

Gambia Civil



Aviation Authority

Performance Based Navigation
(PBN)
Implementation Plan

The Gambia

Version 1.0
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1. Executive Summary

The Gambia PBN Implementation Plan is a cooperative work of The Gambia Civil Aviation Authority (GCAA). This Plan aims to provide aviation stakeholders with appropriate implementation guidance and timelines to allow proper preparation for Performance-based Navigation (PBN) implementations within Gambian Airspace, which is within the Dakar Flight Information Region. The Plan is aligned with the AFI PBN Implementation Plan developed by ICAO/AFI PBN Task Force and with ICAO Assembly Resolutions 36-23 and 37-11.

2. Introduction

The need for state PBN Implementation Plan

2.1 ICAO Assembly resolution A36-23 urged all States to implement RNAV and RNP Navigation Specifications for Air Traffic Services (ATS) routes and terminal/approach procedures in accordance with the ICAO PBN concept laid down in the Performance-based Navigation Manual (Doc 9613). There is unanimous consensus among the aviation community that the modern navigation technologies have promising potential for efficient, reliable air navigation and utilization of airspace. The new aviation challenges can be met by establishing a new navigation system that enhances airspace capacity in line with the projected aviation demand, ensuring fuel savings and reduced environmental impact. The future demand on aviation operations in Africa is also expected to vastly increase due to economic expansion as compared to other regions.

2.2 Gambia is a signatory to the convention and a member State of AFI Region. This Performance-based Navigation Implementation Plan (Roadmap) has therefore been prepared in order to acknowledge the initiatives of APIRG and ICAO Assembly. It is also intended to assist aviation stakeholders in understanding operational goals, determining requirements, and considering future investments. This plan focuses on addressing future efficiency and capacity needs while maintaining or improving the safety of flight operations by leveraging advances in navigation capabilities on the flight deck. This plan provides a high-level strategy for the evolution of navigation capabilities to be implemented in three timeframes i.e. short term (2013-2018), mid-term (2018-2023), and long term (2023-2028). Following ICAO strategy, this plan will recommend (RNAV) Nav Specs first and (RNP) Nav Specs only where required due to more demanding operational requirements. The plan encompasses instrument approaches, Standard Instrument Departure (SID) and Standard Terminal Arrival (STAR) operations, as well as en-route operations.

Benefits of PBN

2.3 PBN offers a number of benefits over the sensor-specific navigation routes and procedures. Some of the benefits are being listed below:

- Enables decommissioning of some sensor-specific routes, e.g. those based on NDB and associated procedures, thus reducing ANSP CNS costs
- Reduces the need for the development of sensor-specific operations..
- Allows more efficient use of airspace in true harmony with the way in which area navigation systems are used
- Facilitates the operational approval process for operators by providing a limited set of navigation specifications intended for global use.
- For the pilots, the main advantage of PBN is that the navigation function is performed by highly accurate and sophisticated on-board navigation equipment allowing reduction in cock-pit workload
- Shorter ATS routes on account of aircraft using area navigation systems that allow more efficient planning of ATS without having to consider the locations of ground-based conventional navigational aids.
- PBN based arrival and departure routes can complement and even replace radar vectoring, thereby reducing Approach and Departure Controllers' workload.

- Use of PBN arrival and departure instrument procedures, i.e. SIDs and STARs, reduced controller/pilot communication and controller workload.
- Access to airports in IMC that currently do not have instrument landing systems, for example ILS, VOR or NDB.
- Increase in capacity in enroute airspace by implementing closely spaced ATS routes based on more advanced PBN Nav. Specs, e.g. RNAV 2 or RNP 2 instead of conventional VOR structure

PBN Implementation Status in The Gambia

2.4 Recognizing the benefits of PBN, Gambia has established a national PBN Task Force for the study of PBN technology, requirements for implementation, fostering a cooperative approach among country aviation stakeholders in the implementation of PBN over The Gambia Airspace Banjul Control Zone. Planning and Implementation activities involve participation of PBN experts from relevant Departments of the Gambia Civil Aviation.

2.5 The national PBN Task Force is responsible for developing policy, implementation plans, and implementation standards for the deployment of PBN procedures and operations in The Gambia.

2.6 Gambia has not yet acquired the capability of Instrument Procedure Design in accordance with new PBN design criteria, and as such will build capacity by training two procedure designers in ICAO WACAF FPP office in Dakar.

