ICAO UNITING AVIATION

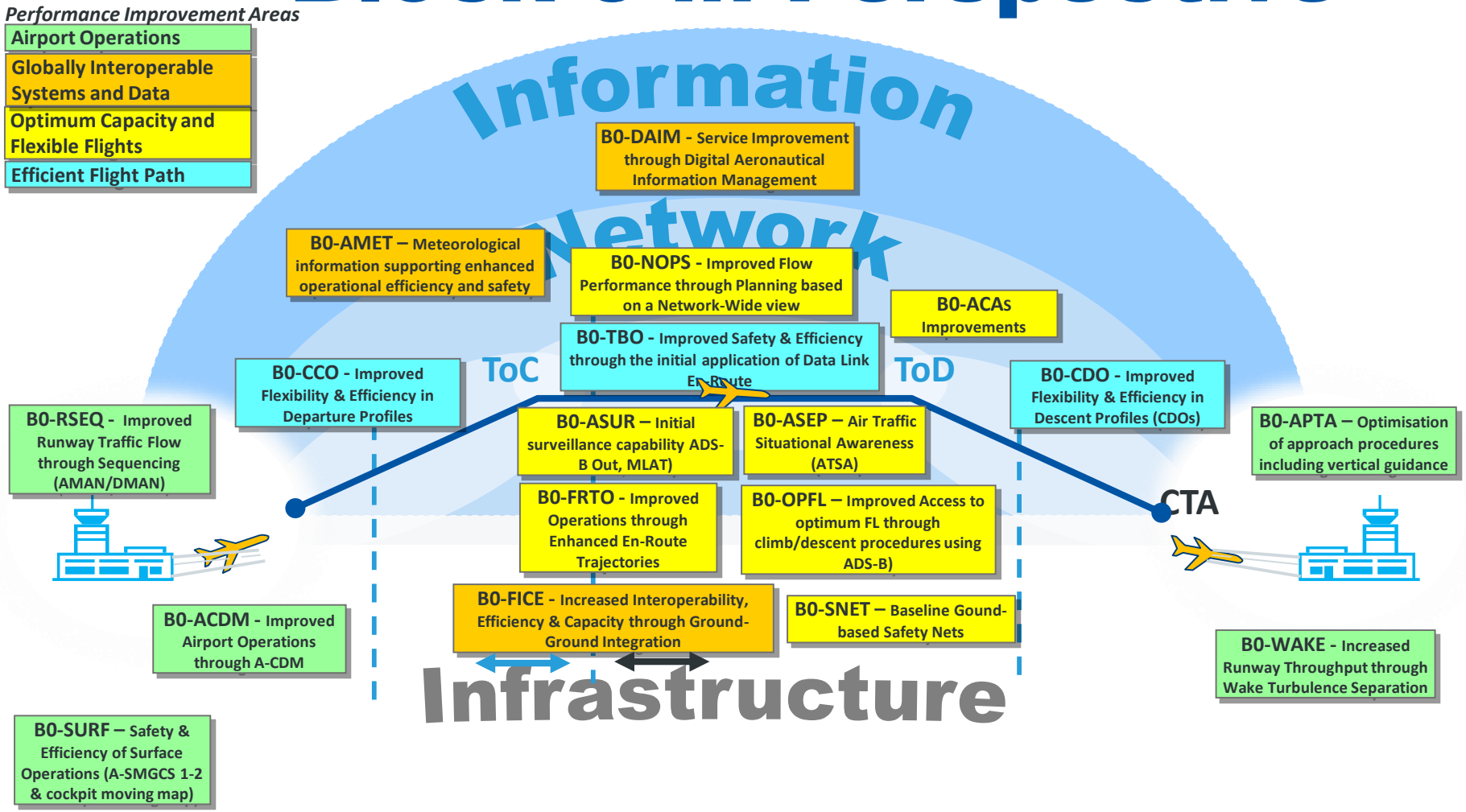
APIRG/20

Air Navigation System Implementation Action Plan (aligned with ASBU Methodology)

