



ICAO

INTERNATIONAL CIVIL AVIATION ORGANIZATION

SIXTH MEETING OF DIRECTORS GENERAL OF CIVIL AVIATION (DGCA/6) (Brazzaville, Congo, 2 – 4 November 2016)

Agenda Item 4: Air Navigation Capacity and Efficiency

IMPLEMENTATION OF AVIATION SYSTEM BLOCK UPGRADES (ASBU) AND AIR NAVIGATION SERVICES PERFORMANCE TARGETS (Presented by the Secretariat)

SUMMARY
This Working Paper presents the implementation of Aviation System Block Upgrades (ASBUs) and the Air Navigation Services Performance Targets in the AFI Region.
Action by the meeting is at paragraph 3.
REFERENCE(S) <ul style="list-style-type: none"> ▪ Doc 9702 - Report of the Seventh Africa-Indian-Ocean Regional Air Navigation (AFI/7) ▪ Doc 9930 - Report on the AFI SP AFI / RAN /08 Meeting ▪ Global Air Navigation Plan (GANP, Doc.9750) ▪ AFI Regional Air Navigation Plan (Doc. 7474) ▪ Report on APIRG 20 Meeting
Related ICAO Strategic Objective(s): <i>A: Safety; B: Air Navigation Capacity and Efficiency, D: Economic Development of Air Transport; E: Environment Protection</i>
Related ICAO ASBU Performance Improvement Areas and Block 0 Modules: <i>All</i>

1. INTRODUCTION

1.1. The ICAO Twelfth Air Navigation Conference (AN-Conf/12) Recommendation 6/1–Regional performance framework–planning methodologies and tools, the APIRG/19 meeting adopted the AFI Regional Air Navigation System Implementation Plan aligned with the ASBU Methodology contained in the GANP, and agreed on the priorities, targets and metrics/indicators to measure implementation progress and operational improvements for all ASBU Block 0 modules applicable to the AFI Region. The following Conclusion was adopted:

Conclusion 19/06: *Adoption of AFI Regional Air Navigation System Implementation Plan aligned with the ICAO ASBUs*

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 (ASBUs) Methodology, as provided at Appendix 3.0A to the APIRG/19 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 established 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;*
- 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.

1.2. The categorization and prioritization of ASBU Block 0 modules is provided as **Appendix A** to this working paper. The Group also recognized the importance of providing capacity building through workshops and seminars to AFI States and regional stakeholders as the needs arise at different levels of ASBUs.

1.3. Subsequently, the Group agreed to review its working methods and organizational structure, using project management principles and other methodologies as and when necessary, and consider making adjustments to better support the ICAO performance framework in the planning and implementation of its ASBU related activities (Decision APIRG 19/48). As a result, a revised structure of the APIRG was developed and adopted by the APIRG Extraordinary meeting held in Lusaka, Zambia in 2014 (Decision APIRG EO/01), taking due account of best practices/benchmarking, established regional targets and priorities, and the need for synergies between similar or complementary activities.

1.4 In noting the adoption of the Regional Air Navigation System Implementation Action Plan aligned with the ASBU Methodology, the DGCA/5 meeting requested States to develop their national plans based on their operational needs and taking into account the prioritization and categorization of the ASBU modules as defined in the Action Plan. The DGCAs also agreed that the implementation of ASBU Block 0 safety related modules needs to be coordinated and addressed through regional aviation safety mechanisms (RASG-AFI, AFI Plan) and other relevant safety initiatives for the AFI Region; and that the implementation of ASBU Block 0 would require financial support from Regional Economic Communities.

