INTERNATIONAL CIVIL AVIATION ORGANIZATION

Second Meeting of the Africa - Indian Ocean Aviation System Planning and Implementation Group (AASPG/2)
Livingstone, Zambia, 2 - 6 November 2026

Agenda Item 4: Implementation of safety and air navigation goals, targets and indicators, including priorities set in the Regional Aviation Safety and Air Navigation Plans

DEVELOPMENT OF GNSS MONITORING SERVICES FOR UGANDA

(Presented by Uganda)

SUMMARY
This working paper outlines the ongoing initiatives supporting the introduction of GNSS monitoring services and updates on the development of GNSS monitoring services for Uganda Action by the meeting is in **Paragraph 3.**
REFERENCE(S): 1. ICAO GANP Vol.8 Doc.9750 2. Doc 9849 (GNSS Manual) 3. ICAO Annex 10
This working document relates to the following ICAO Strategic Goals: A. Every Flight is Safe and Secure B. Aviation is Environmentally Sustainable C. Aviation Delivers Seamless, Accessible, and Reliable Mobility for All D. No Country is Left Behind F. The Economic Development of Air Transport Assures the Delivery of Economic Prosperity and Societal Well-Being for All

1. INTRODUCTION

1.1 Global Navigation Satellite System (GNSS) supports critical aviation functions, including en-route, terminal and approach operations, Performance-Based Navigation (PBN), and advanced air navigation applications. However, its low-power signals are vulnerable to anomalies, environmental factors, equipment failures, and radio frequency interference such as jamming and spoofing, which can degrade or falsify navigation information. GNSS monitoring services help States and ANSPs assess availability, accuracy, integrity and continuity, detect and investigate anomalies, maintain records, and coordinate responses. Given the cross-border nature of some interference, regional cooperation and information sharing are essential.

1.2 Uganda, through a Memorandum of Understanding with SatNav Africa Joint Programme Office (JPO), conducted a six (6) months Proof of Concept (PoC) from 31st October 2025 to 30th June 2026 to assess the feasibility of implementing a GNSS monitoring capability within the Entebbe

Flight Information Region (FIR) and gain practical experience to inform the development of a national GNSS monitoring service.

2. DISCUSSION

2.1 Need for GNSS Monitoring

2.1.1 Increasing reliance on GNSS for PBN operations requires ANSPs to continuously monitor system performance, detect interference, validate pilot reports, investigate events, and support operational decision-making. ICAO guidance highlights GNSS monitoring as a critical first step in detecting and mitigating radio frequency interference through defined procedures, reporting mechanisms, and stakeholder coordination. The AFI Region has also recognized the need to strengthen GNSS interference risk management. Additionally, GNSS monitoring supports SBAS implementation by providing essential data for system design, validation, deployment, and operational oversight, while enabling real-time visibility of interference events.

2.2 Regional Developments within the EAC

2.2.1 The EAC Secretariat, working with Partner States, has promoted the gradual establishment of national GNSS monitoring capabilities and a harmonized regional monitoring framework. I order to do this, the 20th Meeting of the EAC Sectoral Council on Transport, Communications and Meteorology (SC-TCM/20) directed the EAC Secretariat to coordinate GNSS monitoring and trial missions to assess the technical viability of GNSS/SBAS in the region. Regional coordination is essential because GNSS interference may cross national borders, and data from multiple monitoring sites can help determine the extent and nature of interference events. A regional approach would support common standards for monitoring performance and signal quality, detecting and reporting anomalies, retaining data, sharing information on significant events, coordinating with aviation and spectrum stakeholders, and strengthening technical capacity across Partner States.

2.3 Uganda GNSS Monitoring Proof of Concept

2.3.1 Uganda's Proof of Concept (PoC) demonstrated the feasibility of establishing a national GNSS monitoring service using monitoring equipment at Buwaya station and the OWL software platform. The system monitored GPS and Galileo performance, measuring key indicators such as accuracy, availability, integrity, continuity, and interference. The project identified critical requirements including suitable sites, reliable communications and power, trained personnel, data management, and stakeholder coordination. Following the successful PoC, UCAA plans to deploy permanent monitoring sensors at Entebbe and Soroti airports, providing a model for other States.

3. ACTIONS BY THE MEETING

The meeting is invited to:

a) note the ongoing developments within Uganda towards the introduction and coordination of GNSS monitoring services;
b) encourage States to assess their operational requirements for GNSS monitoring and progressively establish appropriate capabilities for monitoring GNSS performance and identifying interference events; and
c) provide any other guidance as appropriate.