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18/12/2018

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**Agenda Item 5: AIM Planning and Implementation in the MID Region**

MID REGION AIR NAVIGATION STRATEGY - B0-DATM

*(Presented by the Secretariat)*

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|---|
| <b>SUMMARY</b>  |
| This working paper presents the MID Region Air Navigation Strategy.<br><br>Action by the meeting is at paragraph 3. |
| <b>REFERENCES</b>   |
| - MSG/6 Report  |

**1. INTRODUCTION**

1.1 The meeting may wish to recall that the MSG/6 meeting, through MSG Conclusion 6/5 endorsed an updated version of the MID Air Navigation Strategy, as at **Appendix A**.

**2. DISCUSSION**

2.1 The meeting may wish to note that MSG/6 reviewed the MID Region Air Navigation Strategy (MID Doc 002) and agreed to the following changes:

- deletion of the elements “National AIM implementation plan/roadmap”, eTOD and Digital NOTAM from the list of Elements of B0-DATM in the MID Air Navigation Strategy; and inclusion of a new element related to the agreements with data originators;
- update of the parts related to B0-FRTO, B0-NOPS, B0-FICE and B0-SNET;
- deletion of the element “PBN plans” from B0-APTA; and
- addition of a new element related to OPMET to B0-AMET.

**3. ACTION BY THE MEETING**

3.1 The meeting is invited to review and update, as necessary, the MID Air Navigation Strategy B0-DATM elements and targets.

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**INTERNATIONAL CIVIL AVIATION ORGANIZATION**

**MIDDLE EAST AIR NAVIGATION PLANNING  
AND IMPLEMENTATION REGIONAL GROUP  
(MIDANPIRG)**

**MID REGION  
AIR NAVIGATION STRATEGY**

**EDITION DECEMBER, 2018**

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## 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 Through Recommendation 6/1 - *Regional performance framework – planning methodologies and tools*, AN-Conf/12 urged States and PIRGs to harmonize the regional and national air navigation plans with the ASBU methodology in response to this, the MID region developed the MID Region Air Navigation Strategy, 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 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 Block '0' features Modules 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 Modules 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 ASBU Implementation Plan, including action plans for the implementation of relevant priority 1 ASBU Modules and other Modules according to the States' operational requirements.

3.4 The implementation of the ASBU Block 0 Modules in the MID Region started in 2013 and is continuing.

3.5 Blocks 1 features Modules are characterized by both existing and projected performance area solutions, with availability milestones beginning in 2019.

3.6 The Block Upgrades incorporate a long-term perspective matching that of the Regional Air Navigation Plan (eANP). They coordinate clear aircraft- and ground-based operational objectives together with the avionics, data link and ATM system requirements needed to achieve them. The overall strategy serves to provide industry wide transparency and essential investment certainty for operators, equipment manufacturers and ANSPs.

3.7 The implementation of Block 2 and Block 3 Modules is planned for 2025 and beyond.

#### 4. MID Region ASBU Block 0 Modules Prioritization and Monitoring

4.1 On the basis of operational requirements and taking into consideration the associated benefits, **Table 1** below shows the priority for implementation of the 18 Block “0” Modules, as well as the MIDANPIRG subsidiary bodies that will be monitoring and supporting the implementation of the Modules:

**Table 1. MID REGION ASBU BLOCK 0 MODULES PRIORITIZATION AND MONITORING**

| Module Code  | Module Title  | Priority | Start Date | Monitoring |                        | Remarks                  |
|--|---|----------|------------|------------|------------------------|--------------------------|
|  |   |          |            | Main       | Supporting             |                          |
| <b>Performance Improvement Areas (PIA) 1: Airport Operations</b>   |   |          |            |            |                        |                          |
| B0-APTA  | Optimization of Approach Procedures including vertical guidance                       | 1        | 2014       | PBN SG     | ATM SG, AIM SG, CNS SG |                          |
| B0-WAKE  | Increased Runway Throughput through Optimized Wake Turbulence Separation              | 2        |            |            |                        |                          |
| B0-RSEQ  | Improve Traffic flow through Runway Sequencing (AMAN/DMAN)                            | 2        |            |            |                        |                          |
| B0-SURF  | Safety and Efficiency of Surface Operations (A-SMGCS Level 1-2)                       | 1        | 2014       | ANSIG      | CNS SG                 | Coordination with RGS WG |
| B0-ACDM  | Improved Airport Operations through Airport-CDM                                       | 1        | 2014       | ANSIG      | CNS SG, AIM SG, ATM SG | Coordination with RGS WG |
| <b>Performance Improvement Areas (PIA) 2 Globally Interoperable Systems and Data Through Globally Interoperable System Wide Information Management</b> |   |          |            |            |                        |                          |
| B0-FICE  | Increased Interoperability, Efficiency and Capacity through Ground-Ground Integration | 1        | 2014       | CNS SG     | AIM SG, ATM SG         |                          |
| B0-DATM  | Service Improvement through Digital Aeronautical Information Management               | 1        | 2014       | AIM SG     |                        |                          |
| B0-AMET  | Meteorological information supporting enhanced operational efficiency and safety      | 1        | 2014       | MET SG     |                        |                          |