2. DISCUSSION

ICAO Aviation System Block Upgrades (ASBUs)

2.1. Mindful of the new structure and methods of work of the APIRG, the APIRG/20 meeting (Yamoussoukro, Cote d'Ivoire, 30 November – 2 December 2015) identified and prioritized an initial set of projects, based on the ICAO Aviation System Block Upgrades (ASBUs) Block 0 Modules and the regional performance objectives adopted by APIRG, and accordingly adopted the following conclusion:

Conclusion 20/49: Projects Identification and Implementation issues

That:

- a) The initial set of projects identified by APIRG Sub-groups as shown at Appendix 4.3.8A through Appendices 4.3.8B, 4.3.8C, 4.3.8D1, 4.3.8D2, 4.3.8D3, 4.3.8E1, 4.3.8E2 and 4.3.8E3 to the APIRG/20 report are adopted;*
- b) The Secretariat develop a consolidated catalogue of all identified projects, using a standard format, to be endorsed by the APCC. In doing so, projects should be structured according to applicable areas of routing;*
- c) The APIRG through its APCC explore assistance and funding mechanisms in cooperation with regional and sub-regional organizations such as the African Union, the African Civil Aviation Commission (AFCAC), Regional Economic Communities (RECs) and financial institutions; and*
- d) The ICAO Regional Offices, AFCAC and AFRAA pursue interregional coordination to achieve harmonization and interoperability of air navigation systems, as well as seamless air transport operations across the regions.*

2.2 These projects include the following Air Navigation Plan (ANP) areas: air traffic management (ATM), search and rescue (SAR), communications, navigation and surveillance (CNS), aeronautical information management (AIM), aeronautical meteorology (MET) and aerodromes and ground aids (AGA). An overview of the projects is provided below.

2.2.1 ATM/SAR Projects

2.2.1.1 APIRG/20 meeting identified and prioritized thirteen (13) Air Traffic Management /Search and Rescue (ATM/SAR) projects.

2.2.1.2 Implementation in the area of Performance Based Navigation (PBN) has been carried in four focus areas, all aimed at achieving the global goals provided in Assembly Resolution A37-11, to which the regional goals are aligned:

- a) Development of PBN implementation plans which were to be developed by 2009.
- b) En-route phase, which requires significant coordination by APIRG and Regional Offices
- c) Terminal environment, which links the approach/departure phases of flight to the en-route through Standard Instrument Departures (SIDs) and Standard Arrival Routes (STARs); and
- d) Approach, which is characterized by instrument approach procedures.

2.2.1.3 The development of PBN implementation plans has been one of the major challenges, although templates were developed within the framework of APIRG for use by States. Training was also provided by the ICAO Regional Offices, AFCAC and the AFPP in 2014 and 2015. As of September 2016, only 19 of the 48 States in the AFI area of Air Navigation Plan had completed and submitted National PBN Implementation Plans to ICAO. Of the 19 only four States, Kenya, Nigeria, Seychelles, South Africa, had developed plans considered to be “robust” and able to facilitate implementation.

2.2.1.4 In the en-route phase, primary work in the review of the AFI ATS route network was completed in 2015. As a result, AFI ATS route lengths have been reduced by about 4797 nautical miles, representing a reduction of an estimated 144 million metric tons of CO₂ emissions; and fifty eight (58) iFLEX tracks have been created to provide access to the Atlantic Ocean Random Routing Area (AORRA).

2.2.2 CNS Projects

2.2.2.1 APIRG/20 identified and prioritized thirteen (13) projects covering aeronautical Communications, Navigation, Surveillance, and Frequency Spectrum, based on the status of implementation in the region which is summarized as follows:

