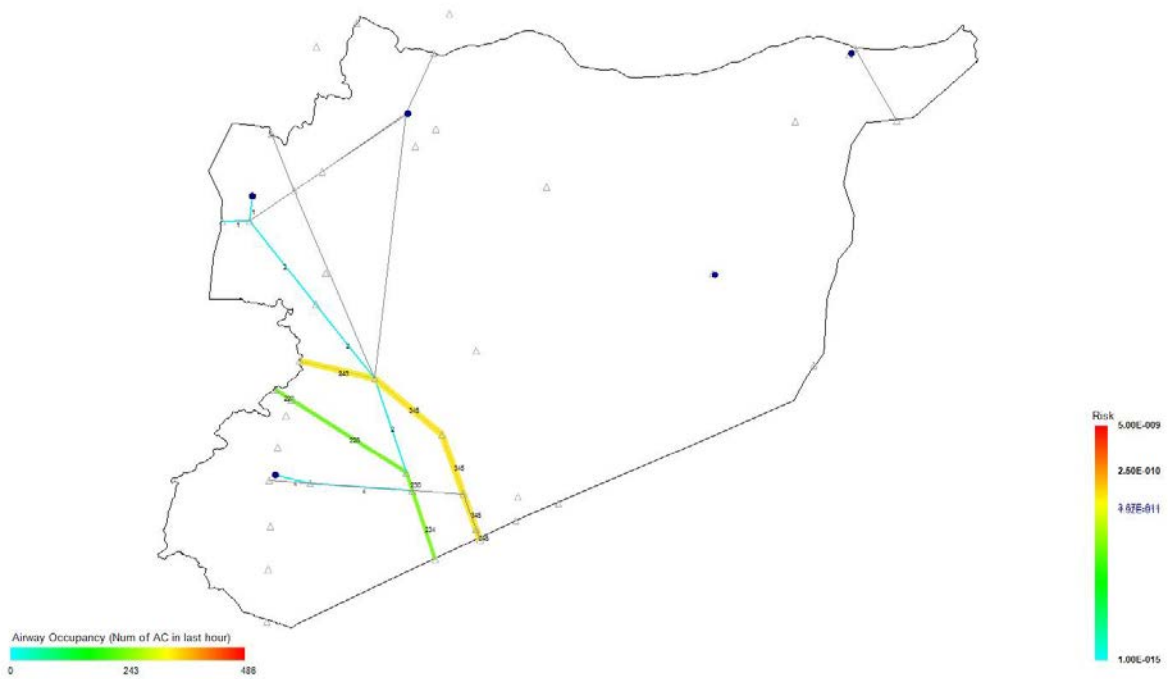


DOHA FIR RVSM Airspace AWYs Occupancy – MID RVSM SMR 2023

5I-37

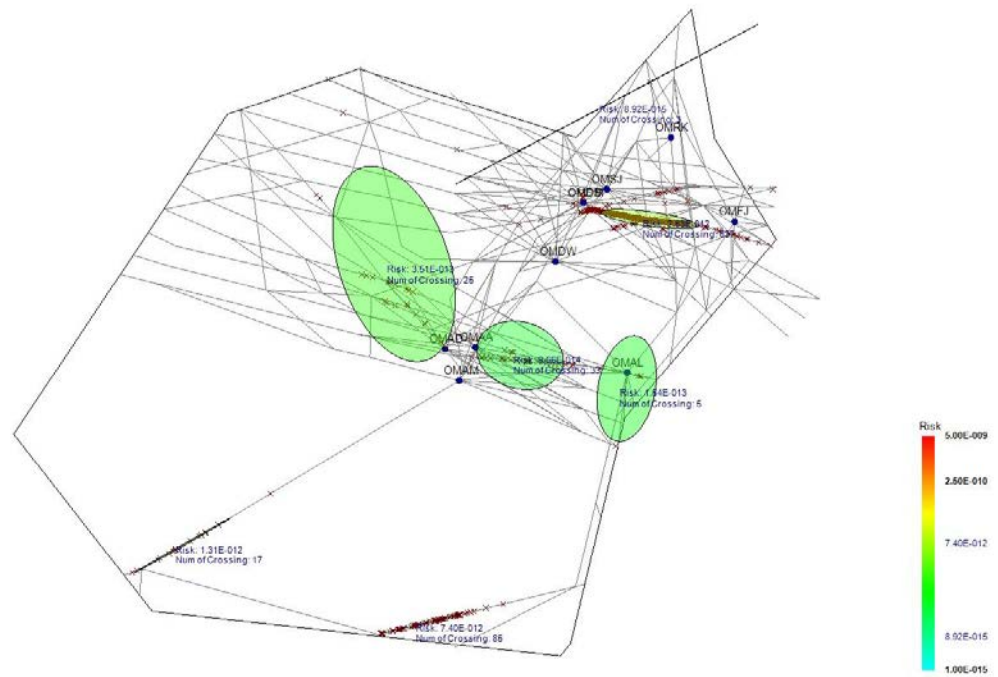


DAMASCUS FIR Hotspots – MID RVSM SMR 2023

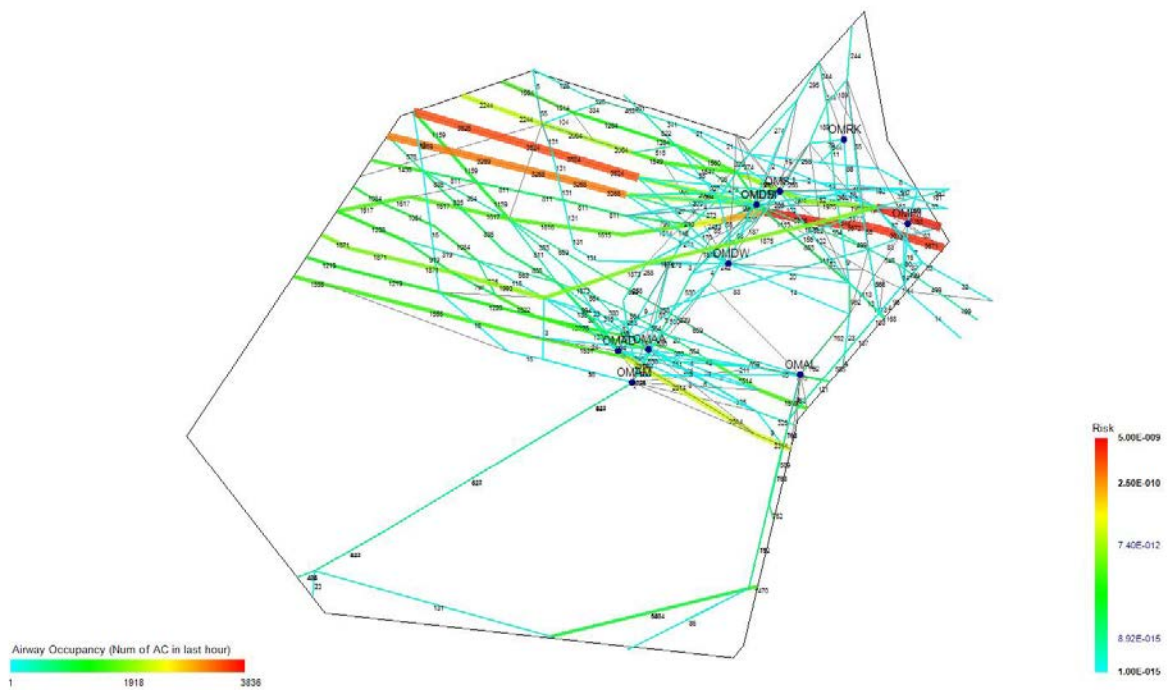


DAMASCUS FIR AWYs Occupancy – MID RVSM SMR 2023

5I-38

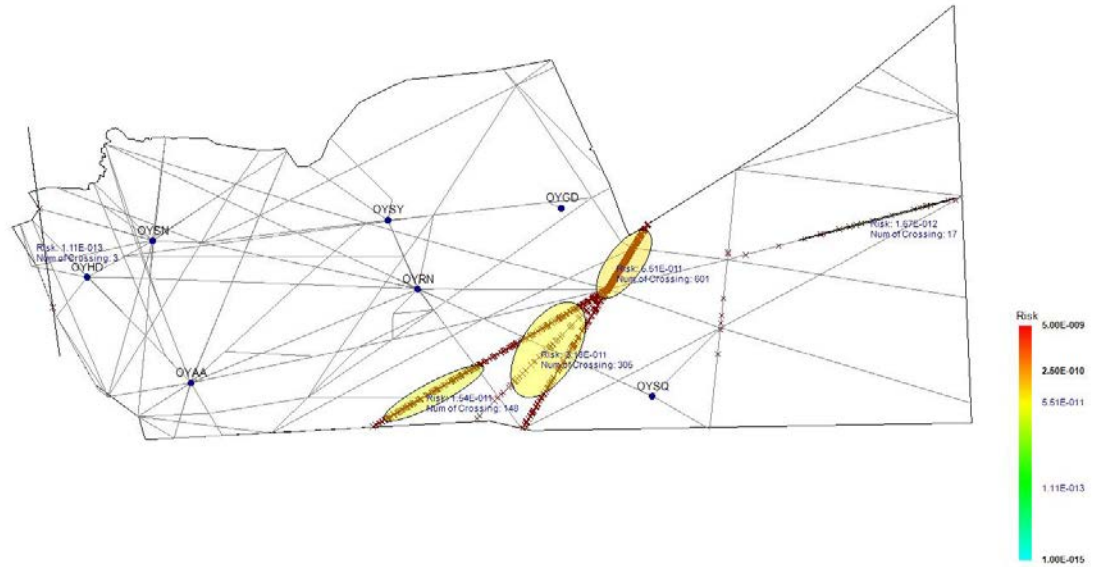


EMIRATES FIR Hotspots – MID RVSM SMR 2023

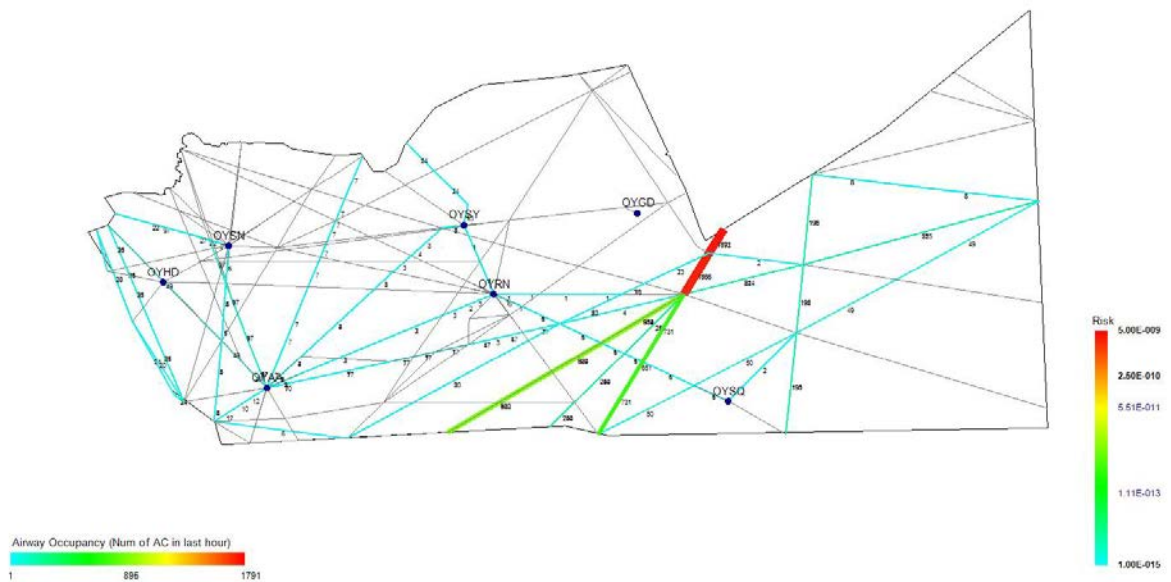


EMIRATES FIR AWYs Occupancy – MID RVSM SMR 2023

5I-39



SANA'A FIR Hotspots – MID RVSM SMR 2023



SANA'A FIR AWYs Occupancy – MID RVSM SMR 2023

5I-40

Attachment D

MIDRMA Member States ICAO RVSM Minimum Monitoring Requirements (MMR)

Valid as for 12th February 2024

MID STATES	RVSM APPROVED A/C	HAVE RESULTS OR COVERED	NOT COVERED	NOT COVERED IN %	A/C MMR
Bahrain	69	68	1	1%	1
Egypt	159	152	7	4%	5
Iran	168	93	75	45%	49
Iraq	59	58	1	2%	1
Jordan	44	41	3	7%	3
KSA	324	313	11	3%	5
Kuwait	73	69	4	5%	3
Lebanon	31	31	0	0%	0
Libya	49	30	19	39%	17
Oman	79	79	0	0%	0
Qatar	295	295	0	0%	0
Sudan	16	5	11	69%	8
Syria	15	13	2	13%	1
UAE	591	556	35	6%	17
Yemen	6	5	1	17%	1
TOTAL	1978	1808	170	9%	111

MID Doc 003

INTERNATIONAL CIVIL AVIATION ORGANIZATION



MID REGION ATM CONTINGENCY PLAN

Version 5.0 (~~Draft~~) ~~November 2023~~ March 2024

This concept was developed by the ICAO MID ATM SG.

Approved by MIDANPIRG/21 and published by the
ICAO MID Office, Cairo

RECORD OF AMENDMENTS

The MID Region ATM contingency plan should be reviewed and updated by the ATM Sub-Group and presented to MIDANPIRG for endorsement.

The table below provides a means to record all amendments. An up-to-date electronic version of the Plan will be available on the ICAO MID Regional Office website.

Edition Date	Description	Pages Affected
15 July 2014	First edition	• Focal Points • Status of Contingency Agreements
26 November 2014	Second edition	• Focal Points • Introduction • Chapter 2 (CCT)
11 June 2015	Third edition	• Chapter 2 (CCT) • Chapter 2 Notification Procedure
20 April 2016	Fourth edition	• Focal Points • Editorials
XX-8 March 2024	Fifth edition	All pages

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1. GLOSSARY

1.1 Abbreviations and Acronyms

ACC	Area Control Centre
AGA	Aerodromes and Ground Aids
AIC	Aeronautical Information Circular
AIG	Accident investigation and prevention
AIM	Aeronautical Information Management
AIP	Aeronautical Information Publication
AIS	Aeronautical Information Service
AHRS	Attitude and Heading Reference System
ANP	Air Navigation Plan
ANSP	Air Navigation Service Provider
AOCG	ATM Operational Contingency Group
AOR	Area of Responsibility
ASM	Airspace Management
ATC	Air Traffic Control
ATFM	Air Traffic Flow Management
AU	Airspace User
AUP	Airspace Use Plan
BPE	Basic Plan Element
CCC	Central Coordinating Committee
CCT	Contingency Coordination Team
CDR	Conditional Route
CNS	Communication, Navigation and Surveillance
DME	Distance Measuring Equipment
EGPWS	Enhanced Ground Proximity Warning System
FIC	Flight Information Center
FIR	Flight Information Region
FLAS	Flight Level Allocation Scheme
GNSS	Global Navigation Satellite System
IATA	International Air Transport Association
ICARD	ICAO Codes and Routes Database
IRU	Inertial Reference Unit
LOA	Letter of Agreement
MET	Meteorological service
MIDANPIRG	MID Air Navigation Planning and Implementation Regional Group
MIDRMA	Middle east Regional Monitoring Agency
MoU	Memorandum of Understanding
NOTAM	Notice to Airmen
PBN	Performance-based Navigation
PFD	Primary Flight Display
RNAV	Area Navigation
RVSM	Reduced Vertical Separation Minimum
SAR	Search and Rescue
SMS	Safety Management System
SSP	State Safety Programme
SUP	Supplement
TAWS	Terrain Awareness Warning System
TDS	Traffic Data Sample

ToR
TOS

Terms of Reference
Traffic Orientation Scheme

1.2 Terminology and Definition

Air traffic flow management (ATFM). A service established with the objective of contributing to a safe, orderly and expeditious flow of air traffic by ensuring that ATC capacity is utilized to the maximum extent possible and that the traffic volume is compatible with the capacities declared by the appropriate ATS authority.

Air traffic management (ATM). The dynamic, integrated management of air traffic and airspace (including air traffic services, airspace management and air traffic flow management) — safely, economically and efficiently — through the provision of facilities and seamless services in collaboration with all parties and involving airborne and ground-based functions.

Air traffic management system. A system that provides ATM through the collaborative integration of humans, information, technology, facilities, and services, supported by air and ground- and/or space-based communications, navigation and surveillance.

Conditional route (CDR). A non-permanent ATS route or portion thereof which can be planned and used under specified conditions.

A Conditional Route may have more than one category, and those categories may change at specified times:

- a) *Category One - Permanently Plannable CDR:* CDR1 routes are in general available for flight planning during times published in the relevant national Aeronautical Information Publication (AIP). Updated information on the availability in accordance with conditions published daily AUP notification.
- b) *Category Two - Not Plannable CDR:* CDR2 routes are not available for flight planning; however, ATC Units may issue tactical clearances on such route segments.

Note: some regional contingency routes published in MID Air Navigation Plan (Doc 9708) under note 5 (Conditional Route).

Global navigation satellite system (GNSS). A worldwide position and time determination system that includes one or more satellite constellations, aircraft receivers and system integrity monitoring, augmented as necessary to support the required navigation performance for the intended operation.

Performance-based navigation (PBN). Area navigation based on performance requirements for aircraft operating along an ATS route, on an instrument approach procedure or in a designated airspace.

Regional ATS route. An ATS route shall be considered as the MID regional ATS route network provided that:

- a) Cross-bordered (at least initiate/terminate from FIR boundary);
- b) Route designator shall be assigned in accordance with Annex 11, Appendix 1 and the ICARD requirement; and
- c) Published in ICAO ANP- Middle East Region (Doc 9708), Volume II, Table ATM II-MID-1 MID Region ATS Route Network.

CHAPTER 1

INTRODUCTION

Purpose

1.1 The various circumstances surrounding each contingency situation preclude the establishment of exact detailed procedures to be followed. The purpose of this plan is to assist in providing for the safe and orderly flow of international air traffic in the event of disruptions of air traffic services and related supporting services and in preserving the availability of major world air routes within the air transportation system in such circumstances.

1.2 The MID Region Air Traffic Management Contingency Plan is primarily for the information to operators and pilots planning and conducting operations in MID Region. This plan also intended to provide guidance to deal with a range of contingency situations and promote a regional harmonized response to contingencies that affect or may affect continuous provision of ATS in the MID Region and provide guidelines for the development of States national contingency plan in line with ICAO provision in Annex 11 paragraph 2.32.

Note 1: Guidance material relating to the development, promulgation and implementation of contingency plans is contained in Annex 11, Attachment C.

Note 2: additional ATM contingency planning principles and template is contained in this document **Appendix A** and **Appendix B** respectively.

1.3 Contingency plans are intended to provide alternative facilities and services to those provided in the regional air navigation plan when those facilities and services are temporarily not available.

1.4 Also contingency plans should be designed to provide alternative routes, using existing airways in most cases, which will allow aircraft operators to fly through or avoid airspace within their jurisdiction taking into consideration the nature of the MID Region airspace and the need to keep operators and other stakeholders informed. The Plan urges the MID states to publish individual contingency plans and contingency routes at their states level to meet the requirement of the operation at regional level to allow aircraft operators to fly through their airspace.

Note 1: this plan is developed to provide **alternative** routes for each regional main flows based on MID ANP, Volume II, Part I, table Gen II-1 (Homogeneous ATM areas and/or major traffic flows identified in the MID region) as well as **Appendix C** on this document, which will allow aircraft operators to circumnavigate airspace in the MID Region, as deemed necessary, due to a perceived risk to the safety of flight with a minimum of disruption to flight operations.

Note 2: based on States ~~Traffic Data Sample (TDS)~~ reports and routing options to MIDRMA, MID Office is responsible to update the main regional routing options at **Appendix C** accordingly.

Note 3: to achieve the requirement in note 1, ICAO MID office based on ANP Volume II, Table I, ATS routes table, periodically should provide MID region ATS route network gap analysis report to ATM SG and RDWG meetings to take the required decisions and actions for further enhancement.

Contingency level and category

1.5 The plan describes a hierarchy of contingency levels and categories of contingency events as follows:

a) Hierarchy of contingency plans:

- i. **Level 1**, for internal State plans dealing with domestic coordination actions for the ANSPs;
- ii. **Level 2**, for coordinated (inter-State) contingency plans involving two or more States; and
- iii. **Level 3**, to detail contingency arrangements in the event of partial or total disruption of ATS designed to provide alternative routes, using existing airways in most cases, which will allow aircraft operators to fly through or avoid airspace within the relevant Flight Information Regions (FIRs).

b) Categories of contingencies:

- i. **Category A – Safe Airspace, but Restricted or ~~with~~ No ATS**, due to causal events such as pandemic, earthquake affecting the provision of ATS, or ATM system failure or degradation;
- ii. **Category B – Not Safe Airspace**, due to causal events such as volcanic ash cloud or military activity; and
- iii. **Category C – Airspace Not Available**, due to causal events such as national security – normally a political decision.

***Note:** any instance of “Airspace Not Available” in this document refers only to a State’s sovereign airspace and is not applicable to “High Seas airspace”.*

Objectives

1.6 The objectives of the Plan are:

- a) to ensure timely, harmonized and appropriate responses to all events that may cause disruption to the provision of ATS;
- b) to provide a contingency response framework for MID States to ensure continuation of aircraft operations in affected FIR(s); and
- c) to provide a greater degree of certainty for airspace and aerodrome users during contingency operations.

1.7 In order to meet these objectives, the Plan:

- a) provides uniform policy and guidance for responding to reasonably foreseeable operational restrictions, including short, medium and long term actions, prevention of overload of the ATSUs affected by contingency measures and guidance for implementation and resumption;

- b) provides a framework for the review of the status of ATS contingency plans and preparedness of MID Region States;
- c) enables to identify and reinforce areas where ATS contingency planning requires improvement;
- d) provides principles for ATS contingency planning;
- e) provides contingency planning templates for States; and
- f) defines the ToR for the MID Contingency Coordination Team (CCT).

CHAPTER 2

MID STATES' CONTINGENCY PLAN REQUIREMENTS

States requirements

2.1 As indicated in Annex 11, Chapter 2, Para 2.32 as well as material related to contingency planning in Annex 11, Attachment C, States Air traffic services authorities shall develop and promulgate contingency plans for implementation in the event of disruption, or potential disruption, of air traffic services and related supporting services in the airspace for which they are responsible for the provision of such services. Such contingency plans shall be developed with the assistance of ICAO MID as necessary, in close coordination with the air traffic services authorities responsible for the provision of services in adjacent portions of airspace and with airspace users concerned. The States contingency plans should be supported by contingency agreements with adjacent ACCs as well as regional arrangements.

2.2 The responsibility for appropriate contingency action in respect of airspace over the high seas continues to rest with the State(s) normally responsible for providing the services until, and unless, that responsibility is temporarily reassigned by ICAO to (an)other State(s).

2.3 Similarly, the responsibility for appropriate contingency action in respect of airspace where the responsibility for providing the services has been delegated by another State continues to rest with the State providing the services until, and unless, the delegating State terminates temporarily the delegation. Upon termination, the delegating State assumes responsibility for appropriate contingency action.

2.4 States are reminded of their obligations under Annex 11, to conduct a safety risk assessment and implement appropriate risk mitigation measures to achieve the best arrangements which will avoid hazards to civil aircraft. Operators are reminded of their obligations under Annex 6 — Operation of Aircraft, to conduct a safety risk assessment and take appropriate risk mitigation.

Note 1: *when conducting safety risk assessments in accordance with Annex 11, para 2.19, coordination should include information that is as specific as possible regarding the nature and extent of threats and their consequences for civil aviation. All parties involved need to ask, and answer, sufficient and correctly phrased questions to enable them to complete a thorough safety risk assessment. For example, the stated risk from an anti-aircraft weapon may be initially given in terms of the threat range as understood from the point of view of effective defence; the range at which the weapon could pose an accidental threat to civil aviation may be greater.*

Note 2: *States shall take into consideration the following ICAO provisions and requirements as well as their national regulations to conduct safety assessment:*

- Annex 6 (Operation of Aircraft);
- Annex 11 (Air Traffic Services);
- Doc 9554 (Manual Concerning Safety Measures Relating to Military Activities Potentially Hazardous to Civil Aircraft Operations);
- Doc 9859 (Safety Management Manual (SMM)).
- State Safety Programme (SSP)
- ANSPs Safety Management Manual (SMM)

2.5 Time is essential in contingency planning if hazards to air navigation are to be reasonably prevented. Timely introduction of contingency arrangements requires decisive initiative and action, which again presupposes

that contingency plans have, as far as practicable, been completed and agreed among the parties concerned before the occurrence of the event requiring contingency action, including the manner and timing of promulgating such arrangements. Based on that States should take preparatory action, as appropriate, for facilitating timely introduction of contingency arrangements. Such preparatory action should include:

- a) preparation of **general contingency plans** for introduction in respect of generally foreseeable events affecting the provision of air traffic services. States providing services in airspace over the high seas should take appropriate action to ensure that adequate air traffic services will continue to be provided to international civil aviation operations. Also States providing air traffic services in their own airspace or, by delegation, in the airspace of (an) other State(s) should take appropriate action to ensure that adequate air traffic services will continue to be provided to international civil aviation operations concerned, which do not involve landing or take-off in the State(s) affected by contingency situation;
- b) **assessment of risk** to civil air traffic due to military conflict or acts of unlawful interference with civil aviation as well as a review of the likelihood and possible consequences of natural disasters, totally/partially CNS failure/degradation including GNSS vulnerabilities and Cybersecurity attack or public health emergencies. Preparatory action should include initial development of special contingency plans in respect of the above circumstances that are likely to affect the availability of airspace for civil aircraft operations and/or the provision of air traffic services. It should be recognized that avoidance of particular portions of airspace on short notice will require special efforts by States responsible for adjacent portions of airspace and by international aircraft operators with regard to planning of alternative routings and services, and the air traffic services authorities of States should therefore, as far as practicable, endeavour to anticipate the need for such alternative actions;

Note 1: in order to develop the required contingency plan and respective safety assessment matrix in term of likelihood and severity for provision of air traffic services, States shall take into consideration the nature and frequency of contingency situations have been occurred in their ATS unit during last 5 years.

