*International Civil Aviation Organization*

**MIDANPIRG Communication, Navigation and Surveillance Sub-Group**

**Thirteenth Meeting (CNS SG/13)**
***(Jeddah, Saudi Arabia, 20 – 23 October 2024)***

**Agenda Item 6: ASBU Threads/ Elements related to CNS**

# TRANSITION TO SWIM IN THE MID REGION

*(Presented by Saudi Arabia)*

**SUMMARY**

The transition from today's AFTN/AMHS point-to-point, message-based to a networked information services-based System-wide Information Management (SWIM) environment will inevitably involve operating in a mixed environment with dual communications infrastructures (e.g. aeronautical fixed telecommunication network (AFTN)/ATS message handling system (AMHS) and Internet Protocol Suite (IPS)-based networks). During this transition period, both have to be supported and maintained in parallel while interoperating via dedicated gateways.

This paper proposes to amend:

- the Terms of Reference (ToRs) of the MIDAMC Steering Group to include activities related to the transition to SWIM in the MID region, considering the relevant ASBU elements of the Global Air Navigation Plan (GANP-Doc 9750); and
- the MID-Region Air Navigation Strategy to insert the SWIM thread and its elements as optional (priority three), which should be revisited during the transition to SWIM based on the progress made on developing applications and infrastructure.

**Action by the meeting is under paragraph 4 of this WP.**

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|---|---|
| *Reference(s)* | - ICAO Doc 9750, Global Air Navigation Plan, 7th Edition<br>- Procedures for Air Navigation Services – Information Management (PANS-IM, Doc 10199)<br>- Manual on System-wide Information Management (SWIM) Concept (Doc 10039)<br>- Manual on System-wide Information Management Implementation (Doc 10203)<br>- Manual on Information Security (Doc 10204)<br>- MIDANPIRG/21 and RASG-MID/11 Report (RASG-MID Conclusion 11/3) |

## 1. INTRODUCTION

1.1 During the review of ATS communications matters, the MIDANPIRG/21 noted the importance of a robust, resilient, and reliable AFTN for the sustainability of ATM operations. The meeting recognized the gravity of potential message loss in the inter-regional exchange with AFTN, encouraged States to uplift the capacity and resilience of the inter-regional AFTN, and urged States to migrate inter-regional communication links to AMHS. (MIDANPIRG Conclusion 21/25 Refers).

1.2 The MIDANPIRG/21 noted 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.

1.3 Concerning the MID IP network solution[1], MIDANPIRG/21 noted that:

- eight (8) States confirmed their interest in joining the New EUROCONTROL IP Network Project (Pan-European Network Service – NewPENS) pending technical and financial proposals; and
- the ICAO MID Office has been approached by the APAC Office to explore the possibility of re-engaging the MID States in the Asia-Pacific (APAC) Common Aeronautical Virtual Private Network (CRV) project since the cost would now be much less than quoted before.

## 2. DISCUSSION

### *Aeronautical Fixed Service (AFS)*

2.1 Most of the existing communication infrastructure in the MID region is built around point-to-point connections between systems, requiring dedicated systems to connect to networks and the messages exchanged between targeted (fixed) addresses. When a new information exchange between two systems arises, a new connection must be set up. Each connection usually has an interface implemented through dedicated interface control documents in the systems that generate or use the information. This requires additional systems deployment or modifications to existing systems to establish the required connection. These interfaces were traditionally designed for aeronautical fixed telecommunication network (AFTN) low-speed links. The result is an architecture that is costly to maintain and expand and lacks the required agility.

2.2 Aeronautical Fixed Service (AFS) is described in Annex 10 — Aeronautical Telecommunications, Volume II — Communication Procedures including those with PANS status, and is composed of:

a) ATS direct speech circuits and networks;
b) meteorological operational circuits, networks and broadcast systems;
c) the aeronautical fixed telecommunication network (AFTN);
d) the common ICAO data interchange network (CIDIN);
e) the air traffic services (ATS) message handling services (AMHS); and
f) the inter-centre communications (ICC).

2.3 The legacy AFTN/AMHS is used by MID States, primarily to exchange flight plans, notices essential to personnel concerned with flight operations (NOTAM), and operational meteorological information. AFTN is character-oriented, limits character set, limits message length and its switches are interconnected using low-speed connections. As ATS Message Handling System (AMHS) uses higher-speed communication and offers greater capacity than AFTN, the MID states were invited to migrate communication links to AMHS.

2.4 The AMHS is described in the Manual on detailed Technical Specifications for the Aeronautical Telecommunication Network (ATN) using ISO/OSI protocols - ATS Message Handling Service (Doc 9880), Part IIB, as a replacement for the outdated AFTN/common ICAO data interchange network

[1] *This excerpts from MIDANPIRG/21 & RASG-MID/11- report, pages 5-22 & 5-23. Additional information can be found in this report.*

(CIDIN). AMHS is based on ITU-T X.400 messaging standards. As such, AMHS 'removes' the restrictions and limitations imposed by AFTN. ICAO has also defined AMHS/AFTN gateways that can accommodate a mix of AMHS and AFTN exchanges (the AFTN limitations would still apply in this case). AMHS is expected to facilitate the exchange ATS inter-facility data communications, Flight Plan, and MET information until the implementation of System-wide Information Management (SWIM).