- a) *Ground/ground communications*: the AFI Air Navigation Plan requirements for Aeronautical Fixed Service (AFS) have been implemented in most cases, except for some links which need to be activated. Efforts are being made by State Air Navigation Service Providers (ANSPs) to implement, operate, maintain and upgrade of the satellite based VSAT networks (AFISNET, CAFSAT, NAFISAT and SADC VSAT 2). Implementation activities related to the Aeronautical Telecommunication Network (ATN) ground components such as the ATS Message Handling System (AMHS) are underway and will facilitate interoperability of ATM systems within the AFI Region and neighboring regions (e.g. EUR, MID and SAM regions). The implementation of ATS Inter facilities Data Communications (AIDC) has also started, with successful trials that have been conducted within the region.
- b) *Air/ground communications*: the extension of VHF radio coverage has been improved as well as the implementation of Controller Pilot Data Link Communications (CPDLC), thus enabling ATS communications in oceanic and the remote continental airspaces.
- c) *Radionavigation*: the implementation of conventional navigational aids is ongoing. APIRG has adopted a strategy for implementation of GNSS services, and called for a region-wide meeting of stakeholders to address related issues.
- d) *Aeronautical surveillance*: the level of implementation of the AFI regional surveillance plan has significantly improved with an increase in the number of Secondary Surveillance Radars (SSRs) in States, which are Mode S compatible, thus enhancing surveillance capabilities in the region. SSRs are supplemented by Automatic Dependent Surveillance – Contract (ADS-C) in most AFI ACCs in remote continental and oceanic airspaces. Sharing of surveillance data should be facilitated by VSAT networks to achieve a seamless aeronautical surveillance.

2.2.3 AIM Projects

2.2.3.1 APIRG/20 identified and prioritized three (3) AIM related Projects:

- a) Transition from AIS to AIM in the AFI region;

- b) Implementation of WGS-84 and e-TOD in the AFI region; and
- c) Service improvement through Digital AIM.

2.2.3.2 Initiatives have been taken to implement these projects. In particular tangible progress has been made in the transition from AIS to AIM in the AFI Region thanks to initiatives by ANSPs. However efforts remain to be made in order to fulfill the regional goals in the timeframe of the ICAO ASBU Block 0.

2.2.4 MET Projects

2.2.4.1 APIRG/20 meeting identified and prioritized two (2) MET related projects with the following objectives:

- a) To assist concerned AFI States to improve the issuance and distribution of SIGMETs, increase the number of certified QMS/MET States in the region, assist States to implement the AFI transition plan to the future System Wide Information Management (SWIM)-enabled environment protection and implement action plans to remove long lasting air navigation deficiencies in the MET field.
- b) To provide States with adequate capabilities to implement aerodromes warnings (AD WRNG) and wind shear warnings (WS WRNG), increase availability of OPMET through the AFI Meteorological Bulletins Exchange (AMBEX), and enhance availability of volcanic ash clouds and tropical cyclones information through the World Area Forecast System (WAFS).

2.2.5 AGA Projects

2.2.5.1 APIRG/20 meeting identified and prioritized nine (9) AGA related projects as follows:

- a) Training and qualification of Technical staff (Regulators and Airport operators);
- b) Aerodrome Rescue and Firefighting Services (RFFS);
- c) Aerodrome Emergency Planning (AEP), including Public Health emergencies;
- d) Aerodrome data management (determination, reliability and publication);
- e) Wildlife/ Environmental/ Land use Management/ obstacle control;
- f) Implementation of Runway safety programmes at Aerodromes;
- g) Aerodrome Maintenance and Runway conditions reporting;
- h) Establishment and implementation of A-CDM; and
- i) Aerodrome Certification (SMS, regulatory framework, procedures and manuals, etc.).

APIRG Project Catalogue

2.3 The Secretariat is in the process of developing a consolidated catalogue of all identified projects, using a standard format and structured according to applicable areas of routing. The AFI areas of routing are provided as **Appendix B** to this working paper.

AFI Key ANS Performance Indicators, Targets and Monitoring

2.4 The DGCA meeting will recall a recommendation made by the AFI Plan Steering Committee concerning the development and adoption by the APIRG of a subset of ANS performance indicators and targets, which would be accorded the same status as the Abuja safety targets of July 2012, endorsed, by the African Union Assembly of Heads of State and Government in January 2013. Accordingly, the APIRG/20 meeting reviewed and adopted the ANS Key Performance Indicators and targets at **Appendix C** to this working paper. In view of the challenge in monitoring and collecting information on the implementation of ASBU modules, States were urged to provide information on the status of implementation on a regular basis (at least twice in a year).

