



WORKING PAPER

FOURTEENTH AIR NAVIGATION CONFERENCE

Montréal, Canada, 26 August to 6 September 2024

Agenda Item 2: Timely and safe use of new technologies
2.2: Addressing safety risks related to evolving aviation technologies

**SATELLITE-BASED AUGMENTATION SYSTEMS IMPLEMENTATION CHALLENGES
ASSOCIATED WITH AVAILABILITY OF INTELLECTUAL PROPERTY ASSETS**

(Presented by 54 Contracting States², members of the African Civil Aviation
Commission (AFCAC))

EXECUTIVE SUMMARY

This paper presents a technology acquisition challenge related to the implementation of satellite-based augmentation systems (SBAS) on the African continent. Since the establishment and adoption of SBAS by the International Civil Aviation Organization (ICAO) as one of the main satellite navigation infrastructures to support seamless global air navigation operations, their development and implementation work have been defended by the sovereign governments which own them. The technologies associated with the development of SBAS are protected by intellectual property (IP) assets and are not in the public domain. These intellectual property assets of SBAS technology are primarily owned by industry. However, for some SBAS systems, intellectual property rights are shared between industry and the owners of those systems. Adoption of SBAS by African States for implementation in support of their air navigation operations may be challenging as this will require access to these intellectual property assets, and most of them could thus encounter difficulties in developing the technology required for SBAS. Traditionally, African states have acquired (at financial cost) conventional navigation systems through private industry (manufacturers) who own the technology necessary for these systems. To this end, there may be challenges in the implementation of SBAS on the continent by some interested States (or group of States).

Action: The Conference is invited to:

- a) take note of the information related to the issues related to the acquisition of intellectual property rights for SBAS technology;
- b) highlight the successful collaboration agreement made by the African continent as a role model in the implementation of SBAS; and
- c) encourage States and relevant stakeholders to take a coordinated approach based on the role model recognizing challenges faced by some States on the African continent in the implementation of SBAS.

¹ English and French versions provided by AFCAC.

² Algeria, Angola, Benin, Botswana, Burkina Faso, Burundi, Cabo Verde, Cameroon, Central African Republic, Chad, Comoros, Congo, Côte d'Ivoire, Democratic Republic of the Congo, Djibouti, Egypt, Equatorial Guinea, Eritrea, Eswatini, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Libya, Madagascar, Malawi, Mali, Mauritania, Mauritius, Morocco, Mozambique, Namibia, Niger, Nigeria, Rwanda, Sao Tome and Principe, Senegal, Seychelles, Sierra Leone, Somalia, South Africa, South Sudan, Sudan, Togo, Tunisia, Uganda, United Republic of Tanzania, Zambia, Zimbabwe.

1. INTRODUCTION

1.1 satellite-based augmentation systems (SBAS) enhance the safety and efficiency of air navigation and are operational in a number of regions around the world. Africa is making great strides to ensure that it is not left behind in this growing trend of SBAS technology adoption. This is evidenced by a number of initiatives that have emerged on the continent, such as the SBAS Augmented Navigation Program for Africa (ANGA) of the Agency for Air Navigation Safety in Africa and Madagascar (ASECNA).

1.2 SBAS facilitates performance-based navigation (PBN) operations ensuring the accuracy, integrity, service continuity and availability necessary to rely on Global Navigation Satellite System (GNSS) navigation for all phases of flight, from en-route to vertically guided approaches. Automatic dependent surveillance – broadcast (ADS-B) also benefits from SBAS as a position source with greater accuracy and integrity, particularly for air traffic management and surface movement management at airports.

1.3 The level of PBN implementation on the African continent currently stands at approximately 69.44 per cent (end of the PBN track), demonstrating a growing trend towards the use of satellite navigation services over aids. to conventional navigation. Africa must adopt and implement SBAS technology to align with the rest of the world and ensure seamless and interoperable global airspace operations.

1.4 The development of SBAS has been supported by the aviation community and standards bodies such as the Radio Technical Commission for Aeronautics (RTCA) and the European Organization for Civil Aviation Equipment (EUROCAE).

1.5 The various SBAS systems have been developed and deployed by manufacturers on behalf of the States which own them. As for the intellectual property (IP) rights associated with the development of technology, the pattern differs from system to system, but they mainly belong to the industry.

2. DISCUSSION

2.1 The development and subsequent deployment of the SBAS core infrastructure requires access to certain technologies protected by intellectual property rights (IPR). This access can generally be obtained within the framework of contractual relationships with manufacturers. For the few IPRs that may belong to the owner of the SBAS, as is the case for the European Geostationary Navigation Overlay Service (EGNOS) which belongs to the European Union (EU), access can be done within the framework of a provision agreement.

2.2 On the African continent, a cooperation agreement on the development of satellite navigation set up between the EU and ASECNA provides access to the use of EGNOS intellectual property for the development of its SBAS navigation program for Africa (ANGA). Access to intellectual property rights helps reduce the duration, risks and costs of the system development phase, thus optimizing development time.

2.3 Given the nature of intellectual property associated with the development of SBAS, as noted above, there may be challenges in the implementation of SBAS by some States on the African continent. Conventional, more flexible systems acquisition practices with the aerospace industry, which have historically been used for traditional air navigation and other aviation systems, can be costly for most states. The case of ASECNA highlights the relevance of a regional approach and the need to collaborate with state entities to access these vital resources for the development of SBAS.

2.4 In addition to ASECNA's ANGA program, a number of SBAS initiatives are underway on the continent, such as the Algerian Satellite Augmentation System (AL-SBAS), the South African National Space Agency. (SANSA) and the SBAS of the Arab Civil Aviation Organization (ACAO). Ensuring flexible access to SBAS technology intellectual property is essential to the successful implementation of current and future initiatives.

3. CONCLUSION

3.1 The standardization of SBAS by ICAO as one of the main satellite navigation infrastructures to support seamless global air navigation operations has been supported in terms of implementation by the sovereign governments that own it. The technologies associated with the development of SBAS are protected by intellectual property rights and are not in the public domain. These rights are mainly held by manufacturers. However, in certain cases, intellectual property rights are shared between manufacturers and owners of the SBAS system. The agreement between the EU and ASECNA offers a typical solution to the intellectual property problem. This solution provides access to intellectual property assets and optimizes the system development phase, thereby reducing development risks and time. It is recommended to promote the successful outcome made by African States in the implementation of SBAS.

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