***System-wide Information Management (SWIM) Concept***

2.5 The Manual on System-wide Information Management (SWIM) Concept (Doc 10039) defines SWIM as a set of standards, infrastructure, and governance that enable the management of ATM-related information and its exchange between qualified parties via interoperable services. This concept is built upon the notion of aeronautical services, defined as a mechanism to enable access to one or more capabilities using a prescribed interface. In a SWIM environment, stakeholders apply Service Orientation Architecture (SOA) to define information exchanges using information services collaboratively.

2.6 The main objective of SWIM is to support increasing levels of automation and decision-support systems and foster machine-to-machine interaction. However, even in an increasingly automated environment, humans will always be part of the system's design and management and should remain the ultimate authority in operationally significant decision-making processes. SWIM enables highly automated systems to integrate and synthesize large amounts of diverse but well-structured information. SWIM will be built upon a necessary level of uniformity to foster interoperability among compatible information systems.

2.7 SWIM is mainly contained in the SWIM thread Block 2 and Block 3. In addition, the ASBU elements relating to service improvement through digital aeronautical meteorological management and integration (AMET–B2/4, AMET–B3/4, and AMET– B4/4) as well as ASBU elements related to aeronautical digital data management and dissemination through DAIM (DAIM–B2/1) are important components of the overall SWIM.

2.8 It is expected that SWIM will become the global and regional platform for exchanging information and providing information services via Internet protocol (IP). That information can be categorized into four key domains: aeronautical information, meteorological, flight and flow, and surveillance/position, three of which have already associated information exchange models, namely the aeronautical information exchange model (AIXM), flight information exchange model (FIXM) and the ICAO meteorological information exchange model (IWXXM).

2.9 The first potential applications of the SWIM concept for information exchange are beginning to emerge, including operational meteorological (OPMET) information; flight and flow information for a collaborative environment (FF-ICE); the Global Aeronautical Distress and Safety System (GADSS); Runway Condition Report (RCR) as part of the new SNOWTAM format; and aeronautical information management (AIM) digital data sets.

2.10 ATN applications such as ATS inter-facility data communications (AIDC) and ATS messaging are moving to SWIM with the identification of specific performance requirements. Existing legacy aeronautical fixed telecommunication networks (AFTN) and AIDC networks will be modernized, and their communications infrastructure move to IP networks, which will permit multiple applications to share the same network.

2.11 The ICAO has already adopted Standards and Recommended Practices (SARPs) for SWIM in Annexes 3, and 10, and published Procedures for Air Navigation Services — Information Management (PANS-IM, Doc 10199) together with two guidance materials (Manual on System-wide Information

Management (SWIM) Concept (Doc 10039) and Manual on System-wide Information Management Implementation (Doc 10203)), that will ensure global adoption and implementation of SWIM-compliant solutions and enable the path towards SWIM-compliant information solutions.

2.12 At ICAO regional level, two specialized task forces were established at ICAO EUR/NAT and APAC regions namely:

- **AFS to SWIM Transition Task Force (AST TF)** was established in 2019 to ensure a seamless transition to SWIM and pursue the tasks and issues related to Aeronautical Fixed Service (AFS) in support of the ICAO Strategic Objectives as reflected in the Global Air Navigation Plan (GANP-Doc 9750) and the relevant ASBUs. The task force has developed AMHS/SWIM Gateway Specification published as EUR Doc 047. This document is already posted under ICAO MID website: https://www.icao.int/MID/Documents/2023/MIDAMC%20and%20CNS/MIDAMC%20STG8-App%20F%20Draft%20AMHS-SWIM%20Gateway%20Specification.pdf

- **SWIM Task Force** established in July 2016 by the twentieth meeting of the Communications, Navigation and Surveillance (CNS SG/20) of APANPIRG held to implement SWIM in the APAC Region, coordinate requirements with applications/system owners, develop a regional structure to manage the new service, and develop dual operations to support both legacy service and new service to prevent duplicated messages as well as rejected messages.

***Transition to System-wide Information Management (SWIM) services***

2.13 SWIM implementation planning can follow different schedules when applied to a specific organization. These schedules may be influenced by local factors, such as the specific business needs and implementation scenarios, as well as regional factors. The ICAO regional plans, and the implementation planning of the Aviation system block upgrades (ASBU) elements of the Global Air Navigation Plan (GANP, Doc 9750) need to be considered. Transitional planning should consider the operational benefits, the maturity of the concepts, and the impact on legacy systems when planning the introduction of information services.

2.14 A transition to SWIM occurs when a combination of legacy interfaces and information services coexists. During this transition, specific management aspects must be considered. It is essential to manage potential information loss when bridging an information exchange between an information service and a legacy interface.