Note 2: to reduce impact of CNS equipment failure or degradation on air traffic operation and ATS, States shall ensure that the required equipment and backup in accordance with the requirements of ICAO Annex 10 (Aeronautical Telecommunications) and Doc 9613 (Performance-based Navigation (PBN) Manual), ICAO Doc 9849 (Global Navigation Satellite System (GNSS) Manual) and ICAO Cybersecurity Policy Guidance are in place and operational.

Note 3: States shall assess the contingency readiness of their operations and provide the information resulting from this assessment to the ICAO MID Regional Office and CCT meeting.

Note 4: processes should be implemented to ensure the outcomes of any testing, pre-activation or activation of a contingency plan or any contingency exercise are reviewed and analysed. accordingly, lessons learned shall be incorporated in contingency procedures and ATCOs training manual.

Note 5: the State shall be responsible for ensuring that its ATM contingency plan comply with the SSP requirements.

Note 6: States should include in their contingency plans provisions related to the spread of communicable diseases such as COVID-19, based on the ICAO guidance related to the Collaborative Arrangement for the Prevention and Management of Public Health Events in Civil Aviation (CAPSCA). In this respect, the success story related to Qatar Civil Aviation Authority (QCAA) is at **Attachment A**.

Note 7: the required guideline to deal with GNSS vulnerabilities and Cybersecurity attack are at **Appendix D** (RASG-MID SAFETY ADVISORY – 14 (RSA-14) April 2019) and **Appendix E** (Cybersecurity Policy Guidance) respectively.

- c) **monitoring** of any developments that might lead to events requiring contingency arrangements to be developed and applied. States should consider designating persons/administrative units to undertake such monitoring and, when necessary, to initiate effective follow-up action;
- d) **designation/establishment of a central agency and focal point** which, in the event of disruption of air traffic services and introduction of contingency arrangements, would be able to provide, 24 hours a day, up-to-date information on the situation and associated contingency measures until the system has returned to normal. A coordinating team should be designated within, or in association with, such a central agency for the purpose of coordinating activities during the disruption;
- e) **proactively nominate State focal point(s) to ICAO MID** who will be responsible and accountable for informing ICAO MID in case of a contingency raised at that FIR, actively participate in the regional CCT meeting and update the meeting regarding progress of contingency and committed to carry out required follow up on decisions taken in CCT meetings with national and regional stakeholders;
- f) State should **periodically review its national contingency plan** and coordinate any amendments with neighbouring States and ICAO MID Office; and
- g) States are required to carry out **recurrent training** such as provision of procedural control services annually for ATCOs, in order to maintain their competency to deal with variety of contingency situation like ATS surveillance failure.

Note: MIDANPIRG 19 meeting encouraged the MID States and ANSPs to maximize the use of realistic simulation to mitigate ATCOs skill fadeout.

2.6 During the contingency operations, States concerned should take necessary measures to grant special over flight permissions to those flights avoiding the affected airspace.

State contingency plan and structure

2.7 The various circumstances surrounding each contingency situation preclude the establishment of exact detailed procedures to be followed. The outlines here in and in **Appendices A & B** are intended as a general guide to MID states to develop their own national contingency plan.

Basic Plan Elements

2.8 The plan includes ~~Basic Plan Elements (BPEs)~~, which define the minimum recommended considerations for inclusion in Levels 1, 2 and 3 Contingency Plans. The BPEs should include procedures and equipment related to administration, ASM, ATM, Pilot/Operator, CNS, aeronautical support services (AIS, NOTAM and MET), as well as related contact details. **Appendix F** of this document lists the required BPE.

Contingency Plan Coordination and Operations meetings

2.9 Each State should establish an ATM contingency Central Coordinating Committee (CCC) meeting for the development, maintenance, activation and conduct of contingency plans (level 1, 2 & 3), and for the forming and convening of an ATM Operational Contingency Group(s) (AOCG) meeting.

2.9 **Note:** States may set up an appropriate Committee and a Group with different names.

2.10 Representatives from all relevant authorities including regulatory, military, meteorological as well as representatives of AUs, ANSP, airports should be part of CCC meeting.

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Note: as a result of the contingency, an aircraft that is flying over contingency airspace may “deviate significantly from its intended track” or “reports that it has been lost” or “has been observed or reported to be operating in a given area but whose identity has not been established”. In this respect, adjacent FIRs should take into consideration that “strayed” and “unidentified aircraft” may be reported at their respective FIRs. To handle this circumstance in the most safe and efficient manner, States are required to develop coordination procedure with relevant military authority and follow procedure in ICAO Doc 4444, paragraph 15.5.1.

2.11 The AOCG meeting should be convened by the CCC with a primary responsibility to oversee the day-to-day operations under the contingency arrangements, and coordinate operational ATS activities, 24 hours a day, throughout the contingency period. The ToRs of the AOCG will be determined by the CCC. The AOCG meeting should include any necessary specialist input from ATM (ATS, ASM, ATFM), CNS, MET, AIM, AGA SAR and SMS.

2.12 The ToR of the AOCG should be developed for contingency plans (level 1, 2 & 3) not only cover, but also be extended to:

- a) review and update of the Contingency Plan as required;
- b) organize contingency teams in each of the specialized areas listed under 2.11;
- c) keep in contact with and update all affected airspace and AUs and other relevant stakeholders;
- d) exchange up-to-date information with the adjacent ATS authorities concerning contingency activities;
- e) notify the designated organizations of the contingency situation in advance and/or as soon as possible thereafter;
- f) take necessary action for issuing NOTAMs in accordance with the contingency plan or as otherwise determined by CCT. Where the contingency situation is sufficiently foreseeable the relevant notification should be issued at least 48 hours in advance of the contingency events; and
- g) liaise with the ICAO MID Regional Office and CCT through accredited focal point.

Level 1 (Domestic) Plans

2.13 Level 1 contingency plans for Category A, B and C events, conforming with the principles and including the Basic Plan Elements of the Regional ATM Contingency Plan, should be developed and implemented for all ATS units.

2.14 Performance-based training and procedures for response to ATM contingency operations for all staff providing related ATS, including ATC, FIC, AIS, Aeronautical Telecommunication and CNS equipment maintenance staff should be developed and regular inter-unit coordinated exercises of all Level 1 contingency plans should be implemented.

Level 2 Contingency Arrangements

2.15 Level 2 contingency arrangements should be formalized for all cases where the pre- activation or activation of a Level 1 contingency plan would impact upon ATS within the [Area of Responsibility \(AoR\)](#) of a neighboring State.

2.16 These arrangements should include procedures for the tactical definition and promulgation by NOTAM of contingency ATS routes and levels, if required, to avoid airspace affected by Category B conditions with proper coordination with relevant adjacent FIR(s) and ICAO MID Office.

Level 3 Contingency Plans

2.17 Each State shall establish and publish its ATM Contingency Plan to comply with Annex 11 SARPs and regional agreements. All States providing ATS in the MID Region shall submit their Level 3 ATM contingency plan to the ICAO MID Regional Office, to then be published in ICAO MID and State websites repository for such purpose. A template for Level 3 contingency plans is provided in **Appendix B**.

Note: notification, by NOTAM, of anticipated or actual disruption of air traffic services and/or related supporting services should be dispatched to users of air navigation services as early as practicable. The NOTAM should include the associated contingency arrangements. In the case of foreseeable disruption, the advance notice should in any case not be less than 48 hours.

States Focal Points

2.18 The List of the MID States ATM contingency focal points is at **Appendix G**. In case of changes in their focal point or contact details, the States shall be responsible for notifying ICAO MID through the official channel. Also, this list should be reviewed and updated, as appropriate at least once a year through ATM SG meetings.

States contingency notification and publication

2.19 Based on paragraph 1.5, the status of contingency event in terms of level and category shall be assessed by relevant State to cascade the information to ICAO MID and other stakeholders through the legitimate channels.

2.20 In the worst-case scenario (level 3, category C), it is likely that the relevant ACC would be able to broadcast on appropriate frequencies that contingency procedures have been initiated before evacuation. In this circumstance, in conformity with regional and national contingency plans the relevant States should notify the appropriate authorities in adjacent FIRs and ICAO MID.

Note: State contingency plan shall include an authorization to ICAO MID Regional Office to activate the plan and CCT on its behalf upon confirmation received from the State focal point refer to **Appendix G** that the provision of ATS is subject to significant degradation or disruption which is necessary to perform the expected level of services.

2.21 For the broadcast of an evacuation warning on appropriate frequencies, it should be communicated in the form of following:

“Emergency evacuation of [ATC unit] is in progress. No air traffic control service will be provided by [ATC unit]. Use extreme caution and monitor [control frequencies], emergency frequencies and air to air frequencies. Contact the next air traffic control unit as soon as possible”.

2.22 Where State is unable to issue the required NOTAM, in accordance with its contingency agreement with adjacent FIRs, an alternative adjacent FIR acting on behalf of the State will issue the required NOTAM after notification has been received through legitimate channel.

2.23 Details of contingency [Track Orientation Scheme \(TOS\)](#) and associated [Flight Level Allocation Scheme \(FLAS\)](#) related to contingency plans (level 1, 2 & 3) shall be published in the State AIP Section ENR 3.5.

2.24 Relevant sections of contingency plans (level 1, 2 & 3) that may have an effect on international flights should be made available on the public internet website of the State/ANSP, and the hyperlink provided to ICAO MID Regional Office for inclusion in the MID Region ATM Contingency Plan.

2.25 State national ATM contingency plans (Level 3) should be published on both website of the State/ANSP as well as ICAO MID region.

Note 1: information of a sensitive nature such as that related to matters of national security need not be included in published contingency plans.

Note 2: air navigation deficiencies may be raised against the provisions of Annex 11 for States that do not publish their own national contingency plan and related agreement with adjacent FIRs and fail to report promulgation of their national ATM contingency plan to MID Office.

2.26 ASHTAM specifying alternate routing or other ATFM measures related to a volcanic eruption or volcanic ash cloud should be issued separately from the ASHTAM issued in accordance with Annex 15, 5.4.2 and Doc 10066, 5.2.5, 5.4.2, Appendices 3, 5 and 7.

Status Reporting of State ATM Contingency Plans

2.27 States shall report the status of their contingency planning to the ICAO MID Regional Office, as follows:

- a) promulgation of the national ATM Contingency Plan, together with the hyperlink to the website location of the Plan, or a copy of the approved contingency plan;
- b) State Contingency Points-of-Contact; and
- c) the establishment of contingency arrangements and agreements with each adjacent FIR.

2.28 States shall report the status of implementation of the performance expectations of their ATM contingency plan at least once annually, by 31 September each year to ICAO MID for review by ATM SG meeting.

CHAPTER 3

ICAO ROLE AND COMMON REGIONAL PROCEDURES

General

3.1 ICAO MID will initiate and coordinate appropriate contingency action in the event of disruption of air traffic services and related supporting services affecting international civil aviation operations provided by a State wherein, for some reason, the authorities cannot adequately discharge the responsibility referred to in 1.1. In such circumstances, ICAO MID will work in coordination with States responsible for airspace adjacent to that affected by the disruption and in close consultation with other related ICAO office(s) and international organizations concerned. ICAO will also initiate and coordinate appropriate contingency action(s) at the request of States which has been agreed by CCT meeting.

3.2 ICAO will be available for monitoring developments that might lead to events requiring contingency arrangements to be developed and applied and will, as necessary, assist in the development and application of such arrangements. During the emergence of a potential crisis, a CCT will be established in the ICAO MID and at ICAO Headquarters, and arrangements will be made for competent staff to be available or reachable 24 hours a day. The tasks of these teams will be to monitor continuously information from all relevant sources, to arrange for the constant supply of relevant information received by the State AIS at the MID States and Headquarters, to liaise with international organizations concerned and their regional organizations, as appropriate, and to exchange up-to-date information with States directly concerned and States which are potential participants in contingency arrangements. Upon analysis of all available data, permission for initiating the action considered necessary in the circumstances will be obtained from the State(s) concerned.

3.3 ICAO MID office is responsible to:

- a) assess conformity of States national contingency plans with MID region ATM contingency plan;
- b) monitor the status of MID States' Contingency Plans and agreement with adjacent FIRs as presented in **Appendix H**;
- c) act as the Secretariate of the CCT;
- d) conduct post-implementation review to identify what needs to be improved for the future;
- e) carry out periodically communication drills and other simulation exercises to rehearse response to contingency scenarios;
- f) keep up to date the list of MID region ATM contingency focal point contact details at **Appendix G**;
- g) periodically conduct ATS route network gap analysis;
- h) keep up to date the list of MID main regional routing options at **Appendix C**;
- i) develop regional DME/DME and Surveillance coverages respectively at **Attachments B** and **C** as the additional safety net to support operation of air traffic during GNSS vulnerabilities.

Note: based on MIDANPIRG Conclusion 20/50, States are encouraged to share Surveillance data with adjacent FIRs.

- j) provide update information in to CCT meeting and prepare required report to ATM SG.

3.4 The ICAO MID Regional Office will coordinate with ICAO HQ and the concerned Regional Offices regarding any amendment related to the Regional Contingency Plan.

3.5 ICAO MID contingency plan, MID States contingency plan Level 3 as well as agreements are available to users through the ICAO MID website <https://www.icao.int/MID/MIDANPIRG/Pages/MID-Docs.aspx>. In order to maintain the effectiveness of the plan, stakeholders are encouraged to provide the ICAO MID Regional Office (icaomid@icao.int) with their comments/suggestions and updates, on yearly basis.

Contingency Coordination Team (CCT)

Objectives and responsibilities

- a) upon notification, activate the regional contingency arrangement;
- b) enhance and expedite individual and regional response to contingencies or possible contingencies scenarios that may affect the ATS and all other activities related to ensuring that air transport operations can be maintained to provide continual ATS provision in the MID Region, identifying threats and communicating possible solutions.
- c) liaise with States, international/regional organizations to support the exchange of information and improve the regional response to contingencies;
- d) exchange information with international/regional organizations and humanitarian aid agencies such as Red Crescent and WFP;
- e) exchange up-to-date information with States directly concerned and States which are potentially engaged in contingency arrangements;
- f) review document prepared by the relevant States regarding safety and security assessment;
- g) make the required consensus regarding actions and decision to be taken including but not limited to *development of contingency plan, development of Letter of Procedure, set date and time of implementation, content of required NOTAM* and etc.;
- h) support the adequate implementation of the measures established in the individual contingency plans developed by CCT and monitor the progress of the contingency. The following valid, reliable and relevant information expected to be monitored, gathered and shared:
 - i. information regarding any situation, condition or phenomena that may threat the safe and continuous provision of air traffic/air transport services in the MID Region;
 - ii. possible and/or actual contingency measures, proposed or implemented;
 - iii. relevant information from ATM, AIM, AGA, safety, security, etc.;
 - iv. expected impact to operations;
 - v. time and date of the beginning of the contingency measures;

- vi. airspace/airport availability for landing and overflying traffic and airspace to be avoided;
- vii. availability of facilities and their limitation on provision of ATS;
- viii. availability and status of contingency routes;
- ix. status and availability of services by neighboring States/ATS units;
- x. States progress reports and challenges to cover at least the following areas:
 - status of hotspot areas;
 - capacity constraints;
 - status of CNS equipment and facilities;
 - status of voice communication/coordination and data exchange with adjacent FIRs;
 - changes to aeronautical publications; and
 - any development having an impact on the implementation of the plan.
- xi. procedures to be followed by airlines;
- xii. feedback from humanitarian aid, including ability to provide aid, flight permissions, and status on the ground; and
- xiii. any other details with respect to the disruption and actions being taken by aircraft operators.

Note: to perform the requirement of the above item, IATA is responsible for providing the CCT with the required feedback from AUs.

- i) make a decision to deactivate CCT.

Note 1: States which anticipate or experience disruption of air traffic services and/or related supporting services should advise, as early as practicable, the ICAO MID, and other States whose services might be affected. Such advice should include information on associated contingency measures or a request for assistance in formulating contingency plans.

Note 2: detailed coordination requirements agreed in CCT meeting should be reflected in the contingency plan, Letter of Procedure (LoP), agreement between States concerned to promulgate common NOTAM text at a commonly agreed effective date.

Note 3: notification, by NOTAM, of anticipated or actual disruption of air traffic services and/or related supporting services should be dispatched to users of air navigation services as early as practicable. The NOTAM should include the associated contingency arrangements. In the case of foreseeable disruption, the advance notice should in any case not be less than 48 hours.

Note 4: since State who is subject to contingency situation may encounter additional hidden challenges and shortcoming like degradation of ATCOs competency or CNS infrastructure, CCT shall take into account those requirements to develop recovery plan based on step-by step approach before terminating CCT activity.

Note 5: notification by NOTAM of discontinuance of contingency measures and reactivation of the services set forth in the regional plan should be dispatched as early as practicable to ensure an orderly transfer from contingency conditions to normal operation.

Membership

3.6 A CCT should compose of members/focal points from the followings :

3.6• Core members

- ICAO (HQ and Regional Office(s)). MID ATM Officer will serve as the Secretary;
- IATA Africa & the Middle East (AME);
- States and ANSPs concerned ; and

• Observers

- Other States, Regional and international Organizations, Agencies, Associations, when deemed necessary, as temporary members.

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Activation

3.7 Activation of the MID CCT will be based on;

- a) the relevant State requested directly to ICAO MID; or
- b) recommendation from ICAO MID (feedback from IATA and States) which is confirmed by the concerned State.

Note 1: the plan might be also activated in cases when airspace users decided to circumnavigate airspace(s) due to a perceived risk to the safety of flight with a minimum of disruption to flight operations caused by man-made or natural events, which might have negative impact on provision of ATS services on the relevant FIR i.e. CNS equipment failure (fully or partially) consequences not only decrease airspace capacity over that FIR, but also significantly increase and change the flow of the traffic in other airspace(s).

Note 2: the MID region main AUs shall inform IATA, when they have a plan to change significantly on their flow of traffic due to any reason highlighted in "Note 1". Accordingly, IATA should inform ICAO MID, if deemed necessary.

Working methods

- a) CCT will conduct at least one test activation or table-top exercise every year during the month of May (actual date to be determined based on availability of majority of participant members).
- b) once activated, the CCT will be conducted based on decision taken by previous meeting.
- c) use the following for sharing/exchange of information.
 - i. e-mail notification;

- ii. daily teleconferences, if required;
- iii. bulletin (in case of significant changes); and
- iv. CCT summary of discussion.

Contingency Plan

3.8 Development of a contingency plan is dependent upon circumstances, including the availability, or not, of the airspace affected by the disruptive circumstances for use by international civil aviation operations. Sovereign airspace can be used only on the initiative of, or with the agreement or consent of, the authorities of the State concerned regarding such use. Otherwise, the contingency arrangements must involve bypassing the airspace and should be developed by adjacent States or by ICAO in cooperation with such adjacent States. In the case of airspace over the high seas or of undetermined sovereignty, development of the contingency plan might involve, depending upon circumstances, including the degree of erosion of the alternative services offered, temporary reassignment by ICAO of the responsibility for providing air traffic services in the airspace concerned.

Note: *a contingency plan should be acceptable to providers and users of contingency services alike, i.e. in terms of the ability of the providers to discharge the functions assigned to them and in terms of safety of operations and traffic handling capacity provided by the plan in the circumstances.*

3.9 Development of a contingency plan presupposes as much information as possible on current and alternative routes, navigational capability of aircraft and availability or partial availability of navigational guidance from ground-based aids, surveillance and communications capability of adjacent air traffic services units, volume and types of aircraft to be accommodated and the actual status of the air traffic services, communications, meteorological and aeronautical information services. The principles and requirements in **Appendix A** should be considered for development of any contingency plan.

CHAPTER 4

ATM VOLCANIC ASH CONTINGENCY PLAN

4.1 The MID Region ATM Volcanic Ash Contingency Plan (MID ATM VACP) was developed based on the VACP prepared by the International Volcanic Ash Task Force (IVATF) in August 2012. The MID ATM VACP sets out standardised guidelines and procedures for the provision of information to airlines and en-route aircraft before and during a volcanic eruption. The plan and its appendices are at **Attachment D** to this Document.

4.2 The MID ATM VACP includes the pre-eruption, start of eruption, ongoing; and recovery phases. It is to be highlighted that most MID States would practice the ongoing and recovery phases only as the pre-eruption and start of eruption phases would only apply to the States where volcanoes erupt. Furthermore, the MID Region would receive volcanic ash advisories and volcanic ash advisories in graphic form from the Volcanic Ash Advisory Center (VAAC) Toulouse.

4.3 Volcanic contamination, of which volcanic ash is the most serious, is a hazard for safe flight operations. Mitigating the hazards posed by volcanic ash in the atmosphere and/or at the aerodrome cannot be resolved in isolation but through collaborative decision making (CDM) involving all stakeholders concerned. During an eruption, volcanic contamination can reach and exceed the cruising altitudes of turbine-powered aircraft within minutes and spread over vast geographical areas within a few days. Encounters with volcanic ash may result in a variety of hazards including one or more of the following:

- a) the malfunction, or failure, of one or more engines leading not only to reduction, or complete loss of thrust but also to failures of electrical, pneumatic and hydraulic systems;
- b) the blockage of pitot and static sensors resulting in unreliable airspeed indications and erroneous warnings;
- c) windscreens rendered partially or completely opaque;
- d) smoke, dust and/or toxic chemical contamination of cabin air requiring crew to don oxygen masks, thus impacting verbal communication; electronic systems may also be affected;
- e) the erosion of external and internal aircraft components;
- f) reduced electronic cooling efficiency leading to a wide range of aircraft system failures;
- g) the aircraft may have to be manoeuvred in a manner that conflicts with other aircraft; and
- h) volcanic ash deposition on a runway may degrade aircraft braking performance, most significantly if the volcanic ash is wet; and in extreme cases, this can lead to runway closure.

4.4 Operators are required by ICAO Annex 6 – Operation of Aircraft to implement appropriate mitigation measures for volcanic ash in accordance with their safety management system (SMS), as approved by the State of the Operator/Registry. The guidelines provided in the MID ATM VACP document assume that the ICAO requirements regarding safety management systems have been implemented by the operators. Detailed guidance on Safety Risk Assessments (SRAs) for flight operations with regard to volcanic ash contamination can be found in the

manual on Flight Safety and Volcanic Ash – Risk Management of Flight Operations with Known or Forecast Volcanic Ash Contamination (ICAO Doc 9974).

4.5 Based on the above, States' regulatory provisions and arrangements should be reviewed to ensure that, in accordance with the guidance provided in ICAO Doc 9974:

- a) aircraft operators are to include in their SMS an identifiable safety risk assessment for operations into airspace forecast to be, or at aerodromes known to be, contaminated with volcanic ash; and
- b) safety oversight procedures are used for the evaluation of operators' capability to conduct flight operations safely into airspace forecast to be, or aerodromes known to be, contaminated with volcanic ash.

4.6 Distribution of applicable Aeronautical Information Services (AIS) and Meteorological (MET) messages related to volcanic ash are set out in relevant ICAO Annexes, specifically Annex 15–Aeronautical Information Services and Annex 3 – Meteorological Service for International Air Navigation.

4.7 Volcanic ash can also affect the operation of aircraft at aerodromes. Volcanic ash deposition at an aerodrome, even in very small amounts, can result in the closure of the aerodrome until all the deposited ash has been removed. In extreme cases, the aerodrome may no longer be available for operation at all, resulting in repercussions on the ATM system, e.g. diversions, revised traffic flows, etc.

4.8 Some aircraft types or engine technologies are more vulnerable to volcanic ash contaminants than others; therefore, any specific mitigation measures to be applied would have to take into account any such variance. Considering that a commercial aircraft travels about 150 km (80 NM) in 10 minutes and that volcanic ash can rise to flight levels commonly used by turbine-engine aircraft in half that time, a timely response to volcanic eruptions and volcanic ash in the atmosphere is essential.

4.9 It is imperative that information on the volcanic activity is disseminated as soon as possible. In order to assist staff in expediting the process of originating and issuing relevant AIS and MET messages, a series of templates should be available for different stages of the volcanic activity. For the list of ICAO registered volcanoes see the Manual on Volcanic Ash, Radioactive Material and Toxic Chemical Clouds (ICAO Doc 9691). Volcanoes name, number and nominal position should be available at the State's International NOTAM office. Volcanic ash exercises (VOLCEX) should be conducted at a frequency determined by the ICAO Region concerned, in order to ensure the smooth implementation and effectiveness of the contingency plan in case of an actual volcanic eruption.