Need for DGCAs' support

2.5 The DGCAs may wish to note that, in the application of Project Management Principles, cost, time, and quality are co-dependent, and that mobilization of resources has always been a major challenge in the implementation of air navigation facilities and services in the AFI Region. Accordingly, in order to support implementation of a sustainable air navigation system, the DGCAs should explore assistance and funding using their national planning framework, bilateral/multilateral cooperation, and mechanisms such as the ICAO No Country Left Behind initiative, as well as those established through regional and sub-regional organizations including the African Union (AU), the African Civil Aviation Commission (AFCAC), Regional Economic Communities (RECs), and financial institutions.

3. ACTION BY THE MEETING

3.1 The DGCAs are invited to:

- a) Note the information provide in this working paper;
- b) Ensure that, if not yet done so, national PBN plans and ASBU plans are developed for their respective States, and submitted to ICAO;
- c) Champion the implementation of APIRG Projects and AFI ANS Key Performance Targets at national and regional level, through their national planning framework, bilateral/multilateral cooperation, the ICAO No Country Left Behind initiative, the AU, the AFCAC, RECs and financial institutions; and
- d) Provide the information on the status of implementation concerning their States to ICAO, APIRG and RASG-AFI Secretariat on a regular basis, and as required by regional studies or surveys./-

Appendix A

Implementation of ASBU Block 0 modules and AFI Regional Performance Objectives

The categories of the 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 are yet 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.

The priorities of the 18 adopted Block 0 Modules are as follows:

- Priority 1 : Immediate Implementation
- Priority 2 : Recommended Implementation

Categorization and prioritization of Block 0 Modules for the AFI Region

PIA	Module Description	Module	Cat	Priority
PIA1	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	B0-SURF	O	2
	Improved Airport Operations through Airport-CDM	B0-ACDM	E	1
PIA2	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
PIA3	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
PIA4	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

Appendix B

AFI Major Traffic Flows/Routing Areas

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 ,Canarias , Casablanca , Dakar Oceanic, 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, Etebbe, 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, Etebbe, Kano, Khartoum , Kinshasa, Nairobi, Ndjamen, Niamey, Roberts	Continental/oceanic low density	Homogeneous area AFI (this is a growing traffic, developing into major traffic flow)
AR6	Trans-Indian Ocean	Antananarivo, Mumbai , Johannesburg , Male , Mauritius, Melbourne , Seychelles	Oceanic high density	Homogeneous ATM area AFI/ASIA/PAC

Appendix C

Air Navigation Services (ANS) Key Performance Indicators and Targets adopted by APIRG/20 Meeting

OPERATIONAL TARGETS BY 31 DECEMBER 2020

1. Reduce the number of loss of separation occurrences due to ANS infrastructure deficiencies by 50%
2. Reduce the number of aircraft accidents related to ATM safety by 50%
3. Reduce the number of uncoordinated flights by 50%

INSTITUTIONAL TARGETS 100% BY 31 DECEMBER 2018

At national level

4. Implement ICAO Aviation System Block Upgrades (ASBUs)
 - 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 Continuous Descent Operations/Continuous Climb Operations (CDO/CCO) by 2018
5. Reduce CO₂ Emissions
 - Establish CO₂ emissions reduction action plans by December 2016
 - Implement mitigation measures
6. Assess and manage risks
 - Establish effective and operational Search and Rescue (SAR) organization by 31 December 2016
 - Establish aerodrome emergency plans
 - Establish wildlife management systems
 - Establish ANS human resource management system

At regional level

7. Integrate ANS systems by 31 December 2018
 - Implement digital ATS coordination
 - Implement en-route data link applications
 - Implement ANS Quality Management Systems (QMS)
8. Increase harmonization between ANS operations and regulations by 31 December 2016
 - Implement seamless ANS along Air Traffic Flows (AFI Single Sky)

-END-