



**Twenty Second Meeting of the Africa-Indian Ocean Planning and Implementation Regional Group (APIRG/22)**  
(Accra, Ghana, 29 July to 3 August 2018)

**Agenda Item 2.4**

**STATUS OF THE AVIATION SYSTEM BLOCKS UPGRADES (ASBU) IN SPACES  
MANAGED BY ASECNA**

*[Presented by ASECNA]*

<b>SUMMARY</b>	
<p>This note describes, in a qualitative and quantitative way, the state of implementation of the modules of Block 0 of the ASBU framework in the 17 Member States of ASECNA as an Air Navigation Service Provider.</p> <p>It presents the various Bloc 0 modules whose implementation is deemed necessary following the analysis of operational needs, in line with the Agency's strategy and its investment plan.</p>	
Strategic Objectives	<p>This Working Paper is related to ICAO Strategic Objectives:</p> <p><b>A - Safety:</b> Enhance global civil aviation safety.</p> <p><b>B - Air Navigation Capacity and Efficiency:</b> Increase the capacity and improve the efficiency of the global civil aviation system.</p> <p><b>C - Security &amp; Facilitation:</b> Enhance global civil aviation security and facilitation.</p> <p><b>E - Environmental Protection:</b> Minimize the adverse environmental effects of civil aviation activities.</p>
References	<ul style="list-style-type: none"> <li>- DOC 9750: Global Air Navigation Plan;</li> <li>- ASECNA Service et Equipment's Plan (PSE);</li> <li>- ASECNA Strategic Orientation Plan (POS);</li> <li>- APIRG 19, 20 et 21</li> </ul>

## 1. INTRODUCTION

1.1 The Global Air Navigation Plan (GANP) and the Aviation System Blocks Upgrades (ASBU) concept, integrated into the GANP, provide a framework for future improvements in air navigation technologies and procedures, which are structured in a strategic consultative approach that combines specific global performance capabilities and flexibility, with timelines for improvements associated with each component.

1.2 The ASBU modules are structured in blocks and their implementation must be in accordance with the operational requirements of the region. The ASBU framework and the technology roadmap have been set to ensure that all planning conditions at national and regional level are met.

## 2. DISCUSSION

2.1 The AFI Region has adopted a classification by category (Essential, Desirable, Specific or Optional) and in order of priority (1 or 2) of the eighteen (18) modules of ASBU Block 0.

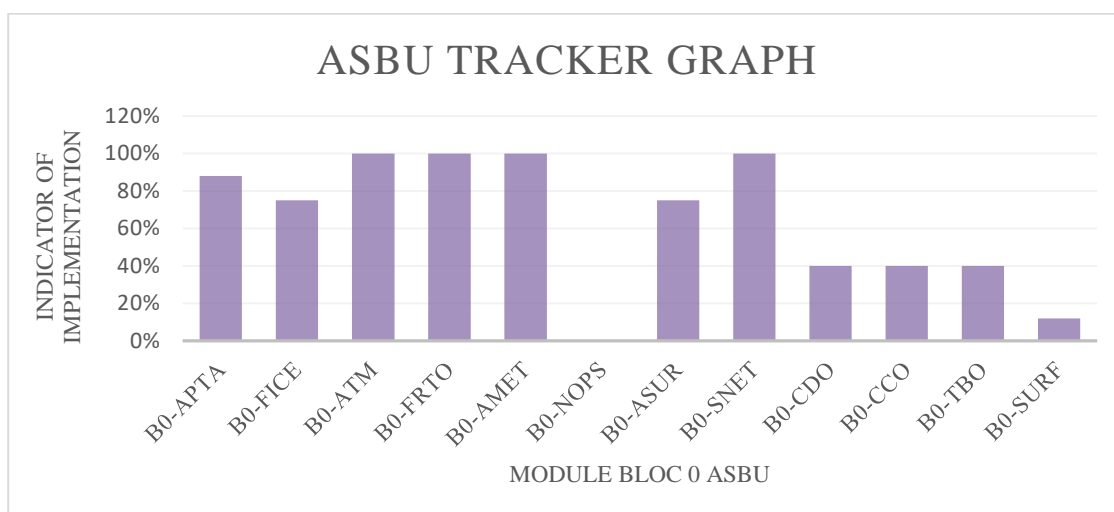
2.2 These 18 modules of Block 0 were the subject of a relevant analysis according to operational needs in the ASECNA member states.

