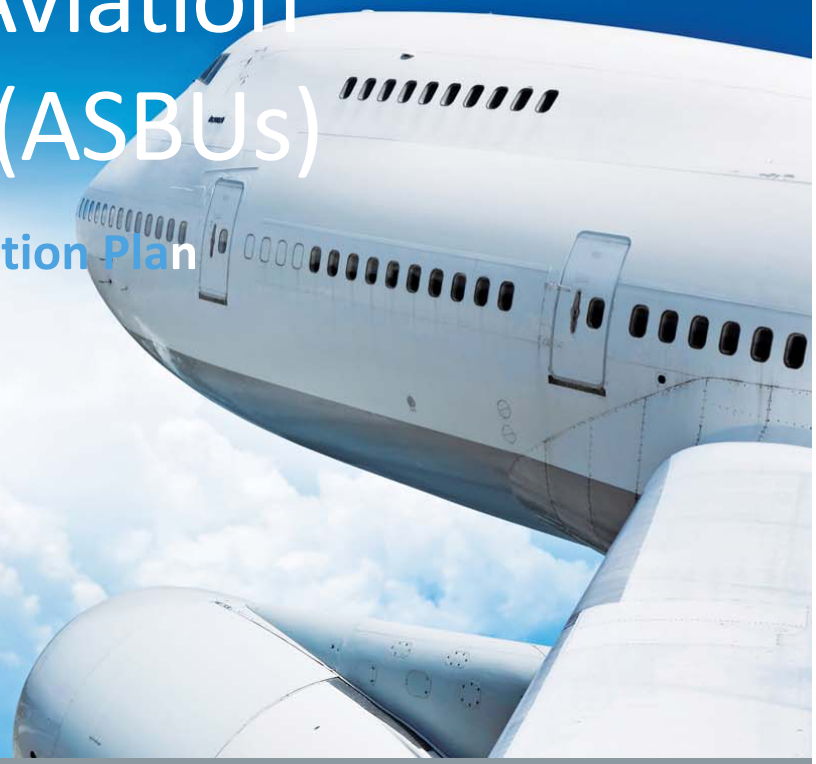
ICAO UNITING AVIATION

NO COUNTRY LEFT BEHIND

AFI/MID Workshop on Aviation System Block Upgrades (ASBUs)

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



Cairo, Egypt

23-26 November 2015

Regional Implementation – *Air*

Next GANP *2016*

GANP

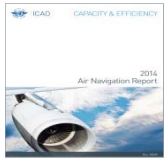
PIRGS

Establish Regional Priorities, ASBU Modules & Targets
Regional workshops and meetings