2.15 The transition from today's AFTN/AMHS point-to-point, message-based to a networked information services-based SWIM environment will inevitably involve operating in a mixed environment with dual communications infrastructures (e.g. aeronautical fixed telecommunication network (AFTN)/ATS message handling system (AMHS) and Internet Protocol Suite (IPS)-based networks). During this transition period, both have to be supported and maintained in parallel while interoperating via dedicated gateways. Furthermore, the associated legacy message products (e.g. METAR, SIGMET, NOTAM, and FPL) and their equivalent SWIM information services have to be developed and maintained in parallel.

2.16 The MID Region Air Navigation Strategy is a key regional harmonization and service interoperability document. The strategy covers the ASBU elements from Block 0 and Block 1 with their associated priorities, as well as the MIDANPIRG subsidiary bodies assigned to monitor and support the implementation of these Threads/Elements. As the SWIM thread is defined under Block 2 and Block 3, the MID Region Air Navigation Strategy does not cover this thread and its associated ASBU elements.

2.17 As the SWIM thread and associated ASBU elements cover all ATM ground-ground and air/ground applications and nodes relying on IP networks for the exchange and access to information between flights and ground control and operations, there is a need to amend the MID Region Air Navigation Strategy to insert SWIM thread and its elements as optional (priority three) which should be revisited with the progress made in the transition in the implementation of SWIM applications and infrastructure.

## 3. CONCLUSION

3.1 The transition from the legacy AFS-based data or message exchange capabilities to SWIM information services requires regional collaboration and planning. Currently, the MIDAMC Steering Group manages the regional activities related to ATS communications and associated infrastructure. The main duties can be summarized as follows:

- provide support/guidance to MID States for AMHS Implementation and monitor the AMHS activities;
- provide guidance/support to States on implementation of XML based data models (IWXXM, FIXM, AIXM,…etc) over AMHS;
- monitor States' readiness to implement XML based data models over extended AMHS;
- follow-up the implementation of IP Network in the MID Region, through joining relevant projects, like CRV and act as project manager; and
- proposes appropriate actions for the early implementation to support the IP Network until the Operational Group is established. This means that MIDAMC Steering Group is focusing on technical enablers for ATS communications and message exchange.

3.2 Considering the above and the need for regional SWIM planning and implementation, it's proposed to amend:

- the Terms of Reference (ToRs) of MIDAMC Steering Group to include technical activities to ensure a seamless transition to SWIM in the MID region considering the relevant ASBU elements of the Global Air Navigation Plan (GANP-Doc 9750). The proposal for amendment to MIDAMC STG ToRs is provided in **Appendix A** to this WP and should be submitted to the MIDANPIRG/22 meeting for approval.

- the MID-Region Air Navigation Strategy to insert the SWIM thread and its elements as optional (priority three), which should be revisited during the transition to SWIM based on the progress made on developing applications and infrastructure. A proposal for the amendment of MID Region Air Navigation Strategy is provided in **Appendix B** to this WP.

## 4. ACTION BY THE MEETING

4.1 The meeting is invited to:

a) note the information provided in this WP;

b) discuss and adopt the proposal to amend the Terms of Reference (ToRs) of MIDAMC Steering Group to include technical activities related to the transition to SWIM in the MID region considering the relevant ASBU elements of the Global Air Navigation Plan (GANP-Doc 9750). The activities will focus on technical and infrastructure enablers needed for the transition to SWIM;

c) task the Chairperson of MIDAMC Steering Group to coordinate with the ICAO MID Secretariat to draft a proposal for WP to the MIDANPIRG/22 meeting, which includes a decision on the amended ToRs;

d) discuss and adopt the proposal for amendment to the MID-Region Air Navigation Strategy and invite the ICAO Secretariat to draft a proposal for WP to the MIDANPIRG/22 meeting on this proposal; and

e) agree to assign the validation of two WPs to the MIDANPIRG/22 meeting to the Chairperson of CNS SG.

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**Appendix A - Proposal for Amendment to MIDAMC Steering Group (MIDAMC STG) Terms of Reference**

## 1. TERMS OF REFERENCE (TOR)

### 1.1 The Terms of Reference of the MIDAMC Steering are:

a) to promote the efficiency and safety of aeronautical fixed services in the MID Region through the operation and management, on a sound and efficient basis, of a permanent MID Regional ATS Messaging Management Center (MIDAMC);

b) foster the implementation of the Air traffic service Message handling service in the MID Region through provision of the guidance materials and running facilitation tools, utilizing the MIDAMC;

c) MIDAMC Steering Group will consist of a focal point from each Participating MID State who would represent the State and acts as the Steering Group Member;

d) MIDAMC Steering Group will be responsible for overall supervision, direction, evaluation of the MIDAMC project and will review/update the MIDAMC work plan whenever required;

e) the MID Region is considering the establishment of a Regional MID IP Network; the MIDAMC STG will drive the project which is called Common aeRonautical Virtual Private Network (CRV), until the Operation Group is established;

f) Develop and maintain a regional plan for the transition from AFS to SWIM services; and

g) provide regular progress reports to the CNS SG, and MIDANPIRG concerning its work programme.