2.3 Of the 18 modules, 12 modules were selected as required by the Agency's Member States for the provision of air navigation services.

2.4 The table in **Appendix A** presents these 12 modules with their classification by category and by priority according to the criteria used in the AFI Region.

2.5 The table in **Appendix B** presents the planning and details of the implementation status of Block 0 modules at ASECNA Member States level.

2.6 The ASBU Tracker realized on the level of implementation of ASBU in ASECNA zone gives the graph below (This graphic is presented for information only).



2.7 The implementation of some of the modules is very advanced in the ASECNA zone. These include B0-FRTO, B0-AMET, B0-DATM and B0-SNET. However, their completion cannot be done without coordination with adjacent centers in some cases. This is why ASECNA wants to know the level of implementation in these areas of its neighbors in order to carry out local work prior to the full implementation of certain modules.

**3. ACTION BY THE MEETING**

3.1 The meeting is invited to:

3.2

- a) Take note of the implementation status of ASBU Block 0 modules in ASECNA Member States for the provision of air navigation services;
- b) Call on States to strengthen the bilateral and multilateral cooperation necessary for the effective and coordinated implementation of the modules with a view to ensuring interoperability between systems and services.

**APPENDIX A :****INDICATORS FOR THE IMPLEMENTATION OF BLOCK 0 MODULES**

Block O Module	Title	Category	Priority	High level implementation indicator	
				Wording	Value (for information)
<b>PERFORMANCE IMPROVEMENT FIELD N°1: AIRCRAFT OPERATIONS</b>					
<b>APTA</b>	Optimization of approach procedures, including vertical guidance	Essential	1	% of international aerodromes having a PBN procedure (APV Baro-VNAV or LPV) for at least one end of the track	<b>88%</b>
<b>SURF</b>	Safety and efficiency of surface operations (ASMGCS Levels 1-2)	Optional	2	% of international aerodromes having implemented the A-SMGCS Level 2	<b>12%</b>
<b>PERFORMANCE IMPROVEMENT FIELD N°2 : GLOBAL INTEROPERABLE SYSTEMS AND DATA</b>					
<b>FICE</b>	Enhancing interoperability, efficiency and capacity through ground-to-ground integration	Essential	1	% of FIR whose RCCs implemented at least one AIDC/OLDI interface with neighboring RCCs	<b>75%</b>
<b>DATM</b>	Improving services by managing digital aeronautical information	Essential	1	% of States that have implemented an AIS database based on AIXM % of states that have implemented QMS	<b>100%</b> <b>100%</b>
<b>AMET</b>	Meteorological information supporting increased operational efficiency and safety	Essential	1	% of states that have implemented SADIS % of states that have implemented QMS	<b>100%</b> <b>100%</b>
<b>PERFORMANCE IMPROVEMENT FIELD N°3 : OPTIMUM CAPACITY AND FLEXIBLE FLIGHTS</b>					
<b>FRTO</b>	Improved operations with better road trajectories	Essential	1	% of FIRs with flexible use of space (FUA)	<b>100%</b>
<b>NOPS</b>	Performance improvement by planning based on a network-wide vision	Desirable	2	% of FIRs with all RCCs using air traffic flow management systems (ATFM)	<b>0%</b>
<b>ASUR</b>	Initial capacity for ground surveillance	Desirable	2	% of FIR or ADS-B OUT and / or MLAT are implemented for the provision of surveillance services in identified areas	<b>75%</b>
<b>SNET</b>	Increased efficiency of ground-based safety nets	Desirable	2	% of states that have implemented ground-based safety nets (STCA, APW, MSAW, etc.)	<b>100%</b>