Revise Regional Air Navigation Implementation Plans

Revise Regional Air Navigation Plans

In progress



Annual Global Air Navigation Report

Regional Performance Indicators

Revised PIRG TORs & Work Programme

PIRG Meeting Reports

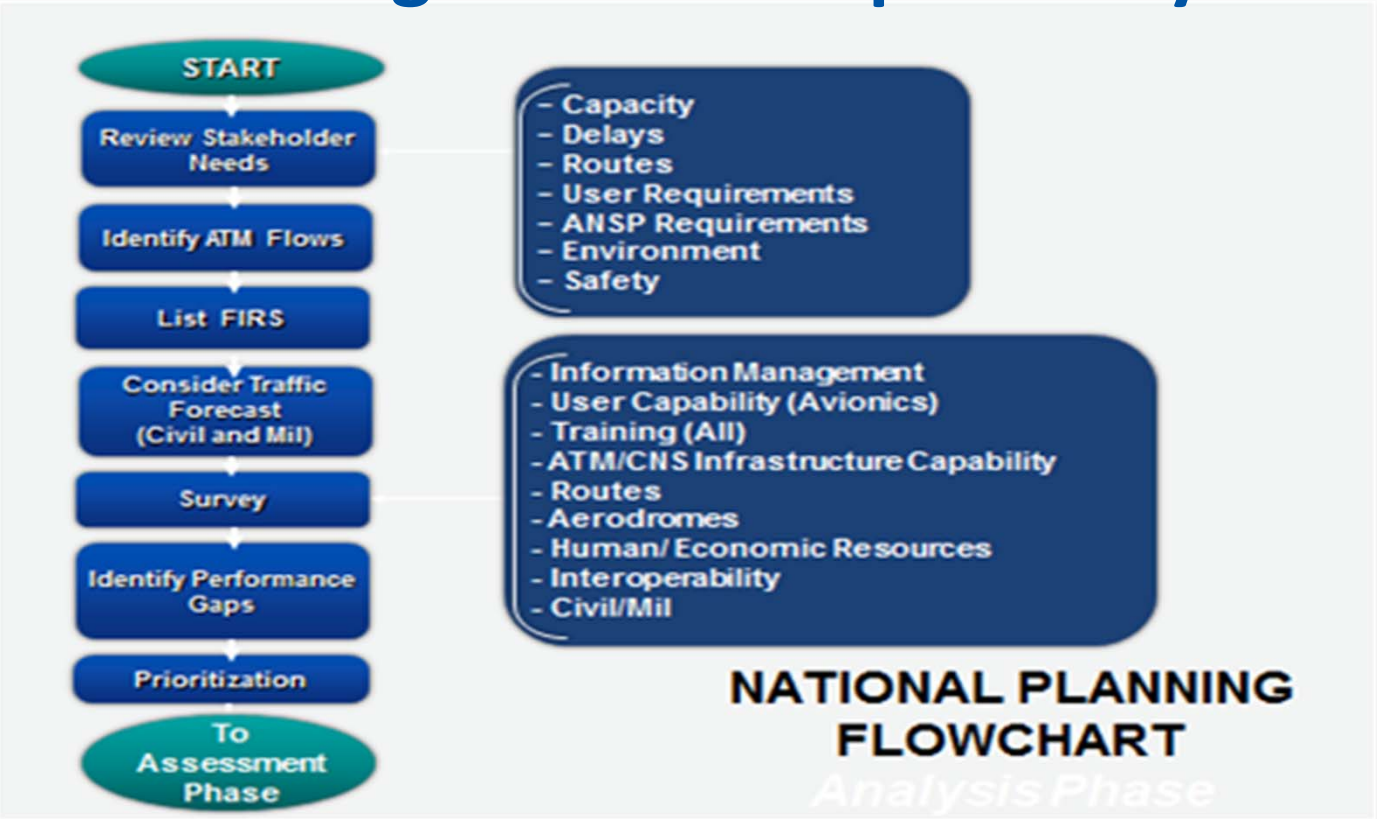
Annual ANC/Council Review

Regional Implementation Support Mechanisms

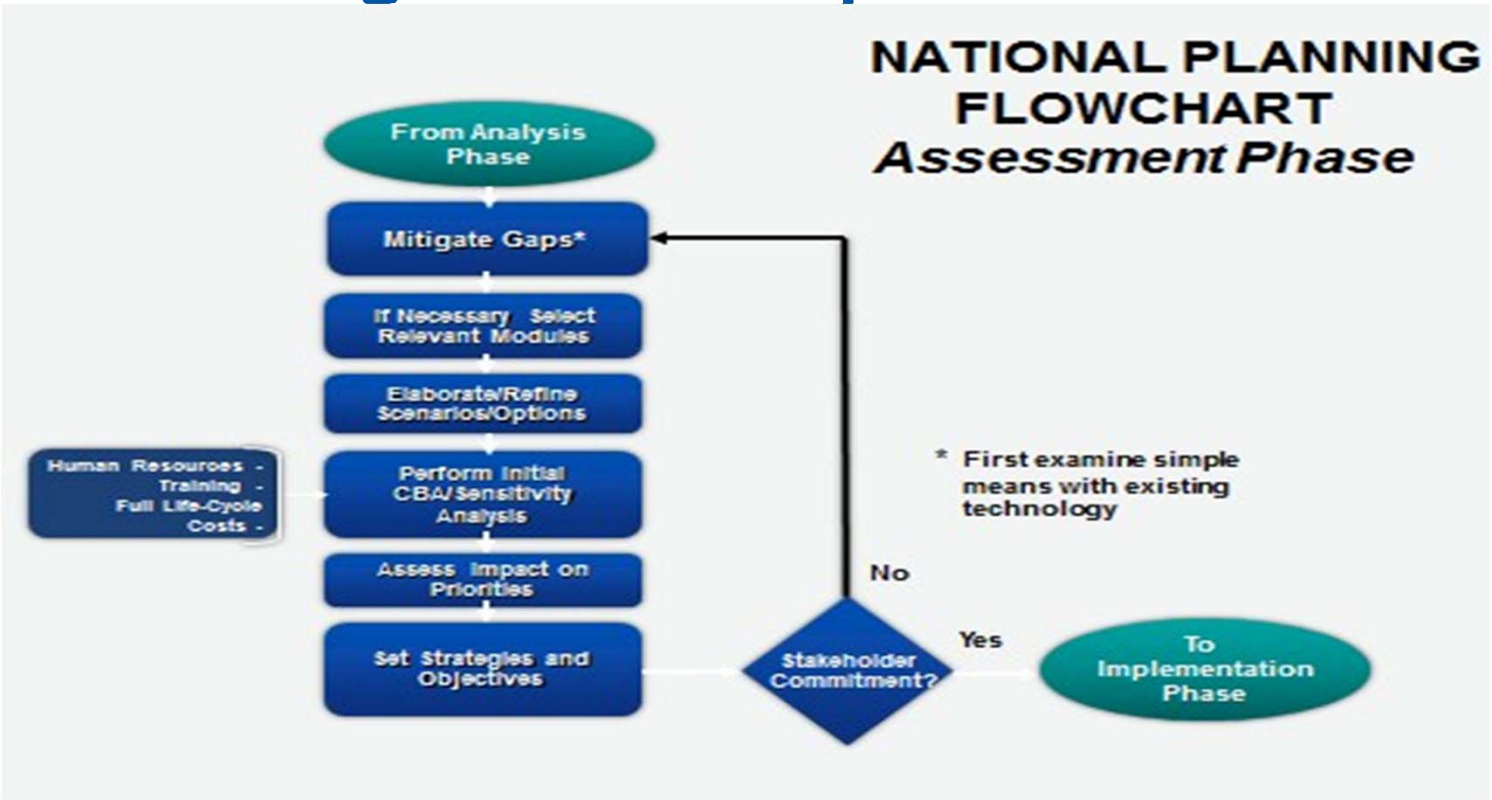
- APIRG
  - Set regional **air navigation priorities and targets**
  - Support **regional implementation** of the GANP
  - Review air navigation **plans and deficiencies**
  - Involve **all aviation stakeholders** in the region
    - States, ICAO, and international organizations