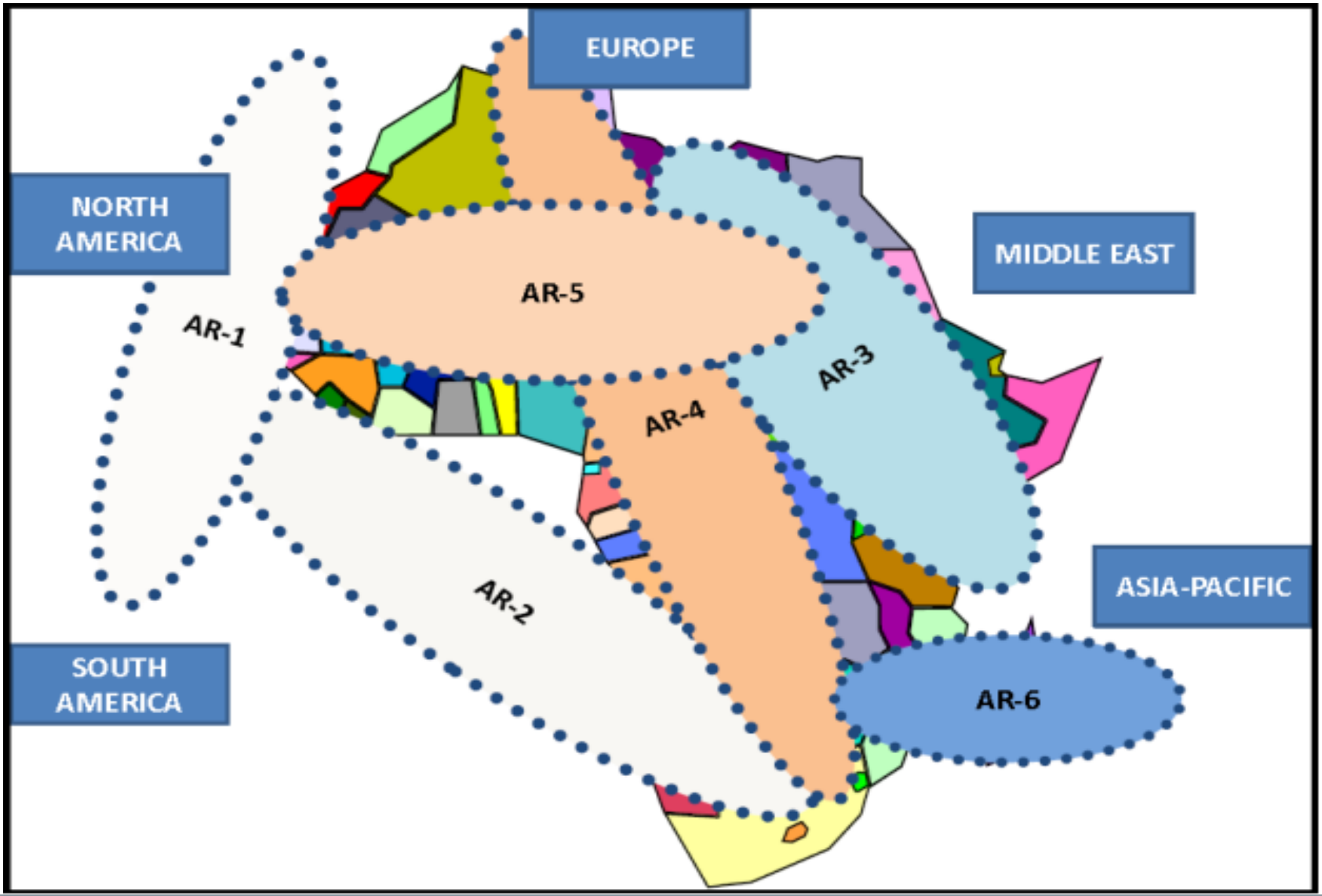
Yamoussoukro, Cote d'Ivoire

30 November – 2 December 2015

Block 0 in Perspective



HOMOGENEOUS AREAS AND MAJOR TRAFFIC FLOWS IN THE AFI REGION



ATM Homogeneous Areas in AFI Region

Areas of routing (AR)	Traffic Flows	Areas involved	Type of area covered	Remarks
Africa-Indian Ocean (AFI) Region				
AR1	Europe — South America (EUR/SAM) (oceanic)	Atlantico [1], Canarias, Casablanca, Dakar Oceanic, Recife, Sal Oceanic	Oceanic en route low density in southern part and oceanic high density in northern part	Major traffic flow EUR/SAM
AR2	Atlantic Ocean interface between the AFI, NAT and SAM Regions	Accra, Dakar, Johannesburg, Luanda, Sal	Oceanic en route low density	Homogeneous ATM area AFI/NAT/SAM
AR3	Europe — Eastern Africa routes including the area of the Indian Ocean	Addis Ababa, Antananarivo, Asmara, Cairo, Dar es-Salaam, Entebbe, Khartoum, Mauritius, Mogadishu, Nairobi, Seychelles, Tripoli	Continental en route/ oceanic low density	Major traffic flow AFI/EUR
AR4	Europe to Southern Africa	Algiers, Beira, Brazzaville, Cape Town, Gaborone, Harare, Johannesburg, Kano, Kinshasa, Lilongwe, Luanda, Lusaka, N'Djamena, Niamey, Tripoli, Tunis, Windhoek	Continental en route low density	Major traffic flow AFI/EUR
AR5	Continental Western Africa including coastal areas	Accra, Addis Ababa, Brazzaville, Dakar, Dar-es-Salaam, Entebbe, Kano, Khartoum, Kinshasa, Nairobi, Ndjamena, Niamey, Roberts	Continental/oceanic low density	Homogeneous area AFI (this is a growing traffic, developing into major traffic flow)
AR6	Trans-Indian	Antananarivo, Bombay [1], Johannesburg Male [1], Mauritius, Melbourne [1], Seychelles	Oceanic high density	Homogeneous ATM area AFI/ASIA

Categories of 18 adopted Block 0 Modules are as follows:

- **Essential (E):** These are the ASBU modules that provide substantial contribution towards global interoperability, safety or regularity. The nine (9) Modules for all States of AFI region are FICE, DATM; ACAS, FRTO, APTA, CDO, CCO, AMET and ACDM.
- **Desirable (D):** These are the ASBU modules that, because of their strong business and/or safety case, are recommended for implementation almost everywhere. The four (4) Modules for all States of AFI region are NOPS, ASUR, SNET, and TBO.
- **Specific (S):** These are the ASBU modules that are recommended for implementation to address a particular operational environment in specific countries of AFI region (for example South Africa). The three (3) Modules are OPFL, ASEP and WAKE *(elements and targets to be developed by APIRG).*
- **Optional (O):** These are the ASBU modules that address particular operational requirements in specific countries of AFI region and provide additional benefits that may not be common everywhere. The two (2) Modules are SURF and RSEQ.

Prioritization of Block 0 Modules

Criteria for priority allocation

- **Priority 1** = Immediate Implementation
- **Priority 2** = Recommended Implementation

Categorization and prioritization of Block 0 Modules for the AFI Region

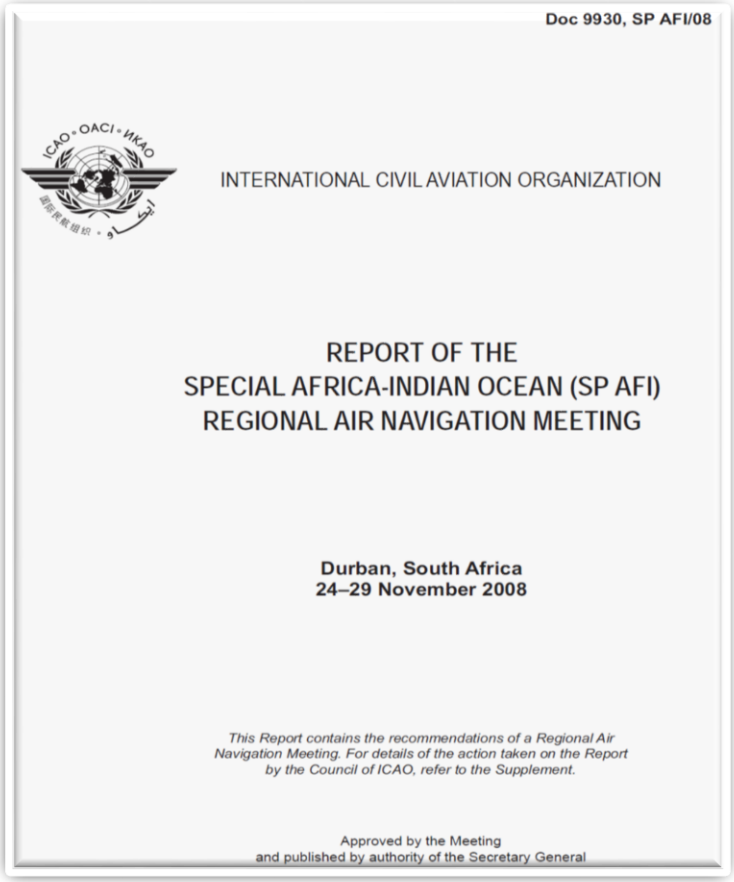
PIA	Module Description	Module	Category	Priority
PIA 1	Improve Traffic flow through Runway Sequencing (AMAN/DMAN)	B0-RSEQ	O	2
	Optimization of Approach Procedures including vertical guidance	B0-APTA	E	1
	Increased Runway Throughput through optimized Wake Turbulence Separation	B0-WAKE	S	2
	Safety and Efficiency of Surface Operations (A-SMGCS Level 1-2)	B0-SURF	O	2
	Improved Airport Operations through Airport-CDM	B0-ACDM	E	1
PIA 2	Increased Interoperability, Efficiency and Capacity through Ground-Ground Integration	B0-FICE	E	1
	Service Improvement through Digital Aeronautical Information Management	B0-DAIM	E	1
	Meteorological information supporting enhanced operational efficiency and safety	B0-AMET	E	1

