INTERNATIONAL CIVIL AVIATION ORGANIZATION

Twenty-Seventh Meeting of the Africa-Indian Ocean Planning and Implementation Regional Group (APIRG/27)

5 - 6 November 2024

Agenda item 3: Implementation of air navigation objectives, targets and indicators, including the priorities set out in the regional air navigation plan

Progress on the implementation of GNSS/SBAS in Africa SBAS CBA Phase II Report

(Presented by AFCAC)

EXECUTIVE SUMMARY

This Working Paper provides updates on the Phase II SBAS CBA Study and outcomes of the recent Stakeholder Validation Workshop held virtually from 23 to 24 October 2024. After consideration of the comments made during the validation workshop, AUC and AFCAC are expected to submit outcomes of the Phase II SBAS CBA Study for consideration by the relevant AU Policy Organs.

Action: The meeting is invited to

a) take note of outcomes of the SBAS CBA PHASE II Study;
b) Urge Member States to continue exploring the continental implementation of SBAS to increase air navigation safety and efficiency and reduce environmental impact due to air navigation.

Strategic Objectives:	To increase capacity and efficiency of Air Navigation in Africa
Financial implications:	
References:	• Africa Union Space Strategy and Policy • AFCAC Constitution • AFCAC 10-Year Strategic Plan (2022-2032) • AFCAC Consolidated Strategic Work Programme • Report of the 1st Ordinary Session of the AU STC TIIITE 13-17 March 2017, Declaration of Lomé • APIRG/22 Meeting report of the Africa-Indian Ocean Planning and Implementation Regional Group (APIRG/22), Accra, Ghana, 29 July - 02 August 2019 • Final report on CBA for SBAS implementation in Africa • ICAO Annex 10, Volume I, up to amendment 92

1. INTRODUCTION

1.1 Following the decision adopted by the AU Member States in 2017 [2] and in line with the APIRG/22 conclusion 22/39 [3], the African Union Commission (AUC) was tasked to conduct to continental cost-benefit analysis (CBA) on SBAS introduction in the region, taking consideration of existing initiatives, with the overall objectives to assess the SBAS economic attractiveness for the continent, to support the decision-making process by States and Stakeholders on the best implementation options, and enable update of the AFI GNSS strategy accordingly.

1.2 Phase I of this Cost Benefit Analysis, centered on the economic attractiveness of SBAS at a continental level, was conducted throughout 2021-2022, and its results were presented in the SBAS Continental Workshop, in Kigali in May 2022. As part of the next steps of the Continental Workshop, there was a call to prepare a study on institutionalization.

1.3 The SBAS CBA Phase II study was subsequently conducted through a consultancy arrangement by AUC and EASA in 2023. The outcomes of the Phase II study were presented at the Stakeholder Validation Workshop held virtually from 23 – 24 October 2024. The workshop welcomed good participation with 106 Participants connected via zoom from AU Member States, regional organizations, and key partners in the area of SBAS (EAC, COMESA, ECOWAS, and international organizations (ICAO, IATA, ASECNA, SATNAV JPO, EASA).

1.4 The Consultants delivered 2 presentations on Task 1 covering Organization and Institutionalization Studies, and Task 2 covering Technology Transfer and Risk Assessment for the continental CBA study on SBAS. The presentations were followed by a session of questions and answers as well as presentations and experience sharing from Member States and stakeholders

2. DISCUSSION

2.1 **Specific objectives of the SBAS Phase II CBA** study included the following: -

a) **Governance and organization**: i.e. definition of main functions within the program and identification of roles and interactions between program stakeholders, to define the overall governance structure;
b) **Regulation and oversight**: i.e. definition of overall regulatory and standardization framework, including the certification layer and program oversight activities;
c) **Funding**: i.e. definition of the funding needs and the potential funding mechanisms;
d) **Service provision**: i.e. definition of the service provision and liability schemes that define the interactions between the stakeholders in the service provision layer; and
e) **Technology**: i.e. definition of the development model for African SBAS, ranging from full independent system development to direct import from a third country and the possible transfer of technology arrangements.

3. Study Outcomes - Organization and Institutionalization

3.1 Outcomes of the "organization and institutionalization" study provided available SBAS institutional model options including (i) **public ownership approach**, (ii) **single or dual organizational approach**, (iii) **hybrid centralization approach**. The meeting considered Hybrid centralization as the preferred option to continental or regional approaches. A central entity provides a common policy and governance platform, a unified regulatory framework, and service levels defined in terms of functionalities such as strategic direction, oversight, regulation, and market development.