| <b>Performance Improvement Areas (PIA) 3 Optimum Capacity and Flexible Flights – Through Global Collaborative ATM</b> |  |   |      |        |        |  |
|---|--|---|------|--------|--------|--|
| B0-FRTO   | Improved Operations through Enhanced En-Route Trajectories                                 | 1 | 2014 | ATM SG |        |  |
| B0-NOPS   | Improved Flow Performance through Planning based on a Network-Wide view                    | 1 | 2015 |        |        |  |
| B0-ASUR   | Initial capability for ground surveillance   | 2 |      |        |        |  |
| B0-ASEP   | Air Traffic Situational Awareness (ATSA)   | 2 |      |        |        |  |
| B0-OPFL   | Improved access to optimum flight levels through climb/descent procedures using ADS-B      | 2 |      |        |        |  |
| B0-ACAS   | ACAS Improvements  | 1 | 2014 | CNS SG |        |  |
| B0-SNET   | Increased Effectiveness of Ground-Based Safety Nets  | 1 | 2017 | ATM SG |        |  |
| <b>Performance Improvement Areas (PIA) 4 Efficient Flight Path – Through Trajectory-based Operations</b>              |  |   |      |        |        |  |
| B0-CDO  | Improved Flexibility and Efficiency in Descent Profiles (CDO)                              | 1 | 2014 | PBN SG |        |  |
| B0-TBO  | Improved Safety and Efficiency through the initial application of Data Link En-Route       | 2 |      | ATM SG | CNS SG |  |
| B0-CCO  | Improved Flexibility and Efficiency Departure Profiles - Continuous Climb Operations (CCO) | 1 | 2014 | PBN SG |        |  |

**Priority 1:** Modules that have the highest contribution to the improvement of air navigation safety and/or efficiency in the MID Region. These modules should be implemented where applicable and will be used for the purpose of regional air navigation monitoring and reporting for the period 2015-2018.

**Priority 2:** Modules recommended for implementation based on identified operational needs and benefits.

## 5. Measuring and Monitoring Air Navigation Performance

5.1 The monitoring of air navigation performance and its enhancement is achieved 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 modules 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 Modules to achieve the air navigation targets.

5.3 The priority 1 Modules along with the associated elements, applicability, performance Indicators, supporting Metrics, and performance Targets are shown in the **Table 2** below.

*Note: The different elements supporting the implementation are explained in detail in the ASBU Document which is attached to the Global Plan (Doc 9750).*

## **6. Governance**

6.1 Progress report on the status of implementation of the different priority 1 Modules and other Modules, as appropriate, should be developed by the Air Navigation System Implementation Group (ANSIG) and presented to the MIDANPIRG Steering Group (MSG) and/or MIDANPIRG on regular basis.

6.2 The MIDANPIRG and its Steering Group (MSG) 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 Report, etc.; and to the stakeholders in the Region within the framework of MIDANPIRG.

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**Table 2. MONITORING THE IMPLEMENTATION OF THE ASBU BLOCK 0 MODULES  
IN THE MID REGION**

*B0 – APTA: Optimization of Approach Procedures including vertical guidance*

**Description and purpose:**

The use of performance-based navigation (PBN) and ground-based augmentation system (GBAS) landing system (GLS) procedures will enhance the reliability and predictability of approaches to runways, thus increasing safety, accessibility and efficiency. This is possible through the application of Basic global navigation satellite system (GNSS), Baro vertical navigation (VNAV), satellite-based augmentation system (SBAS) and GLS. The flexibility inherent in PBN approach design can be exploited to increase runway capacity.