4.10 This document has been prepared and is in line with a proposal for amendment to the Procedures for Air Navigation Services – Air Traffic Management (PANS-ATM, Doc 4444) paragraph 15.8 Procedures for an ATC unit when a volcanic ash cloud is reported or forecast — which is expected to become applicable in November 2014.

4.11 Also based on the above reference, States' airspace and airport management policies and procedures should be reviewed to ensure that:

- a) Airspace affected by volcanic ash cloud should not be 'closed'.
- b) Specification in ASHTAM of alternate routing or other ATFM measures to manage airspace constraints arising from volcanic ash cloud should be solely for the purpose of ensuring the predictability and regularity of air traffic and should be based on an assessment of capacity and demand in airspace affected by volcanic ash and/or by aircraft avoiding the volcanic ash cloud.
- c) ASHTAM specifying alternate routing or other ATFM measures related to a volcanic eruption or volcanic ash cloud should be issued separately from the ASHTAM issued in accordance with Annex 15, 5.4.2 and Doc 10066, 5.2.5, 5.4.2, Appendices 3, 5 and 7.

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- d) Aerodromes should only be closed by NOTAM for periods of observed volcanic ash contamination of the surface of the aerodrome movement area.
 - e) Airport capacity limitations of alternate aerodromes, including apron capacity, should be considered, and recommendations for the use of other alternates considered for inclusion in ASHTAM as mentioned in c, above.
 - f) If required by State regulations, any declaration of a Danger or Restricted Area should be confined to the pre-eruptive or erupting volcano and the area containing its forecast or observed ejecta.

4.12 General considerations during the development of an ATM contingency plan for volcanic ash and anticipated flight crew issues when encountering volcanic ash are provided in Appendices A and B, respectively.

APPENDIX A

ATM CONTINGENCY PLANNING PRINCIPLES AND REQUIREMENTS

A.1 All ATS units should have a Level 1 Contingency Plan to ensure the safe transit of international traffic in the event of disruption or withdrawal of ATS, or unsafe airspace conditions.

A.2 The overriding principle is that safety has primacy over efficiency and optimal levels and routes.

A.3 Contingency operations over the concerned airspace will necessitate lower than airspace capacity to ensure safety.

Note 1: collaborative ATFM measures should be the first priority response to Category A events, and for the management of deviating traffic during Category B and C events.

Note 2: amended ATS routes, whether published or promulgated Ad hoc, may be prescribed as part of the ATFM response to expected demand and capacity imbalance caused by contingency events.

A.4 Reassignment of responsibility for providing air traffic services in airspace over the high seas or in delegated airspace should be considered.

A.5 If the State is not able to issue the required NOTAM(s), the relevant authority of this State shall agree with adjacent FIR under MoU to publish required NOTAM on its behalf in accordance with ICAO provisions in Annex 15.

A.6 System and ATC service redundancy is the most effective contingency capability.

A.7 All Contingency Plans should define the following where applicable:

- a) re-routing of traffic to avoid the whole or part of the airspace concerned, normally involving establishment of additional routes or route segments with associated conditions for their use such as implementation of FLAS, if required;

Note 1: establishment of a simplified route network such as unidirectional route through the airspace concerned together with a FLAS is highly recommended.

Note 2: contingency FLAS planning should include consideration of allocating the optimum flight levels to routes used by long haul aircraft, depending on the traffic density on the route, wherever practicable.

- b) provisions for tactical definition and coordination of additional routes/FLAS and priority for access to accommodate selected non-scheduled operations such as humanitarian, medical, evacuation, Red Crescent and WFP;
- c) priority determination for routine scheduled and non-scheduled flights;
- d) define ground and airborne navigation requirements if necessary;

Note: the aircraft minimum operational requirement to operate over contingency airspace should include procedures to “display navigation and anti-collision lights”, “transponders set on a discrete code assigned by ATC or, if code not assigned, select code 2000”, “apply Strategic Lateral Offset Procedures (SLOP) (PANS-ATM, paragraph 16.5)”,

“ACAS operational and pilot watch for conflicting traffic both visually and by reference to ACAS” and if agreed by CCT meeting, “keep ADS-B operational” at all times;

- e) specified minimum longitudinal separation between consecutive aircraft entering the contingency airspace;

Note 1: to maintain an increased agreed longitudinal separation, aircraft needs to maintain assigned speed, during entire flight within contingency airspace except in cases of emergency.

Note 2: emergency and weather deviation descent procedures are contained in ICAO Doc 4444, paragraph 15.1.4 and paragraph 15.2.4 respectively.

Note 3: contingency ATS routes should provide minimum lateral separation of 80 NM between aircraft that are not vertically separated under a FLAS, except where CCT upon safety assessment agreed to implement reduced lateral separation specified in ICAO Doc 4444.

Note 4: States and CCT should specify any necessary buffers to minimum lateral separation requirements where meteorological phenomena may require aircraft to deviate from the ATS route to maintain flight safety. Information on the buffers should be provided in operational information provided on pre-activation or activation of the contingency plan.

Note 5: minimum longitudinal spacing between aircraft operating on the same contingency route and not vertically separated should be 15 minutes or 120 NM. However, this may be reduced to 10 minutes or 80 NM in conjunction with application of the Mach number technique where authorized by the relevant authority and agreed in the LoA or CCT arrangement.

- f) contingency communication arrangements including means of communication within contingency airspace (Air - Ground and Ground – Ground) and communications transfer arrangements for aircraft entering and leaving the airspace;

Note: communication arrangements should include procedure for aircraft to maintain continuous listening watch on specified VHF frequencies in specified areas where air-ground communications are uncertain or non-existent as well as requirement for pilots to continuously guard the IATA In-flight Broadcast Procedure (IFBP).

- g) details of delegation of ATS arrangements (if any); and
- h) contingency points of contact.

A.8 Level 2 Contingency Arrangements (arrangements between neighboring FIRs) should be included in bi-lateral or multi-lateral agreements between States in all cases where activation of any Level 1 Contingency Plan will impact upon a neighboring State’s ATS Unit.

A.9 Level 1 Contingency Plans should include, either in detail or by reference, any relevant Level 2 Contingency Arrangements.

A.10 Close cooperation between neighboring FIRs, together with supporting mechanisms for the tactical definition and promulgation of contingency routes for the avoidance of Category B and C is essential.

A.11 Contingency ATS routes should be published in State AIP to permit the storing of route details in AUs’ navigation databases.

A.12 State appropriate ATS authority or CCT should redefine classification of the airspace which is subject to contingency operation.

A.13 Alternate aerodromes should be specified where necessary in Level 1 contingency plans for airport control towers and terminal airspace.

A.14 The adjacent contingency FIRs should take into consideration that “strayed” and “unidentified aircraft” may be reported at their respective FIRs. To handle this circumstance, States are required to develop coordination procedures with relevant military authority and follow procedure in ICAO Doc 4444, paragraph 15.5.1.

A.15 States and ANSPs are required to maximize the use of realistic simulation to mitigate ATCOs skill fadeout.

A.16 Airspace affected by volcanic ash cloud should not be closed to international civil aviation.

A.17 Closure of airports affected by volcanic ash deposition should be supported by a safety assessment conducted in collaboration between airport operator, aircraft operators and the ANSP, in accordance with their respective SMS.

APPENDIX B

CONTINGENCY PLAN TEMPLATE

OBJECTIVE

B.1 This contingency plan contains arrangements to ensure the continued safety of air navigation in the event of partial or total disruption of ATS and is related to ICAO Annex 11- *Air Traffic Services*. The contingency plan should be designed to provide alternative routes, using existing airways in most cases, which will allow aircraft operators to fly through or avoid airspace which is subject to contingency.

AIR TRAFFIC MANAGEMENT

ATS Responsibilities

B.2 Tactical ATC considerations during periods of overloading may require re-assignment of routes or portions thereof.

B.3 Alternative routes should be designed to maximize the use of existing ATS route structures and CNS services.

Note: *airspace should be designed in a way to minimize potential confliction of different traffic flows. In doing so, the establishment of unidirectional route as well as implementation of FLAS might be required.*

B.4 In the event that ATS cannot be provided within designated FIR or portion thereof, the State with coordination of ICAO MID, adjacent FIRs and if required, CCT shall publish the corresponding NOTAM/ASHTAM indicating the following:

- a) time and date of the beginning of the contingency measures;
- b) airspace available for landing and overflying traffic, and airspace to be avoided;
- c) details of the facilities and services available or not available and any limits on ATS provision (e.g., ACC, Approach (APP), Tower (TWR) and Flight Information Service (FIS)), including an expected date of restoration of services if available;
- d) information on the provisions made for alternative services;
- e) ATS contingency routes;
- f) procedures to be followed by adjacent ATS units;
- g) procedures to be followed by pilots; and
- h) any other details with respect to the disruption and actions being taken that aircraft operators may find useful.

B.5 If the State is not able to issue the required NOTAM(s), the relevant authority of this State shall agree with adjacent FIR under MoU to publish required NOTAM on its behalf.

Separation

B.6 Separation criteria will be applied in accordance with the Procedures for Air Navigation Services in ICAO Doc 4444 as well as decision that may be taken by CCT meeting.

Level Restrictions

B.7 Where possible, aircraft on long-haul international flights shall be given priority with respect to cruising levels.

Other measures

B.8 Other measures related to the closure of airspace and the implementation of the contingency scheme in the relevant FIR may be taken as follows:

- a) suspension of all VFR operations;
- b) delay or suspension of general aviation IFR operations; and
- c) delay or suspension of commercial IFR operations.

TRANSITION TO CONTINGENCY SCHEME

B.9 During times of uncertainty when airspace closures seem possible, aircraft operators should be prepared for a possible change in routing while en-route, familiarization of the alternative routes outlined in the contingency scheme as well as what may be promulgated by a State via NOTAM, AIC, SUP or AIP.

B.10 In the event of airspace closure that has not been promulgated, ATC should, if possible, broadcast to all aircraft in their airspace, what airspace is being closed and ~~to stand~~stand by for further instructions.

B.11 ATS providers should recognize that when closures of airspace or airports are promulgated, individual airlines might have different company requirements as to their alternative routings. ATC should be ~~alerted~~alerted to respond to any request by aircraft and react commensurate with safety.

TRANSFER OF CONTROL AND COORDINATION

B.12 The transfer of control and communication between ATS units should be at the common FIR boundary unless there is mutual agreement between adjacent ATS units. ATS providers should also review current coordination requirements in light of contingency operations or short notice of airspace closure.

PILOTS AND OPERATOR PROCEDURES

B.13 Pilots need to be aware that in light of current international circumstances, a contingency routing requiring aircraft to operate off of normal traffic flows, could result in an intercept by military aircraft. Aircraft

operators must therefore be familiar with international intercept procedures contained in ICAO Annex 2 –Rules of the Air, paragraph 3.8 and Appendix 2, Sections 2 and 3.

B.14 Pilots need to continuously guard the VHF emergency frequency 121.5 MHz and should operate their transponder at all times during flight, regardless of whether the aircraft is within or outside airspace where Secondary Surveillance Radar (SSR) is used for ATS purposes. Transponders should be set on a discrete code assigned by ATC or select code 2000 if ATC has not assigned a code.

Note: additional safety net such as implementation of IFBP or SLOP may be considered by CCT meeting during contingency situation.

OVERFLIGHT PERMISSION

B.15 Aircraft operators should obtain overflight permission from States for flights operating through their jurisdiction of airspace, where required. In a contingency situation, flights may be rerouted at short notice and it may not be possible for operators to give the required advanced notice in a timely manner to obtain approval. States responsible for the airspace in which contingency routes are established should consider making special arrangements to expedite flight permission in these contingency situations.

CONTINGENCY UNIT

B.16 The ATM national contingency unit assigned the responsibility of monitoring developments that may dictate the enforcement of the contingency plan and coordination of contingency arrangements. The contact details of this unit shall include the followings:

Name of Agency:
Contact Person:
Telephone:
Fax:
Email:

B.17 During a contingency situation, the State designated focal point in national contingency unit will coordinate with the adjacent ATS units and liaise with the ICAO MID Regional Office as well as CCT as appropriate.

CONTINGENCY ROUTE AND LEVEL SCHEME

B.18 Aircraft operators should file their flight plans using the alternative contingency routes and levels listed in the scheme below or published NOTAM(s) in order to operate in the airspace which is subject to contingency measures.

Present ATS route	Contingency routes and levels	FIRs involved
In lieu of: xxxx	(ATS unit) provides ATS on the following routings: CR1 and FLAS, if required: CR2 and FLAS, if required: CR3 and FLAS, if required:	xxxx: in coordination with xxxx
In lieu of: xxxx	(ATS unit) provides ATS on the following routings: CR4 and FLAS, if required: CR5 and FLAS, if required:	xxxx: in coordination with xxxx

B.19 All aircraft should establish and maintain contact on published VHF or HF frequencies with the (xxx) ATS unit (APP/ACC/FIC) responsible for the airspace being traversed.

APPENDIX C

MID MAIN REGIONAL ROUTING OPTIONS

C.1 This Contingency Plan has been developed based on existing ATS routes and making use of appropriate contingency routes in the MID Region. Priority has been given to safety considerations and to ensuring that to the extent possible, ATC operations are not complicated. Temporary routes may be established where necessary.

Note 1: these alternative routes including permanent and temporary as well as conditional route (CDR) are based mainly on the existing route network or established earlier for this purpose. Concerned States and CCT in consultation with AUs, might establish additional temporary routes to be able to accommodate extra traffic in a safe manner.

Note 2: regional ATS routes which are allocated for provision of service during contingency situation are available in ANP Volume II, Table I, ATS route table under the condition of "Note 5-CDR" which will be used during specified period by issuing required NOTAM.

C.2 The contingency routings are designed to take into consideration that disruptions to normal traffic flows have the potential to create an additional burden and complexity to ATC. Therefore, temporary contingency routes would be designed to be safe and instantly manageable by ATC. This may require additional track miles to be flown by the aircraft operator.

Note: it is recognized that operators may incur economic penalties during application of the contingency scenarios by imposing additional track miles or implementation of air traffic flow management measures when deemed necessary.

C.3 The alternative routings were given "CR" designators based on various scenarios that may be implemented. It is to be highlighted that the scenarios drawn on the charts were developed based on the existing route network, and do not reflect new routes. Furthermore, one scenario could be used to avoid different FIRs, subject to users' requirements. The scenarios are detailed in the Table below:

CR	FIR(s) to be Avoided	Routing options	Remarks
CR 1	Amman, Beirut and Damascus	EUR/NAT region from/to APAC region	
		- Ankara, Tehran, Kabul/Karachi - Nicosia, Cairo, Jeddah, Bahrain, Doha, UAE, Muscat, Karachi/Mumbai	
CR 2	Baghdad and Kuwait	EUR/NAT region from/to Gulf States	
		- Ankara, Baghdad, Kuwait, Bahrain, Doha, UAE and Muscat - Ankara, Tehran, Bahrain/Doha/UAE/Muscat - Nicosia, Cairo, Jeddah, Bahrain, Doha, UAE, Muscat	
CR 2	Baghdad and Kuwait	EUR/NAT region from/to APAC region	
		- Ankara, Tehran, Kabul/Karachi - Nicosia, Cairo, Amman, Jeddah, Bahrain, Doha, UAE, Muscat, Karachi/Mumbai - Tel Aviv, Amman, Jeddah, Bahrain, Doha, UAE, Muscat, Karachi/Mumbai	
CR 2	Baghdad and Kuwait	EUR/NAT region from/to Gulf States	

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		- Ankara, Tehran, Bahrain/Doha/UAE/Muscat - Nicosia, Cairo, Amman, Jeddah, Bahrain, Doha, UAE, Muscat - Tel Aviv, Amman, Jeddah, Bahrain, Doha, UAE, Muscat	
CR 3	Bahrain	EUR/NAT region from/to APAC region - Ankara, Tehran, Kabul/Karachi - Nicosia, Cairo, Amman, Jeddah, Doha, UAE, Muscat, Karachi/Mumbai - Tel Aviv, Amman, Jeddah, Doha, UAE, Muscat, Karachi/Mumbai EUR/NAT region from/to Gulf States - Ankara, Tehran, Doha/UAE/Muscat - Ankara, Baghdad, Kuwait, Doha, UAE and Muscat - Nicosia, Cairo, Amman, Jeddah, Doha, UAE, Muscat - Tel Aviv, Amman, Jeddah, Doha, UAE, Muscat Northeast Africa from/to Gulf States - Cairo, Jeddah, Doha/UAE/Muscat Gulf States from/to APAC region - Jeddah, Doha, Tehran, Karachi - Jeddah, Doha, UAE, Muscat, Mumbai/Karachi	
CR 4	Doha	EUR/NAT region from/to APAC region - Ankara, Tehran, Kabul/Karachi - Nicosia, Cairo, Amman, Jeddah, Bahrain, UAE, Muscat, Karachi/Mumbai - Tel Aviv, Amman, Jeddah, Bahrain, UAE, Muscat, Karachi/Mumbai EUR/NAT region from/to Gulf States - Ankara, Tehran, Bahrain/UAE/Muscat - Ankara, Baghdad, Kuwait, Bahrain, UAE and Muscat - Nicosia, Cairo, Amman, Jeddah, Bahrain, UAE, Muscat - Tel Aviv, Amman, Jeddah, Bahrain, UAE, Muscat Northeast Africa from/to Gulf States - Cairo, Jeddah, Bahrain/UAE/Muscat Gulf States from/to APAC region - Bahrain, Tehran, Karachi - Bahrain, Jeddah, Muscat, Mumbai/Karachi	
CR 5	Cairo	EUR/NAT region from/to Gulf States - Ankara, Baghdad, Kuwait, Bahrain, Doha, UAE and Muscat - Ankara, Tehran, Bahrain/Doha/UAE/Muscat - Tel Aviv, Amman, Jeddah, Bahrain, UAE, Muscat Northeast Africa from/to EUR/NAT region - Juba/Addis Ababa, Khartoum, Tripoli, Malta - Juba, Khartoum, Jeddah, Amman, Tel Aviv - Asmara, Jeddah, Amman, Tel Aviv - Mogadishu/Djibouti/Addis Ababa, Sana'a, Jeddah, Amman, Tel Aviv North Africa from/to Gulf States and Asia - N'djamena, Khartoum, Jeddah, Doha, UAE, Muscat, Mumbai	

		Malta, Nicosia, Tel Aviv, Amman, Jeddah, Bahrain, Doha, UAE, Muscat, Mumbai	
CR 6	Tehran	Northeast of Tehran FIR from/to Gulf States - Turkmenbashi, Ashgabat, Turkmenabad, Kabul, Karachi, Muscat, UAE, Doha, Bahrain - Baku, Yerevan, Ankara, Baghdad, Kuwait, Bahrain, Doha, UAE, Muscat EUR/NAT region from/to Gulf States - Ankara, Baghdad, Kuwait, Bahrain, Doha, UAE and Muscat - Tel Aviv, Amman, Jeddah, Bahrain, Doha, UAE, Muscat - Nicosia, Cairo, Amman, Jeddah, Bahrain, Doha UAE, Muscat EUR/NAT region from/to APAC region - Ankara, Yerevan/Tbilisi, Baku, Turkmenbashi, Ashgabat - Ankara, Baghdad, Kuwait, Bahrain, Doha, UAE and Muscat, Karachi/Mumbai - Tel Aviv, Amman, Jeddah, Bahrain, Doha, UAE, Muscat, Karachi/Mumbai - Nicosia, Cairo, Amman, Jeddah, Bahrain, Doha UAE, Muscat, Karachi/Mumbai Gulf States from/to APAC region - Kuwait, Bahrain, Doha, UAE, Muscat, Mumbai/Karachi	
CR 7	Jeddah	EUR/NAT region from/to Gulf States - Ankara, Baghdad, Kuwait, Bahrain, Doha, UAE and Muscat - Ankara, Tehran, Bahrain/Doha/UAE/Muscat - Tel Aviv, Amman, Baghdad, Kuwait, Bahrain, Doha, UAE, Muscat EUR/NAT region from/to APAC region - Ankara, Baghdad, Kuwait, Bahrain, Doha, UAE and Muscat, Karachi/Mumbai - Ankara, Tehran, Karachi - Tel Aviv, Amman, Baghdad, Kuwait, Bahrain, Doha, UAE, Muscat, Karachi/Mumbai Northeast Africa from/to Europe - Mogadishu, Sana'a, Asmara, Khartoum, Cairo, Nicosia/Athens - Djibouti, Asmara, Khartoum, Cairo, Nicosia/ Athens Northeast Africa from/to APAC region - Khartoum, Asmara, Sana'a, Mumbai - Addis Ababa/Mogadishu, Sana'a, Mumbai South and east Africa from/to Gulf States - Mogadishu/Addis Ababa, Sana'a, Muscat, UAE, Doha	
CR 8	Khartoum	EUR/NAT region from/to Northeast Africa - Nicosia/Athens, Cairo, Jeddah, Asmara Western Africa from/to Northeast Africa - N'djamena/Brazzaville, Juba, Addis Ababa	
CR 9	UAE	EUR/NAT region from/to APAC region - Ankara, Tehran, Kabul/Karachi - Nicosia, Cairo, Amman, Jeddah, Muscat, Mumbai - Tel Aviv, Amman, Jeddah, Muscat, Mumbai	

		<i>EUR/NAT region from/to Gulf States</i> - Ankara, Tehran, Bahrain/Doha/Muscat - Ankara, Baghdad, Kuwait, Bahrain, Doha, Jeddah, Muscat - Nicosia, Cairo, Amman, Jeddah, Bahrain, Doha, Muscat - Tel Aviv, Amman, Jeddah, Bahrain, Doha, Muscat <i>Northeast Africa from/to Gulf States</i> - Cairo, Jeddah, Bahrain, Doha, Muscat <i>Gulf States from/to APAC region</i> - Bahrain, Doha, Tehran, Karachi - Bahrain, Doha, Jeddah, Muscat, Mumbai/Karachi	
CR 10	Muscat	<i>EUR/NAT region from/to APAC region</i> - Ankara, Tehran, Kabul/Karachi - Nicosia, Cairo, Amman, Jeddah, Sana'a, Mumbai - Tel Aviv, Amman, Jeddah, Sana'a, Mumbai <i>South and east Africa from/to Gulf States</i> Mogadishu/Addis Ababa, Sana'a, Jeddah, Doha, UAE	
CR 11	Sana'a	<i>Northeast Africa from/to APAC region</i> - Khartoum, Asmara, Jeddah, Muscat, Mumbai - Addis Ababa/Mogadishu, Mumbai <i>Northeast Africa from/to Europe</i> - Djibouti, Asmara, Khartoum, Cairo, Nicosia/ Athens <i>South and east Africa from/to Gulf States</i> - Addis Ababa, Asmara, Jeddah, UAE, Doha	
CR 12	Tripoli	<i>Western Europe from/to northeast Africa and Gulf States</i> - Malta, Cairo, Khartoum, Asmara/Addis Ababa/Juba - N'djamena, Khartoum, Asmara/Addis Ababa/Jeddah, Doha, UAE, Muscat	

C.4 ICAO MID Office will proactively carry out the following actions based on the aforementioned CRs and taking into account the main flows of the MID region in line with the annual TDS and routing options reports submitted by MID States to MIDRMA.

- periodically conduct ATS route network gap analysis;
- with participation of IATA, and MID States, prepare required proposal to ATM SG and RDWG to develop MID ATS route network; and
- keep up to date the content of the following table.

Main flow				Permanent routing option(s)		Temporary routing option(s)	
MID region entry point/departure airport	Name of the routes	Relevant FIRs	Exit point from MID region/destained at airport in the MID region	Route designators	Relevant FIRs	Route designators	Relevant FIRs
OMDB	M556, T602, L602, M860	UAE, Bahrain, Kuwait, Baghdad	NINVA				

APPENDIX D

GNSS VULNERABILITIES

INTRODUCTION

D.1 GNSS supports positioning, navigation and timing (PNT) applications. GNSS is the foundation of Performance Based Navigation (PBN), automatic dependent surveillance – broadcast (ADS-B) and automatic dependent surveillance – contract (ADS-C). GNSS also provides a common time reference used to synchronize systems, avionics, communication networks and operations, and supports a wide range of non-aviation applications.

D.2 GNSS Vulnerability has been identified as a safety issue and one of the main challenges impeding the implementation of PBN in the MID Region. The MIDANPIRG/16Kuwait, 13-16 February 2017 recognized the impact of the GNSS signal interference and vulnerabilities and agreed that the subject should be addressed by the RASG-MID in order to agree on measures to ensure effective reporting of GNSS interferences, which could be mandated by the States' regulatory authorities. The meeting invited the RASG-MID to consider the development of a RASG-MID Safety Advisory (RSA) related to GNSS vulnerabilities, highlighting the Standard Operating Procedures (SOP) for pilots, including the reporting procedures.

D.3 The RASG-MID/6 (Bahrain, 26 – 28 September 2017) agreed that IATA and ICAO MID Office should develop a RSA on GNSS vulnerabilities.