Categorization and prioritization of Block 0 Modules for the AFI Region

PIA	Module Description	Module	Category	Priority
PIA 3	Improved Operations through Enhanced En-Route Trajectories	B0-FRTO	E	1
	Improved Flow Performance through Planning based on a Network-Wide view	B0-NOPS	D	2
	Initial capability for ground surveillance	B0-ASUR	D	2
	Air Traffic Situational Awareness(ATSA)	B0- ASEP	S	2
	Improved access to Optimum Flight Levels through Climb/Descent Procedures using ADS-B	B0- OPFL	S	2
	ACAS Improvements	B0-ACAS	E	1
	Increased Effectiveness of Ground-Based Safety Nets	B0-SNET	D	2
PIA 4	Improved Flexibility and Efficiency in Descent Profiles (CDO)	B0-CDO	E	1
	Improved Safety and Efficiency through the initial application of Data Link En-Route	B0-TBO	D	2
	Improved Flexibility and Efficiency Departure Profiles - Continuous Climb Operations (CCO)	B0-CCO	E	1

AFI Regional Performance Objectives

- ASBU Workshop.AFI ATM PFFs.docx
- ASBU Workshop.AFI AIM PFFs.docx
- ASBU Workshop.AFI SAR PFFs.docx
- ASBU Workshop.AFI MET PFFs.docx
- ASBU Workshop.AFI AOP PFFs.docx
- ASBU Workshop.AFI CNS PFFs.docx



Doc 9930, SP AFI/08

INTERNATIONAL CIVIL AVIATION ORGANIZATION

REPORT OF THE
SPECIAL AFRICA-INDIAN OCEAN (SP AFI)
REGIONAL AIR NAVIGATION MEETING

Durban, South Africa
24–29 November 2008

This Report contains the recommendations of a Regional Air Navigation Meeting. For details of the action taken on the Report by the Council of ICAO, refer to the Supplement.

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

AFI Regional Performance Objectives

- **RVSM Implementation (PFF ATM/01)**
- **PBN Implementation (en-route, terminal and approach) (PFFs ATM/02, ATM/03 and ATM/04)**
- **Enhancement of CNS Infrastructure (PFF CNS/01)**
- **Search and Rescue (PFF SAR/01)**
- **Transition from AIS to AIM (PFFs AIM/01 and AIM/02)**
- **Improvement of the provision of Meteorological Services (PFFs MET/01, MET/02)**
- **Improvement of Aerodrome Operations (PFF AGA/01)**

REGIONAL/NATIONAL PERFORMANCE OBJECTIVE – B0-CDO: Improved Flexibility and Efficiency in Descent Profiles (CDO) Performance Improvement Area 4: Efficient Flight Path – Through Trajectory-based Operations					
ASBU B0-CDO: Impact on Main Key Performance Areas (KPA)					
	Access & Equity	Capacity	Efficiency	Environment	Safety
Applicable	N	N	Y	Y	Y

ASBUB0- CDO: Implementation Progress	
Elements	**Implementation Status (Ground and Air)**
1. CDO	
2. PBN STARs	