**Main performance impact:**

|                             |                   |                     |                      |                 |
|-----------------------------|-------------------|---------------------|----------------------|-----------------|
| KPA- 01 – Access and Equity | KPA-02 – Capacity | KPA-04 – Efficiency | KPA-05 – Environment | KPA-10 – Safety |
| Y                           | Y                 | Y                   | Y                    | Y               |

**Applicability consideration:**

This module is applicable to all instrument, and precision instrument runway ends, and to a limited extent, non-instrument runway ends.

| <i>B0 – APTA: Optimization of Approach Procedures including vertical guidance</i> |   |   |  |           |
|---|---|---|--|-----------|
| Elements  | Applicability                             | Performance Indicators/Supporting Metrics   | Targets  | Timelines |
| LNAV  | All RWYs Ends at International Aerodromes | Indicator: % of runway ends at international aerodromes with RNAV(GNSS) Approach Procedures (LNAV)<br><br>Supporting metric: Number of runway ends at international aerodromes with RNAV (GNSS) Approach Procedures (LNAV)                            | 100%<br>(All runway ends at Int'l Aerodromes, either as the primary approach or as a back-up for precision approaches) | Dec. 2016 |
| LNAV/VNAV   | All RWYs ENDS at International Aerodromes | Indicator: % of runways ends at international aerodromes provided with Baro-VNAV approach procedures (LNAV/VNAV)<br><br>Supporting metric: Number of runways ends at international aerodromes provided with Baro-VNAV approach procedures (LNAV/VNAV) | 100%<br>(All runway ends at Int'l Aerodromes, either as the primary approach or as a back-up for precision approaches) | Dec. 2017 |

**Module B0-SURF: Safety and Efficiency of Surface Operations (A-SMGCS Level 1-2)**

**Description and purpose:**

Basic A-SMGCS provides surveillance and alerting of movements of both aircraft and vehicles on the aerodrome thus improving runway/aerodrome safety. ADS-B information is used when available (ADS-B APT).

**Main performance impact:**

|                             |                   |                     |                      |                 |
|-----------------------------|-------------------|---------------------|----------------------|-----------------|
| KPA- 01 – Access and Equity | KPA-02 – Capacity | KPA-04 – Efficiency | KPA-05 – Environment | KPA-10 – Safety |
| Y                           | Y                 | Y                   | Y                    | Y               |

**Applicability consideration:**

A-SMGCS is applicable to any aerodrome and all classes of aircraft/vehicles. Implementation is to be based on requirements stemming from individual aerodrome operational and cost-benefit assessments. ADS-B APT, when applied is an element of A-SMGCS, is designed to be applied at aerodromes with medium traffic complexity, having up to two active runways at a time and the runway width of minimum 45 m.

| <b>B0-SURF: Safety and Efficiency of Surface Operations (A-SMGCS Level 1-2)</b> |  |   |                |                  |
|---|--|---|----------------|------------------|
| <b>Elements</b>   | <b>Applicability</b>   | <b>Performance Indicators/Supporting Metrics</b>  | <b>Targets</b> | <b>Timelines</b> |
| A-SMGCS Level 1*  | OBBI, HECA, OIII, OKBK, OOMS, OTBD, OTHH, OEDF, OEJN, OERK, OMDB, OMAA, OMDW | Indicator: % of applicable international aerodromes having implemented A-SMGCS Level 1<br><br>Supporting Metric: Number of applicable international aerodromes having implemented A-SMGCS Level 1 | 70%            | Dec. 2017        |
| A-SMGCS Level 2*  | OBBI, HECA, OIII, OKBK, OOMS, OTBD, OTHH, OEJN, OERK, OMDB, OMAA, OMDW       | Indicator: % of applicable international aerodromes having implemented A-SMGCS Level 2<br><br>Supporting Metric: Number of applicable international aerodromes having implemented A-SMGCS Level 2 | 50%            | Dec. 2017        |

\*Reference: Eurocontrol Document – “Definition of A-SMGCS Implementation Levels, Edition 1.2, 2010”.

**B0 – ACDM: Improved Airport Operations through Airport-CDM**

**Description and purpose:**

To implement collaborative applications that will allow the sharing of surface operations data among the different stakeholders on the airport. This will improve surface traffic management reducing delays on movement and maneuvering areas and enhance safety, efficiency and situational awareness.