<b>PERFORMANCE IMPROVEMENT FIELD N°4 : EFFECTIVE FLIGHT TRAJECTORIES</b>					
<b>CDO</b>	Improved flexibility and efficiency of descent profiles using Continuous Descent Operations (CDO)	Essential	1	% of international aerodromes / TMA with STAR PBN % of international aerodromes / TMA with CDO	<b>80%</b> <b>0%</b>
<b>TBO</b>	Improved security and efficiency through the initial application of en-route data links	Desirable	2	% of FIR using data links en-route in the spaces where it is applicable	<b>40%</b>
<b>CCO</b>	Improved Flexibility and Effectiveness of Start Profiles - Continuous Climb Operations (CCO)	Essential	1	% of international aerodromes / TMA with SID PBN % of international aerodromes / TMA with CCO	<b>80%</b> <b>0%</b>

**APPENDIX B :****PLAN FOR THE IMPLEMENTATION OF THE ASBU BLOCK 0 AT THE ASECNA LEVEL**

<b>Performance improvement Areas (PIA)</b>	<b>Block 0 modules</b>	<b>Module entitled</b>	<b>Module description</b>	<b>Implementation status</b>	<b>ASECNA Dates</b>
<b>PIA 1: AERODROME OPERATIONS</b>	B0-APTA	Optimization of approach procedures, including vertical guidance	The use of performance-based navigation (PBN) to improve the reliability and predictability of approaches for runways, thereby increasing safety, accessibility, efficiency and capacity. This is possible through the application of Global Navigation Satellite System (GNSS), Baro-Vertical Navigation (VNAV), Satellite Augmentation System (SBAS) and GBAS GLS.	80% of the 17 main airports of the ASECNA Member States have SID / STAR PBN RNP1 procedures. All major airports in ASECNA Member States have VAN (Baro VNAV) procedures except Bangui (Central African Republic) and N'Djamena (Chad) for which validation of the safety study is in progress. An SBAS implementation program is underway	2018-2022
	B0-SURF	Safety and efficiency of surface operations (A-SMGCS levels 1-2)	Advanced Surface Movement Control and Guidance System (A-SMGCS) provides surveillance and alerting of aircraft and vehicle movements on the aerodrome surface, improving runway / airfield safety.	<b>A-SMGCS</b> systems already installed at Dakar-Diass and Nouakchott Oumtounsy airports.	2018-2022
<b>PIA 2: INTEROPERABLE SYSTEMS AND DATA IN THE WORLD</b>	B0-FICE	Increased interoperability, efficiency and capacity through ground-to-ground integration	Coordination of ground-to-ground data communications between air traffic management units through communications between ATS facilities (AIDC) defined in ICAO Doc 9694. The transfer of communication in a data link environment improves the efficiency of this process, especially	<b>AIDC:</b> Implementation includes activation of AIDC functionality on ATM systems for 100% traffic coordination between CCR. ATM systems at ASECNA Member States' main airports have AIDC functionality with the exception of the Bangui center, which will be implemented as soon as possible In summary the point of implementation status of the AIDC is:	2018-2022

Performance improvement Areas (PIA)	Block 0 modules	Module entitled	Module description	Implementation status	ASECNA Dates
			for Units that manage oceanic airspace.	<ul style="list-style-type: none"> <li>- Implementation of links: Antananarivo/Piacenza (Mauritius), Brazzaville/Khartoum (Sudan), Dakar/Abidjan, Niamey/N'Djamena, N'Djamena/Brazzaville, N'Djamena/Khartoum (Sudan), Ouagadougou/Niamey, Ouagadougou/Bamako, Ouagadougou/Abidjan, Niamey/Bamako, Niamey/Lomé and Niamey/Cotonou, Douala/Ndjamena, Lomé/Cotonou.</li> <li>- Trials concluding in March 2019 between Accra and Abidjan with the prospect of expansion in Lomé, Cotonou, Niamey and Ouagadougou by the end of 2019</li> <li>- Ongoing trials Dakar/Nouakchott, Dakar/Bamako;</li> <li>- ATM systems at the 16 main airports of the ASECNA Member States with the exception of the Bangui center are equipped with AIDC functionality.</li> <li>- Regional AIDC Implementation Project between ASECNA and NAMA Centers (Nigeria), GCAA (GHANA), FIR Roberts and ATNS (SADC, NAFISAT), SAM, MID is underway.</li> </ul> <p><b>AMHS:</b></p> <ul style="list-style-type: none"> <li>- Operational implementation of the AMHS in Lomé, Cotonou, Nouakchott, Niamey, Antananarivo, Brazzaville, Bamako, N'Djamena, Ouagadougou and Dakar, with migration of all relevant circuits in AMHS</li> <li>- Planning for the extension of the AMHS to the remaining COM centers for 2020. of the 17 Member States ASECNA is scheduled for end 2019</li> </ul>	