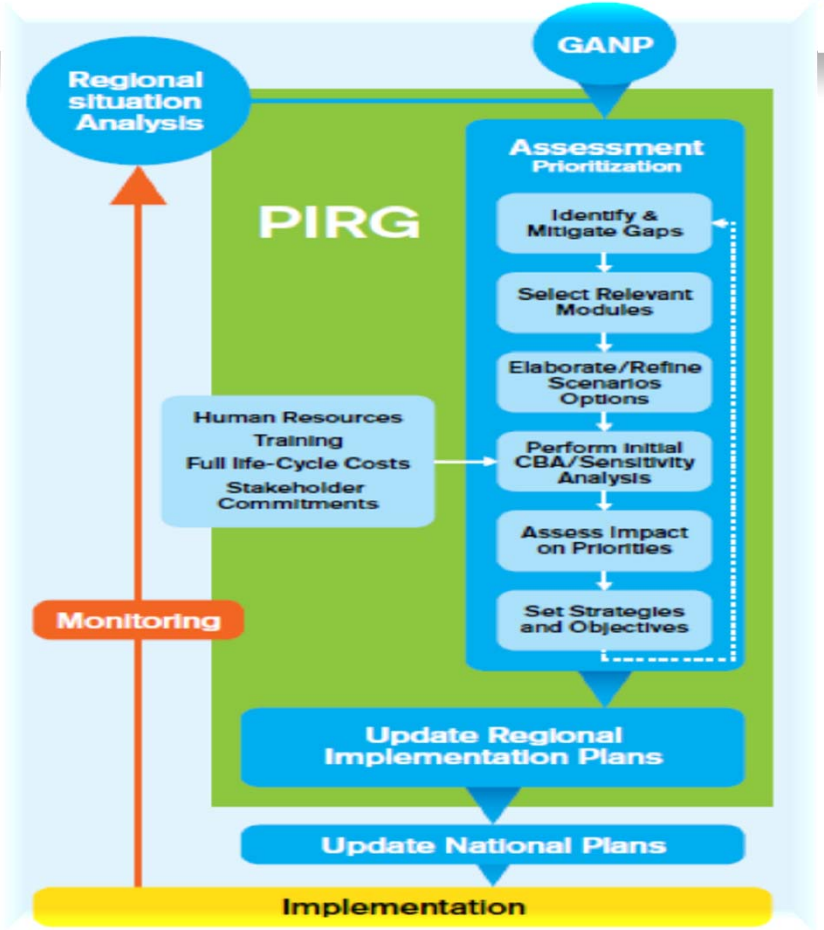
- Regional Offices
  - **Technical** evaluation, follow-up and assistance missions to States
  - **Training** courses, seminars and workshops
  - **Regional** technical cooperation and assistance projects - FPPs
  - **Regional mechanisms** – RASGs and PIRGs