**Main performance impact:**

|                             |                   |                     |                      |                 |
|-----------------------------|-------------------|---------------------|----------------------|-----------------|
| KPA- 01 – Access and Equity | KPA-02 – Capacity | KPA-04 – Efficiency | KPA-05 – Environment | KPA-10 – Safety |
| N                           | Y                 | Y                   | Y                    | N               |

**Applicability consideration:**

Local for equipped/capable fleets and already established airport surface infrastructure.

**B0 – ACDM: Improved Airport Operations through Airport-CDM**

| Elements | Applicability  | Performance Indicators/Supporting Metrics   | Targets | Timelines |
|----------|--|---|---------|-----------|
| A-CDM    | OBBI, HECA, OIII, OKBK, OOMS, OTBD, OTHH, OEJN, OERK, OMDB, OMAA | Indicator: % of applicable international aerodromes having implemented improved airport operations through airport-CDM<br><br>Supporting metric: Number of applicable international aerodromes having implemented improved airport operations through airport-CDM | 50%     | Dec. 2018 |

***B0 – FICE: Increased Interoperability, Efficiency and Capacity through Ground-Ground Integration***

**Description and purpose:**

To improve coordination between air traffic service units (ATSUs) by using ATS Inter-facility Data Communication (AIDC) defined by the ICAO *Manual of Air Traffic Services Data Link Applications* (Doc 9694). The transfer of communication in a data link environment improves the efficiency of this process particularly for oceanic ATSUs.

**Main performance impact:**

|                             |                   |                     |                      |                 |
|-----------------------------|-------------------|---------------------|----------------------|-----------------|
| KPA- 01 – Access and Equity | KPA-02 – Capacity | KPA-04 – Efficiency | KPA-05 – Environment | KPA-10 – Safety |
| N                           | Y                 | Y                   | N                    | Y               |

**Applicability consideration:**

Applicable to at least two area control centers (ACCs) dealing with enroute and/or terminal control area (TMA) airspace. A greater number of consecutive participating ACCs will increase the benefits.

***B0 – FICE: Increased Interoperability, Efficiency and Capacity through Ground-Ground Integration***

| Elements  | Applicability                             | Performance Indicators/Supporting Metrics   | Targets | Timelines |
|---|---|---|---------|-----------|
| AMHS capability                                   | All States                                | Indicator: % of States with AMHS capability<br><br>Supporting metric: Number of States with AMHS capability   | 70%     | Dec. 2017 |
| AMHS implementation /interconnection              | All States                                | Indicator: % of States with AMHS implemented (interconnected with other States AMHS)<br><br>Supporting metric: Number of States with AMHS implemented (interconnections with other States AMHS) | 60%     | Dec. 2017 |
| Implementation of AIDC/OLDI between adjacent ACCs | As per the AIDC/OLDI Applicability Table* | Indicator: % of priority 1 AIDC/OLDI Interconnection have been implemented<br><br>Supporting metric: Number of AIDC/OLDI interconnections implemented between adjacent ACCs                     | 70%     | Dec. 2020 |

\* Note – the required AIDC/OLDI connection is detailed in the MID eANP Volume II Part III

**B0 – DATM: Service Improvement through Digital Aeronautical Information Management**

**Description and purpose:**

The initial introduction of digital processing and management of information, through aeronautical information service (AIS)/aeronautical information management (AIM) implementation, use of aeronautical information exchange model (AIXM), migration to electronic aeronautical information publication (AIP) and better quality and availability of data

**Main performance impact:**

|                             |                   |                     |                      |                 |
|-----------------------------|-------------------|---------------------|----------------------|-----------------|
| KPA- 01 – Access and Equity | KPA-02 – Capacity | KPA-04 – Efficiency | KPA-05 – Environment | KPA-10 – Safety |
| N                           | N                 | Y                   | Y                    | Y               |