D.4 With the increasing dependence on GNSS, it is important that GNSS vulnerabilities be properly addressed. This Safety Advisory provides guidance on set of mitigation measures that States would deploy to minimize the GNSS vulnerabilities impact on safety and air operation. The RSA also includes the regional reporting and monitoring procedures of GNSS anomaly with the aim to analyze the threat and its impact on ~~performance~~, ~~and performance~~ and assess the effectiveness of the mitigation measures in place.

DESCRIPTION

D.5 Dependence on GNSS is increasing as GNSS is used for an ever-expanding range of safety, security, business and policy critical applications. GNSS functionality is being embedded into many parts of critical infrastructures. Aviation is now dependent on uninterrupted access to GNSS positioning, navigation and timing (PNT) services.

D.6 Aviation relies heavily on GNSS for area navigation and precision approach. Aircraft avionics such as the Flight Management Systems (FMS) require GNSS timing for a large number of onboard functions including Terrain Avoidance Warning System (TAWS) or Enhanced Ground Proximity Warning Systems (EGPWS). Onboard avionics are highly integrated on commercial aircraft and are very dependent on GNSS timing data. At the same time, GNSS vulnerabilities are being exposed and threats to denial of GNSS services are increasing.

D.7 There are several types of threat that can interfere with a GNSS receiver's ability to receive and process GNSS signals, giving rise to inaccurate readings, or no reading at all, such as radio frequency interference, space weather induced ionospheric interference, solar storm, jamming and spoofing. The disruption of GNSS, either performance degradation in terms of accuracy, availability and integrity or a complete shutdown of the system, has a big consequence in critical infrastructure. For example, local interference in an airport could degrade position accuracy or lead to a total loss of the GNSS based services, which could put safety of passengers in jeopardy.

D.8 There are two types of GNSS Interference Sources; Intentional and Unintentional sources, the latter is not considered a significant threat provided that States exercise proper control and protection over the electromagnetic spectrum for both existing and new frequency allocations. Solar Effect, Radio Frequency Interference and On-board systems are examples of Unintentional GNSS interference sources. However, the Intentional sources such as Jamming and spoofing are considered as serious threats to the continued safety of air transport.

D.9 GNSS Jamming occurs when broadcasting a strong signal that overrides or obscures the signal being jammed. The GNSS jamming might occur deliberately by a military activity or by Personal Privacy Devices (PPDs). GNSS jamming has caused several GNSS outages in the MID Region.

D.10 In some States, military authorities test the capabilities of their equipment and systems occasionally by transmitting jamming signals that deny GNSS service in a specific area. This activity should be coordinated with State spectrum offices, Civil Aviation Authorities and ANS providers. Military and other authorities operating jamming devices should coordinate with State/ANS providers to enable them to determine the airspace affected, advise aircraft operators and develop any required procedures.

D.11 Spoofing is another source of intentional GNSS Interference, which is a deliberate interference that aims to mislead GNSS receivers into general false positioning solution.

D.12 Detailed information about the GNSS Implementation and Vulnerabilities can be found in MID DOC 010 – The Guidance on GNSS implementation in the MID Region.

RISK ASSESSMENT

D.13 The risk assessment covers affected operations during en-route, terminal, and approach phase of flights. In addition, the aircraft impact at table (1), which presents an overview of different potential impacts from GNSS interference, needs to be considered for risk assessment.

D.14 Understanding the different types of threat and how likely they are to occur is key to conducting an accurate risk assessment. Broadly, the threat types break down as follows:

Threat Source	Threat TypeCategory	Description	Impact on the User
Solar Storms	Unintentional	Electromagnetic interference from solar flares and other solar activity "drowns out" the satellite signals in space.	Loss of signal, or range errors affecting the accuracy of the location or timing information.
Jamming	Intentional	Locally-generated RF interference is used to "drown out" satellite signals.	Loss of signal (if the jammer is blocking out all satellite signals) or

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			range errors affecting the accuracy of the location or timing information.
Spoofing	Intentional	Fake satellite signals are broadcast to the device to fool it into believing it is somewhere else, or at a different point in time.	False location and time readings, with potentially severe impacts on automated and autonomous devices and devices that rely on precise GNSS timing.
RF Interference	Unintentional	Noise from nearby RF transmitters (inside or outside the device) obscures the satellite signals.	Loss of signal (if the transmitter is blocking out all satellite signals) or range errors affecting the accuracy of the location reading (if the receiver is at the edge of the transmitter's range).
Signal Reflection	Unintentional	Reflection due objects such as buildings	GNSS signals can reflect off relatively due to distant objects, such as buildings, which would cause gross errors in position accuracy if the receiver falsely locks onto the reflected signal instead of the direct signal.
User Error	Unintentional	Users over-rely on the GNSS data they are presented with, ignoring evidence from other systems or what they can see.	Can lead to poor decision-making in a range of scenarios.

Table 1: Threat types

D.15 Depending on the nature of the interference and the nature of the application, a user may be affected in several ways; the impact may range from a small nuisance to an economic, operational or a safety impact. The detailed risk assessment methodology is addressed at Appendix B.

MITIGATION STRATEGIES

D.16 To minimize the risks associated with GNSS vulnerabilities, several mitigation strategies can be deployed to reduce the likelihood and impact of the threat.

Reducing the likelihood of GNSS interferences

D.17 The likelihood of interference depends on many factors such as population density and the motivation of individuals or groups in an area to disrupt aviation and non-aviation services. To reduce the likelihood of GNSS interference, the following measures may be applied:

- effective spectrum management; this comprises creating and enforcing regulations/laws that control the use of spectrum and carefully assessing applications for new spectrum allocations.
- the introduction of GNSS signals on new frequencies will ensure that unintentional interference does not cause the complete loss of GNSS service (outage) although enhanced services depending upon the availability of both frequencies might be degraded by such interference.
- State should forbid the use of jamming and spoofing devices and regulate their importation, exportation, manufacture, sale, purchase, ownership and use; they should develop and enforce a strong regulatory framework governing the use of intentional radiators, including GNSS repeaters, pseudolites, spoofers and jammers. The enforcement measures include:

- detection and removal of jammers/interference sources; and
 - direct or indirect detection (e.g. use of dedicated interference detection equipment).
- d) education activities to raise awareness about legislation and to point out that ‘personal’ jammers can have unintended consequences.
- e) multi-constellation GNSS would allow the receiver to track more satellites, reducing the likelihood of service disruption.

Reducing the impact of the GNSS vulnerabilities

D.18 The GNSS signal disruption cannot be ruled out completely and States/ANSPs must be prepared to deal with loss of GNSS signals, and that States conduct risk assessment and implement mitigation strategies. The risk and impacts from these threats can be managed by evaluating the growing threat of GNSS interference, jamming and spoofing.

D.19 The disruption of GNSS signals will require the application of realistic and effective mitigation strategies to both ensure the safety and regularity of air services and discourage those who would consider disrupting aircraft operations. There are three principal methods, which can be applied in combination:

- a) taking advantage of on-board equipment, such as Inertial Reference System (IRS). IRS provides a short-term area navigation capability after the loss of GNSS updating. Many air transport aircraft are equipped with IRS and these systems are becoming more affordable and accessible to operators with smaller, regional aircraft. Most of these systems are also updated by DME;
- b) development of contingency procedures and processes to enable operations in a fallback mode in case of loss of GNSS (aircrew and/or ATC). Procedural (aircrew or ATC) methods can provide effective mitigation in combination with those described above, taking due consideration of:
 - i. the airspace classification;
 - ii. the available ATC services (radar or procedural);
 - iii. the avionics onboard
 - iv. aircrew and air traffic controller workload implications;
 - v. the impact that the loss of GNSS will have on other functions, such as ADS-B based surveillance; and
 - vi. the potential for providing the necessary increase in separation between aircraft in the affected airspace.
- c) taking advantage of conventional navigation aids and radar, conventional aids can provide alternative sources of guidance.

D.20 The regulator should conduct safety oversight of the service provider’s GNSS based Services and validate the safety aspects of mitigation strategies, considering the impact on ATM operations. Details on Risk assessment process including some examples are at **Appendix B**.

D.21 The data analysis of the reported GNSS vulnerabilities incidents for the period from January 2015 to June 2018 showed that the impact of the GNSS interference on Aircraft Operations in the MID Region were as follows:

- a) Loss of GPS1 (fault)/ Loss of GPS2 (fault)
- b) Observation of “Map shift” on Navigation display
- c) Switching to an alternative navigation mode (IRS displayed, VOR/DME)
- d) Degraded PBN Capability (NAV Unable RNP)
- e) GPS POS Disagree
- f) EGPWS warning
- g) ADS-B Traffic triggered

Monitoring

D.22 The success of many of countermeasures is dependent on having a detailed understanding of the threats. In order to establish this understanding and to maintain an up-to-date knowledge of the threats - in terms of both types and number of threats – it is necessary to States to monitor the threat environment and the impact on performance.

D.23 Monitoring and reporting is required to inform stakeholders of the threats that exist. This would help directly with enforcement (detecting and removing sources of interference) as well as monitoring the response to changes in legislation or education activities.

D.24 Receiver autonomous integrity Monitoring (RAIM) provides integrity monitoring by detecting the failure of a GNSS satellite. It is a software function incorporated into GNSS receivers.

D.25 In the event of GNSS performance degrading to the point where an alert is raised, or other cause to doubt the integrity of GNSS information exists, the pilot in command must discontinue its use and carry out appropriate navigation aid failure procedures. Should RAIM detect an out-of-tolerance situation, an immediate warning will be provided. When data integrity or RAIM is lost, aircraft tracking must be closely monitored against other available navigation systems.

D.26 States may consider the deployment of GNSS threat monitoring system, which allows monitoring of local GNSS interference environment; signal recording and monitoring for situational awareness of any drop in signal quality or signal outage and ground validation of GNSS-based flight procedures. The detection equipment may include localization utilities.

With reference to ICAO Doc 9849:

Given the variety of avionics designs, one service status model cannot meet all operators’ requirements. A conservative model would produce false alarms for some aircraft. A less conservative model would lead to missed detection of a service outage for some and false alarms for others. Regardless, only the aircrew, not ATC, is in a position to determine whether, for example, it is possible to continue an ABAS-based instrument approach. In contrast, ATC has access to ILS monitor data and can deny an ILS approach clearance based on a failure indication. The real time monitor concept is neither practical nor required for GNSS ABAS operations. It may be practical for SBAS and GBAS, but implementation would depend on a valid operational requirement.

Aircraft operators with access to prediction software specific to their particular ABAS/RAIM avionics will find it advantageous to employ that software rather than use the general notification service. In the case of SBAS and GBAS, operators will rely on service status notifications.

Reporting

D.27 ANSP must be prepared to act when anomaly reports from aircraft or ground-based units suggest signal interference. If an analysis concludes that interference is present, ANS providers must identify the area affected and issue an appropriate NOTAM.

D.28 From the perspective of the aircrew, a GNSS anomaly occurs when navigation guidance is lost or when it is not possible to trust GNSS guidance. In this respect, an anomaly is similar to a service outage. An anomaly may be associated with a receiver or antenna malfunction, insufficient satellites in view, poor satellite geometry or masking of signals by the airframe. The perceived anomaly may also be due to signal interference, but such a determination requires detailed analysis based on all available information.

D.29 In case of GNSS anomaly detected by aircrew, **Pilot** action(s) should include:

- a) reporting the situation to ATC as soon as practicable and requesting special handling as required; and
- b) filing a GNSS Interference Report using the Template at Appendix A, and forwarding information to the IATA MENA (sfomena@iata.org) and ICAO MID Office (icaomid@icao.int) as soon as possible, including a description of the event (e.g. how the avionics failed/reacted during the anomaly).

D.30 **Controller** action(s) should include:

- a) recording minimum information, including aircraft call sign, location, altitude and time of occurrence;
- b) cross check with other aircraft in the vicinity;
- c) broadcasting the anomaly report to other aircraft, as necessary;
- d) notify the AIS Office in case NOTAM issuance is required; and enable the fallback mode and implement related procedure and process (contingency measures).

D.31 **ANSP** action(s) should include:

- a) ensuring the issuance of appropriate advisories and NOTAM, as necessary;
- b) attempting to locate/determine the source of the interference, if possible;
- c) notifying the agency responsible for frequency management (the Telecommunication Regulatory Authority);
- d) locate and eliminate source in cooperation with local regulatory & enforcement Authorities;
- e) tracking and reporting all activities relating to the anomaly until it is resolved; and
- f) review the effectiveness of the mitigation measures for improvement.

D.32 **ICAO MID Office** action(s) should include:

- a) collect anomaly related information and determine the course of action required to resolve reported anomalies;
- b) follow-up with State having interference incident to ensure implementation of required corrective actions;
- c) coordinate with concerned adjacent ICAO Regional Office(s) to follow-up with States under their accreditation areas, when needed; and
- d) Communicate with ITU Arab Office and Arab Spectrum Management Group to resolve frequent interference incidents, when needed.

Appendix D - Appendix A

GNSS interference reporting form to be used by pilots.

** Mandatory field*

Originator of this Report:	
Organization:	
Department:	
Street / No.:	
Zip-Code / Town:	
Name / Surname:	
Phone No.:	
E-Mail:	
Date and time of report	
Description of Interference	
*Affected GNSS Element	☐ GPS
	☐ GLONASS
	☐ other constellation
	☐ EGNOS
	☐ WAAS
	☐ other SBAS
	☐ GBAS (VHF data-link for GBAS)
Aircraft Type and Registration:	
Flight Number:	

*Airway/route flown:	
Coordinates of the first point of occurrence / Time (UTC):	UTC: Lat: Long:
Coordinates of the last point of occurrence / Time (UTC):	UTC: Lat: Long:
*Flight level or Altitude at which it was detected and phase of flight:	
Affected ground station (if applicable)	Name/Indicator; [e.g. GBAS]
*Degradation of GNSS performance:	☐ Large position errors (details): ☐ Loss of integrity (RAIM warning/alert): ☐ Complete outage (Both GPSs), ☐ Loss of GPS1 or Loss of GPS 2 ☐ Loss of satellites in view/details: ☐ Lateral indicated performance level changed from: ___to ___ ☐ Vertical indicated performance level changed from: ___ to ___ ☐ Indicated Dilution of Precision changed from ___ to ___ ☐ information on PRN of affected satellites (if applicable) ☐ Low Signal-to-Noise (Density) ratio ☐ Others
*Problem duration:	☐ continuous for 20 minutes ☐ intermittent

Appendix D - Appendix B

Risk Assessment

Threats and vulnerabilities

A threat assessment should be performed to determine the best approaches to securing a GNSS against a particular threat. Penetration testing exercises should be conducted to assess threat profiles and help develop effective countermeasures.

Table (B1) presents an overview of different potential impacts from GNSS interference. This is a snapshot of impacts based on input from two manufacturers and not intended to be a comprehensive list of all impacts:

Effect	Affected Operation	Impact
Loss of GNSS-based navigation	Enroute/ Terminal/ Approach	Aircraft with Inertial Reference Unit (IRU) or Distance Measuring Equipment (DME)/DME may have degraded RNP/RNAV. Aircraft may deviate from the nominal track May increase workload on aircrew and ATC May result in missed approach or diverting to other runway in case the aerodrome operating minima cannot be met through conventional precision or visual approaches. Conventional ATS routes, SIDs and STARs would be used.
Larger than normal GNSS position errors prior to loss of GNSS	Enroute/ Terminal/ Approach	Interference could cause the GNSS position to be pulled off but not exceed the HAL (2NM , 1NM, 0.3NM for enroute, terminal and approach phases, respectively).
Loss of EGPWS/ TAWS	Enroute/ Terminal/ Approach	Reduced situational awareness and safety for equipped aircraft. Terrain Awareness and Warning System (TAWS) is required equipment for turbine powered airplanes > 6 passengers. Loss of GPS results in loss of terrain/obstacle alerting. Position errors as GPS degrades can result in false or missed alerts.
Loss of GPS aiding to AHRS	Flight Control	Can result in degradation of AHRS pitch and roll accuracy with potential downstream effects such as was experienced by a Phenom 300 flight.
Loss of GNSS to PFD/MFD	All flight phases	Can result in: - Loss of synthetic vision display and flight path marker on PFD - Loss of airplane icon on lateral and vertical electronic map displays, georeferenced charts, and airport surface maps without DME-DME or IRU - Loss of airspace alerting and nearest waypoint information without DME-DME or IRU Overall loss of situational awareness to flight crew and increased workload.
No GNSS position for ELT	Search and Rescue	Loss of GNSS signal could result in larger search areas for the Emergency Locator Transmitters (ELTs)

Table B1: Potential Impact from GNSS

Consequence/Impact of risk occurring

Category	Scale	Effect on Aircrew and Passengers	Overall ATM System effect
Catastrophic	1	Multiple fatalities due to collision with other aircraft, obstacles or terrain	Sustained inability to provide any service.
Major	2	Large reduction in safety margin; serious or fatal injury to small number; serious physical distress to air crew.	Inability to provide any degree of service (including contingency measures) within one or more airspace sectors for a significant time.
Moderate	3	Significant reduction in safety margin.	The ability to provide a service is severely compromised within one or more airspace sectors without warning for a significant time.
Minor	4	Slight reduction in safety margin.	The ability to provide a service is impaired within one or more airspace sectors without warning for a significant time
Negligible	5	Potential for some inconvenience.	No effect on the ability to provide a service in the short term, but the situation needs to be monitored and reviewed for the need to apply some form of contingency measures if the condition prevails.

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Table B2: Impact of Risk Occurring

Likelihood of risk occurring

The definitions in the table (B3) were adopted for estimating the likelihood of an identified risk occurring, for this purpose, six situations are considered:

Event is expected to occur	
1	More frequently than hourly
2	Between hourly and daily
3	Between daily and yearly
4	Between yearly and 5 yearly
5	Between 5 and 50 years
6	Less frequently than once every 50 years

Table B3: Likelihood of risk occurring

Assessment of the level of risk and risk tolerance

All identified risks were reviewed and provided for each an overall risk ranking which is a combination of the two characteristics of consequence and likelihood. For example, a risk with a major consequence but a "5" likelihood would be described as having an "A" or "unacceptable" risk rating. The conversion of the combination of consequence and likelihood into a risk rating has been achieved by use of the following matrix.

Likelihood Criteria	Consequence Criteria				
Event expected to occur:	Catastrophic 1	Major 2	Moderate 3	Minor 4	Insignificant 5

1	More frequently than hourly	A	A	A	A	C
2	Between hourly and daily	A	A	A	B	D
3	Between daily and yearly	A	A	B	C	D
4	Between yearly and 5 yearly	A	B	C	C	D
5	Between 5 and 50 years	A	B	C	D	D
6	Less frequently than once every 50 years	B	C	D	D	D

Table D-2.4

The previous matrix provides a guide to determine which risks are the highest priorities from the perspective of the timeliness of the corrective action required. The following table outlines the position in more definitive terms.

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Safety tolerability risk matrix

Risk Index Range	Description	Recommended Action
A	Unacceptable	Stop or cut back operation promptly if necessary. Perform priority/immediate risk mitigation to ensure that additional or enhanced preventive controls are put in place to bring down the risk index to the moderate or low range.
B	High Risk	Urgent action. Perform priority/immediate risk mitigation to ensure that additional or enhanced preventive controls are put in place to bring down the risk index to the moderate or low range.
C	Moderate Risk	Countermeasures actions to mitigate these risks should be implemented.
D	Low Risk	Acceptable as is. No further risk mitigation required

Table B5: Risk Tolerability Matrix

Sample risk assessment

The risk assessment table (B6) could be used to identify and capture the threats, select the risk rating based on the risk matrix above considering the existing controls. In addition, recommended actions could be selected to minimize the risk.

L = Likelihood

C = Consequence

R = Risk

Threat	Initial Risk			Existing controls	Accept/Reduce	Recommended controls	Residual Risk		
	L	C	R				L	C	R

Table B6: Sample Risk Assessment tables

The table (B7) below is an example of risk assessment for approach phase of flight, the detailed Risk assessment process is at Appendix B

L = Likelihood

C = Consequence

R = Risk

Threat	Initial Risk			Existing controls	Accept/Reduce	Recommended controls	Residual Risk		
	L	C	R				L	C	R
Between daily and yearly	3	2	A	-Error message notification by avionic	Reduce	1) using of on-board equipment (IRS); 2)Interference detector by ANSPs 3)executing miss approach	3	4	C

Table B7: Example Risk Assessment for Approach phase of flight

Another example risk assessment for en-route phase of flight at table (B8)

L = Likelihood

C = Consequence

R = Risk

Threat	Initial Risk			Existing controls	Accept/Reduce	Recommended controls	Residual Risk		
	L	C	R				L	C	R
Between 5 and 50 years (short time GNSS outage)	5	5	D	-Error message notification by avionic -Regulations/ law to protect the GNSS signal	Accept	-			

Table B8: Example risk assessment for enroute phase of flight

APPENDIX E

ICAO CYBERSECURITY POLICY GUIDANCE

Introduction

E.1 This guidance is in line with the ICAO Aviation Cybersecurity Strategy, and the Cybersecurity Action Plan, which action item CyAP0.1 recommends that the International Civil Aviation Organization (ICAO) develops a model Cybersecurity Policy for reference by Member States and industry when developing their own national/internal policies.

E.2 The model Cybersecurity Policy is included in Appendix A to this guidance.

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Scope

E.3 The model Cybersecurity Policy outlined in Appendix A of this document addresses the protection and resilience of international civil aviation's critical infrastructure against cyber threats, and the multilateral collaboration requirement within civil aviation as well as with external authorities such as military, cybersecurity, and national security.

Objectives

E.4 The model Cybersecurity Policy is intended to serve as a guide to help States and industry focus resources and actions to achieve a systemic approach to cybersecurity in civil aviation, including current and legacy systems. The ultimate goal is for States and stakeholders to be able to develop a system-of-systems approach that enables civil aviation to be protected against cyber threats, and to respond to and recover from cyber incidents in a timely fashion, and, therefore, to withstand new threats without significant disruptions.

E.4 The main outcomes expected from implementing a Cybersecurity Policy are:

E.4.1 *Ensure civil aviation is protected against cyber threats*

The protection of civil aviation against cyber-attacks is addressed through the implementation of ICAO cybersecurity Standards and Recommended Practices, procedures, and guidance material. It includes the implementation of robust risk management practices, the identification of critical infrastructure, and the implementation of a holistic multilayered approach to cybersecurity. This approach should ensure that a successful attack on one layer does not compromise other layers of the system and/or lead to loss of safety, security or continuity of critical functions. The system should also adopt a continuous improvement approach to ensure that necessary enhancements to planned technical or procedural evolutions are coordinated, implemented, and kept up to date.

E.4.2 *Ensure civil aviation is cyber-resilient*

A cyber-resilient civil aviation system is a system that, under attack, can maintain its critical functionalities: i.e., supports safe and secure flight operations with minimal, if any, disruption. The system should also include appropriate cooperation and information-sharing mechanisms between aviation stakeholders, such as government, industry and, where appropriate, with civil law enforcement and military authorities.

E.4.3 *Ensure civil aviation is self-strengthening by adopting a "Security by Design" approach*

Adopting a security by design approach for civil aviation requires, at the outset of a system's conception, consideration of security objectives that need to be achieved during a system's design process, along with traditional operational and safety objectives. Ensuring the security of critical elements and processes "by design" changes the security paradigm from reactive to proactive, and fosters the development of a self-protected civil aviation system, therefore enabling it to evolve and enabling improved security and resilience.

E.4.4 Ensure coordination of aviation cybersecurity within civil aviation and with concerned non-aviation stakeholders

In order to ensure a consistent and complementary approach to aviation cybersecurity across aviation disciplines, the civil aviation system must ensure the comprehensive management of cyber risks to civil aviation by coordinating the safety and security aspects of aviation cybersecurity. In addition, coordination of aviation cybersecurity should extend beyond civil aviation to other concerned entities such as national/regional/international cybersecurity authorities, law enforcement, military, etc.

Elements of the Cybersecurity Policy

E.5 This section provides guidance on the elements included in the model Cybersecurity Policy in Appendix A. It is therefore recommended to be read together with the model Cybersecurity Policy.

E.5.1 Governance and Organization

E.5.1.1 States should designate an Appropriate Authority for Aviation Cybersecurity (AA/Cyber) with an overall mandate and responsibility for aviation cybersecurity and cyber resilience.

E.5.1.2 There is no one-size-fits-all model as to where the AA/Cyber would fit within individual States' civil aviation organizational structures. The decision would be impacted by several considerations related to the national aviation and relevant non-aviation set-up in terms of entities and mandates. It is important however that the AA/Cyber be provided with the required resources and authority to be able to discharge its mandate, including the negotiation and coordination with non-aviation concerned stakeholders.

E.5.1.3 Overall, the designated AA/Cyber should:

- a) determine, in coordination with the national competent authority for cybersecurity, the roles and responsibilities to be undertaken by each authority;
- b) lead the development of aviation cybersecurity regulations;
- c) clearly define roles and responsibilities for the different civil aviation domains within the national competent authority for civil aviation;
- d) coordinate the definition of roles and responsibilities of civil aviation entities overseen by the national competent authority for civil aviation through the national safety and security programmes;
- e) define the elements of civil aviation cybersecurity culture and monitor its implementation;
- f) define regulations, processes, requirements, and roles for cybersecurity crisis management, including testing requirements and frequencies; and
- g) coordinate cross-cutting aviation cybersecurity issues with relevant non-aviation stakeholders involved in aviation cybersecurity such as information sharing and incident investigation.

