Airspace and Aerodrome Operational Focus

ESAF Regional Office

Seminar/Workshop on Aviation System Block Upgrades (ASBU)
(Addis Ababa, Ethiopia, 17-19 November 2014)

Outline

- Today's challenges
- Tomorrow's needs
- Airspace and aerodrome modules (ATM & AOP) related to ASBU
- PBN implementation targets

Today's Challenges

- Air traffic growth expands two-fold every 15 years.
- Growth can be a double-edged sword.
- Challenge is how to achieve both safety and operational improvements.

Today's Challenges

- Many Regional and National ATM modernization programmes are being developed worldwide to cater for increase in air traffic.
- They are following ICAO's Global Air Navigation Plan and Operational Concept, but nevertheless they are different in their own way, thus resulting in interoperability challenges .

Tomorrow's Needs

- Global framework, focused on interoperability is needed to ensure:

  - Safety is maintained and enhanced

  - ATM improvement programs are harmonized

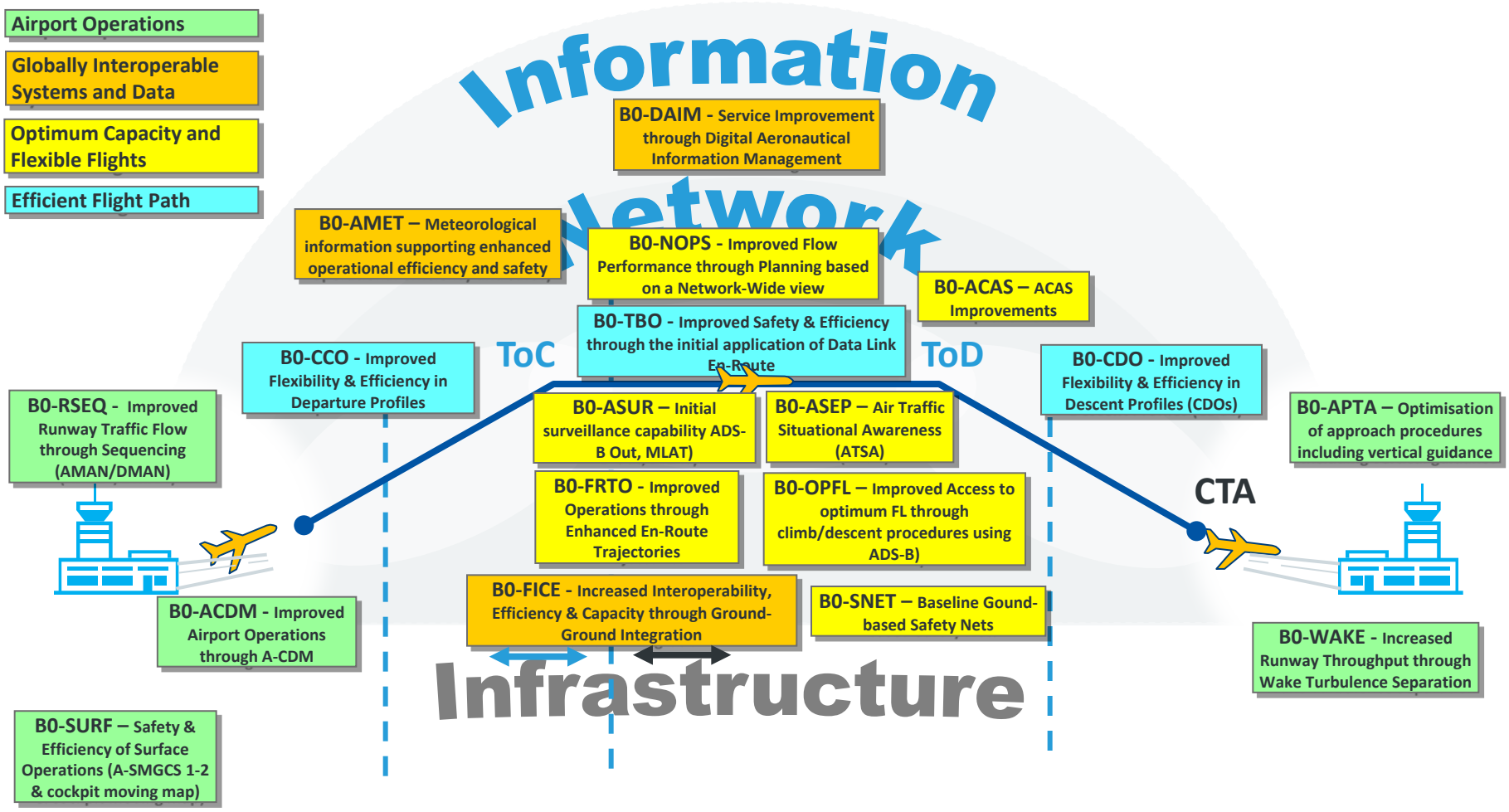
  - Barriers to future efficiency and environmental gains are removed, at reasonable cost (e.g. better civil/military cooperation resulting in enhanced airspace optimization

