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ASSEMBLY — 39TH SESSION

TECHNICAL COMMISSION

Agenda Item 36: Aviation safety and air navigation implementation support

**ASECNA PBN IMPLEMENTATION, CONTINUOUS DESCENT OPERATION AND
CONTINUOUS CLIMB OPERATION (CDO/CCO)**

(Presented by the Agency for Air Navigation Safety in Africa and Madagascar (ASECNA))

EXECUTIVE SUMMARY

This information paper aims to present the implementation status of the navigation based on the performances (PBN) and Continuous Descent Operation / Continuous Climb Operation (CDO/CCO) in seventeen (17) African member states of ASECNA.

Action: The Assembly is invited to:

- a) take note of the progress made by ASECNA member States in the implementation of the PBN;
- b) take note of the ongoing process for the deployment of the CDO / CCO operations on the international Airports

<i>Strategic Objectives:</i>	This working paper relates to the Safety, Air Navigation Capacity and Efficiency, Economic Development and Environmental Protection Strategic Objectives.
<i>Financial implications:</i>	N/A
<i>References:</i>	Resolution A37-11 AFI Road map for the PBN States PBN Plan Doc 9613, <i>Performance-based Navigation (PBN) Manual</i>

¹ English and French versions provided by ASECNA

1. INTRODUCTION

1.1 The A36-23 and A37-11 Resolution of the ICAO Assembly, calls on Contracting States to implement ATS routes, departures and arrivals procedures, and approaches, based on the PBN concept and urge these States and Planning and Implementation Regional Groups (PIRG) to develop each of the PBN implementation plans.

1.2 The 12th Air Navigation Conference of ICAO adopted a planning framework for global harmonization and interoperability named Aviation System Block Upgrade (ASBU) Methodology to be included in the fourth edition of the Global Air Navigation Plan (GANP). The ASBU framework, which is divided into 4 blocks, contains modules describing operational improvements for a series of blocks, supported by technology roadmaps, which serve to progressively enhance many aspects of civil aviation operations.

1.3 Performance Based Navigation (PBN) and Continuous Descent Operation/Continuous Climb Operation (CDO/CCO) were included as priorities for the performance improvement area “efficient flight paths” of ASBU Block 0. The combination of the CDO/CCO operations and PBN will contribute to maximize efficiency in the air operations for terminal areas and reduce significantly the environmental impact.

1.4 As a follow up to ICAO Resolutions, the Planning and Implementation Group for Africa and Indian- Ocean Region (APIRG) adopted in December 2008, the Roadmap for PBN Implementation in the Africa and Indian-Ocean Region (AFI).

1.5 The AFI roadmap for the PBN implementation is structured in three (3) stages: the short term (2008-2012), the middle term (2013-2016), and the long term (2017 and beyond). For the short term the objectives were defined as follows:

- a) **Operations in oceanic and continental routes distant:** implementation in 2010, by States or concerned ANSPs, of the RNAV 10 and RNP4 if necessary, in the remote oceanic and continental zones;
- b) **Operations in continental routes:** Upgrade of conventional and non PBN RNAV routes into PBN specifications RNAV5, RNAV 2 and RNAV 1 if needed;
- c) **Operations in terminal zone:** implementation of PBN SIDs and STARS on 30% of the international airports in 2010 and 50 % in 2012.
- d) **Operations in approach:** Implementation of the RNP APCH (with Baro-VNAV) for 30 % of instruments runways in 2010 and 50 % in 2012.

2. STATUS OF IMPLEMENTATION IN THE ASECNA MEMBER STATES

2.1 ASECNA is an air navigation service provider (ANSP) for 17 Central and West African States. As such, it manages air traffic in the following Flight Information Regions (FIR): Dakar terrestrial, Dakar Oceanic, Niamey, N'Djamena, Brazzaville and Antananarivo.

2.2 As part of the GPI 7 initiative adopted for the implementation of the ATM Global Operational Concept, which encourages the implementation of preferential flight paths for users, ASECNA has actively participated in several initiatives in the AFI region and SAT (South Atlantic) Group activities since 2006 which allowed to implement PBN trajectories both in oceanic airspace and in the continental airspace.

2.3 Regarding Continental EN Route airspace, between 2007 and 2010, about twenty (20) RNAV 10 fixed ATS routes have been implemented, some as part of the IATA "Roads Lab" project. At the 5th meeting of the PBN Working Group held in Dakar, Senegal from 17 to 20 February 2015, fifteen (15) new RNAV 10 fixed routes were also selected to be implemented in the airspace managed by ASECNA. The implementation process is ongoing.

2.4 In 2012, still in the En Route Continental airspace and in close collaboration with other ANSPs involved in the AFI region, ASECNA has implemented twenty (20) RNAV 10 routes called "flexible routes", proposed by IATA and designed to provide operators the paths that optimizes their flight profile depending on the wind, and to save fuel and reduce CO2 emissions. This project concerned all FIRs under the management of ASECNA except that of Antananarivo.