E.5.2 Risk Management

E.5.2.1 Managing cybersecurity risks should draw on aviation safety and security risk management frameworks in order to develop an integrated and accurate assessment of cybersecurity threats and risks, and ensure the development and implementation of effective mitigation measures that take into account safety requirements and the implications of mitigation measures on safety and continuity of civil aviation.

E.5.2.2 All data and systems should have identified ownership at all times. Identifying and maintaining ownership establishes accountabilities and supports the management of data and systems from adoption to disposal. As such, rules and processes should be established by the owners to include physical locations of data and systems, access rights, management rights, and security requirements based on data and system classification. This will eventually support adequate usage of data and systems by the right people, setting and implementing quality control standards, and resolve issues and conflicts.

E.5.3 Critical Systems Security

E.5.3.1 Defence in depth principles should be applied to protect critical systems. Defence in depth integrates people, technology, and operations capabilities to establish variable barriers across multiple layers and missions of the organization. It is an approach to cybersecurity in which a series of defensive mechanisms are layered in order to protect critical systems, data and information. This multilayered approach with intentional redundancies increases the security of a system as a whole and addresses many different attack vectors.

E.5.3.2 The AA/Cyber should ensure that civil aviation entities identify and adequately protect their critical systems as well as develop the ability to detect, respond to, and recover from cyber incidents.

E.5.4 Data Security

E.5.4.1 Periodic offline secure backup of critical data should be considered as an enabler to support information availability and integrity. It is however paramount to develop a robust backup policy, in line with risk assessments, since an offline backup taken while a cyber-attack is in progress would be already compromised and therefore cannot be used to restore access to critical information.

E.5.4.2 Encryption of sensitive data should be considered as an enabler to support information confidentiality. It is however important to define, in line with risk assessments, processes for the use of encryption that strike the appropriate balance between the level of confidentiality and operational performance requirements, especially for "live" data required for flight safety, as well as taking into account the resources needed to manage the data.

E.5.4.3 Processes should be established to ensure continuity of critical functions in case of loss of data availability and/or integrity.

E.5.5 Supply Chain Security

E.5.5.1 Entities should ensure that software and hardware used in critical aviation functions comply with cybersecurity requirements throughout the life cycle of aviation systems, from design and development through operation and maintenance, continuing through the safe and secure disposal.

E.5.5.2 Service Level Agreements can be leveraged to include cybersecurity requirements for hardware and software as well as for the update, upgrade, and patching in case of discovered vulnerabilities.

E.5.6 Physical Security

E.5.6.1 Examples of physical security controls of relevance to aviation cybersecurity include, inter alia, defining physical access management and control policies, background checks of personnel with administrative rights on systems/databases, or with access to sensitive and/or critical data, recommendations for separation of duties and/or rotation in personnel with access to, or ability to modify critical systems, etc.

E.5.7 Information, Communication, Technology (ICT) Security

E.5.7.1 Examples of ICT security controls of relevance to aviation cybersecurity include, inter alia, access control policies and application of least privilege principles, software/hardware firewalls and network security, cryptography, organizational password policies, end-point protection, network monitoring and detection of anomalies, network separation, device management, etc.

E.5.8 Incident Management and Continuity of Critical Functions

E.5.8.1 The AA/Cyber should define regulations, processes, requirements, and roles for cyber incidents management, recovery and continuity of critical systems.

E.5.8.2 Existing crisis management and business continuity plans should be leveraged to include response to and recovery from cyber incidents.

E.5.8.3 Testing emergency response and business continuity plans should be periodically conducted with the aim to improve the plans as well as the capabilities of responders. Testing should include all relevant stakeholders and comprise a combination of Table Top Exercises (TTX) as well as live tests.

E.5.9 Cybersecurity Culture

E.5.9.1 Cybersecurity culture should be implemented across all aviation entities.

E.5.9.2 Cybersecurity culture should be endorsed by organizational leadership, and should include a programme to be undertaken by all personnel.

E.5.9.3 The programme should include recurrent cybersecurity education (including principles of cyber hygiene practices), awareness on latest threats, training, and testing (both as part of training and live simulation of attacks) to assess the level of cyber awareness/hygiene.

E.5.9.4 Cybersecurity culture should include elements from safety and security cultures, e.g. self-reporting, reporting of suspicious behaviour/practice, just culture, etc.

Appendix E - Appendix A Model Cybersecurity Policy

1. Introduction

1.1 This cybersecurity policy shall be the framework for further development and implementation of aviation cybersecurity. It shall be published, disseminated to relevant stakeholders, and periodically reviewed.

1.2 Further guidance material shall be developed to support the implementation of this cybersecurity policy.

2. Scope

2.1 Aviation cybersecurity shall address the security and resilience of the civil aviation system, as well as support the collaboration with concerned non-aviation entities and authorities, including national cybersecurity authority, national security, law enforcement and military, as appropriate.

2.2 Aviation cybersecurity shall be coordinated at the national level with aviation safety, aviation security, critical infrastructure protection, cyber defence and military.

2.3 Aviation cybersecurity shall be coordinated at the international level with equivalent Foreign Appropriate Authorities designated for Aviation cybersecurity.

3. Objectives

3.1 The overall objectives of this aviation cybersecurity policy are to ensure the security, resilience, and self-strengthening of the civil aviation system against cyber threats and risks, and to ensure the coordination of aviation cybersecurity with concerned national authorities and entities.

4. Governance and Organization

4.1 In accordance with [Regulation/Legislation Reference for the designation], [Entity Name] shall be the Appropriate Authority for Aviation Cybersecurity (AA/Cyber) with an overall mandate for aviation cybersecurity and cyber resilience.

4.2 The AA/Cyber shall:

- a) engage with the national competent authority for cybersecurity in order to define the civil aviation cybersecurity roles and responsibilities to be undertaken by each authority;
- b) coordinate and contribute to the development of aviation cybersecurity regulations;
- c) define, coordinate, and provide support to aviation safety and aviation security appropriate authorities to include aviation cybersecurity requirements, including oversight and quality control elements, in the national SSP and the National Civil Aviation Security Programme (NCASP);
- d) define, support, and monitor the implementation of the cybersecurity culture programme by all civil aviation stakeholders;
- e) define regulations, processes, requirements, and roles for cybersecurity crisis management; and
- f) coordinate cross-cutting aviation cybersecurity issues with relevant non-aviation stakeholders involved in aviation cybersecurity.

5. Risk Management

5.1 Cybersecurity shall be intelligence driven, threat based and risk managed.

5.2 Risk management shall be an integral part of overall systems' life cycle.

5.3 All data and systems shall have identified ownership at all times.

6. Critical Systems Security

6.1 Critical functions, systems, and infrastructure shall be identified through risk management processes.

6.2 Security by design approach, coupled with Defence in depth principles, shall be applied to protect critical systems.

6.3 Redundancy of critical systems shall be considered as an enabler for system security.

7. Data Security

7.1 Data and information shall be protected during storage and transmission, in line with its sensitivity profile.

8. Supply Chain Security

8.1 End-to-end management of software/hardware supply chain shall be part of aviation cybersecurity management.

8.2 Software and hardware used in critical aviation functions shall comply with cybersecurity requirements throughout the life cycle of aviation systems.

9. Physical Security

9.1 Physical security (including personnel security) shall be part of aviation cybersecurity management.

9.2 Physical security shall safeguard people, infrastructure, facilities, equipment, material, and documents from unlawful interference and protect critical aviation systems from unauthorized physical access.

9.3 Physical security shall contribute to risk management through supporting the identification of threat actors and/or the likelihood of attacks on civil aviation critical infrastructure.

10. Information, Communication, Technology (ICT) Security

10.1 ICT security shall be part of aviation cybersecurity management.

10.2 ICT security shall define and implement logical security measures as well as contribute to cyber incident management, recovery, and operation continuity processes.

10.3 ICT security shall contribute to risk management through the identification of vulnerabilities, attack vectors, and monitoring the evolution of the aviation cybersecurity threat landscape.

11. Incident Management and Continuity of Critical Functions

11.1 Safety of operations and continuity of critical functions shall be the main drivers in incident management processes.

11.2 Testing crisis management and recovery plans shall be an integral part of incident management.

12. Cybersecurity Culture

12.1 An education, awareness, training, and exercise plan shall be an integral part of aviation cybersecurity management.

12.2 Cybersecurity culture shall be fully coordinated with existing safety and security cultures.

12.3 Cybersecurity culture shall be supported by robust internal and, to the extent possible, external information sharing practices.

APPENDIX F

BASIC PLAN ELEMENTS

Element 1: Administration

- a) record of signatories, version control and records of amendment.
- b) definition of the objectives, applicable airspace and operations, and exclusions.

Element 2: Plan Management

- c) list of States and FIRs affected, and the agreed methods of notification in the event of pre-activation, activation and termination of the plan.

Contingency events may arise with insufficient advance notice to permit pre-activation of contingency plans

- d) details of the arrangements in place for management of the plan, including:
 - i. provisions for a Central Coordinating Committee to authorize and oversee the activation of the plan and arrange for ATS restoration in the event of an extended outage;
 - ii. ATM Operational Contingency Group for 24-hour coordination of operational and supporting activities under the plan, and
 - iii. the ToRs, structure and contact details for the CCC and AOCG.
- e) details of testing, review, and reporting actions:
 - i. Schedule of table-top and simulator testing;
 - ii. Post-Activation Review (PAR) requirements:

- completion of a preliminary PAR report within 28 days of any activation or testing of contingency plans, including any recommendations to address deficiencies and implement improvements in contingency plans, arrangements, procedures and training.
- a more comprehensive PAR report should be prepared for major contingency events, or any contingency event involving an air safety incident investigation.
- input to the PAR from all parties affected by or involved in the response to the contingency is actively sought and considered;
- bi-lateral or multi-lateral PAR for activation or testing of Level 2 contingency arrangements; and
- Timely reporting to ICAO MID and other affected States of anticipated or experienced disruptions requiring activation of contingency plans.

Note: Annex 11 states that: States anticipating or experiencing disruption of ATS and/or related supporting services should advise, as early as practicable, the ICAO MID Regional Office and other States whose services might be affected. Such advice should include information on associated contingency measures or a request for assistance in formulating contingency plans.

- f) inclusion of contingency plans/procedures in ATS training and refresher training programmes.

Element 3: Airspace

- g) procedures and determinants for implementation and activation of Special Use Airspace (SUA) including, where necessary, Restricted or Prohibited Areas in territorial airspace, or Danger Areas over the high seas.
- h) criteria for airspace classification changes and associated separation and CNS requirements.
- i) Collaborative Trajectory Options for Category A, B and C events, and for Large Scale Weather Deviations (LSWD).

Element 4: ATM Procedures

- j) details of re-routing to avoid the whole or part of the airspace concerned, normally involving establishment of:
 - i. strategic and tactical collaborative trajectory options providing additional routes or route segments with associated conditions for their use; and/or
 - ii. a simplified route network through the airspace concerned, together with a FLAS, to ensure that a standard minimum vertical separation is applied where less than a specified minimum lateral separation exists between routes.
- k) details of how domestic traffic, departing and arriving flights and SAR, humanitarian and State aircraft flights will be managed during the contingency period.
- l) procedures for transition from normal services levels to contingency services, and resumption of normal service.
- m) procedures for joining or departing a contingency route.
- n) details of reduced levels of service, if any, within the affected airspace.
- o) establishment of arrangements for controlled access to the contingency area to prevent overloading of the contingency system, utilizing allocated airspace entry times or, where ATFM capability exists, tactical ATFM measures.
- p) procedures for adjacent service providers to establish longitudinal spacing at the entry point, and to maintain such separation through the airspace;
- q) reassignment of responsibility for providing ATS, to the extent possible, in non-sovereign airspace and to international aircraft transiting sovereign airspace; and/or
- r) coordination and communications transfer procedures for aircraft entering and leaving the affected airspace.

Element 5: Pilot/Operator Procedures

- s) requirements for flight plan submission during the contingency period, including contingency route planning requirements, and arrangements if airspace is restricted or not available and no contingency route is available.
- t) emergency procedures, including In-flight requirements for broadcast of position and other information, and for continuous listening watch, on specified pilot-pilot and GUARD Very High Frequency (VHF) frequencies.
- u) requirements for display of navigation and anti-collision lights.
- v) requirements for climbing and descending well to the right of the centreline of specifically identified routes.

- w) requirements for all operations to be conducted in accordance with Instrument Flight Rules (IFR), including operating at IFR flight levels from the relevant Table of Cruising Levels in Appendix 3 of Annex 2 – Rules of the Air, except where modified by a FLAS.

Element 6: Communications Facilities and Procedures

- x) provision and operation of adequate air-ground communications, Aeronautical Fixed Telecommunication Network (AFTN) and ATS direct speech links.
- y) specification of radio frequencies to be used for particular contingency routes.
- z) log-on and connection management for Controller Pilot Data-link Communications (CPDLC) aircraft, where appropriate.
- aa) use of Automatic Dependent Surveillance-Contract (ADS-C) automatic position reporting in lieu of voice position reporting to ATS.

Element 7: Aeronautical Support Services including AIS (AIM), NOTAM and MET

- bb) AIP Information regarding the contingency planning, and notification by ASHTAM/NOTAM of anticipated or actual disruption of ATS and/or supporting services, including associated contingency arrangements, as early as practicable and, in the case of foreseeable disruption, not less than 48 hours in advance.
- cc) reassignment to adjacent States of the responsibility for providing meteorological information and information on status of navigation aids.

Element 8: Contact Details

- dd) contact details for the Rescue Coordination Centre (RCC) responsible for the affected FIR, and coordination arrangements.
- ee) contact details of adjacent States ANSPs and other International Organizations participating in the contingency plan.
- ff) prior notification requirements for adjacent FIR activation of Level 2 contingency arrangements.

Note: The first priority response to any short notice contingency response should be the immediate handling of the air situation, followed by the activation of the contingency plan.

APPENDIX G

MID REGION ATM CONTINGENCY FOCAL POINTS

Note: since the nature of contingency is vary, ICAO MID is responsible to develop the exact list of contingency focal point and member of contingency coordination team (CCT) for each event accordingly.

NAMES	PHONE (WORK)	PHONE (HOME)	MOBILE PHONE	FAX	E-MAIL	OTHER CONTACT DETAILS
BAHRAIN						
Mr. Abdulla Al Qadhi	9731732 1116		973 36639955	973 17321 9966	aalqadhi@mtt.gov.bh	Bahrain ACC Duty Supervisor Tel: 973 1732 1081/1080 Fax : 973 1732 1029 Email : bahatc@caa.mtt.bh
EGYPT						
Mr. Moatassem BalighWael Ezzat Mahoud Mohamed Ammar	202-265 7849-	202-639 1792-	01001695252 +2010060137 34	202-268 0627+20222680 629	moatassem_5@hotmail.comwael.ammar@nansceg.net	General Director of Cairo ACC
Mr. Amr Ibrahim Abdel Latiff			+2010015564 47	+202422681375 +20222681371	amraircommander@gmail.com	ANS Inspector Egyptian Civil Aviation Authority
IRAN						
Mr. Hamed Rahbar Modami Deputy of G.D in Area Control Center of ATM Mr. Masoud Nikbakht DG of ATM Department	+9821631466 1498-21-445 44101		+9891252288 0998-912326 3905	9821-44544102	rahbar@airport.ir masoudnikbakht@gmail.com	Note:— During New Year Holidays in Iran (20 March—5 April) or for any urgent message Contact Tehran ACC on +9821-44544116
Mr. Seyed Hamid Reza Sanei Iran CAA, Director of Aerodromes and ANS oversight Mr. Ahmad Kavehfiroz Deputy Director of Tehran ACC	9821 44544119		+9891259359 90989423230 447	9821-44544102	h-saanei@caa.gov.ir ahmadkavehfiroz@gmail.com	

MID Region ATM **Volcanic Ash** Contingency Plan

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NAMES	PHONE (WORK)	PHONE (HOME)	MOBILE PHONE	FAX	E-MAIL	OTHER CONTACT DETAILS
IRAQ						
Mr. Fadhil Getea Director ATS	96418133370		964 7828844998		atc@iraqcaa.com	
JORDAN						
Mr. Nayef Al Marshoud Director, ATM	9626 489 7729	962 5 3862584	962 797498992 962 777789470	9626 4891 266	nayefmarshoud@hotmail.com datm@carc.gov.jo	
KUWAIT						
Mr. Adel S. Boresli Director Air Navigation	965 24710268		96599036556	965 24346221	as.buresli@dgca.gov.kw	
LEBANON						
Mr. Kamal Nasserddine Chief Air Navigation Dept.	+ 961 1 628178		+961 71309409	+961 1 629023	ATM@beirutairport.gov.lb	AFTN OLBZPZX
LIBYA						
Mr. Mohamed E. Bakar Director of ATM	218-61 360 5535		218-91 219 4477	218-21 360 5535	mohamed.bakar@caa.gov.ly	
OMAN						
Mr. Mubarak Gheilani Director ATS	~~+968-24-354~~ ~~867+966-12-~~ ~~6848121~~		~~+968-9507~~ ~~6157+966-~~ ~~548184040~~	~~+966-12-~~ ~~6854016~~	m.alghelani@paca.gov.om	
SAUDI ARABIA						
Mr. ~~Waleed M.~~ ~~Madani~~ ~~Ahmed Sami~~ ~~Abughallab~~	(966-12) 671 7717 Ext 1818		966-50 567 4867	9662 6401005	~~Asabughallab@sans.com~~ ~~s.com.sawaleedmadani@gaca.gov.sa~~ ~~ma~~	
SUDAN						
Mr. Abubakr Elsiddig Elamin	24918378496 4		24991214674 5	249183784964	abubakratco@live.com	ATM Director ANS P.O. Box 137 code 11112, Khartoum, Sudan
SYRIA						
Mr.Hassan Hamoud ATM Director	00963115401 0180	00963116 460395	00963 988235106	963 11 540101801	ans@scaa.sy hamoud_hasan@yahoo.com	P.O.BOX:6257 Damascus, Syria

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NAMES	PHONE (WORK)	PHONE (HOME)	MOBILE PHONE	FAX	E-MAIL	OTHER CONTACT DETAILS
UNITED ARAB EMIRATES (UAE)						
Mr. Ahmed Al Jallaf Assistant Director General, ANS, GCAA	9712 599 6888		97150 614 9065	9712 599 6883	aljallaf@szc.gcaa.ae	9712 599 6999 SCZ
Mr. Muayyed Al Teneiji Senior Director ATM	971-2 5996830		+971 56 685 4505	971-2 5996836	mteneiji@szc.gcaa.ae	
YEMEN						
Mr. Younis Al-Khader Mr. Abdullah Abdulwareth Aleryani	967-2-343722967-1-345403	967-2-238600967-1-344254	967-777523776967-1-7777190602	967-2-343722967-1-345403	airmavcnsaden@gmail.com mail.comernlabd@gmail.com	Mr. Younis Al-Khader D.G ACC/FIC
Mr. Ashhab Omar Mr. Ahmed Mohammed Al-Koobati	967-2-343722967-1-344675	967-2-366089967-1-214375	967-777848215967-1-7777241375	967-2-343722967-1-344047	ashhabx@gmail.com CAMA70@yahoo.com	Mr. Ashhab Omar D.Air Navigation Operation
Mr. Ahmed Mohammed Al-Koobati	967-1-344675	967-1-214375	967777241375	967-1-344047	CAMA70@yahoo.com	D.Air Navigation Operation
Mr. Abdullah Abdulwareth Aleryani	967-1-345403	967-1-344254	967777190602	967-1-345403	ernlabd@gmail.com	D.G ACC/FIC
IATA						
Mr. George Rhodes	96 26 580 4200 Ext 1215			962 (6) 593 9912	rhodesg@iata.org SFOMENA@iata.org	
ICAO MID						
Mr. Ahmad Amireh (RO ATM/SAR)	202 2267 4840/5		+2010502144 80	202 2267 4843	aamireh@icao.int icaomid@icao.int	
Mr. Ahmad Kaveh (RO ATM)	ext 4120 ext 4122		+2010321824 88		akaveh@icao.int	
ICAO APAC						
Mr. Leonard Wicks (RO ATM)	662 537 8189 ext 152				lwicks@icao.int	
ICAO ESAF						
Mr. Sebosese Machobane Ms. Keziah Ogutu (RO/-ATM)					kogutu@icao.int machobane@icao.int	
Mr. Colin Bryant (RO/ATM)					cbryant@icao.int	
ICAO EUR/NAT						
Mr. Sven Halle (RO/ATM)					shalle@icao.int	
ICAO WACAF						
Mr. Albert Taylor Mr. Tchanda Serge Guy (RO/ATM)	+22133 869 24 13		+2217638791 39		Ataylorstchanda@icao.int	
ICAO Headquarters						
Mr. Chris Dalton (C/AMO)	1514 954-6711				cdalton@icao.int	

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APPENDIX H

STATUS OF CONTINGENCY AGREEMENTS IN THE MID REGION

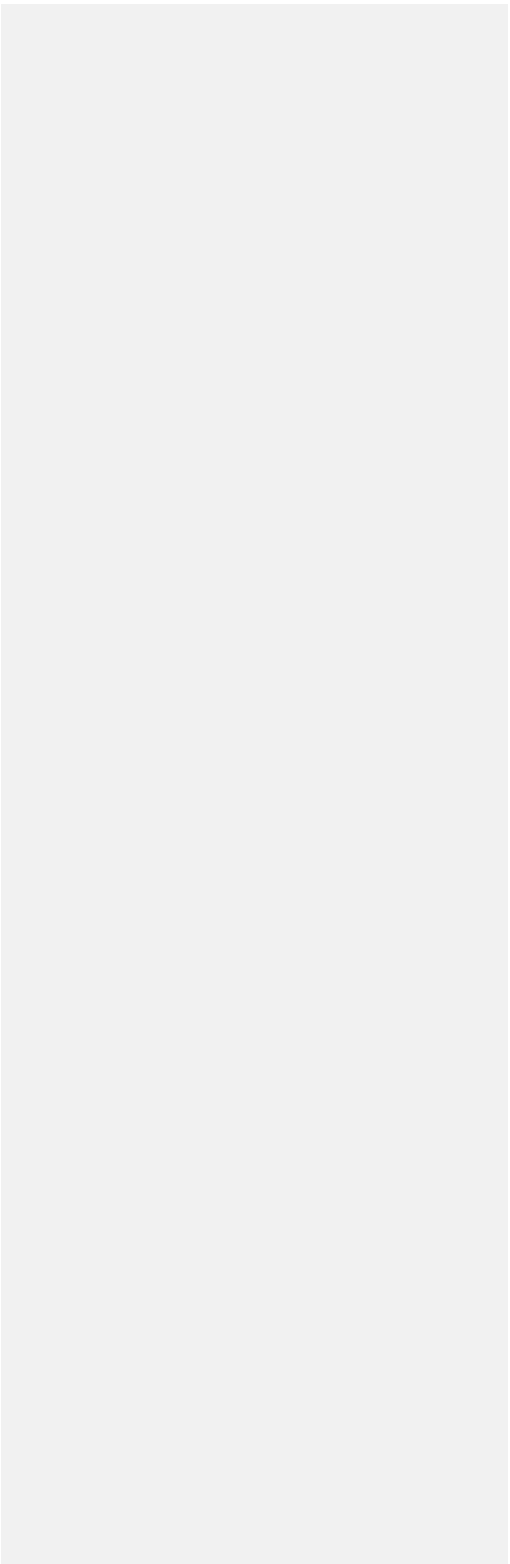
STATE	CORRESPONDING STATES			REMARKS*
BAHRAIN	☒ IRAN ☒ KUWAIT	☒ QATAR ☒ SAUDI ARABIA	☒ UAE	Completed
EGYPT	☒ GREECE ☒ JORDAN	☒ LYBIA ☒ CYPRUS	☒ SAUDI ARABIA ☒ SUDAN	Completed
IRAN	☒ ARMENIA ☐ AZERBAIJAN ☐ TURKMENISTAN ☐ AFGHANISTAN	☒ BAHRAIN ☒ IRAQ ☐ KUWAIT ☒ OMAN	☒ PAKISTAN ☒ TURKEY ☒ UAE	7/11
IRAQ	☒ IRAN ☐ JORDAN	☐ KUWAIT ☐ SAUDI ARABIA	☐ SYRIA ☐ TURKEY	1/6
JORDAN	☒ EGYPT ☐ IRAQ	☐ ISRAEL ☒ SAUDI ARABIA	☐ SYRIA	2/5
KUWAIT	☒ BAHRAIN ☐ IRAN	☐ IRAQ	☒ SAUDI ARABIA	2/4
LEBANON	☐ CYPRUS	☐ SYRIA		0/2
LIBYA	☐ ALGERIA ☐ CHAD ☒ EGYPT	☐ MALTA ☐ NIGER	☐ SUDAN ☐ TUNIS	1/7
OMAN	☐ INDIA ☒ IRAN	☐ PAKISTAN ☐ SAUDI ARABIA	☒ UAE ☒ YEMEN	3/6
QATAR	☒ BAHRAIN	☐ SAUDI ARABIA	☒ UAE ☒ Iran	2/3
SAUDI ARABIA	☒ BAHRAIN ☒ EGYPT ☐ ERITREA ☐ IRAQ	☒ JORDAN ☒ KUWAIT ☐ OMAN ☒ QATAR	☐ SUDAN ☒ UAE ☐ YEMEN	5/11
SUDAN	☐ CENTRAL AFRICAN ☐ CHAD ☒ EGYPT	☐ ERITREA ☐ ETHIOPIA ☐ LIBYA	☐ SAUDI ARABIA ☐ SOUTH SUDAN	1/8
SYRIA	☐ IRAQ ☐ JORDAN	☐ LEBANON ☐ CYPRUS	☐ TURKEY	0/5
UAE	☒ BAHRAIN ☒ IRAN	☒ OMAN ☒ QATAR	☒ SAUDI ARABIA	45/5
YEMEN	☐ DJIBOUTI ☐ ERITREA	☐ INDIA ☒ OMAN	☐ SOMALIA	1/7