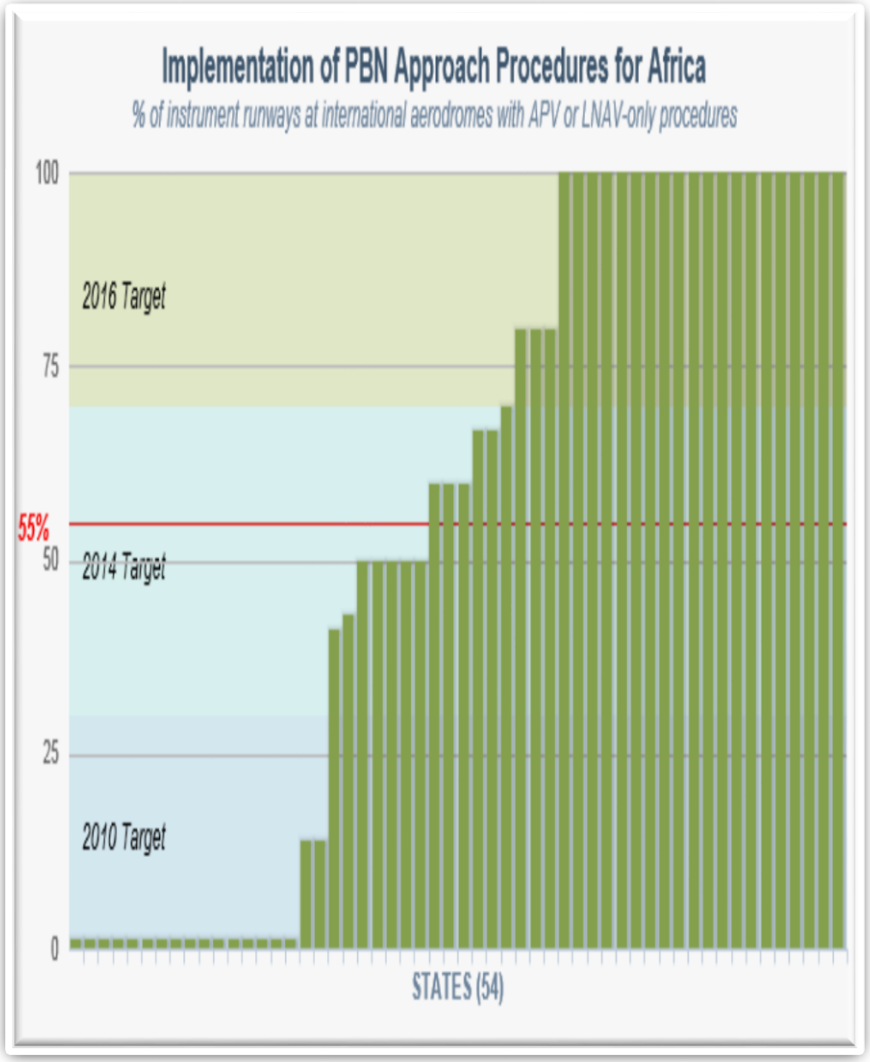
ASBU B0-CDO: Implementation Roadblocks/Issues				
Elements	**Implementation Area**			
	Ground Implementation	Air Implementation	Procedures Availability	Operational Approvals
1. CDO				
2. PBN STARs				

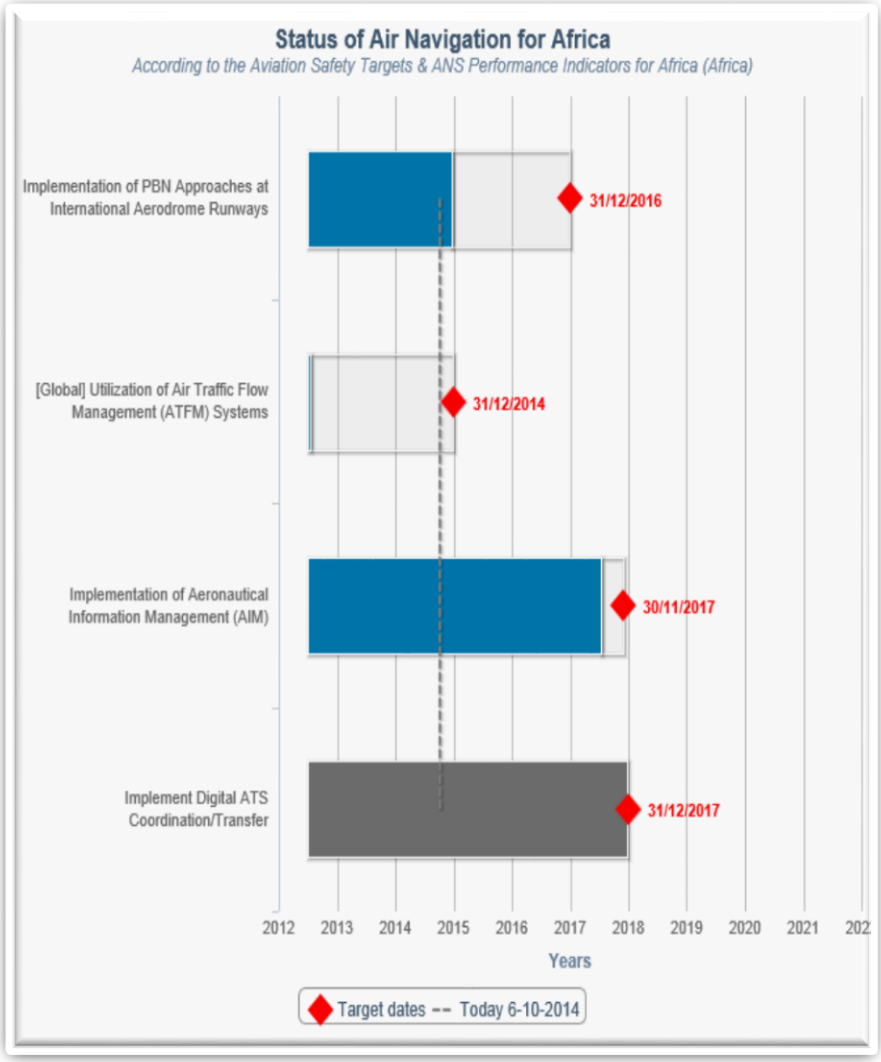
ASBU B0-CDO: Performance Monitoring and Measurement (Benefits)	
Key Performance Areas	**Performance Metrics**
Access & Equity	Not applicable
Capacity	Not applicable
Efficiency	Kilograms of fuel saved per flight
Environment	Kilograms of CO_2 emissions reduced per flight (= KGs fuel saved per flight x 3.157)
Safety	Number of controlled flight into terrain (CFIT) incidents/accidents