### 1.2 In order to meet the Terms of Reference, the MIDAMC Steering Group shall:

a) develop/update the accreditation procedure for all users on the MIDAMC;

b) develop and maintain guidance materials for MIDAMC users;

c) discuss and identify solution for operational problems that may be arising;

d) provide support/guidance to States for AMHS Implementation, and monitor the AMHS activities;

e) assist and encourage States to conduct trial on the Implementation of the ATS extended services, and identify operational requirements;

f) provide guidance/support to States on implementation of XML-based data models (IWXXM, FIXM, AIXM,…etc) over AMHS;

g) monitor States' readiness to implement XML based data models over extended AMHS;

h) identify the need for any enhancement for the MIDAMC and prepare functional and technical specifications, and define its financial implications;

i) follow-up on ICAO standards and recommendations on the ATS messaging management and SWIM;

j) define future liabilities and new participating States and ANSPs in the progressive introduction of SWIM services;

k) follow-up and review the work of similar groups in other ICAO Regions including successful implementations of SWIM services to identify and adopt best practices;

l) Identify SWIM prerequisites in terms of infrastructure, including IP-based network; and monitor the status of implementation of those elements in the MID Region;

m) follow-up the implementation of IP Network in the MID Region supporting SWIM services, through joining relevant projects, like CRV and act as project manager; and

n) proposes appropriate actions for the early implementation also support the IP Network supporting the progressive introduction of SWIM services until the Operational Group is establish.

o) Develop and amend the relevant ICAO MID Regional documentation considering the progress made in SWIM implementation and considering the need for harmonization with the adjacent Regions in compliance with the GANP;

p) Coordinate with the relevant ICAO MID Regional Groups to ensure a gradual transition of AFS services to SWIM in the MID Region ensuring operational continuity and develop guidance material accordingly; and

q) Provide guidance and training to MID States and stakeholders involved in SWIM implementation.

## 2. COMPOSITION

a) ICAO MID Regional Office;

b) Members appointed by the MIDANPIRG member States; and

c) Other representatives, who could contribute to the activity of the Steering Group, could be invited to participate as observers, when required.

## 3. WORKING ARRANGEMENTS

3.1 The Chairperson, in close co-operation with the Secretary, shall make all necessary arrangements for the most efficient working of the Study Group. The Study Group 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 Chairperson, Secretary and Members of the Study Group to advance the work. Best advantage should be taken of modern communications facilities, particularly video-conferencing (Virtual Meetings) and e-mails.

3.2 Face-to-face meetings will be conducted when it is necessary to do so.

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**Appendix B - Proposal for Amendment to MID-Region Air Navigation Strategy**

**MID DOC 002**

# 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**

# 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 ASBU Blocks '0', ~~and~~ "1", "2", and "3" feature ~~Elements~~ elements are characterized by operational improvements, which have already been developed, ~~and~~ implemented, and planned in many parts of the world. The MID Region priorities for the planning and implementation of ASBU elements are described in **Table 1** with the following priorities:

- Priorities 1 and 2 for ASBU elements in ~~y 1~~ Blocks 0 & 1 ~~Elements are reflected in **Table 1** below.~~; and
- ~~3.2~~ Priority 3 for ASBU elements in Blocks 2 and 3.

3.3 The MID Region Air Navigation Strategy aims to maintain regional ~~harmonisation~~harmonization and service interoperability. The States should develop their National Air Navigation Plan (NANP), including action plans for implementing ASBU Elements and other ASBU elements or non-ASBU solutions based on their operational requirements, cost-benefit~~. 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, and the established priorities.

3.4 The implementation of ASBU Block 0 Elements in the MID Region started before 2013 and is continuing. For the short and medium terms, the MID Region priorities include identified ASBU Elements from Blocks 0 and 1.

3.5 For the long term, the MID Region priorities include identified ASBU Elements from Blocks 2 and 3.

## 4. MID Region ASBU Threads/Elements Prioritization and Monitoring

4.1 ~~On the basis of~~ Based on operational requirements and technical enablers and taking into consideration the associated benefits, **Table 1** below shows~~s~~ the priority associated ~~for~~ with each ASBU element from Blocks 0, ~~and Block~~ 1, 2, and 3, as well as the MIDANPIRG subsidiary bodies that will be monitoring and supporting the implementation of these Threads/Elements:

- ***Priority 1 Thread and ASBU Elements****: Any Thread with at least one priority 1 ASBU Element.* Priority 1 ASBU Elements make the highest contribution to improving ~~*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 Thread and ASBU Elements****: Any Thread with at least one priority 2 ASBU Element.* Priority 2 ASBU *Elements recommended for implementation based on identified operational needs and benefits by States.*