	☐ ETHIOPIA	☐ SAUDI ARABIA	

☒ Agreement Signed

☐ Agreement NOT Signed

*Signed Agreements / Total No. of required Agreements



ATTACHMENT A**MEASURES TAKEN BY QCAA AND ATS UNITS DURING COVID-19**

The COVID-19 Worldwide pandemic had a significant impact on a global air transport industry and the provision of air navigation services with a massive decrease in aircraft movements during this period. Several recommendations /guidelines for contingency measures for a navigation service provider by ICAO, Eurocontrol, CANSO AND IFATCA were subsequently published to ensure the health of employees, mitigate any safety risks associated with impacted services to ensure continuous and safe provision of air traffic services. QCAA/AND have been closely monitored the rapidly developing situation prior to COVID-19 being formally declared as a pandemic including the active engagement/discussion with the Qatar National pandemic preparation committee spearheaded by QATAR Ministry of Public Health. The QCAA/Air Navigation Department took extraordinary measures to prevent the infection of essential employees and maintain a continuous and safe Air Traffic Services with support and guidelines provided by the Qatar Ministry of Public Health and the Aerodrome Operator (MATAR). Measures taken by AND to prevent the infection of staff to ensure continuous provision of air traffic services include but are not limited to the following:

1. Limit facility access to essential personnel (ATCO and ATCA, ATSEPs to maintain the ATM/CNS critical system and equipment that directly supports Air Traffic Service by allowing administration staff to work from home. Non-essential training and visitors 'access was suspended. Exceptions were made for the ATCO's training to maintain their currency and some exceptions were agreed and approved with the QCAA Regulatory Authority.
2. The ATC roster was adapted to ensure that minimum staff was available. Excess staff, due to the reduction in traffic, would be on standby at home to avoid crowded operational rooms. Standby teams were established in the event of any emergency situation/late notice staffing requirements and were rostered as additional cover.
3. Health and Safety measures were implemented such as the installation of hydro alcoholic distributors in the operational buildings, provision of wipes to disinfect the equipment touched by ATC personnel (mouse, keyboards, and VCCS panels).
4. Increase the frequently of facility cleaning, including periods of routine planned "deep cleaning" (OPS rooms, break rooms, wash rooms).
5. Due to the number of CWPs/Position available in excess of operational and back up requirements at OTBD, OTHH Towers and Doha Approach room, social distancing between different working position in the ATC rooms was implemented.
6. A procedure for operational rooms deep cleaning and sterilization was established. Contingency COVID-19 operations rooms to deliver air traffic service from alternatives/backup site in case of confirmed case reported in the main operation room were established to enable sterilization and deep cleaning of any affected areas.
7. Additional break rooms/space were provided to staff.
8. Essential staff vaccination was prioritized by the Air Navigation Department in coordination with the Qatar Ministry of Public Health.
9. Employees were encouraged to follow the Qatar Ministry of Public Health recommendations and measures (social distancing, health and safety measures: washing hands, staying at home if not feeling well and self-testing, not sharing their headsets, encourage employees to clean their own position) . These were promoted by e-mails, circulars and posters located within the building.

10. Implement temperature taking stations at the building entrance and Etheraz checks.
11. COVID rapid antigen tests were provided to employees requesting these.
12. Providing sterilization materials on the facility (units, break rooms, elevators).

Factors that played a major role in facilitating the implementation of these measures and the measures which were either recommended or required to be taken as advised or mandated by the local Public Health Authority:

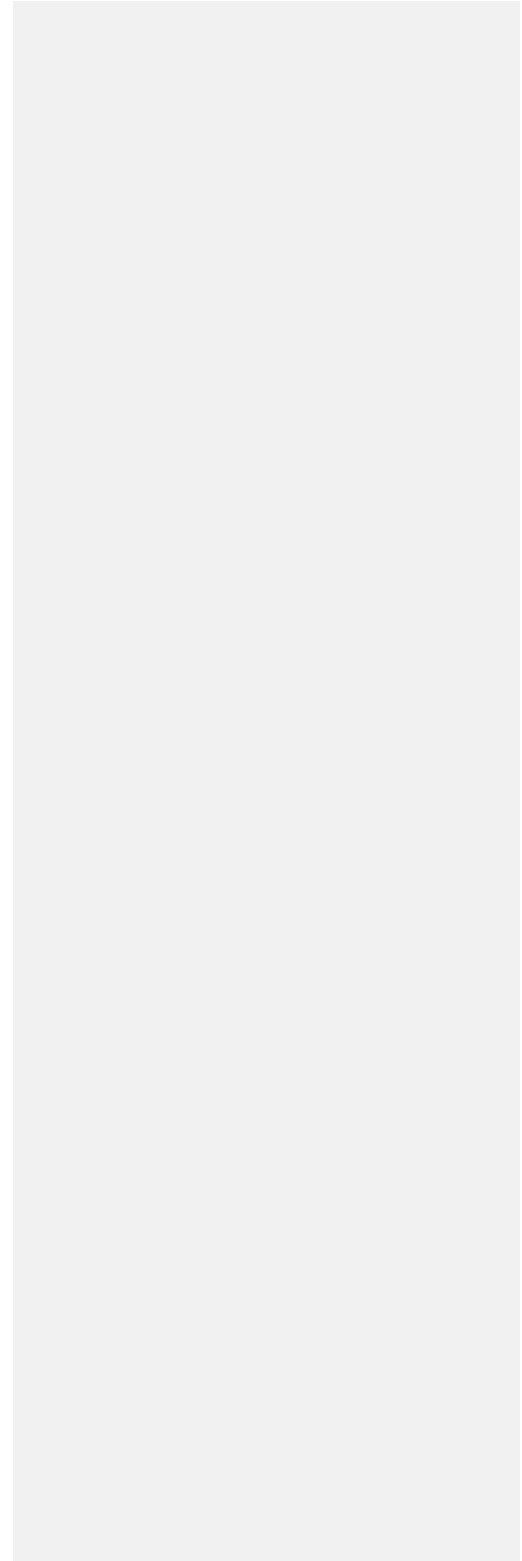
- the size of the operational rooms
- the numbers of back up working positions available
- the aircraft movement decrease
- the number of essential staff
- the establishment of COVID contingency rooms
- the awareness and communication with the employees

ATTACHMENT B
MID REGION DME/DME COVERAGE

TDB

ATTACHMENT C
MID REGION SURVEILLANCE COVERAGE

TDB



ATTACHMENT D

INTERNATIONAL CIVIL AVIATION ORGANIZATION



MID REGION ATM VOLCANIC ASH CONTINGENCY PLAN

MID REGION AIR TRAFFIC MANAGEMENT VOLCANIC ASH CONTINGENCY PLAN

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 - 1.2 Danger Areas
 - 1.3 Phases of an Event
- 2. Pre-eruption phase**
 - 2.1 General
 - 2.2 Originating ACC Actions
 - 2.3 Adjacent ACC Actions
 - 2.4 ATFM Unit Actions
- 3. Start of eruption phase**
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 - 3.2 Originating ACC Actions
 - 3.3 Adjacent ACC Actions
 - 3.4 ATFM Unit Actions
- 4. On-going eruption phase**
- 5. Recovery phase**
- 6. Air traffic services procedures**
- 7. Air traffic flow management procedures**

APPENDIX A General guidance for the development of an ATM volcanic ash contingency plan

APPENDIX B Anticipated flight crew issues when encountering volcanic ash

APPENDIX C Communication and dissemination of pilots' reports of volcanic activity

APPENDIX D SIGMET and NOTAM examples during volcanic ash

MID Region ATM Volcanic Ash Contingency Plan

1. TERMINOLOGY

1.1. Areas of Contamination

1.1.1. Information on areas of observed and/or forecast volcanic ash in the atmosphere is provided by means of appropriate MET messages in accordance with Annex 3 – *Meteorological Service for International Air Navigation*.¹

1.2. Danger Areas

1.2.1. If it is considered that the volcanic event could pose a hazard to aviation, a danger area² may be declared by NOTAM. However, this option should only be applied over and in the proximity of the volcanic source. Normally, clearances will not be issued through the danger area unless explicitly requested by the flight crew. In this context it should be noted that the final responsibility for aircraft safety rests with the flight crew. Therefore, the final decision regarding route, whether it will be to avoid or proceed through an area of volcanic activity, is the flight crew's responsibility. Wherever this document discusses the possible establishment of danger areas, States are not prevented from establishing restricted or prohibited areas over the sovereign territory of the State if considered necessary by the State concerned.

1.2.2. Although it is the prerogative of the Provider State to promulgate a danger area in airspace over the high seas, it should be recognized that restrictions to the freedom of flight over the high seas cannot be imposed in accordance with the United Nations Convention on the Law of the Sea (Montego Bay 1982).

1.3. Phases of An Event

1.3.1. The response to a volcanic event that affects air traffic has been divided into four distinct phases in this document: Pre-Eruption, Start of Eruption, On-going Eruption and Recovery Phases as follows:

Pre-Eruption Phase (when applicable): The initial response, "raising the alert", commences when a volcanic eruption is expected.

Appropriate AIS and MET messages may be issued in accordance with Annex 15 and Annex 3 respectively, and disseminated to affected aircraft in flight by the most expeditious means. It should be noted that, sometimes volcanoes erupt unexpectedly without any alert being raised; hence the pre-eruption phase may be omitted.

Start of Eruption Phase (when applicable): The start of eruption phase commences at the outbreak of the volcanic eruption and entrance of volcanic ash into the atmosphere and mainly pertains to aircraft in flight. Appropriate AIS and MET messages may be issued as appropriate in accordance with Annex 15 and Annex 3 respectively, and a danger area may be declared by NOTAM. Normally, clearances will not be issued through the danger area unless explicitly requested by the flight crew.

On-Going Eruption Phase: The on-going eruption phase commences with the issuance of the first Volcanic Ash Advisory (VAA) containing information on the extent and movement of the volcanic ash cloud following completion of the previous reactive responses. Appropriate AIS and MET messages may be issued as appropriate in accordance with Annex 15 and Annex 3, respectively.

¹ Principally this will include volcanic ash advisory messages (issued by volcanic ash advisory centres) and SIGMET information on volcanic ash (issued by meteorological watch offices).

² Depending on the State's regulation, the area may be established as a "danger area", "restricted area" or "prohibited area". Over the high seas only "danger area" may be established.

MID Region ATM Volcanic Ash Contingency Plan

Recovery Phase: The recovery phase commences with the issuance of the first VAA containing a statement that “NO VA EXP” (i.e. “no volcanic ash expected”) which normally occurs when it is determined that no volcanic ash is expected in the atmosphere and the volcanic activity has reverted to its pre-eruption state.

Note: These descriptions are amplified in Chapter 3 of this document.

1.3.2. Although the four distinct phases herein describe actions to be undertaken during an actual volcanic event, they are based on a theoretical scenario. Actual eruptions may not always be distinct with respect to ATM actions to be undertaken. Similarly, an eruption may occur without any pre-eruptive activity, or may cease and restart more than once. Hence, the first observation may be the presence of an ash cloud which is already some distance away from the volcano. It is essential that the contingency planning prepares the ATM system for an appropriate response depending on the actual conditions. Therefore, the “Pre-Eruption Phase” and “Start of Eruption Phase” described in this document are annotated “when applicable” in order to provide for flexibility in the application of the contingency plan in those parts of the world with insufficient volcano monitoring and alerting.

1.3.3. Flight crews are required to report observations of volcanic activity by means of a special air-report (Special AIREP). Arrangements should be put in place to ensure that such information is transferred without delay to the appropriate aeronautical institutions responsible for subsequent action. The communication and dissemination of pilot reports on volcanic activity is described in Appendix C.

2. PRE-ERUPTION PHASE

2.1. General

2.1.1. Where flight operations are planned in areas that are susceptible to volcanic eruptions, ATS units may expect to receive from flight crews the ICAO Volcanic Activity Report (VAR) form (published in the *Procedures for Air Navigation Services – Air Traffic Management* (PANS-ATM, Doc 4444, Appendix 1).

2.1.2. The focus of this phase is to gain early recognition of volcanic events. This phase is frequently characterised by a very limited availability of information on the potential extent and severity of the impending eruption. The priority is to ensure the continued safety of aircraft in flight; this requires promulgating information as a matter of urgency. Notwithstanding the potentially limited extent of information available, the pre-eruption phase actions described below should be carried out for every expected eruption.

2.1.3. The initial response, “raising the alert”, commences when a volcanic eruption is expected. Initial awareness of the event may be by means of a Special AIREP/VAR and/or from information provided by meteorological or volcano-logical agencies. Arrangements in each State between designated volcano observatories, meteorological and air traffic management agencies should ensure that alerting information is provided expeditiously by the most appropriate means to provide continued safety of flight.

2.1.4. Emphasis is placed on raising awareness of the hazard and to protect aircraft in flight. The actions are based on well-prepared, well-exercised contingency plans and standard operating procedures. Aircraft are expected to clear or avoid the volcanic ash affected area based on standard operating procedures.

2.2. Originating ACC Actions (*eruption expected in its own flight information region*)

2.2.1. In the event of significant pre-eruption volcanic activity, which could pose a hazard to aviation, an area control centre (ACC)³, on receiving information of such an occurrence, should carry out the following:

³ Where the term “ACC” is used throughout this document, it is intended to also include all ATS facilities.

MID Region ATM Volcanic Ash Contingency Plan

- a) ensure that appropriate AIS messages are originated in accordance with Annex 15. These must provide as precise information as is available regarding the activity of the volcano. It is imperative that this information is issued by the international NOTAM office and disseminated as soon as possible in accordance with the provisions of Annex 15;
- b) when so required by the State, define an initial, precautionary danger area in accordance with established procedures. The size of the danger area should encompass a volume of airspace in accordance with the information available, aiming to avoid undue disruption of flight operations;
 - i. if no such procedures have been established, the danger area should be defined as a circle with a radius of xxx km (xx NM)⁴. The circle should be centred on the estimated or known location of the volcanic activity;
 - ii. although ATC would not normally initiate a clearance through a danger area, it will inform aircraft about the potential hazard and continue to provide normal services. It is the responsibility of the pilot-in-command to determine the safest course of action.
- c) advise the associated MET service provider(s) in accordance with national/regional arrangements unless the initial notification originated from such provider(s), who will then inform the appropriate air traffic flow management (ATFM) units;
- d) alert flights already within the area concerned and offer assistance to enable aircraft to exit the area in the most expeditious and appropriate manner. Flight crews should be provided with all necessary information required to make safe and efficient decisions in dealing with the hazards in the defined area. Aircraft that are close to the area should be offered assistance to remain clear of the area. Flights which would be expected to penetrate the area should be re-cleared onto routes that will keep them clear;
- e) immediately notify other affected ACCs of the event and the location and dimensions of the area concerned. The ACC should also negotiate any re-routings necessary for flights already coordinated but still within adjacent Flight Information Regions (FIRs) and provide any information on potential implications on traffic flow and its capability to handle the expected traffic. It is also expected that adjacent ACCs will be asked to reroute flights not yet coordinated to keep them clear of the area. It should be noted that flight crews may make the decision not to completely avoid the area based on, for example, visual observations; and
- f) implement flow management measures if necessary to maintain the required level of safety.

Note 1. — In order to assist staff in expediting the process of composing the AIS messages, a series of templates should be available for this stage of the volcanic activity.

2.2.2. In addition to sending the relevant AIS messages to the normal distribution list, it will be sent to the relevant meteorological facilities.

2.3. Adjacent ACC Actions

⁴ The size of the area is to be agreed in the region concerned and should be based on local knowledge as regards the volcano concerned.

MID Region ATM Volcanic Ash Contingency Plan

2.3.1. During the pre-eruption phase, ATC will not normally initiate clearances through a danger area; however, it will inform aircraft about the potential hazard and continue to provide normal services. Adjacent ACCs should take the following action to assist:

- a) when advised, re-clear flights to which services are being provided and which will be affected by the area; and
- b) unless otherwise instructed, continue normal operations and:
 - i. if one or more routes are affected by the area, suggest re-routings to the affected aircraft onto routes clear of the area; and
 - ii. maintain awareness of the affected area.

2.4. ATFM Unit Actions

2.4.1. The ATFM unit and the associated Volcanic Ash Advisory Centre (VAAC) will determine how their initial communications will take place on the basis of bilateral agreements. Upon reception of preliminary information on volcanic activity from the lead VAAC, the ATFM unit should initiate actions in accordance with its procedures to ensure exchange of information in order to support CDM between air navigation service providers (ANSPs), Meteorological Watch Offices (MWOs), VAACs and aircraft operators concerned.

3. START OF ERUPTION PHASE

3.1. General

3.1.1. This phase commences at the outbreak of a volcanic eruption, with volcanic ash being ejected into the atmosphere. The focus of the processes in this phase is to protect aircraft in flight and at aerodromes from the hazards of the eruption through the collection and use of relevant information.

3.1.2. In addition to relevant actions described under the pre-eruption phase, major activities of the start of eruption phase such as the issuance of relevant AIS and MET messages in accordance with Annex 15 and Annex 3, respectively and provision of information and assistance to airborne traffic. Danger areas will be declared via NOTAM, as appropriate. This phase will last until such time as the on-going eruption phase can be activated.

3.2. Originating ACC Actions (eruption in its own FIR)

3.2.1. The ACC providing services in the FIR within which the volcanic eruption takes place should inform flights about the existence, extent and forecast movement of volcanic ash and provide information useful for the safe and efficient conduct of flights.

3.2.2. If necessary, rerouting of traffic should commence immediately or may be in progress if the alerting time has been sufficient to facilitate activation of the pre-eruption phase. The ACC should assist in rerouting aircraft around the danger area as expeditiously as possible. Adjacent ACCs should also take the danger area into account and give similar assistance to aircraft as early as possible.

3.2.3. During the start of eruption phase, although ATC will not normally initiate a clearance through a danger area, it will inform aircraft about the hazard and will continue to provide normal services. It is expected that aircraft will attempt to remain clear of the danger area. However, it is the responsibility of the pilot-in-command to determine the safest course of action.

3.2.4. During the start of eruption phase the ACC should:

MID Region ATM Volcanic Ash Contingency Plan

- a) ensure that a NOTAM is originated to define a danger area delineated cautiously so as to encompass a volume of airspace in accordance with the limited information available. In determining the area, information on upper winds should be taken into account, if available. The purpose is to ensure safety of flight in the absence of any prediction from a competent authority of the extent of contamination;
- b) maintain close liaison with MET facilities, who should issue appropriate MET messages in accordance with Annex 3;
- c) devise and update ATFM measures when necessary to ensure safety of flight operations, based on these forecasts and in cooperation with aircraft operators and the adjacent ACCs using the CDM process;
- d) ensure that reported differences between published information and observations (pilot reports, airborne measurements, etc.) are forwarded as soon as possible to the appropriate authorities to ensure its dissemination to all concerned;
- e) begin planning for the on-going eruption phase in conjunction with the aircraft operators, the appropriate ATFM unit and ACCs concerned; and
- f) issue appropriate AIS messages in accordance with Annex 15. Significant reductions in intensity of volcanic activity should take place during this phase and the airspace no longer is contaminated by volcanic ash. Otherwise, begin CDM planning for the on-going eruption phase in conjunction with aircraft operators, the appropriate ATFM unit and the affected ACCs.

3.3. Adjacent ACC Actions

3.3.1. During the start of eruption phase, adjacent ACCs should take the following actions:

- a) maintain a close liaison with the appropriate ATFM unit and the originating ACC to design, implement and keep up to date ATFM measures which will enable aircraft to ensure safety of flight operations;
- b) the adjacent ACC, in cooperation with the originating ACC and aircraft operators, should impose as required additional tactical measures to those issued by the appropriate ATFM unit;
- c) maintain awareness of the affected area; and
- e) begin planning for the on-going eruption phase in conjunction with the aircraft operators, the appropriate ATFM unit and ACCs concerned.

3.4. ATFM Unit Actions

3.4.1. During the start of eruption phase, depending on the impact and/or extent of the volcanic ash, the appropriate ATFM unit should organise the exchange of latest information on the developments with the associated VAACs, ANSPs, MWOs and operators concerned in order to support CDM.

4. ON-GOING ERUPTION PHASE

4.1. The on-going eruption phase commences with the issuance of the first volcanic ash advisory (VAA) by the lead VAAC which contains information on the extent and movement of the volcanic ash cloud in accordance with Annex 3 provisions.

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Note 2 - Volcanic ash advisory information in graphical format (VAG) may also be issued by the VAAC, containing the same information as its text-based VAA equivalent.

4.2. The VAA/VAG should be used to:

- a) prepare appropriate AIS and MET messages in accordance with Annex 15 and Annex 3 provisions, respectively; and
- b) plan and apply appropriate ATFM measures.

4.3. The volcanic contamination may affect any combination of airspace; therefore, it is not possible to prescribe measures to be taken for all situations. Furthermore, it is not possible to detail the actions to be taken by any particular ACC. The following guidance therefore may prove useful during the on-going eruption phase but should not be considered mandatory or exhaustive:

- a) ACCs affected by the movement of the volcanic ash should ensure that appropriate AIS messages are originated in accordance with Annex 15. ACCs concerned and the appropriate ATFM unit should continue to publish details on measures taken to ensure dissemination to all concerned;
- b) depending on the impact and/or extent of the volcanic ash, the appropriate ATFM unit may take the initiative to organize teleconferences to exchange the latest information on the developments, in order to support CDM, with the VAACs, ANSPs and MWOs and operators concerned;
- c) ACCs and ATFM units should be aware that for the purposes of flight planning, operators could treat the horizontal and vertical extent of the volcanic ash contaminated area to be over-flown as if it were mountainous terrain; and
- d) any reported differences between published information and observations (pilot reports, airborne measurements, etc.) should be forwarded as soon as possible to the appropriate authorities (see Appendix C).

5. RECOVERY PHASE

5.1. The recovery phase commences with the issuance of the first VAA/VAG containing a statement that “NO VA EXP” (i.e. “no volcanic ash expected”) — which normally occurs when it is determined that the volcanic activity has reverted to its pre-eruption state and the airspace is no longer affected by volcanic ash contamination. Consequently, appropriate AIS messages should be issued in accordance with Annex 15.

5.2. ACCs and ATFM units should revert to normal operations as soon as practical.

6. AIR TRAFFIC CONTROL PROCEDURES

6.1. If a volcanic ash cloud is reported or forecasted in the FIR for which the ATS unit is responsible, the following actions should be taken:

- a) relay all pertinent information immediately to flight crews whose aircraft could be affected to ensure that they are aware of the ash cloud’s position and levels affected;
- b) request the intention of the flight crew and endeavour to accommodate requests for re-routing or level changes;
- c) suggest appropriate re-routing to the flight crew to avoid an area of reported or forecast ash clouds; and

MID Region ATM Volcanic Ash Contingency Plan

- d) request a special air-report when the route of flight takes the aircraft into or near the forecast ash cloud and provide such special air-report to the appropriate agencies.

Note 3.— The recommended escape manoeuvre for an aircraft which has encountered an ash cloud is to reverse its course and begin a descent if terrain permits.

Note 4. — The final authority as to the disposition of the aircraft, whether to avoid or proceed through a reported or forecast volcanic ash cloud, rests with the flight crew.

6.2. When advised by the flight crew that the aircraft has inadvertently entered a volcanic ash cloud, the ATS unit should:

- a) take such action applicable to an aircraft in an emergency situation; and
- b) do not initiate modifications of route or level assigned unless requested by the flight crew or necessitated by airspace requirements or traffic conditions.

Note 5.— General procedures to be applied when a pilot reports an emergency situation are contained in Procedures for Air Navigation Services – Air Traffic Management (PANS-ATM, Doc 4444, Chapter 15, 15.1.1 and 15.1.2).

Note 6.— Guidance material concerning the effect of volcanic ash and the impact of volcanic ash on aviation operational and support services is provided in Chapters 4 and 5 of the Manual on Volcanic Ash, Radioactive Material and Toxic Chemical Clouds (Doc 9691).

7. ATFM PROCEDURES

7.1. Depending on the impact and/or extent of the volcanic ash and in order to support CDM, the appropriate ATFM unit should organize the exchange of the latest information on the developments with the associated VAACs, ANSPs, MWOs and operators concerned.

7.2. The ATFM unit will apply ATFM measures on request of the ANSPs concerned. The measures should be reviewed and updated in accordance with updated information. Operators should also be advised to maintain watch for relevant AIS and MET messages for the area.