3.2 The Report recommended that Africa should consider establishing a **Continental Policy Body** – where a single policy-making body within the AU would set general policies and an overall African SBAS Program roadmap, providing oversight over individual SBAS programs. It would also push for continent-wide standards for SBAS performance, ensuring consistency in service quality and reliability and seamless operation of SBAS users between different SBAS regions. The political layer of the African SatNav Programme should be funded through **mechanisms typically used by AfSA**, while individual SBAS Programme leaders would cover their initiatives independently **using public funds, multilaterals, and grants**

3.3 **Institutional Roles**. Taking into consideration the **3 SBAS Model Options** key institutions were identified and allocated key roles as follows-

- **African Space Agency (AfSA)** – To ensure alignment with continental policies and goals through AUC space policy and strategy guidelines concerning the Satellite Navigation Component
- **RECs** – To support AfSA and act as a liaison between the African SBAS Programme and the Individual SBAS initiatives, contributing to the African SBAS Programme's policies
- **ICAO, AFCAC, and the RSOOs** – To support AfSA by ensuring regional planning, regulatory harmonization, and certification. This involved cooperation among key stakeholders at this level to coordinate regulatory harmonization towards technical and operational regulations, ensuring consistency and interoperability between neighboring airspaces. All components of the SBAS system (ground, space, and user segments) must be certified to ensure compliance with specific aviation standards. The service provider must also be certified, either by National CAAs, RSOOs, or other relevant authorities
- **SatNav Africa JPO** – To act as the SBAS Market Development Agent for the African SBAS Program, focusing on driving market adoption and stakeholder engagement across the continent.

4. Study Outcomes - Technology Transfer and Risk Assessment

4.1 The Technology Transfer and Risk Assessment Report focused on defining the SBAS system development approach, in terms of whether through independent African development, technology transfer, or import, while conducting risk analysis and providing recommendations for seamless implementation.

4.2 Three (3) development options were identified and these included Full Independent System, Full Technology Import, and Technology Transfer.

- **Full Independent System** included complete technological development within Africa and its advantage is that it allows capacity building and acquisition of skills across the entire SBAS value chain, from design to operations.
- **Full Technology Import** involves complete outsourcing to third-party and its advantage is that it carries the lowest technological risk.
- **Technology Transfer** was the best-recommended option as it involves leveraging existing SBAS systems and it is regarded as a balanced capability development derived from harnessing international expertise.

4.3 The report highlighted risks associated with SBAS technology transfer and recommended setting up a Technical and Programme Management Committee with the task of identifying, assessing, and monitoring the main programme risks, with the participation of all key stakeholders.

4.4 The report also highlighted the need for investment in local talent and technology as this is crucial for the long-term sustainability of SBAS services in Africa. Developing a skilled workforce within Africa ensures that the continent is not perpetually dependent on external experts for the operation and maintenance of its SBAS.

5. Next Steps

The report recommended the following Roadmap for African SatNav Programme –
2024 - 2025: Creation of the African SatNav Programme under the African Space Agency (AfSA);
2026 - 2027: Drafting of common policies, a harmonized regulatory framework, development oversight capabilities, and integration of the JPO into the African SatNav Programme;
2025 – 2034: Develop individual SBAS initiatives – i.e. consider the evolution and expansion of current and any new initiatives including the ANGA and EGNOS v3 SBAS.

6. Conclusion

The study concluded that there is a need for a policy-making body within the AU, set up under AfSA which would set general policies and an overall African SBAS Program roadmap, providing oversight over individual SBAS programs. The entity would also push for continent-wide standards for SBAS performance, ensuring consistency in service quality and reliability and seamless operation of SBAS users between different SBAS regions.

A technology transfer arrangement is the most suitable system development alternative for African SBAS. It will allow African stakeholders to gain capabilities and expertise in the area, as they will lead the conceptual design, procurement, and testing of the system, as well as autonomously perform the operation and maintenance.

Investment in local talent and technology is crucial for the long-term sustainability of SBAS services in Africa. Developing a skilled workforce within Africa ensures that the continent is not perpetually dependent on external experts for the operation and maintenance of its SBAS.

— END —