Performance improvement Areas (PIA)	Block 0 modules	Module entitled	Module description	Implementation status	ASECNA Dates
				<ul style="list-style-type: none"> <li>- Regional project to implement AMHS circuits between ASECNA, NAMA (Nigeria), GCAA (GHANA), FIR Roberts and ATNS (SADC, NAFISAT), SAM, MID, EUR is planned for the end of 2019</li> </ul>	
	B0-DATM	Improved service with digital aeronautical information management	Introduction of the digital processing and management of aeronautical information through the implementation of AIS / AIM using AIXM, transition to electronic AIP and improvement of data quality and availability.	<p><b>AIS/AIM</b> Implementation elements include:</p> <ul style="list-style-type: none"> <li>- AFTN / AMHS,</li> <li>- IP network in preparation for SWIM</li> <li>- Migration from AIS to AIM: <ul style="list-style-type: none"> <li>o Operational exploitation of the AIXM 4.5 database and production of the eAIP since 2018.</li> <li>o On-line publishing on the eAIP web site in HTML scheduled for November 2019</li> <li>o Migration to the AIXM 5.1 version and evolution of the GED-AIP in 2019-2022</li> </ul> </li> <li>- QMS for AIM implemented. ISO 9001 V2015 certified in all Member States of ASECNA.</li> <li>- WGS-84 campaign conducted periodically; last campaign made in 2015 on ASECNA States airports.</li> <li>- e-TOD and AMDB, projects planned for 2019-2022.</li> </ul>	2019-2022
	B0-AMET	Meteorological Information for Enhancing Operational Effectiveness and Security	Global, regional and local meteorological information provided by World Area Forecast Centers, Volcanic Ash Advisory Centers, Tropical Cyclone Advisory Centers and Aerodrome Meteorological Centers, supporting flexible space management aerial, improved	<p>Implementation elements include:</p> <ul style="list-style-type: none"> <li>- QMS for MET implemented, ISO 9001 V 2015 certified in all Member States of ASECNA.</li> <li>- Reception of WAFCS products in all formats.</li> <li>- Cooperation agreement with the St Denis TCCA for better coordination in the monitoring of tropical cyclones.</li> </ul>	2019

Performance improvement Areas (PIA)	Block 0 modules	Module entitled	Module description	Implementation status	ASECNA Dates
			<p>situational awareness and collaborative decision-making, and dynamic optimization of flight path planning.</p> <p>This module includes elements that should be considered as a subset of all available meteorological information that can be used to support and improve operational efficiency and safety</p>	<ul style="list-style-type: none"> <li>- Improvement of the en route watch through the reinforcement of the capacities of the CVM for the detection and the emission of SIGMET envisaged of all the dangerous phenomena not taken into account by the regional centers (VAAC and TCCA).</li> <li>- Wind shear detection systems being installed or acquired at ten aerodromes.</li> <li>- Thunderstorm warning and warning systems in all FIRs managed by the agency</li> </ul>	
<b>PIA 3: OPTIMUM CAPACITY AND FLEXIBLE FLIGHTS</b>	B0-FRTO	Improved operations with better en-route trajectories	<p>Allows the use of airspace that would otherwise be excluded (military airspace) and flexible routes adapted to given traffic patterns.</p> <p>As a result, the number of possible routes will be increased, which will reduce congestion on main roads and high-traffic intersections, and hence the duration of flights and fuel consumption.</p>	<p>Implementation elements include:</p> <ul style="list-style-type: none"> <li>- SSR and ADS -B</li> <li>- Indian Ocean Strategic Partnership to Reduce Emissions (INSPIRE) implemented in Antananarivo FIR by ASIO ACG.</li> <li>- Preferred trajectories in the Dakar Oceanic FIR through the implementation of AORRA.</li> <li>- Implementation of flexible routes in the mainland Dakar FIR, Niamey FIR, FIR Brazzaville, Ndjamena FIR which include airspace for all Member States.</li> <li>- PBN Strategic Implementation Plan in coordination with NBS national plans of Member States</li> <li>- Implementation of CCO / CDO trajectories for accessibility of Libreville, Ouagadougou airports Scheduled for 2019., Abidjan and Dakar in 2020</li> </ul>	2020
	B0-NOPS	Improved traffic flow through planning based on an overview of the network	Collaborative ATFM measures to regulate peak currents, relating to departure slots, admission flow management in a given portion of airspace for traffic along a certain	<p>Implementation elements include:</p> <ul style="list-style-type: none"> <li>- The reorganization of the provision of navigation services.</li> <li>- Determination of ATC capacity of ATS units, in progress, expected end 2019</li> </ul>	2019-2022