ASBU B0-CDO: Performance Monitoring and Measurement (Implementation)	
Elements	**Implementation Indicators/Metrics**
1. CDO	Percentage of international aerodromes/TMAs with CDO implemented
2. PBN STARs	Percentage of international aerodromes/TMAs with PBN STARs implemented

Air Navigation Dashboard (Africa)

(PBN, ATFM, AIM, Digital ATS Coordination/Transfer)





Regional Targets - Communications

ASBU B0-FICE: Planning Targets and Implementation Progress

Elements	Targets and Implementation Progress (Ground and Air)
1. Complete AMHS implementation at States still not counting with this system	December 2015 – Services provider
2. AMHS interconnection	December 2015 – Services provider
3. Implement AIDC/OLDI at some States automated centres	June 2014 – Services provider
4. Implement operational AIDC/OLDI between adjacent ACCs	June 2015 – Services provider
5. Implement the AFI Integrated Telecommunication Network	June2015– Services provider

Regional Targets – Communications

ASBU B0-ASUR: Planning Targets and Implementation Progress

Elements	Targets and Implementation Progress (Ground and Air)
1. Implementation of ADS-B	June 2018 – Users and service provider
2. Implementation of Multilateration	June 2018 – Users and service provider
3. Automation system (Presentation)	June 2017 – Users and service provider

ASBU B0-TBO: Planning Targets and Implementation Progress

Elements	Targets and Implementation Progress (Ground and Air)
1. ADS-C over oceanic and remote areas	June 2018 – Service provider
2. Continental CPDLC	June 2018 – Service provider

Regional Targets - Surveillance

ASBU B0-SNET: Planning Targets and Implementation Progress

Elements	Targets and Implementation Progress (Ground and Air)
1. Short Term Conflict Alert (STCA)	June 2014 / Service provider 2013-2018
2. Area Proximity Warning (APW)	June 2014 / Service provider 2013-2018
3. Minimum Safe Altitude Warning (MSAW)	June 2014
4. Dangerous Area Infringement Warning (DAIW)	2013-2018

Regional Targets - Navigation

ASBU B0-APTA: Planning Targets and Implementation Progress

Elements	Targets and Implementation Progress (Ground and Air)
1. APV with Baro-VNAV	December 2016 – Service Providers and users
2. APV with SBAS	December 2017 – As per AFI-GNSS Strategy.
3. APV with GBAS	December 2018 – Initial implementation at some States (service providers)

Regional Targets - Surveillance

ASBU B0-SURF: Planning Targets and Implementation Progress

Elements	Targets and Implementation Progress (Ground and Air)
1. Surveillance system for ground surface movement (PSR, SSR, ADS-B or Multilateration)	December 2017 Service provider
2. Surveillance system on board (SSR transponder, ADS-B capacity)	December 2017 Service provider
3. Surveillance system for vehicle	December 2017 Service provider
4. Visual aids for navigation	December 2015 Service provider
5. Wildlife strike hazard reduction	December 2015 Aerodrome operator / Wildlife Committee
6. Display and processing information	December 2017 Service Provider