Planning Process Step 1-Analysis



Planning Process Step 2-Assessment



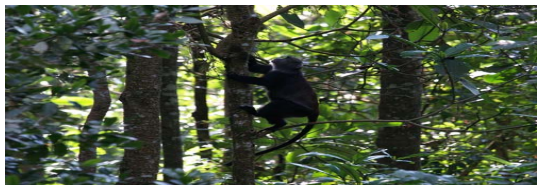

GANP
Regional situation Analysis
PIRG
Assessment Prioritization
Identify & Mitigate Gaps
Select Relevant Modules
Elaborate/Refine Scenarios Options
Perform Initial CBA/Sensitivity Analysis
Assess Impact on Priorities
Set Strategies and Objectives
Human Resources
Training
Full life-Cycle Costs
Stakeholder Commitments
Monitoring
Update Regional Implementation Plans
Update National Plans
Implementation

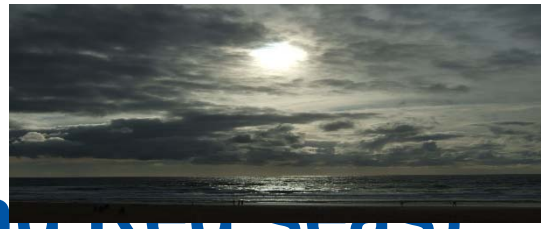
The Dilemma

AFRICAN ENVIRONMENT

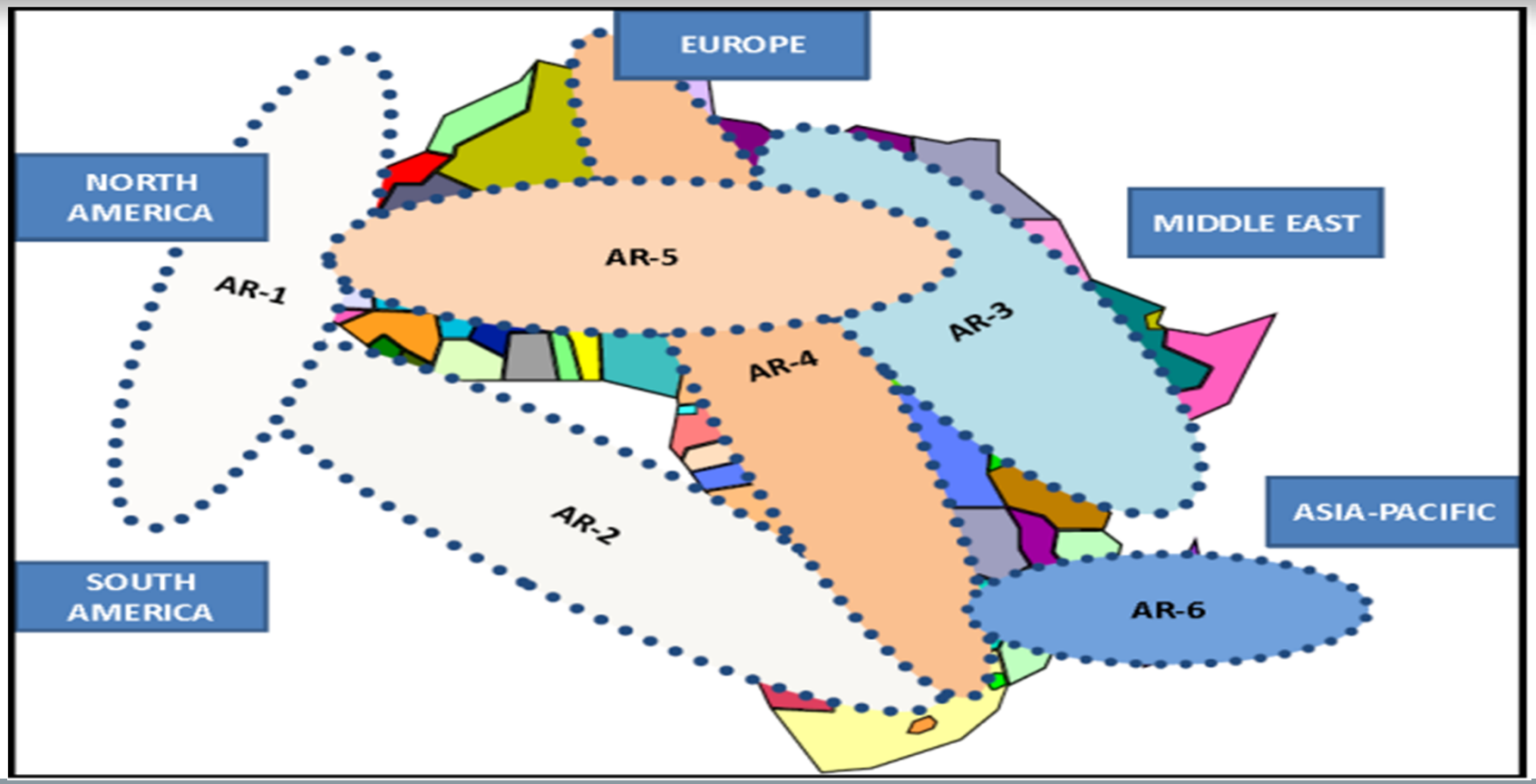
Huge region with remote areas such as:

- **Desert (Sahara and Kalahari)**
- **Deep equatorial forests**
- **Oceanic area (Atlantic and Indian oceans, Mediterranean and Red Seas)**





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

Development and trends of Civil Aviation industry in Africa

Context & Challenges

- Air Transport : key stakeholder in a huge continent
- Air Transport in Africa: 3-5% of Global Market
- For next two decades
  - Annual Growth estimated trend: 5,9% Vs 4% for Global growth
  - 125 Millions PAX to 377 Millions PAXs
- Air Transport based on Safety of life

- Building One sky to ensure the provision of a seamless Air Navigation Service
- Safety of Civil Aviation, Continuity, Regularity of air traffic relies on a robust seamless integrated infrastructure, systems, procedures and human capacities …
- Users requirements
- Interoperability requirements
- Environment protection

Cost effectiveness to provide air navigation service relies on a balanced investment ensuring **P**erformance **B**ased **N**avigation.

INFRASTRUCTURE REQUIREMENTS

Safety of civil aviation supported by seamless :

- **Ground/Ground Communication (Voice and data)**
- **Air/Ground Communication (voice and data)**
- **Navigation (Global Navigation Satellite System-GPS; Glonass , Galileo) & Augmented GNSS**
- **Surveillance data exchange (Radar, flight data)**
- **Interoperable ATM systems**
- **Efficient airspace organization and AT Management**

Outcome of APIRG/19 –

Implementation of AN-Conf/12 Rec 6/1

APIRG Conclusion 19/06: Adoption of AFI Regional Air Navigation System Implementation Plan aligned with the ICAO Aviation System Block Upgrades

That:

a) AFI States adopt the Regional Air Navigation System Implementation Plan aligned with the 18 Block 0 Modules *of the ICAO Aviation System Block Upgrades (ASBU) Methodology, as provided at Appendix 3.0A to this report;*

b) That AFI States implement the adopted modules based on their operational needs, the categorization and the prioritization *defined in the Action Plan;*

c) The Secretariat finalize the implementation targets set for the adopted ASBU Block 0 Modules, and ensure that these targets are aligned with existing regional programmes aimed at enhancing air navigation capacity and efficiency and aviation safety;

APIRG Conclusion 19/06: Adoption of AFI Regional Air Navigation System Implementation Plan aligned with the ICAO Aviation System Block Upgrades