- ***Priority 3 Thread and ASBU Elements:*** *Optional Thread with at least one priority 3 ASBU Element. Optional thread and elements that are recommended for implementation based on identified* ~~*technical and*~~ *technical, and operational needs.*

~~***Priority 1 Thread:*** *Any Thread with at least one priority 1 element*~~

**Table 1. MID REGION ASBU THREADS & ELEMENTS (BLOCKS 0, ~~&~~ 1, 2 & 3) PRIORITIZATION AND MONITORING**

| Thread | Element code | Title | Priority | Start Date | Monitoring | | Remarks |
|---|---|---|---|---|---|---|---|
| | | | | | Main | Supporting | |
| ***Information Threads*** | | | | | | | |
| **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 | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **DAIM** | **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 | | | | |
| | **B2/1** | Dissemination of aeronautical | 3 | | | | |
| | **B2/2** | Daily Airspace Management | 3 | | | | |
| | **B2/3** | Aeronautical information to support higher airspace operations | 3 | | | | |
| | **B2/4** | Aeronautical information requirements tailored to UTM | 3 | | | | |
| | **B2/5** | NOTAM replacement | 3 | | | | |
| **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 | |
| | **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 | | | | |
| | **B2/1** | Meteorological observations information | 3 | | | | |
| | **B2/2** | Meteorological forecast and warning information | 3 | | | | |
| | **B2/3** | Climatological and historical meteorological information | 3 | | | | |
| | **B2/4** | Meteorological information service in SWIM | 3 | | | | |
| | **B3/1** | Meteorological observations information | 3 | | | | |
| | **B3/2** | Meteorological forecast and warning information | 3 | | | | |
| | **B3/3** | Climatological and historical meteorological information | 3 | | | | |
| | **B3/4** | Meteorological information service in SWIM | 3 | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **FICE** | | | | | | | |
| | **B2/1** | Planning Service | 3 | | | | |
| | **B2/2** | Filing Service | 3 | | | | |
| | **B2/3** | Trial Service | 3 | | | | |
| | **B2/4** | Flight Data Request Service | 3 | | | | |
| | **B2/5** | Notification Service | 3 | | | | |
| | **B2/6** | Publication Service | 3 | | | | |
| | **B2/7** | Flight information management service for higher airspace operations | 3 | | | | |
| | **B2/8** | Flight information management service for low-altitude operations | 3 | | | | |
| | **B2/9** | Flight information management support for inflight re- | 3 | | | | |
| | **B3/1** | Flight information management services for enhanced trajectory operations | 3 | | | | |
| **SWIM** | | | | | | | |
| | **B2/1** | Information service provision | 3 | | | | |
| | **B2/2** | Information service consumption | 3 | | | | |

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|---|---|---|---|---|---|---|---|
| | **B2/3** | SWIM registry | 3 | | | | |
| | **B2/4** | Air/Ground SWIM for non-safety critical information | 3 | | | | |
| | **B2/5** | Global SWIM processes | 3 | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ***Operational Threads*** | | | | | | | |
| **APTA** | | | | | | | |
| | **B0/1** | PBN Approaches (with basic capabilities) | **1** | 2014 | PBN SG | ATM SG<br>AIM SG<br>CNS SG<br>RANP/<br>NANP TF | |
| | **B0/2** | PBN SID and STAR procedures (with basic capabilities) | **1** | 2014 | PBN SG | ATM SG<br>AIM SG<br>RANP/<br>NANP TF | |
| | **B0/3** | SBAS/GBAS CAT I precision approach procedures | 2 | | | | |
| | **B0/4** | CDO (Basic) | **1** | 2014 | PBN SG | ATM SG<br>RANP/<br>NANP TF | |
| | **B0/5** | CCO (Basic) | **1** | 2014 | PBN SG | ATM SG<br>RANP/<br>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<br>CNS SG<br>ASPIG<br>RANP/ | |
| | **B0/8** | Performance based aerodrome operating minima – Basic aircraft | 2 | | | | |
| **APTA** | **B1/1** | PBN Approaches (with advanced capabilities) | 3 | | | | |
| | **B1/2** | PBN SID and STAR procedures (with advanced capabilities) | 3 | | | | |
| | **B1/4** | CDO (Advanced) | 3 | | | | |
| | **B1/5** | CCO (Advanced) | 3 | | | | |
| | **B2/1** | GBAS CAT II/III precision approach procedures | 3 | | | | |
| | **B2/2** | Simultaneous operations to parallel runways | 3 | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | **B2/3** | PBN Helicopter Steep Approach Operations | 3 | | | | |
| | **B2/4** | Performance based aerodrome operating minima – Advanced aircraft with SVGS | 3 | | | | |
| | **B3/1** | Parallel approaches without vertical guidance | 3 | | | | |
| | **B3/2** | Implementation of A-RNP to support non-complex simultaneous independent parallel approaches | 3 | | | | |