Regional Targets - Surveillance

ASBU B0-SNET: Planning Targets and Implementation Progress

Elements	Targets and Implementation Progress (Ground and Air)
1. Short Term Conflict Alert (STCA)	June 2014 / Service provider 2013-2018
2. Area Proximity Warning (APW)	June 2014 / Service provider 2013-2018
3. Minimum Safe Altitude Warning (MSAW)	June 2014
4. Dangerous Area Infringement Warning (DAIW)	2013-2018

Regional Targets – Meteorological Information Management *(updated by APIRG/20)*

Elements	Targets and Implementat° Progress (Ground and Air)
1. Forecasts provided by WAFCs, IAVW and TCAC	75% by December 2016
2. Aerodrome warnings (AD WRNG, WS WRNG and alerts)	50% by December 2016
3. SIGMET	80% by December 2016
4. QMS/MET	75% by December 2016
5. AMBEX	80% by December 2016
6. Other OPMET Information (METAR, SPECI, TAF)	80% availability by December 2016

Regional Targets – Aeronautical Information Management

ASBU B0-DATM: Planning Targets and Implementation Progress

Elements	Targets and Implementation Progress (Ground and Air)
1. QMS for AIM	December 2014
2. e-TOD implementation	December 2016
3. WGS-84 implementation	Implemented
4. AIXM implementation	December 2016
5. e-AIP implementation	December 2014
6. Digital NOTAM	December 2017

Regional Targets – Avionics

ASBU B0-ACAS: Planning Targets and Implementation Progress

Elements	Targets and Implementation Progress (Ground and Air)
ACAS II (TCAS Version 7.1)	2013-2018

Next steps

Operational Requirements	CNS Services	Identified projects components	Identified Tasks	To be completed	New Task	ASBU PIA	ASBU Module
Increase situational awareness	ASS	Implementation of Surveillance systems	Implementation of SSR Mode S	x		3 3 3	B0 - ASUR B0 – SNET B0-ASEP
			Implementation of ADS-C	x		4	B0- TBO
			Implementation of ADS-B (Ground & Space)		x	3 3 3	B0-ASUR B0- SNET B0- OPFL B0-ASEP
			Implementation of MLAT/WAM		x	3 3	B0-ASUR B0-SNET B0-ASEP

Targets	Linkage with ASBU	ANS Performance Indicators/Metrics	Qualitative performance benefits associated with Safety key performance area	Remarks
1-Implement Performance Based Navigation (PBN)	ASBU Module B0-APTA	Number of PBN routes Number of International Aerodromes/TMAs with PBN SIDs implemented Number of International Aerodromes/TMAs with PBN STARs implemented Number of International Aerodromes with Approach Procedures with vertical guidance (APV) Number of International Aerodromes with Approach Procedures with lateral guidance (LNAV)	Increased safety through stabilized approach paths Reduced runway safety related accidents/incidents and CFIT Increased safety through optimization of airspace use in the vertical and horizontal planes.	Reflected on the AN Dashboard Safety key performance area (KPA) related ASBU Module identified by APIRG/19

Targets	Linkage with ASBU	ANS Performance Indicators/Metrics	Qualitative performance benefits associated with Safety key performance area	Remarks
2-Implement Continuous Descent Operations (CDO) and Continuous Climb Operations (CCO)	ASBU Modules B0-CDO and CCO	Number of International Aerodromes/TMA with CDO implemented Number of International Aerodromes/TMAs with CCO implemented Annual environmental benefits attained (reduced fuel consumption/GHG emissions)	More consistent flight paths and stabilized approach paths.	Safety key performance area (KPA) related ASBU Module identified by APIRG/19
3-Reduce Aircraft Proximity incidents (AIRPROX) due to ANS deficiencies by 50%		Number of Aircraft Proximity incidents (AIRPROX) due to ANS Number of ACAS Resolution Advisory (RA) events due to ATS deficiencies Number of States with training programmes for ANS personnel implemented on yearly basis	Increased safety through application of standard separation minima between aircraft and improved recurrent ATC training.	Safety key performance area (KPA) related ASBU Module identified by APIRG/19