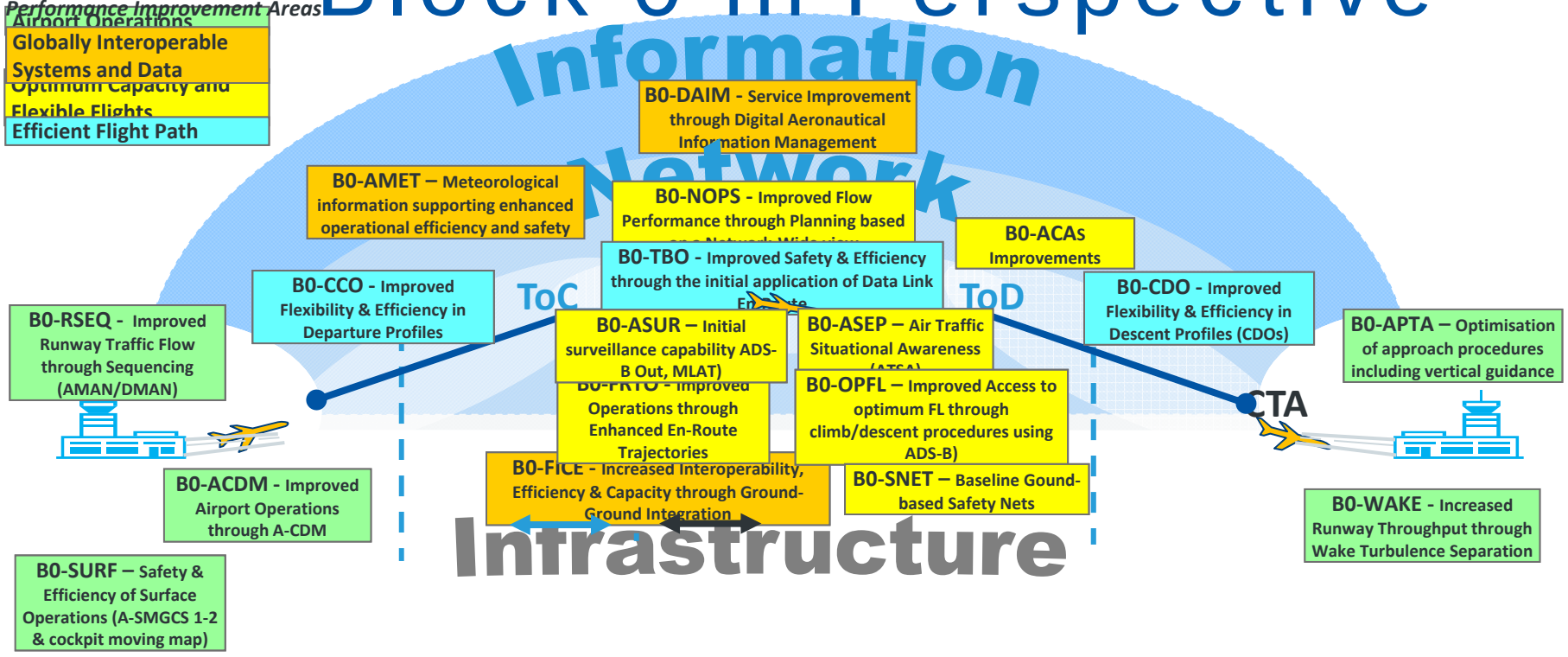
d) The APIRG and the ICAO Regional Offices coordinate the implementation of the ASBU Block 0 Modules related to Safety Key Performance Area with regional aviation safety mechanisms (RASG-AFI, AFI Plan) and other relevant safety initiatives for the AFI Region;

e) ICAO continually provide capacity building through workshops and seminars to AFI States and regional stakeholders as the needs arise in the different levels of ASBUs; and

f) The African Civil Aviation Commission (AFCAC), Regional Economic Communities and Financial institutions to provide their support and assist States the implementation of the AFI Regional Air Navigation System Implementation Action Plan.

11/23/2015
14

Block 0 in Perspective



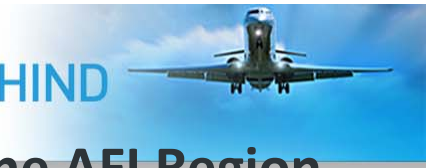
Categories of 18 adopted Block 0 Modules are as follows:

- **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

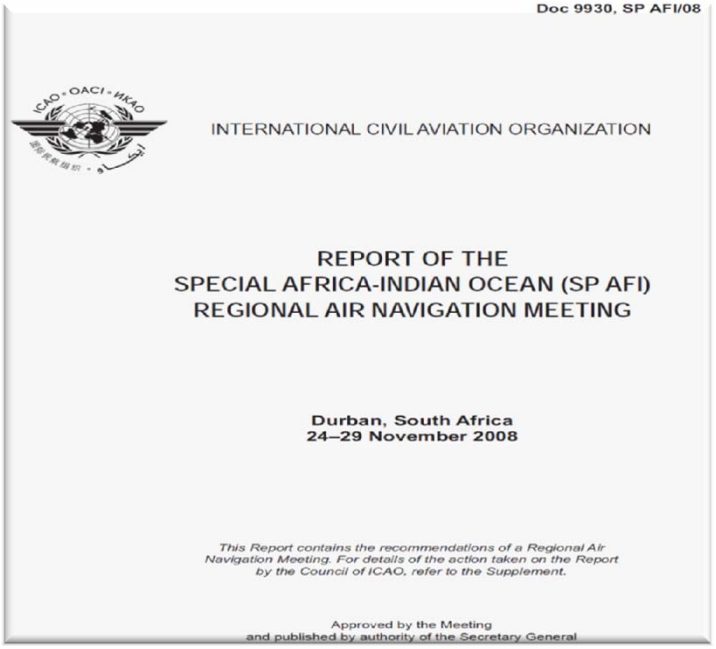
PIA	Module Description	Module	Category	Priority
PIA 1	Improve Traffic flow through Runway Sequencing (AMAN/DMAN)	B0-RSEQ	O	2
	Optimization of Approach Procedures including vertical guidance	B0-APTA	E	1
	Increased Runway Throughput through optimized Wake Turbulence Separation	B0-WAKE	S	2
	Safety and Efficiency 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 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

