ICAO CAPACITY & EFFICIENCY

# *B0–FRTO, B0-NOPS, B0-ASUR and B0-ACAS Implementation in the AFI and MID Regions*


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# Presentation Outline

- Generalities
- Status of implementation
- Challenges

# Performance Improvement Area 3:

## Optimum Capacity and Flexible Flights – Through Global Collaborative ATM

# Thread: Free-Route Operations (FRTO)

**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.**

# Thread: Free-Route Operations (FRTO)

**Benefits:**

- ✓ **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.**

# B0-FRTO (MID Region)

| B0 – FRTO: Improved Operations through Enhanced En-Route Trajectories | | | |
|---|---|---|---|
| **Elements** | Applicability | Performance Indicators/Supporting Metrics | Targets |
| **Flexible use of airspace (FUA)** | All States | Indicator: % of States that have implemented FUA<br><br>Supporting metric*: number of States that have implemented FUA | 40% by Dec. 2017 |
| **Flexible routing** | All States | Indicator: % of required Routes that are not implemented due military restrictions (segregated areas)<br><br>Supporting metric 1: total number of ATS Routes in the Mid Region<br><br>Supporting metric 2*: number of required Routes that are not implemented due military | 60% by Dec. 2017 |

# B0-FRTO (MID Region) Cont'd

**The ATM SG/2 meeting, Cairo, 30 November-3 December 2015, will agree on the monitoring mechanism of B0-FRTO and the necessary measures to move forward with the implementation of this Module.**

**Challenges**

- **Complicated Airspace Structure**
- **Large military airspaces**
- **Security escalated situation**
- **Identification of specific routes to be implemented through the segregated airspace**

**Mitigation Measures**

**MIDANPIRG/15 through Conclusion 15/15 established the Civil/Military Cooperation Support with a view to expedite the implementation of the Flexible Use of Airspace (FUA) Concept in the MID Region, and to address the challenges that prevent the implementation of the identified Routes across the segregated airspaces.**

# B0-FRTO (AFI Region)

| Elements | Performance Indicators/Supporting Metrics | Targets Date |
|---|---|---|
| 1. Airspace planning | Not assigned Indicator and metrics. | December 2018 |
| 2. Flexible Use of airspace | **Indicator**: % of time segregated airspaces are available for civil operations in the State<br>**Supporting Metric:** Reduction of delays in time of civil flights | December 2016 |
| 3. Flexible Routing | **Indicator**: % of PBN routes implemented<br>**Supporting Metric**: KG of Fuel savings<br>**Supporting Metric:** Tons of CO2 reduction | December 2018 |

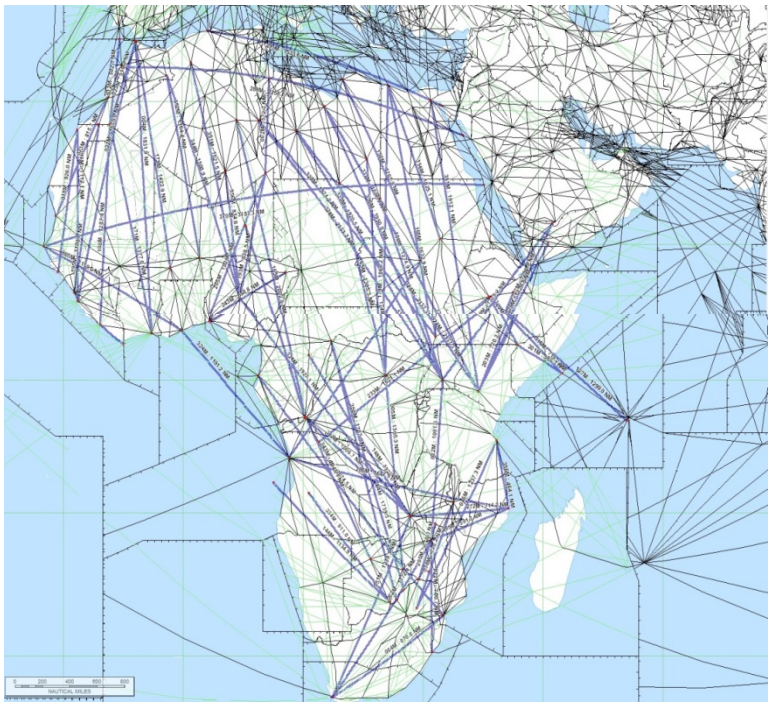
# B0-FRTO-AFI Region (Cont.)

- En-route phase largely implemented through APIRG– PRND WG
  - Route network shortened by about 4797
  - CO2 emissions reduced by an estimated 144 million metric tons

- Focus tasks
  - Route maintenance
  - UPR in IORRA and continental airspace

- Terminal airspace progress weaker – To be addressed under AORTA (AFI Optimised Routes and Terminal Airspace)

- AORRA well established
- IORRA – Under development
  - Supported by ASIOACG & INSPIRE



# Thread: Network Operations (NOPS)

**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.**

# Thread: Network Operations (NOPS)

| Benefits | |
|---|---|
| Access and Equity | Improved access by avoiding disruption of air traffic in periods of demand higher than capacity.<br>ATFM processes take care of equitable distribution of delays. |
| Capacity | Better utilization of available capacity |
| Efficiency | Reduced fuel burn due to better anticipation of flow issue |
| Environment | Reduced fuel burn as delays are absorbed on the ground |
| Participation by the ATM community | Common understanding of operational constraints, capabilities and needs |
| Predictability | Increased predictability of schedules as the ATFM algorithms tends to limit the number of large delays. |
| Safety | Reduced occurrences of undesired sector overloads |
| Cost Benefit Analysis | The business case has proven to be positive due to the benefits that flights can obtain in terms of delay reduction. |