| 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 | | | | |
| **FRTO** | | | | | | | |
| | **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 | | | | |
| **FRTO** | **B1/7** | Trajectory Options Set (TOS) | 2 | | | | |
| | **B2/1** | Local components of integrated ATFM and ATC Planning function (INAP) | 3 | | | | |
| | **B2/2** | Local components of Dynamic Airspace Configurations (DAC) | 3 | | | | |
| | **B2/3** | Large Scale Cross Border Free Route Airspace (FRA) | 3 | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | B2/4 | Enhanced Conflict Resolution Tools | 3 | | | | |
| **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 | | | | |
| | B0/4 | Initial Airport/ATFM slots and A-CDM Network Interface | 3 | | | | |
| | B0/5 | Dynamic ATFM slot allocation | 3 | | | | |
| | B1/1 | Short Term ATFM measures | 3 | | | | |
| | B1/10 | Collaborative Trajectory Options Program (CTOP) | 3 | | | | |
| | B1/2 | Enhanced Network Operations Planning | 3 | | | | |
| | B1/3 | Enhanced integration of Airport operations planning with network operations planning | 3 | | | | |
| | B1/4 | Dynamic Traffic Complexity Management | 3 | | | | |
| | B1/5 | Full integration of airspace management with air traffic flow management | 3 | | | | |
| | B1/6 | Initial Dynamic Airspace configurations | 3 | | | | |
| | B1/7 | Enhanced ATFM slot swapping | 3 | | | | |
| | B1/8 | Extended Arrival Management supported by the ATM Network function | 3 | | | | |
| | B1/9 | Target Times for ATFM purposes | 3 | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | **B2/1** | Optimised ATM Network Services in the initial TBO context | 3 | | | | |
| | **B2/2** | Enhanced dynamic airspace configuration | 3 | | | | |
| | **B2/3** | Collaborative Network Operation Planning | 3 | | | | |
| | **B2/4** | Multi ATFM slot swapping and Airspace Users priorities | 3 | | | | |
| | **B2/5** | Further airport integration within Network Operation Planning | 3 | | | | |
| | **B2/6** | ATFM adapted for cross-border Free Route Airspace (FRA) | 3 | | | | |
| | **B2/7** | UTM Network operations | 3 | | | | |
| | **B2/8** | High upper airspace network operations | 3 | | | | |
| | **B3/1** | ATM Network Services in full TBO context | 3 | | | | |
| | **B3/2** | Cooperative Network Operations Planning | 3 | | | | |
| | **B3/3** | Innovative airspace architecture | 3 | | | | |

| 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 | |
| | **B2/1** | New collision avoidance system | 3 | | | | |
| | **B2/2** | New collision avoidance capability as part of an overall detect and avoid system for RPAS | 3 | | | | |
| **SNET** | | | | | | | |
| | **B0/1** | Short Term Conflict Alert (STCA) | **1** | 2017 | ATM SG | CNS SG RANP/ NANP TF | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **SNET** | **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 | |
| | **B2/1** | Location of an aircraft in Distress | 3 | | | | |
| | **B2/2** | Distress tracking information management | 3 | | | | |
| | **B2/3** | Post Flight Localization | 3 | | | | |
| | **B2/4** | Flight Data Recovery | 3 | | | | |
| **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 | | | | |
| | **B2/1** | Integration of arrival and departure management | 3 | | | | |
| | **B3/2** | Arrival management in terminal airspace with multiple airports | 3 | | | | |
| | **B3/3** | Increased utilization of runway capacity by improved real-time runway scheduling | 3 | | | | |
| | **B3/4** | Improved operator fleet management in runway sequencing | 3 | | | | |
| **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 | | | | |
| | **B2/1** | Enhanced surface guidance for pilots and vehicle drivers | 3 | | | | |
| | **B2/2** | Comprehensive vehicle driver situational awareness on the airport surface | 3 | | | | |
| | **B2/3** | Conflict alerting for pilots for runway operations | 3 | | | | |
| | **B3/1** | Optimization of surface traffic management in complex situations | 3 | | | | |
| **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 | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | **B2/1** | Airport Operations Plan (AOP) | 3 | | | | |
| | **B2/2** | Airport Operations Centre (APOC) | 3 | | | | |
| | **B2/3** | Total Airport Management (TAM) | 3 | | | | |
| | **B3/1** | Full integration of ACDM and TAM in TBO | 3 | | | | |

