ICAO

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

SA Surveillance Implementation status

(Presented by South Africa)

SUMMARY	
This information paper presents an update on the surveillance implementation status in South Africa. Action by the Meeting as in Paragraph 3.	
Strategic Objectives	• Safety • Air Navigation Capacity and Efficiency • Economic Development of Air Transport

1 INTRODUCTION

1.1 The surveillance systems provide air traffic controllers with the information necessary to ensure the specified separation between aircraft and the efficient management of airspace. Moreover, surveillance systems are used in weather stations to locate and determine precipitation.

1.2 There are two fundamental principles for surveillance systems:

- **Non-cooperative** surveillance to track non-cooperative (no transponder) targets in Terminal airspace where and when required. This will be provided by Primary Surveillance Radar (PSR) until an alternative, acceptable solution is available. The weather radar also uses this principle to determine precipitation.

- **Cooperative surveillance** to track cooperative (transponder equipped) targets in Terminal and Area Control airspace. This can be enabled by SSR and/or SSR Mode-S and/or Wide Area Multilateration and/or ADS-B and ADS-C.

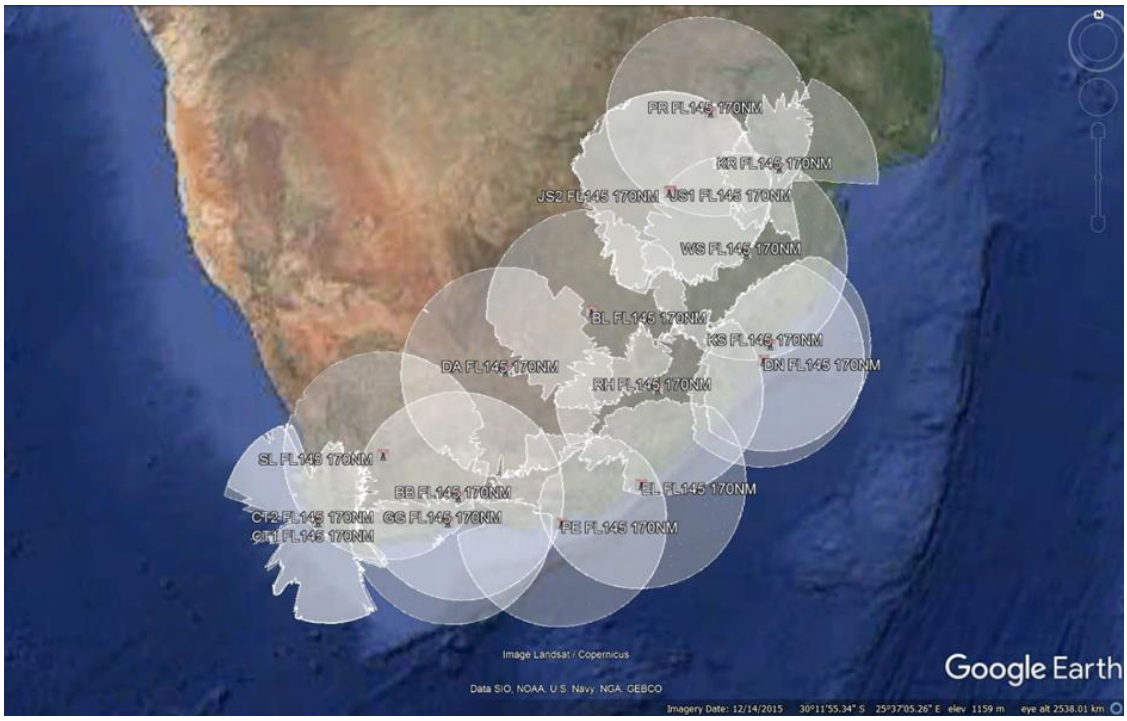
1.3 Additional South Africa has an Advanced Surface Movement Ground Control System (ASMGCS) which consists of Surface Movement Radar (SMR), Multilateration and ADS-B.

1.4 This paper provides an update on the implementation status of the surveillance systems in South Africa.

2. DISCUSSION

2.1 Aviation Surveillance Radars

2.1.1. The current South African surveillance environment consists of nine co-mounts (PSRs + SSRs), nine pure MSSRs and two A-SMGCSs. Figure 1 below illustrates the current south African surveillance coverage taken at FL 145:



2.1.2. ATNS is currently undergoing a radar replacement programme of which out of the 18 surveillance radars, nine of them are due for replacement in the next period of 7 years.

2.2 Weather Radars

2.2.1. South African Weather Service has a Radar network made of three C-Band Radars and ten S-Band Radars country-wide. These Radars are one of the essential weather forecasting instruments that are used in South African Weather Service, accurate radar data is critical for the continued function and improvement of weather sensing, monitoring, forecasting, warning and is therefore in the best of public safety and security. These Radars are also of extreme importance for Aviation or Safety in the sky.