Performance improvement Areas (PIA)	Block 0 modules	Module entitled	Module description	Implementation status	ASECNA Dates
			axis, the requested time of arrival at a waypoint or at the boundary of an FIR/sector, the spacing in miles in the wake to regulate the flow along certain axes, and the change of course to avoid saturated areas.	- Study on ATFM implementation	
	B0-ASUR	Initial Ground Monitoring Functionality	Ground-based surveillance supported by ADS-B OUT and/or Extended Coverage Multilateration will improve safety, search and rescue and capacity through separation reductions. This feature will be integrated into various ATM services (traffic information, search and rescue, separation, etc.)	Implementation elements include: - SSR densification and ATM systems completed in 2017. - Means coverage of total airspace with terrestrial ADS-B to supplement current radar coverage, scheduled to be completed by 2020. - Cover 100% continental airspace by ADS B satellite envisaged from 2020 to take into account remote continental areas; Initial tests started in 2018, pre-operational phase 2019	2017-2020
	B0-SNET	Increased efficiency of ground safety nets	This module provides efficiency improvements to ground-based safety nets that help the air traffic controller and provide timely increased risk alerts for flight safety (short-term conflict alerts, proximity warnings, warnings). minimum safe altitude, etc.).	Implementation elements include: - backup nets of automated ground based ATM systems based on short-term conflict alerts and minimum safe altitude proximity warning alarms already implemented - all centers equipped with monitoring equipment are equipped with automated TOPSKY ATM system with ADS-C / CPDLC, FDPS, FPASD, RDP, SDP functions.	Realized (2017)
<b>PIA 4: EFFECTIVE FLIGHT TRAJECTORIES</b>	B0-CDO	Improved flexibility and efficiency in descent profiles (CDOs)	Application of performance-based airspace and arrival procedures that allow aircraft to follow their optimal profile given the complexity of airspace and traffic through	CDO/CCO procedures have been studied for Dakar Yoff and Abidjan airports. But the procedures have not been validated yet. As part of ICAO/ASECNA cooperation, CDO procedures studies are underway for Libreville and Ouagadougou airports.	2022

Performance improvement Areas (PIA)	Block 0 modules	Module entitled	Module description	Implementation status	ASECNA Dates
			Continuous Descent Operations (CDO).		
	B0-TBO	Improved security and efficiency with the initial application of en-route data links	Implementation of a first set of data link applications for surveillance and communications in air traffic control (ATC).	SSR Mode S systems, ADS-C / CPDLC implemented. Preferred trajectories implemented in both continental airspace and oceanic airspace. HF/DL and VDL provided for in the 2018-2022 investment plan. Installation of D-VOLMET for FIR Brazzaville and Antananarivo is in progress. D-ATIS is provided for in the 2018-2022 investment plan.	2018-2022
	B0-CCO	Improved Flexibility and Efficiency in Starting Profiles - Continuous Climbs (CCO)	Application of departure procedures to allow aircraft to follow an optimized profile given the complexity of airspace and traffic through Continuous Climb Operations (CCO).	CDO / CCO procedures have been studied for Dakar / Yoff and Abidjan airports. But the procedures have not been validated yet. Within the framework of the ICAO / ASECNA cooperation, studies of CCO procedures are in progress for the airports of Libreville and Ouagadougou.	2022

**END.**