APPENDIX A

GENERAL CONSIDERATIONS DURING THE DEVELOPMENT OF AN ATM CONTINGENCY PLAN FOR VOLCANIC ASH

1. In a contingency plan relating to volcanic ash contamination, certain steps need to be taken to provide a coordinated and controlled response for dealing with an event of this nature. Responsibilities should be clearly defined to ATS personnel. The plan should also identify the officials who need to be contacted, the type of messages that are to be created, the proper distribution of the messages and how to conduct business.
2. ATS personnel need to be trained and be made aware of the potentially hazardous effects if an aircraft encounters a volcanic ash cloud. Some particular aspects include:
 - a) volcanic ash contamination may extend for hundreds, or even thousands of miles horizontally and reach the stratosphere vertically;
 - b) volcanic ash may block the pitot-static system of an aircraft, resulting in unreliable airspeed indications;
 - c) braking conditions at aerodromes where volcanic ash has recently been deposited on the runway will affect the braking ability of the aircraft. This is more pronounced on runways contaminated with wet ash. Flight crews and ATS personnel should be aware of the consequences of volcanic ash being ingested into the engines during landing and taxiing. For departure, it is recommended that pilots avoid operating in visible airborne ash; instead they should allow sufficient time for the particles to settle before initiating a take-off roll, in order to avoid ingestion of ash particles into the engine. In addition, the movement area to be used should be carefully swept before any engine is started;
 - d) volcanic ash may result in the failure or power loss of one or all engines of an aircraft; and
 - e) aerodromes with volcanic ash deposition may be declared unsafe for flight operations. This may have consequences for the ATM system.
4. The area control centre (ACC) in conjunction with ATFM units serves as the critical communication link between affected aircraft in flight and the providers of information during a volcanic eruption. During episodes of volcanic ash contamination within the FIR, the ACC has two major communication roles. First and most important is its ability to communicate directly with aircraft enroute which may encounter the volcanic ash. Based on the information provided in SIGMET information for volcanic ash and volcanic ash advisories (VAAs), and working with MWOs, ATS personnel should be able to advise the flight crew of which flight levels are affected by the volcanic ash and the forecast movement of the contamination. Through various communication means, ATS units have the capability to coordinate with the flight crew alternative routes which would keep the aircraft away from the volcanic ash cloud.
5. Similarly, through the origination of a NOTAM/ASHTAM for volcanic activity the ACC can disseminate information on the status and activity of a volcano even for pre-eruption increases in volcanic activity. NOTAM/ASHTAM and SIGMET, together with AIREPs, are critical to dispatchers for flight planning purposes. Operators need as much advance notification as possible on the status of a volcano for strategic planning of flights and the safety of the flying public. Dispatchers need to be in communication with flight crew enroute so that a coordinated decision can be made between the flight crew, the dispatcher and ATS regarding alternative routes that are available. The ACC should advise the ATFM unit concerning the availability of alternative routes. However, it cannot be presumed that an aircraft which is projected to encounter ash will be provided with the most desirable route to avoid the contamination. Other considerations

ATM Volcanic Ash Contingency Plan Template
Appendix A

have to be taken into account such as existing traffic levels on other routes and the amount of fuel reserve available for flights which may have to be diverted to other routes to allow for the affected aircraft to divert.

6. The NOTAM/ASHTAM for volcanic activity provides information on the status of activity of a volcano when a change in its activity is, or is expected to be, of operational significance. They are originated by the ACC and issued through the respective international NOTAM office based on the information received from any one of the observing sources and/or advisory information provided by the associated VAAC. In addition to providing the status of activity of a volcano, the NOTAM/ASHTAM also provides information on the location, extent and movement of the ash contamination and the air routes and flight levels affected. NOTAM can also be used to limit access to the airspace affected by the volcanic ash. Complete guidance on the issuance of NOTAM and ASHTAM is provided in Annex 15 — *Aeronautical Information Services*. Included in Annex 15 is a volcano level of activity colour code chart. The colour code chart alert may be used to provide information on the status of the volcano, with “red” being the most severe, i.e. volcanic eruption in progress with an ash column/cloud reported above flight level 250, and “green” at the other extreme being volcanic activity considered to have ceased and volcano reverted to its normal pre-eruption state. It is very important that NOTAM for volcanic ash be cancelled and ASHTAM be updated as soon as the volcano has reverted to its normal pre-eruption status, no further eruptions are expected by volcanologists and no volcanic ash is detectable or reported within the FIR concerned.

7. It is essential that the procedures to be followed by ATS personnel during a volcanic eruption, as well as supporting services such as MET, AIS and ATFM, should be translated into local staff instructions (adjusted as necessary to take account of local circumstances). It is also essential that such local staff instructions form part of the basic training for all ATS, AIS, ATFM and MET personnel whose jobs would require them to take action in accordance with the procedures. Background information to assist the ACC or Flight Information Centre (FIC) in maintaining an awareness of the status of activity of volcanoes in their FIR(s) is provided in the monthly Scientific Event Alert Network Bulletin published by the United States Smithsonian Institution and sent free of charge to ACCs/FICs requesting it.

APPENDIX B

ANTICIPATED FLIGHT CREW ISSUES WHEN ENCOUNTERING VOLCANIC ASH

1. ATS personnel should be aware that flight crews will be immediately dealing with some or all of the following issues when they encounter volcanic ash:

- a) smoke or dust appearing in the cockpit which may prompt the flight crew to don oxygen masks (could interfere with the clarity of voice communications);
- b) acrid odour similar to electrical smoke;
- c) multiple engine malfunctions, such as stalls, increasing exhaust gas temperature (EGT), torching, flameout, and thrust loss causing an immediate departure from assigned altitude;
- d) on engine restart attempts, engines may accelerate to idle very slowly, especially at high altitudes (could result in inability to maintain altitude or Mach number);
- e) at night, St. Elmo's fire/static discharges may be observed around the windshield, accompanied by a bright orange glow in the engine inlet(s);
- f) possible loss of visibility due to cockpit windows becoming cracked or discoloured, due to the sandblast effect of the ash;
- g) because of the abrasive effects of volcanic ash on windshields and landing lights, visibility for approach and landing may be markedly reduced. Forward visibility may be limited to that which is available through the side windows; and/or
- h) sharp distinct shadows cast by landing lights as compared to the diffused shadows observed in clouds (this affects visual perception of objects outside the aircraft).

2. Simultaneously, ATS personnel can expect flight crews to be executing contingency procedures such as the following:

- a) if possible, the flight crew may immediately reduce thrust to idle;
- b) exit volcanic ash cloud as quickly as possible. The shortest distance/time out of the ash may require an immediate, descend and/or 180 degrees turn (if terrains permit);
- c) don flight crew oxygen masks at 100 per cent (if required);
- d) monitor airspeed and pitch attitude. If unreliable airspeed is suspected, or a complete loss of airspeed indication occurs (volcanic ash may block the pitot system), the flight crew will establish the appropriate pitch attitude;
- e) land at the nearest suitable aerodrome; and
- f) upon landing, thrust reversers may be used as lightly as feasible.

— — — — —

APPENDIX C

COMMUNICATION AND DISSEMINATION OF PILOT REPORTS OF VOLCANIC ACTIVITY

1. INTRODUCTION

1.1. ICAO Annex 3-*Meteorological Service for International Air Navigation* (paragraph 5.5, g and h) prescribes that volcanic ash clouds, volcanic eruptions and pre-eruption volcanic activity, when observed, shall be reported by all aircraft. The ICAO *Procedures for Air Navigation Services – Air Traffic Management* (PANS-ATM, Doc 4444) contain detailed provisions on this special air report requirement in paragraphs 4.12.3 and 4.12.5, and the Volcanic Activity Report form in Appendix 1.

1.2. Experience has shown that reporting and sharing of information on volcanic ash encounters in accordance with the above mentioned provisions (in-flight and post-flight) varies across the world. The efficiency and quality of reporting currently depends heavily on regional characteristics and the level of regional integration. A high level of global harmonization is essential to achieve the desired level of implementation and consistency of the information.

2. PURPOSES OF VOLCANIC ASH REPORTING AND DATA COLLECTION

2.1. The main purposes for volcanic ash reporting and data collection are to:

- a) locate the volcanic hazards;
- b) notify immediately other aircraft (in-flight) about the hazard;
- c) notify other interested parties: ANSPs (ATC, AIS, ATFM), VAACs, MWO, etc. to ensure the consistent production of appropriate information and warning products in accordance with existing provisions; and
- d) analyse collected reports from the post-flight phase in order to:
 - identify areas of concern;
 - validate and improve volcanic ash forecasts;
 - improve existing procedures;
 - assist in defining better airworthiness requirements; and
 - share lessons learned, etc.

3. PHASE OF OPERATIONS

3.1. The roles and responsibilities of the participants in the collection, exchange and dissemination of the volcanic information are distinctly different in two distinct phases:

- b) in-flight; and
- c) post-flight.

3.2. The following section analyses these separately.

4. PARTICIPANTS IN THE REPORTING PROCESS, THEIR ROLES AND RESPONSIBILITIES

4.1. Identification of the participants as well as their roles and responsibilities in general, but specifically during the two different phases of operations, is an important element in improving collection, exchange and dissemination of volcanic information. The number of participants and their roles and responsibilities depends on the phase of operations (in-flight, post-flight), their position in the information chain within one of these two phases and national/regional arrangements. One of the main issues regarding participants' roles and responsibilities is that each of them is, at one time or another, both a data/information provider and user of the information.

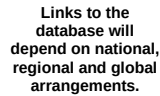
4.2. *In-Flight Phase*

4.2.1 Participants, Roles & Responsibilities:

Participants	Roles & Responsibilities
Pilots, civil and/or military, observing and/or encountering volcanic activity	To provide as much detailed information as possible about the type, position, colour, smell, dimensions of the volcanic contamination, level and time of the observation and forward VAR Part I immediately to the ATS unit with which the pilot is in radiotelephony (R/T) communication. Record the information required for VAR Part II on the appropriate form as soon as possible after the observation or encounter and file the report via data link, if available.
ATS unit receiving the information from the pilot encountering volcanic event	To ensure that information received by an air traffic controller from the pilot has been copied, clarified (if necessary), and disseminated to other pilots as well as to the ACC Supervisor. In addition, air traffic controllers could ask other pilots flying within the same area if they have observed any volcanic activity.
ATS unit/ACC Supervisor (if applicable) or other Air Navigation Service Provider responsible person	To use all means of communication and available forms to ensure that the information received from the air traffic controller has been: - passed on to the associated Meteorological organizations in accordance with national/regional arrangements; - fully and immediately disseminated across the organization, in particular to adjacent sectors and the associated NOTAM Office (NOF); - passed on to the neighbouring sectors and ACCs (if necessary); - passed on to the regional ATFM centre if existing (e.g. CFMU in Europe); - passed on to the national/regional authority responsible for the handling of contingency situations.
Neighbouring ANSPs (ACCs)	To ensure that information is provided to flight crews flying towards the area affected by the volcanic contamination; disseminated across the organization and the system prepared to cope with the possible changes of the traffic flows; and that the information is provided to the national authority responsible for the handling of contingency situations and passed on to the NOF and MWO as required.
MET Watch Office	To use the information originated by flight crews and forwarded by the ATS unit, in accordance with Annex 3.
VAAC	To use the information originated by flight crews, MWOs and other competent sources in accordance with Annex 3
AIS / NOF	To publish appropriate AIS messages in accordance with Annex 15
ATFM unit or centre (if existing)	To ensure that information received is stored and made available for information to all partners in its area of responsibility (ANSPs, airlines, VAAC, MET etc.). As part of the daily activity, coordinate ATFM measures with ACCs concerned.

4.2.2 In-flight reporting – Sample Flow Chart of the volcanic ash information

4.2.2.1 The chart below is a graphical representation of a possible path of the in-flight volcanic ash information and may differ between regions depending on regional arrangements. It also gives the position of the volcanic ash participants in the reporting chain. The flow chart is not exhaustive and the path of the information can be extended and new participants could be added depending of the national and regional requirements:



4.3

Post-Flight Operations Roles & Responsibilities and order of reporting

Participants	Roles & Responsibilities
Civil and/or military pilots/airlines having observed or encountered an eruption or volcanic contamination	To file the volcanic ash report with as much detailed information as possible about the volcanic activity and/or encounter (position, colour, smell, dimensions, FL, time of observation, impact on the flight, etc.). Ensure that the VAR is filed and transmitted to the relevant recipients as soon as possible after landing (if not filed via data link already during the flight). Make an entry into the Aircraft Maintenance Log (AML) in case of an actual or suspected encounter with volcanic contamination.
ANSP	To provide a summary report of effects of the volcanic activity that affected its operations at least once per day to the national authority with as much detailed information as possible about the number of encounters, impact on air traffic management, etc.).
AOC Maintenance - Post flight Inspection	To report about the observation of the aircraft surfaces, engine, etc., and to provide the information to the national, regional or global central data repository, where applicable.

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Appendix C

Investigation authority	All aeronautical service providers (including operators, ANSPs, airports, etc.) shall investigate the effects of a volcanic activity, analyse the information, search for conclusions, and report the investigation results and relevant information to the national supervisory authority and any central data repository.
National Authority	To handle the national central data repository and report to the regional/global central data repository if any. To analyse reports from its aeronautical service providers and take action as appropriate.
Regional Central Data Repository	To collect the national data and make them available to interested stakeholders under agreed conditions.
MWO	To use the national and regional information coming from national and regional central data repositories.
VAAC	To use the information originated by flight crews, and other competent sources to: a) validate its products accordingly and; b) improve the forecast.
Global Data Repository (and research institutes - where appropriate)	To analyse the information stored in the regional central data repository and provide the research outcomes for lessons learnt process.
Knowledge management (e.g. SKYbrary)	To use the post-flight lessons learnt and disseminate them to interested stakeholders.
ICAO	To review/revise ATM volcanic ash contingency plans.

4.4 Tools for presenting and sharing the volcanic ash information

4.4.1 To report, transmit and disseminate the volcanic ash encounter information, different types of tools can be used. The list below is provided to give ideas as to what tools can be used. It could also be split into regulatory and general information tools. At any case, it is not an exhaustive list and can be updated with new elements depending on regional experiences.

- a) Radiotelephony and Data link Communications;
- b) VAR;
- c) NOTAM/ASHTAM;
- d) SIGMET;
- e) VAA/VAG;
- f) Central data repository e.g. CFMU Network Operations Portal (NOP);
- g) Centralized web based sites with the regularly updated information and maps – e.g. <http://www.eurocontrol.int/>;
- h) Teleconferences;
- i) Periodic Bulletins with the set of information defined by the data providers and data users; e.g. Smithsonian Institution Weekly Bulletin; and/or
- j) Centralized internet-based sites for the sharing of lessons learnt (Knowledge management – e.g. SKYbrary http://www.skybrary.aero/index.php/Main_Page).

APPENDIX D

SIGMET and NOTAM EXAMPLES DURING VOLCANIC ASH

Volcanic Ash (VA) Cloud (CLD) in Kuwait FIR

WVKW31 OKBK 030900
OKBK SIGMET 1 VALID 030900/031500 OKBK-
OKAC KUWAIT FIR VA CLD OBS AT 0840Z W OF E48 FL180/320 MOV E 45KT NC FCST1500Z VA CLD APRX E OF
E4730=

Cancellation SIGMET as volcanic ash cloud exits Kuwait FIR into Tehran FIR (sooner than expected)

WVKW31 OKBK 031400
OKBK SIGMET 2 VALID 031400/031500 OKBK-
OKAC KUWAIT FIR CNL SIGMET 1 030900/031500 VA MOV TO OIIX FIR=

VA CLD in Cairo FIR

WVEG31 HECA 030900
HECA SIGMET 1 VALID 030900/031500 HECA-
HECC CAIRO FIR VA CLD OBS AT 0840Z N OF LINE N3140 E2510 - N29 E30 W OF LINE N3150 E3359 – N29 E30
FL100/290 MOV SE 35KT NC FCST1500Z VA CLD APRX N OF LINE N3140 E2510 – N2806 E3435=

Cancellation SIGMET as volcanic ash cloud exits Cairo FIR into Jeddah FIR (sooner than expected)

WVEG31 HECA 031330
HECA SIGMET 2 VALID 031330/031500 HECA-
HECC CAIRO FIR CNL SIGMET 1 030900/031500 VA MOV TO OEJD FIR=

Example NOTAM based on SIGMET issued for Cairo FIR

Q) HECC/QWWXX/IV/NBO/W/100/290/999
A) HECC B) 1311030900 C) 1311031500
E) ATM AND ACFT TAKE NECESSARY ACTION DUE TO VOLCANIC ASH AREA OF HIGH/MEDIUM
CONTAMINATION (FROM VOLCANO ETNA 211060, 37.734N 015.004E) AS FOLLOWS:
3400N 2410E – 3140N 2510E – 2900N 3000E – 3150N 3359E – 3330N 3000E – 3400N 2710E – 3400N 2410E
F) FL100 G) FL290

Special Air-Reports on Volcanic Ash

Special air-reports on volcanic ash sent to ACCs should then be sent via AFTN to the relevant Meteorological Watch Office (MWO) which is forwarded to the relevant Volcanic Ash Advisory Centre (VAAC) – for MID Region that is VAAC Toulouse.

SPECIAL AIREP ☐ ACC ☐ MWO ☐ VAAC

Pilots should use the special air-reports format on volcanic ash as at Table A4-1 in Appendix 4 of ICAO Annex 3.

APPENDIX 5L

SUBMISSION OF FREQUENCY REQUIREMENTS FOR THE PERIOD 2023 – 2030

1.1 The primary purpose of this simulation is to determine if a congestion in the use of frequencies can be foreseen that would require the implementation of 8.33 kHz channel spacing in any parts of the MID Region.

1.2 With the view to determine the medium-term spectrum requirements for VHF communication services, States are invited to submit these requirements to the MID Regional Office by **Q4 2024**. On the basis of these requirements, ICAO will undertake an analysis that is aimed at determining whether these requirements can be assigned a frequency within the available 25 kHz channels.

1.3 In this case, States can introduce the requirements in the local version of Frequency Finder and generate with the button “Export Submissions” an Excel file that can be submitted to the Regional Office.

1.4 States are able to download the Frequency Finder tool from Frequency Spectrum Management Panel (FSMP) webpage at: <https://www.icao.int/safety/FSMP/Pages/Documents.aspx>, and ICAO will provide assistance for any difficulties in installation and use of this ICAO tool.

1.5 Precise details not available.

1.5.1 When precise details are not available for future frequency requirements, States can submit such requirements in any format.

1.5.2 Example 1: For a new airport, States can submit the (approximate) coordinates and specify the need for:

- x TWR frequencies
- x Aerodrome surface frequencies
- x APP-U frequencies
- x APP-L frequencies
- x ACC-U frequencies
- ATTM.- 2
- x ACC-L frequencies
- x VOLMET frequencies
- x ATIS frequencies
- x VDL frequencies

Recommendation emanating from the Cybersecurity and Resilience Symposium

(Doha, Qatar, 6 – 8 November 2023)

MID States are encouraged to consider the following recommendations emanating from the symposium, to support the enhancement of their cybersecurity systems resilience:

Item 1: Cyber-attack Governance and effective legislation and regulations: a path to Cyber maturity

- Establish competent national authorities responsible for cybersecurity.
- Develop and enforce comprehensive legislation and regulations to enhance cybersecurity.
- Foster international cooperation and information sharing to address cyber threats collectively.

Item 2: Aviation Cybersecurity Framework: to enhance the resilience of aviation infrastructure against cyber threats

- Enhance cybersecurity awareness and training programs for aviation personnel.
- Implement robust risk management frameworks to identify and mitigate cyber threats.
- Foster collaboration between aviation stakeholders to share information and best practices.

Item 3: Aviation Cybersecurity Framework: to enhance the resilience of aviation infrastructure against cyber threats

- Enhance cybersecurity awareness and training programs for aviation personnel.
- Implement robust risk management frameworks to identify and mitigate cyber threats.
- Foster collaboration between aviation stakeholders to share information and best practices.

Item 4: Effective Cybersecurity intelligence and Monitoring techniques: to mitigate Cyber-attack impact

- Establish robust information sharing networks and platforms for cybersecurity intelligence.
- Develop national contingency plans that incorporate cybersecurity considerations.
- Invest in advanced monitoring tools and capabilities, including the establishment of SOC.

Item 5: Emergency Response and Contingency Planning

- Develop emergency response plans specific to the aviation sector.
- Conduct regular drills and simulations to test and improve emergency response preparedness.
- Enhance collaboration and communication channels among stakeholders in emergency situations.

Item 6: Human Factors in Cybersecurity

- Conduct regular cybersecurity training and exercises to improve incident response capabilities.
- Establish collaboration and coordination mechanisms for incident response among relevant organizations.
- Stay updated on emerging cybersecurity trends and share knowledge within the aviation community.
- Implement comprehensive cybersecurity training programs for aviation personnel at all levels.
- Foster a culture of cybersecurity awareness and accountability within organizations.
- Invest in continuous skill development and capacity building to mitigate human-related cybersecurity risks.

MID REGION SAR AGREEMENT STATUS BETWEEN ANSPS/ACCS

February 2023

STATE	CORRESPONDING STATES			REMARKS*
BAHRAIN	☒ IRAN ☒ SAUDI ARABIA	☒ KUWAIT ☒ UAE	☐ QATAR	4/5
EGYPT	☒ CYPRUS ☐ JORDAN ☐ SUDAN	☐ GREECE ☒ LIBYA	☐ Israel ☐ SAUDI ARABIA	2/7
IRAN	☒ ARMENIA ☒ BAHRAIN ☒ OMAN ☐ TURKMENISTAN	☒ AZERBAIJAN ☐ IRAQ ☐ PAKISTAN ☒ UAE	☐ AFGHANISTAN ☒ KUWAIT ☐ TÜRKIYE	6/11
IRAQ	☐ IRAN ☒ JORDAN	☐ KUWAIT ☐ SAUDI ARABIA	☐ SYRIA ☐ TÜRKIYE	1/6
JORDAN	☐ EGYPT ☒ IRAQ	☐ ISRAEL ☒ SAUDI ARABIA	☐ SYRIA	2/5
KUWAIT	☒ BAHRAIN ☒ IRAN	☐ IRAQ	☒ SAUDI ARABIA	3/4
LEBANON	☒ CYPRUS	☐ SYRIA		1/2
LIBYA	☐ ALGERIA ☐ CHAD ☐ EGYPT	☐ MALTA ☐ NIGER	☐ SUDAN ☐ TUNIS	0/7
OMAN	☐ INDIA ☒ IRAN	☒ SAUDI ARABIA ☐ PAKISTAN	☐ UAE ☐ YEMEN	2/6
QATAR	☐ BAHRAIN	☐ SAUDI ARABIA	☒ UAE	0/3
SAUDI ARABIA	☒ BAHRAIN ☐ IRAQ ☒ OMAN ☐ UAE	☐ EGYPT ☒ JORDAN ☐ Qatar ☐ YEMEN	☐ ERITREA ☒ KUWAIT ☐ SUDAN	4/11
SUDAN	☐ CENTRAL AFRICAN ☐ CHAD ☐ EGYPT	☒ ERITREA ☒ ETHIOPIA ☐ LIBYA	☐ SAUDI ARABIA ☐ SOUTH SUDAN	2/8
SYRIA	☐ IRAQ ☐ JORDAN	☐ LEBANON ☒ CYPRUS	☒ TÜRKIYE	2/5
UAE	☒ BAHRAIN ☒ IRAN	☐ OMAN ☐ SAUDI ARABIA	☒ QATAR	2/5
YEMEN	☐ DJIBOUTI ☐ ERITREA ☐ ETHIOPIA	☐ INDIA ☐ OMAN ☐ SAUDI ARABIA	☐ SOMALIA	0/7

☒ Agreement Signed ☐ Agreement NOT Signed *Signed Agreements / Total No. of required Agreements

APPENDIX 50

Abu Dhabi Declaration on Continuous Improvements of Air Navigation Services Provision in the MID Region

This non-binding declaration recognizes our commitment to collaborative air navigation planning and implementation, fostering seamless coordination among MIDANPIRG members. The objective of the declaration is to facilitate continuous and agile ANS Provision Improvements in the MID Region and ensure safe, efficient, sustainable and cost-effective air travel across borders. The Key Principles are:

1. **Collaborative Framework:** Establish a collaborative framework to facilitate effective communication and coordination among MIDANPIRG members, promoting shared resources and expertise in air navigation services.
2. **Safety Enhancement:** Prioritize safety standards and best practices, emphasizing continuous improvement in air navigation systems to ensure the highest level of safety for both passengers and aviation stakeholders.
3. **Efficiency Optimization:** Strive for efficiency through strategic airspace utilization and leveraging technological advancements, aiming to significantly enhance the efficiency and reduce delays within the Airspace of the MID Region, increase capacity and reduce complexity.
4. **Sustainability Integration:** Integrate sustainable practices into air navigation planning and implementation, considering environmental impact, resource conservation, and the development of eco-friendly technologies to contribute to a greener aviation industry; minimize the operation impact on environment, targeting 3% reduction of operational CO₂ emission over a duration of 5 year.
5. **Capacity Building and Resilience:** Focus on capacity building initiatives to enhance the resilience of air navigation systems, ensuring they can adapt to evolving challenges, technological advancements, and increased demand for air travel, thereby maintaining operational robustness and reliability.
6. **Stakeholder Engagement and Inclusivity:** Emphasize active engagement with diverse stakeholders, including governments, aviation authorities, industry representatives, and local communities, fostering inclusivity to identify challenges and concerns, propose mitigations, and collectively initiate comprehensive projects and initiatives shaping the future of the MID region air navigation system.