2.2.2. The figure below indicates SAWS Radar network and coverage.

2.2.3. The long-term plan is to expand the network by deploying short-range X-band radar, these radar types will be used as gap fillers to increase our radar footprint.

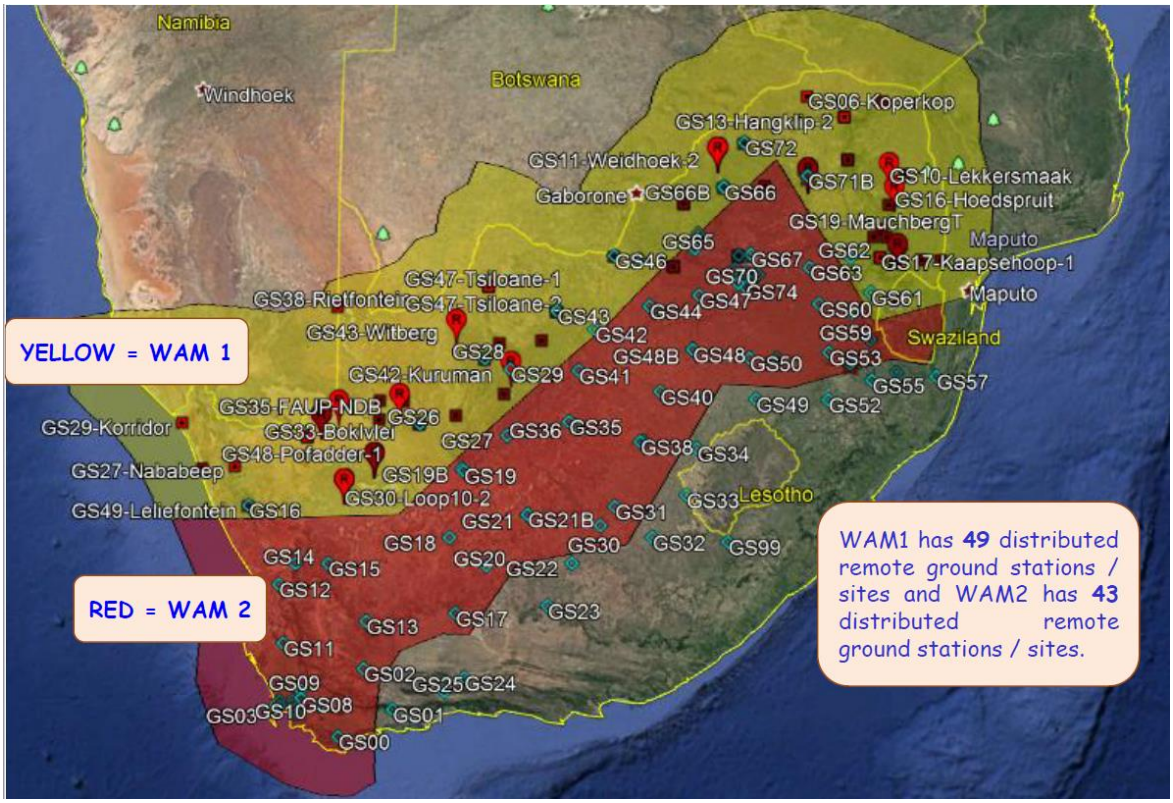
2.3 ASMGC-S

2.3.1. The ASMGC-S system is currently installed at FAOR and FACT airports. The current implementation of A-SMGCS level I and level II is enabled by systems such as SMR and Multilateration and/or ADS-B.

2.3.2. The implementation of higher levels of A-SMGCS (level III and IV) will be implemented in the next 5 years.

2.4 Wide Area Multilateration (WAM)

2.4.1. South Africa is currently implementing the WAM systems. The WAM system is implemented in phases; WAM 1 and WAM 2 The following figure shows the WAM coverage for both WAM 1 and WAM 2.



2.4.2. Below are the identified challenges for the implementation of WAM system.

[a] ICASA (Independent Communications Authority of South Africa) license applications.
[b] SACAA Mode S addresses applications.
[c] Site lease agreements (data links Civil Works Structural Engineering and site reticulations).
[d] Scarce Datalink Service Providers especially in the En route.

2.5 **Space-Based Automatic Dependent Surveillance-Broadcast (ADS-B)**

2.5.1 The space-based ADS-B is currently under trial, the system is expected to be integrated into the ATM systems by March 2023.

2.5.2 Below are the identified challenges for the implementation of the Spaced-Based ADS-B:

[a] Sovereignty space-based ADS-B shared and handled by another country may pose security issues.

[b] Augmentation hence coverage in relation to South Africa's geographical location.

3 ACTION BY THE MEETING

3.1. The meeting is invited to take note of the Surveillance implementation status in South Africa; encourages states to share implementation status; and challenges encountered with Spaced-Based ADS-B.