Links between Modules

Block 0 in Perspective

Performance Improvement Areas

- Airport Operations
- Globally Interoperable Systems and Data
- Optimum Capacity and Flexible Flights
- Efficient Flight Path



ASBU Implementation

- **Block 0 initiatives must leverage on existing on-board avionics**
- **3 Priorities have been agreed to by the Global community:**
  - Performance Based Navigation (PBN) (B0-APTA, BO-ACDM,
  - B0-FRTO)
  - Continuous Descent Operations (CDO) (B0-CDO)
  - Continuous Climb Operations (CCO) (B0-CCO)

Airport Operations

B0-RSEQ - Improved Runway Traffic Flow through Sequencing (AMAN/DMAN)

B0-ACDM - Improved Airport Operations through A-CDM

B0-APTA – Optimisation of approach procedures including vertical guidance

B0-SURF – Safety & Efficiency of Surface Operations (A-SMGCS 1-2 & cockpit moving map)

B0-WAKE - Increased Runway Throughput through Wake Turbulence Separation

Optimum Capacity & Flexible Flights

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

B0-ACAS – ACAS Improvements

B0-ASEP – Air Traffic Situational Awareness (ATSA)

B0-ASUR – Initial surveillance capability ADS-B Out, MLAT)

B0-OPFL – Improved Access to optimum FL through climb/descent procedures using ADS-B)

B0-FRTO - Improved Operations through Enhanced En-Route Trajectories

B0-SNET – Baseline Gound-based Safety Nets

Efficient Flight Path

B0-TBO - Improved Safety & Efficiency through the initial application of Data Link En-Route

B0-CCO - Improved Flexibility & Efficiency in Departure Profiles

B0-CDO - Improved Flexibility & Efficiency in Descent Profiles (CDOs)

Airport Ops: B0-APTA (PIA1)

- **Elements**
  1. APV with Baro VNAV
  2. APV with SBAS
  3. APV with GBAS
- **Targets and implementation progress**
  1. Dec 2016 (service providers and users)
  2. Dec 2017 (as per AFI GNSS Strategy)
  3. Dec 2018 (initial implem at some States)

B0-APTA – Performance Indicators / Supporting Metrics

1 APV with Baro VNAV:

- **Indicator**: Percentage of international aerodromes having instrument runways provided with APV with Baro VNAV procedure implemented (Where the % is defined)
- **Supporting metric**: Number of international airports having approved APV with Baro VNAV

B0-APTA – Performance Indicators / Supporting Metrics

2. APV with SBAS:

- **Indicator**: Percentage of international aerodromes having instrument runways provided with APV with SBAS procedure implemented
- **Supporting metric**: Number of international airports having approved APV with SBAS

B0-APTA – Performance Indicators / Supporting Metrics

2. APV with GBAS:

- **Indicator**: Percentage of international aerodromes having instrument runways provided with APV with GBAS procedure implemented
- **Supporting metric**: Number of international airports having approved APV with GBAS

Continuous Descent Operations B0-CDO (PIA 4)

- **Elements**
  1. CDO implementation
  2. PBN STARs implementation
- **Targets and implementation progress**
  1. Dec 2017
  2. Dec 2017

B0-CDO - Performance Indicators / Supporting Metrics

1. CDO implementation

Indicator: Percentage of international aerodromes/TMAs with CDO implemented

Supporting metric: Number of international aerodromes/TMAs with CDO implemented

B0-CDO - Performance Indicators / Supporting Metrics

2. PBN STARs implementation

Indicator: Percentage of international aerodromes with PBN STARs implementation

Supporting metric: Number of international airport with PBN STARs implementation

B0-FRTO - Optimum Capacity & Flexible Flights (PIA 3)