**Applicability consideration:**

Applicable at State level, with increased benefits as more States participate

| <b>B0 – DATM: Service Improvement through Digital Aeronautical Information Management</b> |                      |  |                                       |                            |
|---|----------------------|--|---------------------------------------|----------------------------|
| <b>Elements</b>   | <b>Applicability</b> | <b>Performance Indicators/Supporting Metrics</b>   | <b>Targets</b>                        | <b>Timelines</b>           |
| AIXM  | All States           | Indicator: % of States that have implemented an AIXM-based AIS database<br><br>Supporting Metric: Number of States that have implemented an AIXM-based AIS database  | 80%                                   | Dec. 2018                  |
| eAIP  | All States           | Indicator: % of States that have implemented an IAID driven AIP Production (eAIP)<br><br>Supporting Metric: Number of States that have implemented an IAID driven AIP Production (eAIP)  | 80%                                   | Dec. 2020                  |
| QMS   | All States           | Indicator: % of States that have implemented QMS for AIS/AIM<br><br>Supporting Metric: Number of States that have implemented QMS for AIS/AIM  | 90%                                   | Dec. 2018                  |
| WGS-84  | All States           | Indicator: % of States that have implemented WGS-84 for horizontal plan (ENR, Terminal, AD)<br><br>Supporting Metric: Number of States that have implemented WGS-84 for horizontal plan (ENR, Terminal, AD)<br><br>Indicator: % of States that have implemented WGS-84 Geoid Undulation<br><br>Supporting Metric: Number of States that have implemented WGS-84 Geoid Undulation | Horizontal: 100%<br><br>Vertical: 90% | Dec. 2018<br><br>Dec. 2018 |
| Agreement with data originators   | All States           | Indicator: % of States that have signed Service Level Agreements (SLA) with at least 50% of their AIS data originators<br><br>Supporting Metric: Number of States that have signed Service Level Agreements (SLA) with at least 50% of their AIS data originators  | 80%                                   | Dec. 2020                  |

***B0 – AMET: Meteorological information supporting enhanced operational efficiency and safety***

**Description and purpose:**

Global, regional and local meteorological information:

- a) forecasts provided by world area forecast centres (WAFC), volcanic ash advisory centres (VAAC) and tropical cyclone advisory centres (TCAC);
- b) aerodrome warnings to give concise information of meteorological conditions that could adversely affect all aircraft at an aerodrome including wind shear; and
- c) SIGMETs to provide information on occurrence or expected occurrence of specific en-route weather phenomena which may affect the safety of aircraft operations and other operational meteorological (OPMET) information, including METAR/SPECI and TAF, to provide routine and special observations and forecasts of meteorological conditions occurring or expected to occur at the aerodrome.

This module includes elements which should be viewed as a subset of all available meteorological information that can be used to support enhanced operational efficiency and safety.

**Main performance impact:**

|                             |                   |                     |                      |                 |
|-----------------------------|-------------------|---------------------|----------------------|-----------------|
| KPA- 01 – Access and Equity | KPA-02 – Capacity | KPA-04 – Efficiency | KPA-05 – Environment | KPA-10 – Safety |
| N                           | Y                 | Y                   | Y                    | Y               |

**Applicability consideration:**

Applicable to traffic flow planning, and to all aircraft operations in all domains and flight phases, regardless of level of aircraft equipage.

| <b><i>B0 – AMET: Meteorological information supporting enhanced operational efficiency and safety</i></b> |                                    |   |                |                  |
|---|------------------------------------|---|----------------|------------------|
| <b>Elements</b>   | <b>Applicability</b>               | <b>Performance Indicators/Supporting Metrics</b>  | <b>Targets</b> | <b>Timelines</b> |
| SADIS FTP   | All States                         | Indicator: % of States having implemented SADIS FTP service<br><br>Supporting Metric: Number of States having implemented SADIS FTP service | 100%           | Dec. 2018        |
| QMS   | All States                         | Indicator: % of States having implemented QMS for MET<br><br>Supporting metric: number of States having implemented QMS for MET             | 80%            | Dec. 2018        |
| SIGMET  | All States with MWOs in MID Region | Indicator: % of States having implemented SIGMET<br><br>Supporting metric: number of States having implemented SIGMET                       | 100%           | Dec. 2018        |
| OPMET   | All States                         | Indicator: % of States having implemented METAR and TAF<br><br>Supporting metric: number of States having implemented METAR and TAF         | 95%            | Dec. 2018        |
| <b>WIND SHEAR</b>   | <b>TBD</b>                         | <b>Indicator: TBD</b><br><br><b>Supporting metric: TBD</b>  | <b>TBD</b>     | <b>TBD</b>       |

**B0 – FRT0: Improved Operations through Enhanced En-Route Trajectories**

**Description and purpose:**

To allow the use of airspace which would otherwise be segregated (i.e. special use airspace) along with flexible routing adjusted for specific traffic patterns. This will allow greater routing possibilities, reducing potential congestion on trunk routes and busy crossing points, resulting in reduced flight length and fuel burn.