2.5 In the oceanic airspace between 2009 and 2012, ASECNA had been involved in the implementation of Phases 2, 3 and 4 of the Atlantic Ocean Random Routing Area (AORRA) up to the 4th parallel North. In this portion of the airspace, ATS routes have been suspended except in contingency situations, to allow users to choose preferential RNP 10 flight paths to optimize the flight profile. This project was an opportunity for a strong cooperation between several ANSPs, IATA and ICAO, concerning mainly the Dakar Oceanic FIR for ASECNA Member States but also Brazzaville FIR, in the framework implementation of transition routes linking the continental airspace and the AORRA.

2.6 Regarding the Indian Ocean, it is also noted that ASECNA, through Antananarivo FIR, participated for several years in the implementation of a random routing area in the framework of the INSPIRE (Indian Ocean Strategy Partnership to Reduce Emission) initiative conducted by the ASIOACG (Arabian sea/Indian Ocean ATS Coordination Group).

2.7 For terminal area and approach as part of the AFI roadmap for the implementation of PBN, ASECNA has developed and implemented the SIDs, STARs and approach procedures based on the criteria of PBN on most of the international airports for its Member States. The situation is shown in the Table in the attached Appendix A.

2.8 Implementation of CCO/CDO procedures

2.8.1 As part of the implementation of ASECNA's strategic objectives approved in July 2011 by its board, the Agency has launched a project to update and implement CDO/CCO procedures on the main airports of the Member States of ASECNA. The strategy of the Agency for the development and implementation of CDO/CCO procedures is composed of two (02) steps:

- ✓ The first step was to develop CDO/CCO procedures on the pilot sites of Dakar, Senegal and Abidjan in Cote d'Ivoire with an external assistance. Updating operations manuals for training of air traffic controllers will, in the coming months, permit use of these procedures that have already been designed but not yet approved.
- ✓ The aim of second step is the gradual deployment of these procedures at other international airports, in close cooperation with users in order to address their priority needs.

2.8.2 The table below shows the planning for the deployment of the CDO/CCO procedures at the international airports of the ASECNA Member States.

N°	State	Airports	CDO/CCO Procedures	Date of implementation
1	Senegal	Dakar	Designed	2016
2	Côte d'Ivoire	Abidjan	Designed	2016
3	Benin	Cotonou	Planned	2019
4	Togo	Lomé	Planned	2019
5	Mauritania	Nouakchott	Planned	2017
6	Madagascar	Tananarivo	Planned	2017
7	Niger	Niamey	Planned	2017
8	Comoros	Moroni	Planned	2019
9	Guinea-Bissau	Bissau	Planned	2019
10	Burkina Faso	Ouagadougou	Planned	2017
11	Cameroon	Douala	Ongoing	2017
12	Gabon	Libreville	Ongoing	2017
13	Equatorial Guinea	Malabo	Planned	2018
14	Chad	N'Djamena	Ongoing	2017
15	Congo	Brazzaville	Ongoing	2017
16	RCA	Bangui	Planned	2019
17	Mali	Bamako	Planned	2018

APPENDIX A

	AEROPORTS	RNP APCH (LNAV)	RNP APCH (LNAV/VNAV)	STARs	SIDs
1	Antananarivo				
2	Mahajanga				
3	Niamey				
4	Dakar				
5	Libreville				
6	Abidjan				2015
7	Lomé		2015		
8	Bamako		2015		2017
9	Cotonou		2015		2017
10	N'Djamena		2015		2017
11	Ouagadougou				2017
12	Yaoundé				2017
13	Douala				2016
14	Moroni				2017
15	Port – Gentil				2017
16	Malabo				2017
17	Nouakchott				2016
18	Brazzaville				2016
19	Point Noire				2016
20	Bissau			2016	2016
21	Bangui		2016		2016
22	Nouadhibou				XXXXXXXX
23	Bobo-Dioulasso				XXXXXXXX
24	Garoua				XXXXXXXX
25	Franceville			XXXXXXXX	XXXXXXXX
26	Sarh			XXXXXXXX	XXXXXXXX
27	Toamasina			XXXXXXXX	XXXXXXXX
28	Ollombo	2015	2015	XXXXXXXX	XXXXXXXX
29	Bata	2015	2015	XXXXXXXX	XXXXXXXX
30	Gao	2015	2015	XXXXXXXX	XXXXXXXX
31	Niamtougou	2015	2015	XXXXXXXX	XXXXXXXX
32	Mopti	2016	2016	XXXXXXXX	XXXXXXXX

Legend	
	IFP done and published.
	IFP done but not published. (Waiting for final validations and CAA approbation CAA...)
2016	IFP not available. IFP planned for 2016.
2017	IFP not available. IFP planned for 2017.
XXXXXXXX	IFP not available. IFP is not a priority,

Number of IFPs that are published			
RNP APCH (LNAV)	RNP APCH (LNAV/VNAV)	STARs	SIDs
72	51	34	13