# B0-NOPS (MID Region)

| B0 – NOPS: Improved Flow Performance through Planning based on a Network-Wide view | | | |
|---|---|---|---|
| **Elements** | **Applicability** | **Performance Indicators/Supporting Metrics** | **Targets** |
| 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% by Dec. 2017 |

**The ATM SG/2 meeting, Cairo, 30 November-3 December 2015, will agree on the monitoring mechanism of B0-NOPS and the necessary measures to move forward with the implementation of this Module.**

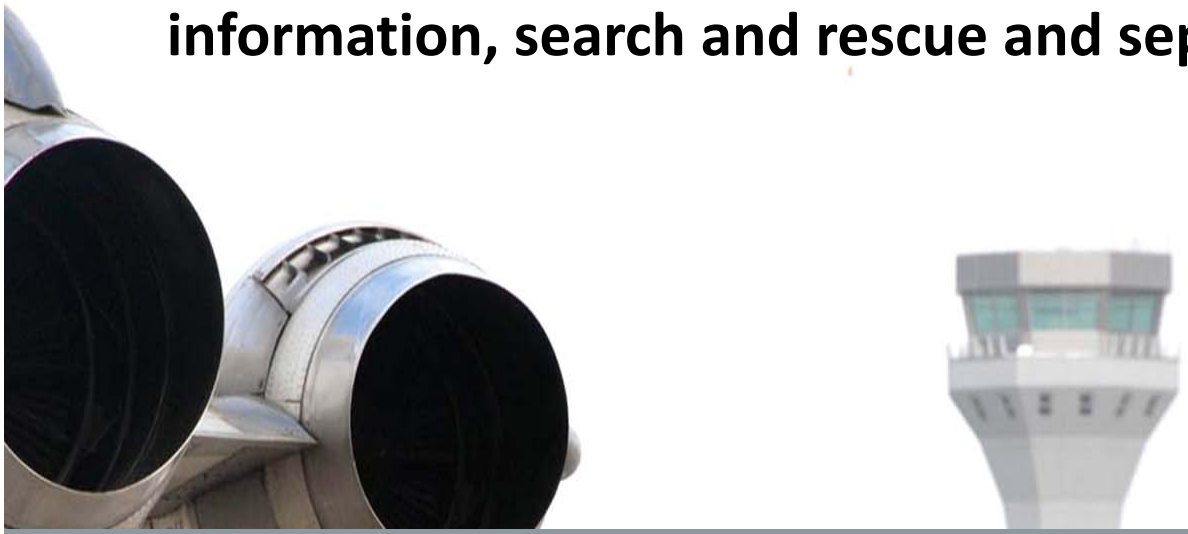
**A regional/sub-regional ATFM System is one of the MID Region ATM Enhancement Programme (MAEP) projects.**

# B0-NOPS (AFI Region)

- APIRG/19 2013 - B0-NOPS not regional priority.
  - Left to States identifying need
- Fully implemented by South Africa – High traffic density
- Other States/FIRs to consider event related and incremental implementation

# Thread: Alternative Surveillance (ASUR)

**This module provides initial capability for lower cost ground surveillance supported by new technologies such as ADS-B OUT and wide area multilateration (MLAT) systems. This capability will be expressed in various ATM services, e.g. traffic information, search and rescue and separation provision.**



# Thread: Alternative Surveillance (ASUR)

| Benefits | |
|---|---|
| **Capacity** | **Typical separation minima are 3 NM or 5 NM enabling a significant increase in traffic density compared to procedural minima. Improved coverage, capacity, velocity vector performance and accuracy can improve ATC performance in both radar and non radar environments. Terminal area surveillance performance improvements are achieved through high accuracy, better velocity vector and improved coverage.** |
| **Safety** | **Reduction of the number of major incidents. Support to search and rescue.** |
| **Cost Benefit Analysis** | **Either comparison between procedural minima and 5 NM separation minima would allow an increase of traffic density in a given airspace; or comparison between installing/renewing SSR Mode S stations using Mode S transponders and installing ADS-B OUT (and/or MLAT systems).** |

# B0-ASUR (AFI Region)

APIRG/19 (2013) Conclusion 19/06

Adoption of AFI Regional Air Navigation System Implementation Plan aligned ASBU

Regional Targets - Surveillance

| | |
|---|---|
| • Implementation of ADS-B | June 2018<br>– Ground and air |
| • Implementation of Multilateration | June 2018<br>– Ground and air |
| • Automation systems | June 2018<br>– Ground and air |

# Thread: Airborne Collision Avoidance Systems (ACAS)

**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.**

# Thread: Airborne Collision Avoidance Systems (ACAS)

| Benefits | |
|---|---|
| **Efficiency** | **ACAS improvement will reduce unnecessary resolution advisory (RA) and then reduce trajectory deviations.** |
| **Safety** | **ACAS increases safety in the case of breakdown of separation.** |

# B0-ACAS (MID Region)

| B0 – ACAS: ACAS Improvements | | | |
|---|---|---|---|
| **Elements** | **Applicability** | **Performance Indicators/Supporting Metrics** | **Targets** |
| **Avionics** | **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** | **80% by Dec. 2015**<br><br>**100% by Dec. 2016** |

**Status of implementation: 6 States = 40%**

**Challenges**

- **Update of the States' Civil Aviation Regulations**
- **Second step the implementation of a mechanism within CAAs to ensure air operators compliance.**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# Thank You