ASBU B0-AMET: Planning Targets and Implementation Progress

Elements	Targets and Implementation Progress (Ground and Air)
1. WAFS	In process of implementation
2. IAVW	In process of implementation
3. Tropical cyclone watch	In process of implementation
4. Aerodrome warnings	In process of implementation
5. Wind shear warnings and alerts	50% by December 2014
6. SIGMET	80% by December 2014
7. QMS/MET	75% by December 2014
8. Other OPMET Information (METAR, SPECI, TAF)	In process of improvement

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

Regional Targets

AIR NAV. REGION	REGIONAL OFFICE	SAFETY	AIR NAVIGATION
AFI	ESAF	**ADOPTED** (Abuja Ministerial – July 2012) ✓	**ADOPTED** (APIRG/19 – October 2013) ✓
MID	MID	**ADOPTED** (DGCA-MID/2 May 2013) (Review – 27-29 April 2014) ✓	**ADOPTED** (MSG/4 , November 2014) (Rev. MIDANPIRG/15, June 2015) ✓
ASIA/PAC	APAC	**RASG-APAC/4** (November 2014)	**ADOPTED** (APANPIRG/25 - September 2014) ✓
NAM	NACC	**US CAST/Canada**	**ADOPTED** (NACC/DCA/5 – April 2014) ✓
CAR		**ADOPTED** (NACC/DCA/5 – April 2014) ✓	
SAM	SAM	**ADOPTED** (RAAC/13 - December 2013) ✓	**ADOPTED** (RAAC/13 - December 2013) ✓
EUR	EUR/NAT	**ADOPTED** (RASG-EUR/03 - February 2014) ✓	**ADOPTED** (EANPG/55 - November 2013) ✓
NAT		**ADOPTED** (NAT SPG/49-June 2013) ✓	*TBA*

Abuja Ministerial Targets -

No	Targets	2012	2013	2014	2015	2016	2017
1	Reduce Runway related accident and serious incident by 50%						
2	Reduce CFIT related accident and serious incident by 50%						
3	Establish autonomous CAAs or delegate to RSOO or other African States						
4	Resolve existing SSCs						
5	Implement ICAO Plans of Actions						
6	Increase EI score to no less than 60% by 19 States						
7	Increase EI score to no less than 60% by 38 States						
8	Increase EI score to no less than 60% by 54 States						
9	Implement SSP and SMS						
10	Certify all international aerodromes						
11	Require African airlines obtain IATA-IOSA						

AFI Plan SC/14 _ ANS Performance Indicators

Targets	Linkage with ASBU	ANS Performance Indicators/Metrics	Qualitative performance benefits associated with Safety key performance area	Remarks
Implement Perfor-mance 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
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
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

Objectives	Linkage with ASBU	ANS Performance Indicators/Metrics	Qualitative performance benefits associated with Safety key performance area	Remarks
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.	
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

AFI Plan SC/14 - ANS Performance Indicators

Targets	Linkage with ASBU	ANS Performance Indicators/Metrics	Qualitative performance benefits associated with Safety key performance area	Remarks
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	
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	Qualitative performance benefits associated with Safety key performance area	Remarks
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
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