**Main performance impact:**

|                             |                   |                     |                      |                 |
|-----------------------------|-------------------|---------------------|----------------------|-----------------|
| KPA- 01 – Access and Equity | KPA-02 – Capacity | KPA-04 – Efficiency | KPA-05 – Environment | KPA-10 – Safety |
| Y                           | Y                 | Y                   | Y                    | N/A             |

**Applicability consideration:**

Applicable to en-route and terminal airspace. Benefits can start locally. The larger the size of the concerned airspace the greater the benefits, in particular for flex track aspects. Benefits accrue to individual flights and flows. Application will naturally span over a long period as traffic develops. Its features can be introduced starting with the simplest ones.

| <b>B0 – FRT0: Improved Operations through Enhanced En-Route Trajectories</b> |                      |  |                |                  |
|--|----------------------|--|----------------|------------------|
| <b>Elements</b>  | <b>Applicability</b> | <b>Performance Indicators/Supporting Metrics</b>   | <b>Targets</b> | <b>Timelines</b> |
| Flexible Use of Airspace (FUA) Level 1 Strategic                             | All States           | Indicator: % of States that have implemented FUA Level 1<br><br>Supporting metric*: number of States that have implemented FUA Level 1 | 50%            | Dec. 2019        |
| FUA Level 2 Pre-tactical   | All States           | Indicator: % of States that have implemented FUA Level 2<br><br>Supporting metric*: number of States that have implemented FUA Level 2 | 60%            | Dec. 2020        |
| FUA Level 3 Tactical   | All States           | Indicator: % of States that have implemented FUA Level 3<br><br>Supporting metric*: number of States that have implemented FUA Level 3 | 60%            | Dec. 2022        |

***B0 – NOPS: Improved Flow Performance through Planning based on a Network-Wide view***

**Description and purpose:**

Air Traffic Flow Management (ATFM) is used to manage the flow of traffic in a way that minimizes delay and maximizes the use of the entire airspace. ATFM can regulate traffic flows involving departure slots, smooth flows and manage rates of entry into airspace along traffic axes, manage arrival time at waypoints or Flight Information Region (FIR)/sector boundaries and re-route traffic to avoid saturated areas. ATFM may also be used to address system disruptions including crisis caused by human or natural phenomena.

Experience clearly shows the benefits related to managing flows consistently and collaboratively over an area of a sufficient geographical size to take into account sufficiently well the network effects. The concept for ATFM and demand and capacity balancing (DCB) should be further exploited wherever possible. System improvements are also about better procedures in these domains, and creating instruments to allow collaboration among the different actors.

Guidance on the implementation of ATFM service are provided in the ICAO Doc 9971– Manual on Collaborative Air Traffic Flow Management

**Main performance impact:**

|                             |                   |                     |                      |                 |
|-----------------------------|-------------------|---------------------|----------------------|-----------------|
| KPA- 01 – Access and Equity | KPA-02 – Capacity | KPA-04 – Efficiency | KPA-05 – Environment | KPA-10 – Safety |
| Y                           | Y                 | Y                   | Y                    | N/A             |

**Applicability consideration:**

Applicable to en-route and terminal airspace. Benefits can start locally. The larger the size of the concerned airspace the greater the benefits. Application will naturally span over a long period as traffic develops.

***B0 – NOPS: Improved Flow Performance through Planning based on a Network-Wide view***

| Elements  | Applicability | Performance Indicators/Supporting Metrics   | Targets | Timelines |
|---|---------------|---|---------|-----------|
| ATFM Measures implemented in collaborative manner | All States    | Indicator: % of States that have established a mechanism for the implementation of ATFM Measures based on collaborative decision<br><br>Supporting metric: number of States that have established a mechanism for the implementation of ATFM Measures based on collaborative decision | 100%    | Dec. 2018 |
| ATFM Structure                                    | All States    | Indicator: % of States that have established an ATFM Structure<br><br>Supporting metric: number of States that have established an ATFM Structure   | 100 %   | Dec. 2019 |

**B0 – ACAS: ACAS Improvements**

**Description and purpose:**

To provide short-term improvements to existing airborne collision avoidance systems (ACAS) to reduce nuisance alerts while maintaining existing levels of safety. This will reduce trajectory deviations and increase safety in cases where there is a breakdown of separation