- **Elements**
  1. Airspace planning
  2. Flexible use of airspace
  3. Flexible routing
- **Targets and implementation progress**
  1. Dec 2018
  2. Dec 2016
  3. Dec 2018

B0 - FRTO – Performance Indicators / Supporting Metrics

1. **Airspace planning (*no indicator assigned*)**
2. **Flexible use of airspace**

Indicator: Percentage of time segregated airspaces are available for civil operations in the State

Supporting metric: Reduction of delays in time of civil flights

B0 - FRTO – Performance Indicators / Supporting Metrics

3. Flexible routing

Indicator: Percentage of PBN routes implemented

Supporting metric: KG of Fuel savings

Supporting metric: Tons of CO2 reduction

Other PIA 1 Modules

Airport Operations-B0-15/RSEQ: Improved Traffic Flow through Runway Sequencing (AMAN/DMAN)

Airport Operations-BO-76/URF: Safety and Efficiency of Surface Operations (A-SMGCS Level 1-2)

Airport Operations-B)-80/ACDM

PBN Implementation - Targets (Mid Term: 2013-2016)

Airspace	Nav. Specifications	Nav. Specifications where Operationally Required
En-Route Oceanic	RNAV 10	RNP 4
En-Route Remote Continental	RNAV 10	RNP 4
En-Route Continental	RNAV 5	RNAV 1/2
TMA-Arrival/Departure	RNAV 1 in a surveillance environment	
	Basic RNP 1 in non-surveillance	
Approach	RNP APCH (with Baro-VNAV) OR RNP APCH (LNAV only). Also See Note RNP AR APCH if required	

Note: Where altimeter setting does not exist or aircraft of maximum certificated take-off mass of 5700kg or more, using an aerodrome are not suitably equipped for APV operations.

Implementation - Targets (Mid Term: 2013-2016)

- **RNP APCH (with Baro-VNAV) in 30% of instrument runways by 2010 and 50% by 2012 and priority given to airports with operational benefits. Each instrument runway will have an associated RNP APCH (LNAV only)**

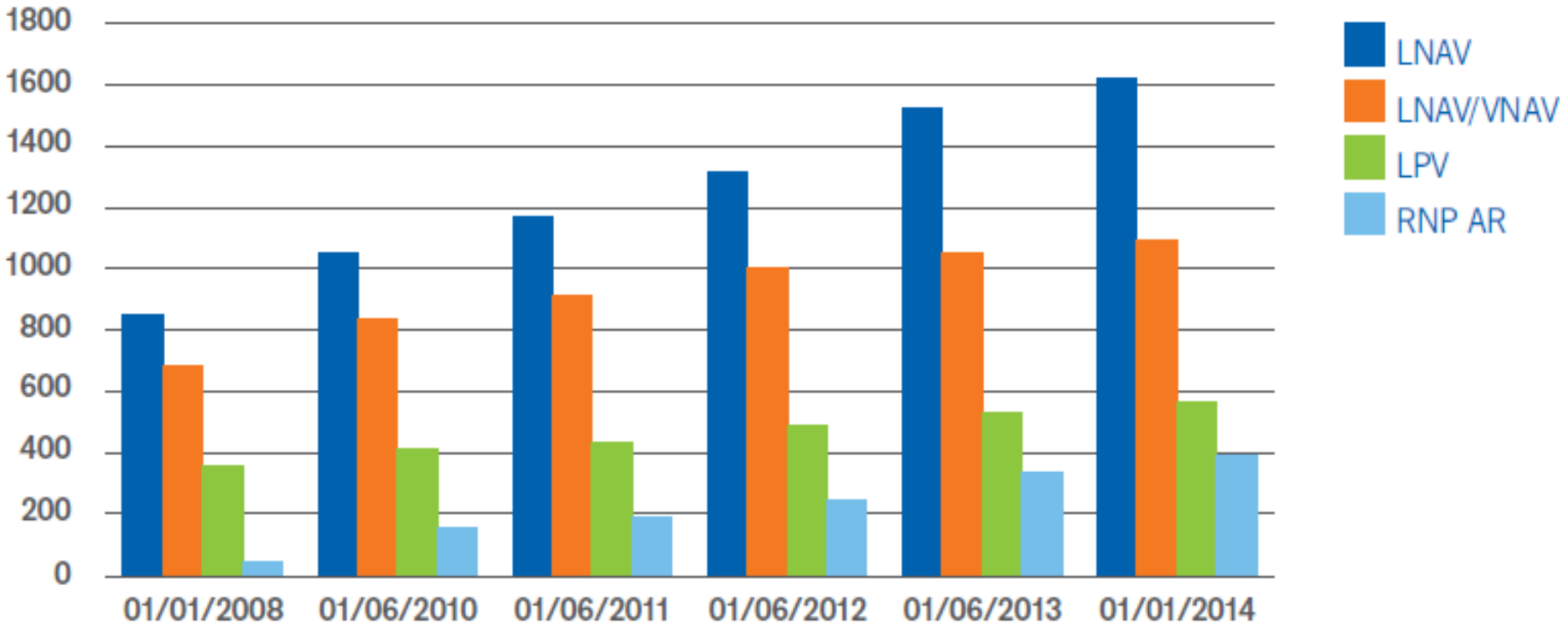
- **Straight-in LNAV only procedures for instrument runways where there is no local altimeter setting available & where aircraft MTOM 5 700 kg or more are not suitably equipped for APV operations**