APIRG Decision EO/01

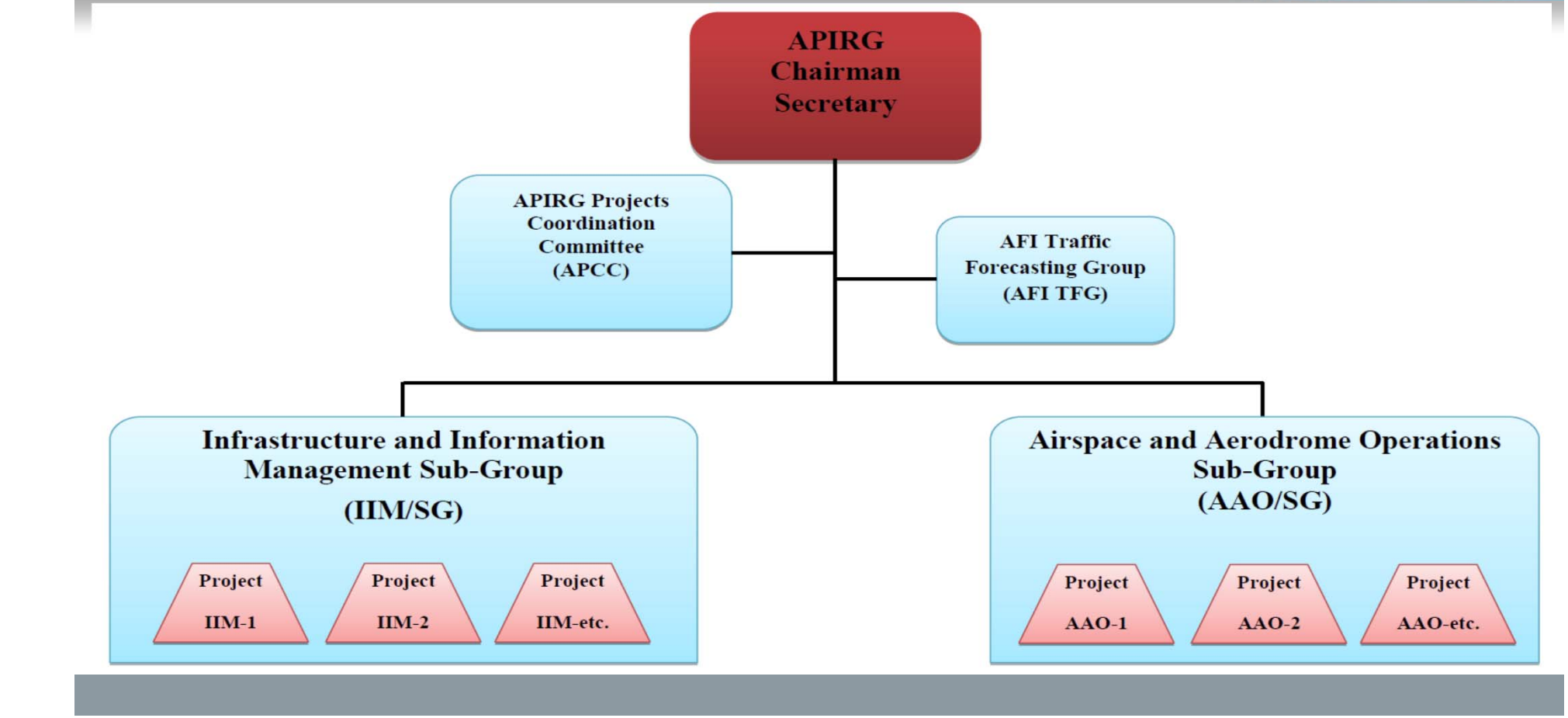
That the new organizational structure of APIRG comprising:

- **one Projects Coordination Committee (APCC)**
- **one Airspace and Aerodrome Operations Sub-Group (AAO/SG),**
- ***one Infrastructure and Information Management Sub-Group (IIM/SG), and***
- **one Traffic Forecasting Group**

…is adopted and will become effective following the next APIRG meeting;

- **the preliminary terms of reference of the APCC provided at Appendix D to this report are to be reviewed and finalized at the next APIRG meeting; and**

- ***projects be identified from ASBU modules and regional performance objectives* adopted by APIRG, to be carried out by teams of experts provided by States and concerned international organizations.**


APIRG
Chairman
Secretary
APIRG Projects
Coordination
Committee
(APCC)
AFI Traffic
Forecasting Group
(AFI TFG)
Infrastructure and Information
Management Sub-Group
(IIM/SG)
Project
IIM-1
Project
IIM-2
Project
IIM-etc.
Airspace and Aerodrome Operations
Sub-Group
(AAO/SG)
Project
AAO-1
Project
AAO-2
Project
AAO-etc.

Next Steps

- Adoption by APIRG and by AU of AFI ANS Performance Targets
- Identification of Regional AN projects by APIRG
- Development of AFI States national ASBU Plans
- Implementation and reporting through the AFI Regional Dashboards

ICAO

THANK YOU