INTERNATIONAL CIVIL AVIATION ORGANIZATION

Twenty Fifth Meeting of the Africa-Indian Ocean Planning and Implementation Regional Group (APIRG/25)

Kigali Rwanda, 7-11 November 2022

Agenda Item 3: Implementation of air navigation goals, targets and indicators, including the priorities set in the regional air navigation plan

3.6 Other Air Navigation Initiatives

Navigation in South Africa

(Presented by South Africa)

SUMMARY	
This information paper provides an update on the implementation of navigation systems, infrastructure, and services in South Africa. Action by the Meeting as in Paragraph 3.	
Strategic Objectives	• Safety • Air Navigation Capacity and Efficiency

1 INTRODUCTION

1.1. South Africa has just gone through a consultative process with various stakeholders within the aviation industry to consolidate and compile the National Navigation Strategy.

1.2. The objective of the National Navigation Strategy is to ensure that there is a harmonized provision of adequate air navigation infrastructure that covers all defined areas within the Republic of South Africa and its delegated airspace and in addition, guides the processes needed in respect of training, qualification, and implementation schedules.

1.3. Currently the National navigation Strategy has been reviewed and is undergoing an approval process and will serve as a baseline for guiding the implementation of air navigation infrastructure and services going forward.

2. DISCUSSION

2.1 General

2.1.1 The needs and requirements of South Africa's airspace users continue to evolve based upon the need to ensure more efficient and safer business outcomes, considering technological, economic, and societal drivers.

2.2 Infrastructure/Systems

2.2.1 South Africa has an extensive network of navigation aid systems (CVOR, DVOR, DME, VDF) and ILS's at a few aerodromes. South Africa intends to maintain a reliable ground-based navigation aid

infrastructure that will support Air Traffic Service routes and procedures and serve as a backup for the Global Navigation Satellite System (GNSS).

2.2.2 The navigation aid systems operated by South Africa which are on aerodromes and off-aerodromes and en-route navigation aid systems are made up of 22 CVORs, 16 DVORs, 16 VDFs, 17 ILS's and 23 DMEs; including mobile and training facilities as well as a network of GNSS monitoring infrastructure.

2.2.3 South Africa is in the process of replacing its conventional navigation aids (CVORs, DVORs and DMEs) and implementing a DME-DME network at selected Terminal Areas (TMAs). Furthermore, as part of future, additional VDFs will be installed at two small airports.

2.2.4 The Future of South African Air navigation environment includes the continuation of the use of the terrestrial navigation systems as well as the Global Navigation Satellite System (GNSS) per below:

- Distance Measuring Equipment (DME) – DME-DME network to support PBN operations at 6 TMAs
- VHF Omnidirectional Radio Range (VOR) – Rationalise the VOR infrastructure once an augmentation system for GNSS is implemented
- VHF Direction Finder (VDF) – Remains a regulatory requirement to accommodate small airports without a surveillance service
- Instrument Landing System (ILS) – Maintain the current ILS infrastructure as contingency for augmented GNSS.
- Aircraft Based Augmentation System (ABAS) – Already in use by appropriately equipped aircraft
- Satellite Based Augmentation System (SBAS) – Ongoing analysis
- Ground-Based Augmentation System (GBAS) – Ongoing analysis

2.2.5 The GNSS monitoring network is intended to baseline the performance of received GNSS signals at specific locations of South Africa's airspace. Furthermore, it is also intended to evaluate available ionospheric threat models to verify their suitability for the South African airspace. This will serve as the precursor to enable the future trials of GBAS at selected aerodromes.

2.2.6 South Africa is also conducting an analysis and engaging stakeholders in different industries with regards to SBAS to establish the need, benefits and cost associated with the SBAS service for South Africa. This analysis will be building on the excellent work done by the African Union Commission on SBAS cost benefit analysis.

2.3 Services

2.3.1 South Africa has redesigned its airspace to accommodate efficient routing based on RNAV and RNP specifications. Furthermore, regular reviews of the airspace and routing structure are being conducted in line with changes in operations.

2.3.2 Initial implementation of PBN procedures have been successful and there are plans to review the implemented procedures where required and design more PBN procedures in the future.

2.3.3 South Africa is continuing to implement CCOs and CDOs with the intention to improve efficiency in operations.

3 ACTION BY THE MEETING

3.1 The meeting is invited to take note of the status of the implementation of the navigation infrastructure and services in South Africa; and encourage states to share the status and challenges encountered in SBAS implementation.