ANS Performance

AFI ANS SC/24 ANS Performance In

Objectives	Linkage with ASBU	Indicators/Metrics	Qualitative performance benefits associated with Safety key performance area	Remarks
4-Reduce risk of accidents related to ATM safety		Number of accidents related to ATM safety	ACAS, SLOP, TIBA and IATA IFBP to increase safety in the case of breakdown of separation.	
5-Implement Digital ATS Coordination/ Transfer	ASBU Module B0-FICE	Number of FIRs within which all applicable ACCs have implemented at least one interface to use ATS Inter-facility Data Communications (AIDC) with neighboring ACCs Number of reported incidents related to lack of coordination between ACCs	Improved coordination between ATS units.	Reflected on the AN Dashboard

Targets	Linkage with ASBU	ANS Performance Indicators/Metrics AFI Plan SC/14 - ANS Pe	Qualitative performance benefits associated with Safety key performance area	Remarks
6-Establish effective and operational SAR Organization		Number of States with SAR Organization Number of States with SAR Plans Number of States with SAR Agreements	Better capacity to provide SAR services over own territory and regionally Improved response for near-border events	
7-Implement En-Route Data Link Applications	ASBU Module B0-TBO	Number of FIRs having implemented Data Link (ADS-C/CPDLC, ADS-B) for en-route operations	ADS-C and ADS-B based safety nets support cleared level adherence monitoring, route adherence monitoring, danger area infringement warning and improved search and rescue. CPDLC to reduce occurrences of misunderstandings between air traffic controllers and pilots Solution to stuck microphone situations	Safety key performance area (KPA) related to ASBU Module identified by APIRG/19

targets	Linkage with ASBU	ANS Performance Indicators/Metrics	Quantitative performance benefits associated with Safety key performance area	Remarks
		an SC/14 - ANS Performance In		
8-Implement Aeronautical Information Management (AIM) Quality Management System (QMS)	ASBU Module B0-DATM	Number of States with AIM QMS implemented	Reduction in the number of data inconsistencies and inaccuracies	Reflected on the AN Dashboard Safety key performance area (KPA) related to ASBU Module identified by APIRG/19
9-Implement Aeronautical Meteorology (MET) Quality Management System (QMS)	ASBU Module B0-AMET	Number of States with MET QMS implemented Number of incidents/accidents with MET conditions as a sole or contributory factor	Reduced MET related incidents/accidents in flight and at international aerodromes	Safety key performance area (KPA) related to ASBU Module identified by APIRG/19

Proposed AFI ANS Targets

OPERATIONAL TARGETS BY END DEC. 2020

- **Reduce the number of loss of separation occurrences due to ANS infrastructure deficiencies by 50%**
- **Reduce the number of aircraft accidents related to ATM safety by 50%**
- Reduce The number of uncoordinated flights by 50%

INSTITUTIONAL TARGETS 100% BY 31 DEC. 2018

AT national level

- Implement ICAO Aviation System Block Upgrades (ASBU)
  - Implement Priority ASBU Block-0 Modules **by 2018**
  - **Establish and update national PBN plans by 2016**
  - **Implement all applicable elements of PBN by 2018**
  - **Implement CDO/CCO by 2018.**
- Reduce CO_2 Emissions
  - Establish CO_2 emissions reduction action plans **by December 2016**
  - Implement mitigation measures

Proposed AFI ANS Targets

- Assess and manage risks
  - **Establish effective and operational SAR organization by Dec 2016**
  - Establish aerodrome emergency plans
  - Establish wildlife management systems
  - Establish ANS human resource management system

AT regional level

- Integrate ANS infrastructures **by Dec 2018**
  - **Implement digital ATS coordination**
  - **Implement en-route data link applications**
  - **Implement ANS QMS**
- Increase harmonization between ANS operations and regulations **by Dec 2016.**
  - Implement seamless ANS along Air Traffic Flows (AFI single sky)

Action by APIRG/20

a) To adopt proposed ANS High Level Targets to be provided to the AFI Plan Steering Committee for further processing with AFCAC and AU

b) To request the Secretariat to provide available information on the status of implementation of ASBU Block 0 Modules in APIRG/20 Report

c) To request the APIRG APCC to oversee on-going work on the establishment of an AFI Performance Monitoring and Reporting mechanism.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South American (SAM) Office Lima
ICAO Headquarters Montreal
Western and Central African (WACAF) Office Dakar
European and North Atlantic (EUR/NAT) Office Paris
Middle East (MID) Office Cairo
Eastern and Southern African (ESAF) Office Nairobi
Asia and Pacific (APAC) Office Bangkok

Thank You