- **RNAV 1 SID/STAR for 30% of international airports by 2010 and 50% by 2012 and priority given to airports with RNP Approach.**

- **Review existing conventional and RNAV routes to transition to PBN RNAV 5 or where operationally required RNAV 2/1 by 2012.**

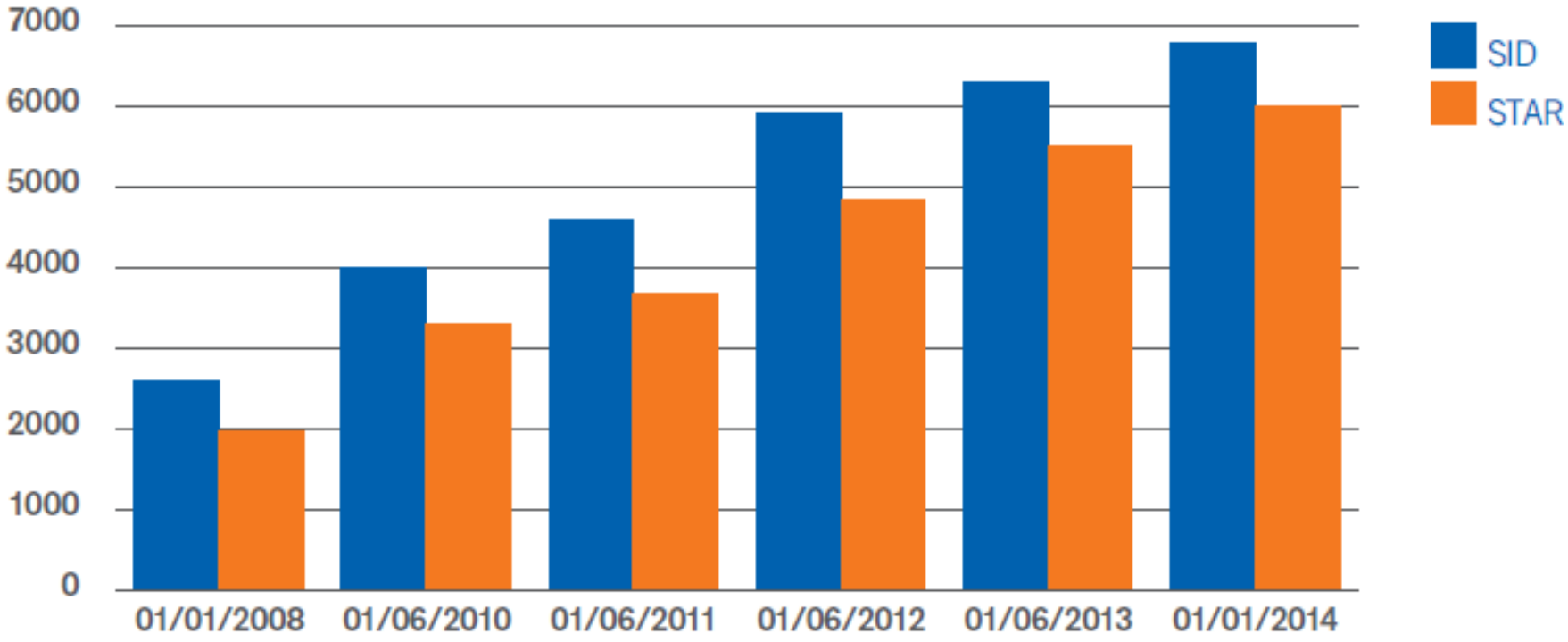