MIDANPIRG/21 & RASG-MID/11-REPORT

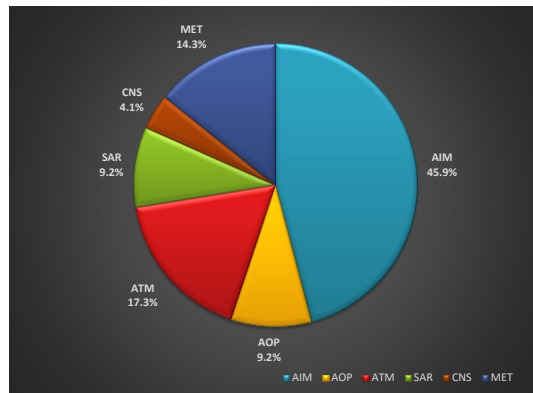
Appendix 5P

AIR NAVIGATION DEFICIENCIES IN THE THE MID REGION

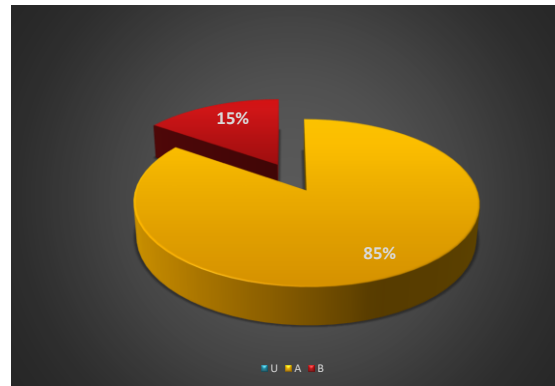
STATE	AIM							Total AIM	AOP							Total AOP	ATM							Total ATM	SAR							Total SAR	CNS							Total CNS	MET							Total MET
	Priority			Rational					Priority			Rational					Priority			Rational					Priority			Rational					Priority			Rational					Priority			Rational				
	U	A	B	F	H	S	O		U	A	B	F	H	S	O		U	A	B	F	H	S	O		U	A	B	F	H	S	O		U	A	B	F	H	S	O		U	A	B	F	H	S	O	
Bahrain							0							0													0																			0		
Egypt	2						2							0													0																			0		
Iran	3						3						1						1								0																		0			
Iraq	5	1	4	4	1	5	6						1									1					0																	2				
Jordan	2	1	3	3			3							0								1					0																	1	2			
Kuwait							0							0													0																			0		
Lebanon	3	1		2			2	4					1														0																		0			
Libya	4	1					5	5					1														1																		2			
Oman	3						3	3						0													0																		0			
Qatar							0							0													0																			0		
Saudi Arabia	0						0	0						0													0																		0			
Sudan	2						2	2					1														0																		1			
Syria	8	1	6	7	1	2	9						3														0																		3			
UAE	0						0	0						0													0																		0			
Yemen	7	1	4	2			4	8					1													0																			3			
Total	0	39	6	17	18	2	28	45	0	9	0	9	9	1	1	9	0	10	7	0	6	11	9	17	0	9	0	0	2	2	9	9	0	2	2	0	0	0	4	4	0	14	0	2	1	3	8	14

TOTAL DEFICIENCIES:98

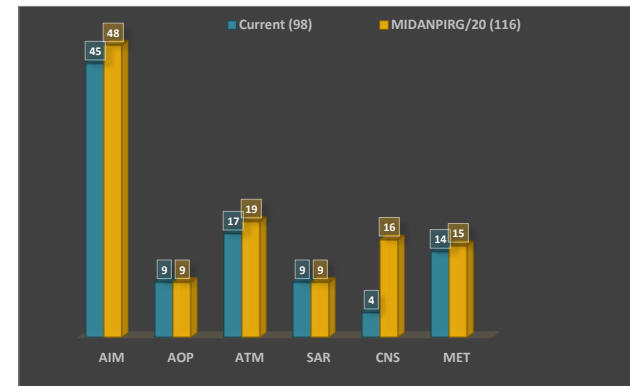
Distribution of Air Navigation deficiencies by field in %

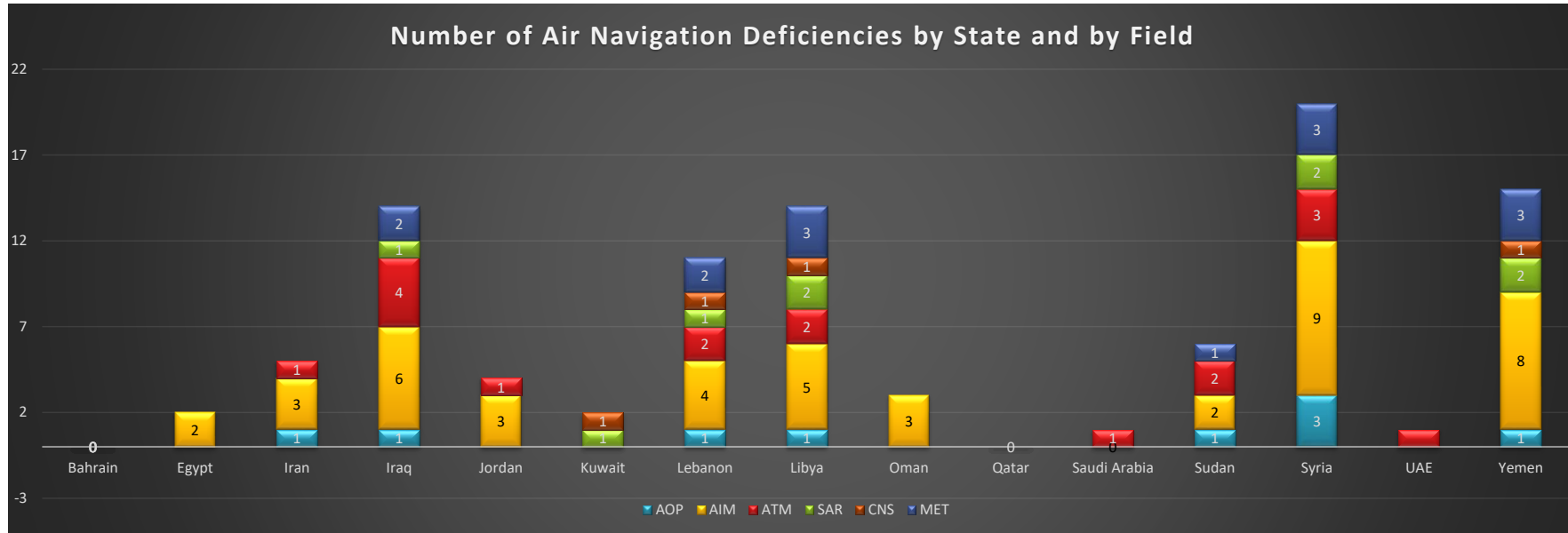


Distribution of Air navigation deficiencies by priority in %



Reported Deficiencies by field (MIDANPIRG/21 & MIDANPIRG/20)





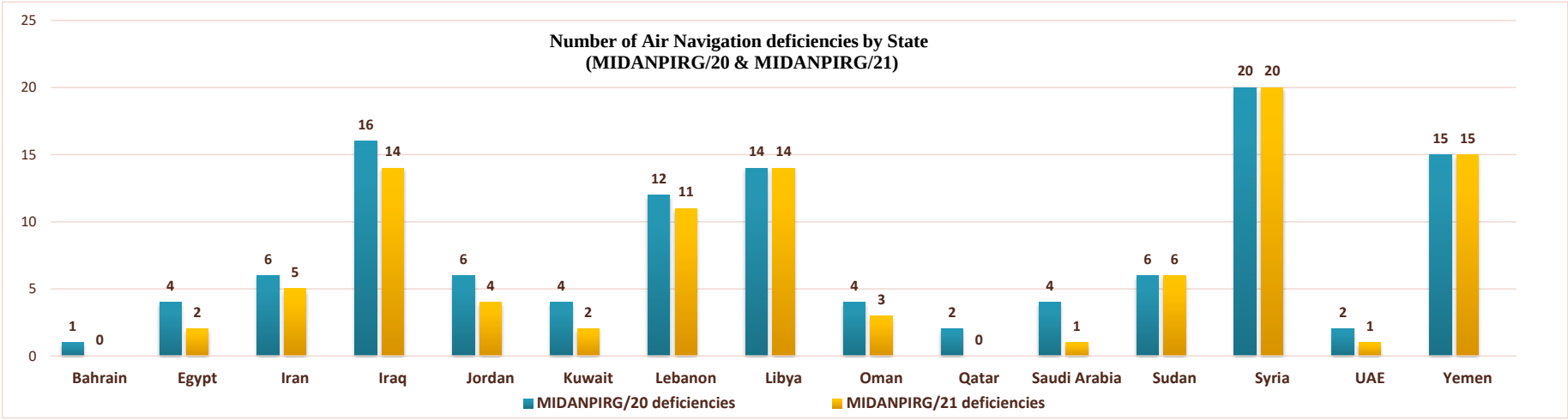
Deficiencies to be approved by MIDANPIRG/21

	Bahrain	Egypt	Iran	Iraq	Jordan	Kuwait	Lebanon	Libya	Oman	Qatar	Saudi Arabia	Sudan	Syria	UAE	Yemen	Total
AOP	0	0	1	1	0	0	1	1	0	0	0	1	3	0	1	9
AIM	0	2	3	6	3	0	4	5	3	0	0	2	9	0	8	45
ATM	0	0	1	4	1	0	2	2	0	0	1	2	3	1	0	17
SAR	0	0	0	1	0	1	1	2	0	0	0	0	2	0	2	9
CNS	0	0	0	0	0	1	1	1	0	0	0	0	0	0	1	4
MET	0	0	0	2	0	0	2	3	0	0	0	1	3	0	3	14
TOTAL	0	2	5	14	4	2	11	14	3	0	1	6	20	1	15	98

Deficiencies approved by MIDANPIRG/20

	Bahrain	Egypt	Iran	Iraq	Jordan	Kuwait	Lebanon	Libya	Oman	Qatar	Saudi Arabia	Sudan	Syria	UAE	Yemen	Total
AOP	0	0	1	1	0	0	1	1	0	0	0	1	3	0	1	9
AIM	0	2	3	7	3	0	4	5	3	0	2	2	9	0	8	48
ATM	0	1	1	4	1	1	2	2	0	1	1	1	3	1	0	19
SAR	0	0	0	1	0	1	1	2	0	0	0	0	2	0	2	9
CNS	1	1	1	1	1	2	2	1	1	1	1	1	0	1	1	16
MET	0	0	0	2	1	0	2	3	0	0	0	1	3	0	3	15
TOTAL	1	4	6	16	6	4	12	14	4	2	4	6	20	2	15	116

	Bahrain	Egypt	Iran	Iraq	Jordan	Kuwait	Lebanon	Libya	Oman	Qatar	Saudi Arabia	Sudan	Syria	UAE	Yemen	Total
MIDANPIRG/20 deficiencies	1	4	6	16	6	4	12	14	4	2	4	6	20	2	15	116
MIDANPIRG/21 deficiencies	0	2	5	14	4	2	11	14	3	0	1	6	20	1	15	98



ATTACHMENT A

MIDANPIRG/21 & RASG-MID/11 Meetings
(Abu Dhabi, UAE, 4-8 March 2024)
List of Participants

States

States	First Name	Last Name	Organizations
BAHRAIN	Abdallah Hassan	Al Kadi	Bahrain CAA
BAHRAIN	Ahmed Youssef	Al Malki	Bahrain CAA
BAHRAIN	Ali Ahmed	Mohamed	Bahrain CAA
BAHRAIN	DARREN	DRIEMEYER	Bahrain CAA
EGYPT	DIAAELDIN	Abdel alim	Egyptian Civil Aviation Authority
EGYPT	hossam	omran	Egyptian Civil Aviation Authority
EGYPT	Ehab	Abdelgalil	National Air Navigation Services Company (NANSC)
IRAN	Majid	Sabzeei	CAA IR.IRAN
IRAN	SYED HAMED	RAZA	CAA IR.IRAN
IRAN	Jaber	Goodarzi	Civil aviation Authority of IRI Iran
IRAN	Mehran	Hematti	Civil Aviation Organization of I.R. Iran
IRAN	MOHAMMED ADEL	NEZARI	Civil Aviation Organization of I.R. Iran
IRAN	Mohammad	Moslehi Jenabeyan	Civil Aviation Organization of I.R. Iran (CAOIRI)
IRAN	BEHZAD	SOHEIL	IRAN
IRAN	MOHAMMED	ADEL	IRAN CAA
IRAN	SAYED	HAMID	IRAN CAA
IRAN	Hassan	Rezaefar	Iran Civil Aviation Authority
IRAN	Masoud	Nikbakht	Iran Civil Aviation Authority
IRAN	Hamed	Rahbar	Iran Civil Aviation Authority
IRAQ	Mohammed	alabd	G.C.A.N.S
IRAQ	Ali	Abbas	GCANS
IRAQ	Hayder	Dhafer	GCANS
IRAQ	Ali	Safaa	Iraqi General Company for Air Navigation Services
IRAQ	Ali	Nasrullah	Iraqi General Company for Airports and Air Navigation
JORDAN	Ali	Emrazeeraq	CARC
JORDAN	Mohammad	Hushki	Jordan Civil Aviation Regulatory Commission
KUWAIT	Faisal	Al-Asousi	Directorate General of Civil Aviation - State of Kuwait
KUWAIT	TAREQ	ALGHAREEB	Kuwait/ DGCA/ Air Navigation Department
LEBANON	Kamal	Nassereddine	Air navigation Department of Lebanon
LIBYA	ALHASAN	SALEM	LIBYA
LIBYA	FATEH	SAID	LINYA
LIBYA	Hasan	Salem	LYCAA
OMAN	Mubarak	Al Ghailani	CAA Oman
OMAN	HANAA	SULTAN	OMAN
OMAN	Hilal	hatmi	OMAN
OMAN	NASSER	SALEM	OMAN
OMAN	SALEH	AL HARTHI	OMAN
OMAN	Hannah	Al Maskari	OMAN CAA
OMAN	Hilal	Al Miqbali	OMAN CAA
OMAN	HILAL	ALI MOHAMMED	OMAN CAA
OMAN	KHALID	ABDULLAH ALYOUSUFI	OMAN CAA
OMAN	Nasser	AL MAZROUI	OMAN CAA
OMAN	Rawya	Al Adawi	Oman CAA
OMAN	Said	Al Bulushi	OMAN CAA
OMAN	SULIMAN	ALRASHID	OMAN CAA

OMAN	Moosa	Al Bulushi	OMAN Civil Aviation Authority
OMAN	SULAIMAN	AL Rashdi	OMAN TRANSPORT SAFETY BUREAU
OMAN	ZIYANA	AL SAID	OMAN TRANSPORT SAFETY BUREAU
QATAR	Ahmed	Al-Eshaq	Qatar Civil Aviation Authority
QATAR	Saleh	Alnisf	Qatar Civil Aviation Authority
QATAR	Mohammed	Almuhammadi	Qatar Civil Aviation Authority
QATAR	Marco	Perotti	Qatar Civil Aviation Authority
SAUDI ARABIA	ibrahim	Al jabri	GACA
SAUDI ARABIA	SULIMAN	SALEH ALMUHAIMED	GACA
SAUDI ARABIA	SULTAN	ABOUD	GACA
SAUDI ARABIA	ABDULLAH	ALANAZI	ksa
SAUDI ARABIA	ALI	ALDIYAB	KSA
SAUDI ARABIA	Abdul KAREEM	MAHJOUB	NCM
SAUDI ARABIA	AMMAR	YASEN	NCM
SAUDI ARABIA	MAJED	MAHJOUB	NCM
SAUDI ARABIA	SAMI	ALWAFI	NCM
SAUDI ARABIA	SAMIR	ALSHARIF	NCM
SAUDI ARABIA	Mohammed	Alshaman	General Authority of Civil Aviation - Kingdom of Saudi Arabia
SAUDI ARABIA	Mohammed	Aldhahri	National Transport Safety Center (NTSC)
SAUDI ARABIA	ATIF	ALHARTHI	SANS
SAUDI ARABIA	MASHHOR	ALBLOWi	SANS
SAUDI ARABIA	MAZEN	ALSHIHRI	SANS
SAUDI ARABIA	SALEH	ALZAHIRANI	SANS
SAUDI ARABIA	MOHAMMED	ALMALAHI	SAUDI
SAUDI ARABIA	SULAIMAN	ALMUHAIMADI	SAUDI
SAUDI ARABIA	ALAA	ALTURKI	SAUDI AIR NAVIGATION SERVICES
SAUDI ARABIA	Ali	Alshehri	SAUDI AIR NAVIGATION SERVICES
SAUDI ARABIA	Abdullah	Alanazi	Saudi Arabian General Authority of Civil Aviation
SAUDI ARABIA	ABDULLAH	ALBATHI	Saudi Arabian General Authority of Civil Aviation
SAUDI ARABIA	BASSAM	ALGHAMDI	Saudi Arabian General Authority of Civil Aviation
SAUDI ARABIA	Khalid	Alharbi	Saudi Arabian General Authority of Civil Aviation
SAUDI ARABIA	Faisal	AlShahrani	General Authority of Civil Aviation - Kingdom of Saudi Arabia
SAUDI ARABIA	MOHAMMED	ALMALAHI	General Authority of Civil Aviation - Kingdom of Saudi Arabia
SUDAN	HAYTHAM	OSMAN	SUDAN
SYRIA	kaleem	sharaf	ministry of transportaion(syria)
SYRIA	HASAN	HAMOUD	Syrian Civil Aviation Authority
SYRIA	mouada	khireldin	Syrian Civil Aviation Authority
SYRIA	Nadim	SALIM	Syrian Civil Aviation Authority
SYRIA	Jamal	Al Daghestani	Cham Wings Airlines
SYRIA	Moussa	Boutros	Cham Wings Airlines
UAE	Ahmed	Sabri	DCAA
UAE	Abdalla	Al Rashdi	UAE GCAA
UAE	ABDULLAH	ALBALOSHI	UAE GCAA
UAE	AHMED	ALHAMMADI	UAE GCAA
UAE	AHMED	ALKETBI	UAE GCAA
UAE	Ahmed	Al Jallaf	UAE GCAA
UAE	Ahmed	Alshehhi	UAE GCAA
UAE	ALBDULRAHMAN	ALMAZMI	UAE GCAA
UAE	AMEIN	ALBLOOSHI	UAE GCAA
UAE	ASMA	ALDHERI	UAE GCAA
UAE	AYMAN	AL NUAIMI	UAE GCAA
UAE	Aysa Mohammed	Al Hamili	UAE GCAA
UAE	BASEL	NASAR	UAE GCAA

UAE	BASHAYER	ALALI	UAE GCAA
UAE	Eman	Almarashda	UAE GCAA
UAE	ESSA	ALRAWAHI	UAE GCAA
UAE	HAMAD	AL BALUSHI	UAE GCAA
UAE	HAMAD	AL ALI	UAE GCAA
UAE	Hamed	Al Zubaidi	UAE GCAA
UAE	HESHAM	AL TENEJI	UAE GCAA
UAE	Humaid	Al Shamsi	UAE GCAA
UAE	LOBN	SALEHELDINE	UAE GCAA
UAE	Maitha	Al Obaidli	UAE GCAA
UAE	Maram	Ahmed	UAE GCAA
UAE	MARIAM	ALOBEDLI	UAE GCAA
UAE	Mohamed Husein	Al Zaabi	UAE GCAA
UAE	MOUZA	ALSWAFI	UAE GCAA
UAE	MUSAAB	ALHOSANI	UAE GCAA
UAE	Nasser	Al Rowaihi	UAE GCAA
UAE	NASSER	AL RUWAIHI	UAE GCAA
UAE	Odd Erik	Kjersem	UAE GCAA
UAE	OMAR	ABDOULI	UAE GCAA
UAE	Rashed	Alshehhi	UAE GCAA
UAE	SHIKAH	ALSHAMSI	UAE GCAA
UAE	SHIMA	ALHAY	UAE GCAA
UAE	Sultan	AlZara	UAE GCAA
UAE	Sultan	Lootah	UAE GCAA
UAE	Syed	Samiullah	UAE GCAA
UAE	THANI	ALSWAIDI	UAE GCAA
UAE	WALEED	ALRIYAMI	UAE GCAA
UAE	WERNER	PITS	UAE GCAA
UAE	YASSER	MOHAMMED	UAE GCAA
UAE	Yousif	Al Awadi	UAE GCAA
UAE	Yousuf	Al Azizi	UAE GCAA
UAE	ZAHID	AHMED	UAE GCAA
UAE	HUMAIID	AL KETBI	UAE MILITARY
UAE	Rovshan	Sultanov	DANS
UAE	Ahmed	Al Obaidli	UAE GCAA
UAE	Ali	Almulla	UAE GCAA
UAE	Aqeel	Ahmed Al Zarouni	UAE GCAA
UAE	Kedari	Manthanwar	UAE GCAA
UAE	Mohamed	Almarzooqi	UAE GCAA
UAE	Rashed	Belrumaitha	UAE GCAA
UAE	Reem	Al Saffar	UAE GCAA
UAE	Saqr	Al Marashda	UAE GCAA
UAE	Dean	Fernandes	UAE GCAA
UAE	Salem	Alseraidi	UAE GHQ
UAE	Gary	Newman	Abu Dhabi Integrated Transport Centre
UAE	Rashed	Alkaabi	Abu Dhabi Integrated Transport Centre
UAE	ABDULLAH	AL QOOBAISI	AFAD
USA(FAA)	Holly	King	FAA (USA/FAA-ATO/Oakland Center)
USA(FAA)	Mohammad	Kushan	FAA
USA(FAA)	Amer M.	Younossi	FAA

Organizations

Organizations	First Name	Last Name	Organizations
ACAO	Hicham	Bennani	Arab Civil Aviation Organization (ACAO)

BOEING	Nancy	Vachon	BOEING
CANSO	Eduardo	Garcia	CANSO
CANSO	Javier	Vanegas	CANSO
ENAV	MARCO	PROIBTTI	ENAV
IATA	JEHAD	ALFAQEER	International Air Transport Association (IATA)
IATA	Lindi-Lee	KIRKMAN	International Air Transport Association (IATA)
IFALPA	Rola	Hoteit	International Federation of Air Line Pilots' Associations
IFALPA	Arnaud	Du Bédât	International Federation of Air Line Pilots' Associations
MIDRMA	FAREED	ALALAUJ	MIDRMA
ICAO	Mohammed	Abu Bakr Farea	ICAO Middle East Office
ICAO	Mashoor	AlBlowi	ICAO Middle East Office
ICAO	Mohamed	Chakib	ICAO Middle East Office
ICAO	MOHAMED IHEB	HAMDI	ICAO Middle East Office
ICAO	Radhouan	Aissaoui	ICAO Middle East Office
ICAO	Ahmad	Amireh	ICAO Middle East Office
ICAO	Ahmad	Kaveh	ICAO Middle East Office
ICAO	JAVIER	LOPEZ GONZALEZ	ICAO HQ
ICAO	Mazen	Ghattas	ICAO HQ
ICAO	Elie	El Khoury	ICAO HQ
ICAO	Martin	Maurino	ICAO HQ
ICAO	Manal	Wissa	ICAO Middle East Office
ICAO	Mohamed	Hamed	ICAO Middle East Office

Sponsors

Orgs/Sponsors	First Name	Last Name	-
GCAA IACT	KARIM	ULLAH	UAE
GANS	ABDULLAH	AL BLOOSHI	UAE
GANS	ARMEND	VERBOVCI	UAE
GANS	DAVID	ABEBIYI	UAE
GANS	EIDA	ALKAABI	UAE
GANS	FAISAL	ALMARZOOQI	UAE
GANS	Moses	Woodard Jr.	UAE
GANS	YAHYA	ALHAMMADI	UAE
INDRA	DHANYA	AJAN	INDRA
INDRA	JACKIE	LYN	INDRA
INDRA	JOHAN	SWANEPOEL	INDRA
INDRA	LARS	NEDREVAUCT	INDRA
INDRA	MARINA	MARTIN	INDRA
INDRA	NIZAR	ELMRABTI	INDRA
INDRA	RAUL	MARTIN	INDRA
THALES	ARNAUD	MIATATZ	THALES
THALES	CHARISTOPHE	LEART	THALES
THALES	LERAT	CHNITOPHE	THALES
GANS	Rashed	AlNuaimi	UAE
EMIRATES AIRLINES	Saeed	AlSuwaidi	UAE
Etihad Airways	Javier	Agueda Encinas	UAE
Etihad Airways	Issa	Al Rawahi	UAE
FLYDUBAI	AHMED	BIN HUZAIM	UAE
FLYDUBAI	KHALID	Alhumaidan	UAE
FREQUENTIS COMS	Thomas	Petschner	GERMANY
Etihad Airways	Mohammad Taher	Mustafa	UAE
Digital Revamp	Marc	Abdo	UAE
STARTICAL	JUAN	JOSE CORNEJO	STARTICAL