**Main performance impact:**

|                             |                   |                     |                      |                 |
|-----------------------------|-------------------|---------------------|----------------------|-----------------|
| KPA- 01 – Access and Equity | KPA-02 – Capacity | KPA-04 – Efficiency | KPA-05 – Environment | KPA-10 – Safety |
| N/A                         | N/A               | Y                   | N/A                  | Y               |

**Applicability consideration:**

Safety and operational benefits increase with the proportion of equipped aircraft.

| <b>B0 – ACAS: ACAS Improvements</b> |                      |   |                |                  |
|-------------------------------------|----------------------|---|----------------|------------------|
| <b>Elements</b>                     | <b>Applicability</b> | <b>Performance Indicators/Supporting Metrics</b>  | <b>Targets</b> | <b>Timelines</b> |
| Avionics (TCAS V7.1)                | 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 | 100%           | Dec. 2017        |

***B0 – SNET: Increased Effectiveness of Ground-based Safety Nets***

**Description and purpose:**

To enable monitoring of flights while airborne to provide timely alerts to air traffic controllers of potential risks to flight safety. Alerts from short-term conflict alert (STCA), area proximity warnings (APW) and minimum safe altitude warnings (MSAW) are proposed. Ground-based safety nets make an essential contribution to safety and remain required as long as the operational concept remains human centered.

**Main performance impact:**

|                             |                   |                     |                      |                 |
|-----------------------------|-------------------|---------------------|----------------------|-----------------|
| KPA- 01 – Access and Equity | KPA-02 – Capacity | KPA-04 – Efficiency | KPA-05 – Environment | KPA-10 – Safety |
| N/A                         | N/A               | Y                   | N/A                  | Y               |

**Applicability consideration:**

Benefits increase as traffic density and complexity increase. Not all ground-based safety nets are relevant for each environment. Deployment of this Module should be accelerated.

| <b><i>B0 – SNET: Increased Effectiveness of Ground-based Safety Nets</i></b> |                      |  |                |                  |
|--|----------------------|--|----------------|------------------|
| <b>Elements</b>  | <b>Applicability</b> | <b>Performance Indicators/Supporting Metrics</b>   | <b>Targets</b> | <b>Timelines</b> |
| Short-Term Conflict Alert (STCA)   | All States           | Indicator: % of States that have implemented Short-term conflict alert (STCA)<br><br>Supporting metric*: number of States that have implemented Short-term conflict alert (STCA)         | 80 %           | Dec. 2018        |
| Minimum Safe Altitude Warning (MSAW)   | All States           | 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) | 80 %           | Dec. 2018        |

**B0 – CDO: Improved Flexibility and Efficiency in Descent Profiles (CDO)**

**Description and purpose:**

To use performance-based airspace and arrival procedures allowing aircraft to fly their optimum profile using continuous descent operations (CDOs). This will optimize throughput, allow fuel efficient descent profiles and increase capacity in terminal areas.

**Main performance impact:**

|                             |                   |                     |                      |                 |
|-----------------------------|-------------------|---------------------|----------------------|-----------------|
| KPA- 01 – Access and Equity | KPA-02 – Capacity | KPA-04 – Efficiency | KPA-05 – Environment | KPA-10 – Safety |
| N                           | Y                 | Y                   | Y                    | Y               |

**Applicability consideration:**

Regions, States or individual locations most in need of these improvements. For simplicity and implementation success, complexity can be divided into three tiers:

- a) least complex – regional/States/locations with some foundational PBN operational experience that could capitalize on near term enhancements, which include integrating procedures and optimizing performance;
- b) more complex – regional/States/locations that may or may not possess PBN experience, but would benefit from introducing new or enhanced procedures. However, many of these locations may have environmental and operational challenges that will add to the complexities of procedure development and implementation; and
- c) most complex – regional/States/locations in this tier will be the most challenging and complex to introduce integrated and optimized PBN operations. Traffic volume and airspace constraints are added complexities that must be confronted. Operational changes to these areas can have a profound effect on the entire State, region or location.