| 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** | | | | |
| | **B2/1** | Interval Management (IM) Procedure | 3 | | | | |
| | **B2/2** | Cooperative separation at low altitudes | 3 | | | | |
| | **B2/3** | Cooperative separation at higher airspace | 3 | | | | |
| | **B3/1** | Interval Management (IM) Procedure with | 3 | | | | |
| | **B3/2** | Remain Well Clear (RWC) functionality for UAS/RPAS | 3 | | | | |
| **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** | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | B2/1 | Separation minima using ATS surveillance systems where VHF voice communications are not available | 3 | | | | |
| | B3/1 | Helicopter RNP 0.3 Terminal and En-Route Operations | 3 | | | | |
| | B3/2 | Expansion of upper limit of the Reduced Vertical Separation Minima (RVSM) band of flight levels | 3 | | | | |
| | B3/3 | Target-to-target separations using Space-based ADS-B data | 3 | | | | |
| **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** | | | | |
| | B2/1 | Pre-departure trajectory synchronization within a flight centric and network performance approach | 3 | | | | |
| | B2/2 | Extended time-based management across multiple FIRs for active flight synchronization | 3 | | | | |
| | B3/1 | Network based on-demand synchronization of trajectory based operations | 3 | | | | |
| ***Technology Threads*** | | | | | | | |
| **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 | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **ASUR** | **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 | | | | |
| | **B2/1** | Evolution of ADS-B and Mode S | 3 | | | | |
| | **B2/2** | New community based surveillance system for airborne aircraft (low and higher airspace) | 3 | | | | |
| | **B3/1** | New non-cooperative surveillance system for airborne aircraft (medium altitudes) | 3 | | | | |
| **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, | |
| | **B0/4** | Navigation Minimal Operating Networks (Nav. MON) | ~~3~~ ٢ | | | | |
| | **B1/1** | Extended GBAS | 3 | | | | |
| | **B2/1** | Dual Frequency Multi Constellation (DF MC) GBAS | 3 | | | | |
| | **B2/2** | Dual Frequency Multi Constellation (DF MC) SBAS | 3 | | | | |
| | **B2/3** | Dual Frequency Multi Constellation (DF MC) ABAS | 3 | | | | |

| 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** | | | | | | | |
| | **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 | |
| **COMI** | **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 | | | | |
| | **B2/1** | Air-Ground ATN/IPS | 3 | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | **B2/2** | Aeronautical Mobile Airport Communication System (AeroMACS) aircraft mobile connection | 3 | | | | |
| | **B2/3** | Links meeting requirements for non-safety critical communication | 3 | | | | |
| | **B3/1** | VHF Data Link (VDL) Mode-2 Connectionless | 3 | | | | |
| | **B3/2** | SATCOM Class A voice and data | 3 | | | | |
| | **B3/3** | L-band Digital Aeronautical Communication System (LDACS) | 3 | | | | |
| | **B3/4** | Links meeting requirements for safety critical communication | 3 | | | | |
| **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 | | | | |
| | **B2/1** | PBCS approved CPDLC (B2) for domestic and procedural airspace | 3 | | | | |
| | **B2/2** | PBCS Approved ADS-C (B2) for domestic and procedural airspace | 3 | | | | |
| | **B2/3** | PBCS approved SATVOICE (incl. routine communications) for procedural airspace | 3 | | | | |
| | **B3/1** | Extended CPDLC (B2 incl. Adv-IM and dynamic RNP) for dense and complex airspace | 3 | | | | |
| | **B3/2** | Extended ADS-C (B2 incl. Adv-IM and dynamic RNP) for dense and complex airspace | 3 | | | | |

## 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~~priority 1 ASBU Threads/Elements is monitored through the MID eANP Volume III.

~~5.1~~5.2 The progress made by MID States in implementing priorities 2 and 3 ASBU elements is reflected in the remark's column of Table 1. States may share details on the implementation during the meetings of subsidiary bodies of the MIDANPIRG.

~~5.2~~5.3 MIDANPIRG ~~through its activities under the various subsidary bodies~~, 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~~5.4 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/ganpportal/ASBU*

## 6. Governance

6.1 Progress report on the status of implementation of the different ~~priority~~ priorities ~~1~~ Threads/Elements should be developed by MIDANPIRG Subsidary bodies. A consolidated MID Air Navigation Report showing the status of implementation of the different priorit~~y 1~~ies 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 ~~subsidary~~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.

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## 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 |
|---|---|---|---|---|---|---|---|
| ***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).<br><br>Supporting Metrics:<br>1. Number of States that have implemented an AIXM-based AIS database (AIXM V5.1+)<br>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).<br><br>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).<br><br>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).<br><br>Supporting Metrics: Number of States that provide the following Meteorological observations products, as required:<br>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)<br>2. Local reports (MET REPORT/SPECIAL)<br>3. Aerodrome reports (METAR/SPECI)<br>4. Lightning Information<br>5. Ground-based weather radar information.<br>6. Meteorological satellite imagery<br>7. Aircraft meteorological report (ie. ADS-B, AIREP, etc.)<br>8. Vertical wind and temperature profiles<br>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)<br><br>Supporting Metrics: Number of States that provides the following Meteorological forecast and warning products, as required:<br>1. World Area Forecast System (WAFS) gridded products.<br>2. Significant Weather (SIGWX)<br>3. Aerodrome Forecast (TAF)<br>4. Trend Forecast (TREND)<br>5. Take-off Forecast<br>6. SIGMET<br>7. Aerodrome Warning<br>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.<br><br>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.<br><br>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.<br><br>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/<br><br>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).<br><br>Supporting Metric: Number of Runway ends at international aerodromes provided with PBN SID and STAR (basic capabilities). | (2022) 55% | 70% | Dec 2022 | Efficiency<br>Capacity/<br><br>KPI 10<br>KPI 11<br>KPI 17<br>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.<br><br>Supporting Metric: Number of International Aerodromes with CDO implemented and published as required. | (2022) 65% | 100% | Dec 2022 | Efficiency/<br><br>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, OEDF, ERK, HSSK, HSPN, OMAA, MAL, OMAD,MDW, OMDB, MSJ, OMRK and OMFJ | Indicator*: % of International Aerodromes with CCO implemented and published as required.<br><br>Supporting Metric: Number of International Aerodromes with CCO implemented and published as required.<br><br>*As per the applicability area | (2022) 65% | 100% | Dec 2022 | Efficiency/<br><br>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.<br><br>Supporting Metric: Number of States<br>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)<br><br>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/<br><br>KPI 10 |
| **FRTO** | | | | | | | |