Implementation – Progress

Global PBN Instrument Approach Growth



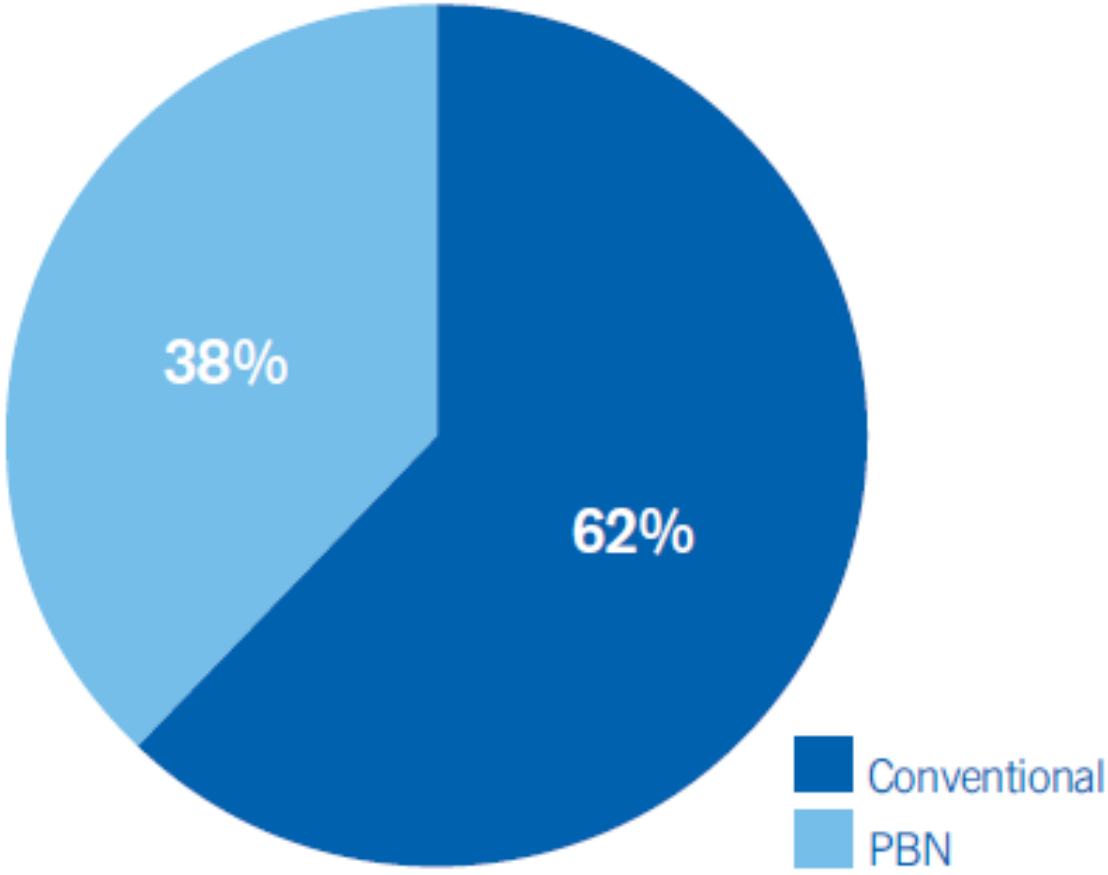
Implementation – Progress

Global PBN SID & STAR Growth



Implementation – Progress

PBN Versus Conventional Routes - Global



STATUS OF RNAV GNSS IMPLEMENTATION IN AFI STATES

ICAO

THANK YOU