| <b>B0 – CDO: Improved Flexibility and Efficiency in Descent Profiles (CDO)</b> |  |  |   |                  |
|--|--|--|---|------------------|
| <b>Elements</b>  | <b>Applicability</b>   | <b>Performance Indicators/Supporting Metrics</b>   | <b>Targets</b>                                  | <b>Timelines</b> |
| PBN STARs  | OBBI, HESN, HESH, HEMA, HEGN, HELX, OIIE, OISS, OIKB, OIMM, OIFM, ORER, ORNI, OJAM, OJAI, OJAQ, OKBK, OLBA, OOMS, OOSA, OTHH, OEJN, OEMA, OEDF, OERK, HSNM, HSOB, HSSS, HSPN, OMAA, OMAD, OMDB, OMDW, OMSJ | Indicator: % of International Aerodromes/TMA with PBN STAR implemented as required.<br><br>Supporting Metric: Number of International Aerodromes/TMAs with PBN STAR implemented as required. | 100%<br>(for the identified Aerodromes/TMAs)    | Dec. 2018        |
| International aerodromes/TMAs with CDO   | OBBI, HESH, HEMA, HEGN, OIIE, OIKB, OIFM, OJAI, OJAQ, OKBK, OLBA, OOMS, OTHH, OEJN, OEMA, OEDF, OERK, HSSS, HSPN, OMAA, OMDB, OMDW, OMSJ   | Indicator: % of International Aerodromes/TMA with CDO implemented as required.<br><br>Supporting Metric: Number of International Aerodromes/TMAs with CDO implemented as required.           | 100%<br>(by for the identified Aerodromes/TMAs) | Dec. 2018        |

**B0 – CCO: Improved Flexibility and Efficiency Departure Profiles - Continuous Climb Operations (CCO)**

**Description and purpose:**

To implement continuous climb operations in conjunction with performance-based navigation (PBN) to provide opportunities to optimize throughput, improve flexibility, enable fuel-efficient climb profiles and increase capacity at congested terminal areas.

**Main performance impact:**

|                             |                   |                     |                      |                 |
|-----------------------------|-------------------|---------------------|----------------------|-----------------|
| KPA- 01 – Access and Equity | KPA-02 – Capacity | KPA-04 – Efficiency | KPA-05 – Environment | KPA-10 – Safety |
| N/A                         | N/A               | Y                   | Y                    | Y               |

**Applicability consideration:**

Regions, States or individual locations most in need of these improvements. For simplicity and implementation success, complexity can be divided into three tiers:

- a) least complex: regional/States/locations with some foundational PBN operational experience that could capitalize on near-term enhancements, which include integrating procedures and optimizing performance;
- b) more complex: regional/States/locations that may or may not possess PBN experience, but would benefit from introducing new or enhanced procedures. However, many of these locations may have environmental and operational challenges that will add to the complexities of procedure development and implementation; and
- c) most complex: regional/States/locations in this tier will be the most challenging and complex to introduce integrated and optimized PBN operations. Traffic volume and airspace constraints are added complexities that must be confronted. Operational changes to these areas can have a profound effect on the entire State, region or location.

**B0 – CCO: Improved Flexibility and Efficiency Departure Profiles - Continuous Climb Operations (CCO)**

| Elements                               | Applicability  | Performance Indicators/Supporting Metrics   | Targets                                      | Timelines |
|--|--|---|--|-----------|
| PBN SIDs                               | OBBI, HESN, HESH, HEMA, HEGN, HELX, OIIE, OISS, OIKB, OIMM, OIFM, ORER, ORNI, OJAM, OJAI, OJAQ, OKBK, OLBA, OOMS, OOSA, OTHH, OEJN, OEMA, OEDF, OERK, HSNN, HSOB, HSSS, HSPN, OMAA, OMAD, OMDB, OMDW, OMSJ | Indicator: % of International Aerodromes/TMA with PBN SID implemented as required.<br><br>Supporting Metric: Number of International Aerodromes/ TMAs with PBN SID implemented as required. | 100%<br>(for the identified Aerodromes/TMAs) | Dec. 2018 |
| International aerodromes/TMAs with CCO | OBBI, HESN, HESH, HEMA, HEGN, HELX, OIIE, OIKB, OIFM, ORER, ORNI, OJAM, OJAI, OJAQ, OKBK, OLBA, OOMS, OOSA, OTHH, OEJN, OEMA, OEDF, OERK, HSNN, HSOB, HSSS, HSPN, OMAA, OMDB, OMDW, OMSJ                   | Indicator: % of International Aerodromes/TMA with CCO implemented as required.<br><br>Supporting Metric: Number of International Aerodromes/TMAs with CCO implemented as required.          | 100%<br>(for the identified Aerodromes/TMAs) | Dec. 2018 |

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