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|---|---|---|---|---|---|---|---|
| **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.<br><br>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/<br><br>KPI 04<br>KPI 05<br>KPI 17<br>KPI 18/<br>KPI 19 |

| Element | | Applicability | Performance Indicators/ Supporting Metrics | Baseline | Target | Timeline | KPA/ KPI |
|---|---|---|---|---|---|---|---|
| | | | between Civil and Military to improve efficiency of Airspace.<br><br>* As per the applicability area | | | | |
| **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.<br><br>Supporting metric: The number of States that implemented MTCD and MONA for ACCs, as required.<br><br>* As per the applicability area | (2022) 63% | 100% | Dec 2022 | Capacity/<br><br>KPI 06<br><br>Safety/<br><br>KPI 20<br>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.<br><br>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.<br><br>* As per the applicability area | (2022) 42% | 70% | Dec 2022 | Efficiency<br>Capacity/<br><br>KPI 04<br>KPI 05<br>KPI 17<br>KPI 18<br>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<br><br>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/<br><br>KPI 20<br>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/<br><br>KPI 20<br>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)<br><br>* 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)<br><br>Supporting metric: number of States that have implemented Minimum safe altitude warning (MSAW)<br><br>* As per the applicability area | (2018) 100% | 100% | Dec 2018 | Safety/<br><br>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.<br><br>Supporting metric: number of States that have Implemented Area Proximity Warning (APW) for ACCs, as required.<br><br>* As per the applicability area | (2022) 67% | 100% | Dec 2022 | Safety/<br><br>KPI 20 |
| **GADS** | | | | | | | |
| **GADS B1/2** | Operational Control Directory | All States | Indicator: % of States that provided GADSS Point of Contact (PoC) information<br><br>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.<br><br>Supporting Metric: Number of Aerodrome that have implemented arrival manager (AMAN), where required/ applicable.<br><br>* As per the applicability area | (2022) 36% | 80% | Dec 2024 | Capacity Efficiency/<br><br>KPI 08<br>KPI 10<br>KPI 11<br>KPI 14/ |
| **SURF** | | | | | | | |

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| **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/<br><br>KPI 02<br>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/<br><br>KPI 20<br>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<br><br>Supporting metric: Number of Airports having implemented the surveillance service of A-SMGCS<br><br>* As per the applicability area | (2022) 61% | 80% | Dec 2022 | Safety/<br><br>KPI 20<br>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.<br><br>Supporting metric: Number of Airports having implemented the A-SMGCS alerting service.<br><br>* As per the applicability area | (2022) 74% | 80% | Dec 2022 | Safety/<br><br>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.<br><br>Supporting metric: number of Airports having implemented ACIS.<br><br>* 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.<br><br>Supporting metric: Number of Airports having integrated ACDM with the ATM Network function<br><br>* As per the applicability area | (2022) 25% | 50% | Dec 2024 | N/A |
| ***Technology Threads*** | | | | | | | |
| **ASUR** | | | | | | | |

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| **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.<br><br>* 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.<br><br>Supporting Metric: Number of States that have implemented Multi-lateration (M-LAT) for provision of ATS.<br><br>Indicator*: % of States that have implemented ADS-B to improve surveillance coverage/capabilities for provision of ATS.<br><br>Supporting Metric: Number of States that have implemented ADS-B to improve surveillance coverage/capabilities for provision of ATS.<br><br>* 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)<br><br>Supporting Metric: Number of States that have implemented Downlink of Aircraft Parameters (SSR-DAPS)<br><br>* As per the applicability area | (2022) 83% | 90% | Dec 2023 | N/A |
| **NAVS** | | | | | | | |

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|---|---|---|---|---|---|---|---|
| **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<br><br>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<br><br>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<br><br>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<br><br>Supporting metric: Number of States that have established National IP Network for voice and data communication | (2022) 60% | 80% | Dec 2022 | N/A |

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