Challenges/Solutions

2.7 During the transition to a PBN environment, the typical challenges to be confronted are as follows:

- a. Adoption of supporting Civil Aviation Regulations
- b. PBN capability register and aircraft minimum equipment lists (MEL)
- c. Integration of PBN capability into the ATM system
- d. Safety monitoring of ATM system
- e. Design and Implementation of PBN routes and procedure
- f. Navigation database integrity and control
- g. Continued involvement in CNS/ATM and PBN development
- h. Adoption of Electronic Terrain and Obstacle Data
- i. Aerodrome obstacle survey (WGS84)
- j. Decommissioning of existing aids, beginning with select NDB
- k. Education and training of personnel concerned

Fleet Readiness Status

2.8 All major commercial aircraft manufacturers since the 1980's have included area navigation capabilities. The majority of aircraft that operate into Banjul are mainly seasonal tourist charters from Europe. The rest of the operations involve utilisation of modern fleet of aircraft that do not require any additional retrofit programme for PBN capability.

3 Implementation Plan for Performance-based Navigation

3.1 This roadmap describes strategic objective and milestones set to meet ICAO timelines for implementation of operations. The transitions described fall into three timeframes, short term (2013-2018), mid-term (2018-2023), and long term (2023-2028).

3.2 Short Term (2013-2018)

3.2.1 En-route

RNAV10 for international routes (To be coordinated with Dakar FIR)

3.2.2 Departures and Arrivals

RNAV1 SIDs and STARs for Banjul International Airport.

3.2.3 Approaches

RNP APCH with vertical guidance (Baro-VNAV) for Banjul International Airport

3.3 Medium Term (2018-2023)

3.3.1 En-route

RNAV5 for international routes (To be coordinated with Dakar FIR)

RNP4 for heavily utilized routes (To be coordinated with Dakar FIR)

3.3.2 Departures and Arrivals

RNP 1SID and STARs for Banjul International Airport

3.3.3 Approaches

RNP AR APCH for Banjul International Airport

3.4 Long Term (2023-2028)

3.4.1 En-route

RNAV2 for international routes (As may be dictated by evolving circumstances)

3.4.2 Approaches

GBAS Landing Systems (GLS) as backups.

3.5 The avionics equipage, development of airspace concept, controller training and other arrangements for airworthiness and operational approvals is a complex and time consuming process which will be undertaken Step-by-Step during transition to PBN. Therefore close liaison within all stake holders necessary to develop transition strategy would be required from the Air Navigation Service Provider and air operators alike. To make transition from conventional navigation environment to Performance-based Navigation smooth and to support mixed operation during transition to accommodate non-compliant aircraft, existing ground-based NAVAIDS system will be retained. These NAVAIDS will also serve for reversionary mode in case of GNSS failure or interference. It may also be required for some general aviation aircraft not equipped with GNSS for low-level operations. The possibility of withdrawal of existing ground-based NAVAID infrastructure will only be considered in the long term time frame following assessment of on-board navigation equipment, reliance on PBN implementation during the first two terms, safety assessments, and after consultation with all stake holders. Also conventional procedures will be used at the same time with PBN application until reasonable time in the future to suspend the conventional procedures.

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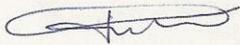
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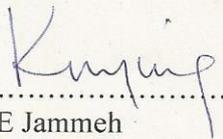
	Near Term (2013-2018)	Medium Term (2018-2023)	Long Term (2023-2028)
En-route	RNAV10 for international routes	RNAV5, RNP4 for international routes	RNAV2 for international routes
Departures & Arrivals	RNAV1 SIDs, STAR for Banjul Intl. Airport	RNP1 SIDs, STAR for Banjul Intl. Airport	GBAS for Banjul Intl. Airport
Approach	RNP APCH for Banjul Intl. Airport	RNP AR APCH for Banjul Intl. Airport	GLS as backup for Banjul Intl. Airport

GCAA

PBN Implementation Plan

The National PBN Program implementation Manager shall be the Director of Air Navigation Service.

Signed: 
Sulayman J Jabang
DIRECTOR OF AIR NAVIGATION

Signed: 
Abdoulie E Jammeh
DIRECTOR GENERAL

