International Civil Aviation Organization
Project RLA/03/902 – "*Transition to GNSS in the CAR/SAM Regions – SACCSA"*
Tenth Meeting of the Coordination Committee (RCC/10)
Bogota, Colombia, 9 to 13 February 2015

Agenda Item 2: Report on closure of activities of Regional Project RLA/03/902 and Work Packages

ADVANTAGES AND POSSIBLE EVOLUTION OF THE PROJECT

(Presented by ENAIRE)

SUMMARY

This working paper presents a vision of the advantages of Project RLA/03/902 – SACCSA and its possible evolution.

1) BACKGROUND

Project RLA/03/902 stemmed from the EC EDISA programme and its conclusions, and from WAAS conclusions, which coincided in the impossibility of extending the WAAS or EGNOS to the CAR/SAM Regions and that an independent system for the Region should be developed, tailored to its special ionosphere conditions.

It should be noted that Project RLA/03/902 is to conclude at this meeting, reserving the SACCSA designation for a possible SBAS system in the CAR/SAM Regions.

2) PROJECT ADVANTAGES, PRODUCTS AND BENEFITS

Project RLA/03/902 – SACCSA started operating on the basis of prior studies and analyses to determine its feasibility and to seek technical and operational solutions to ionosphere problems. To this end, two phases were implemented. These phases, which are to conclude at this RCC, showed the feasibility of implementing the system, overcoming the difficulties caused by high ionosphere activity, as notably seen when implementing the real SACCSA signal during the RCC held in Bariloche in October 2010.

Project results have been presented at different forums, the most important being the ION, on GNSS, where the results and models presented generated great expectation and support from attendants, confirming the feasibility and good operation of the Project, opening the road to its implementation, subject to the will of CAR/SAM States.

SACCSA was developed by and for the CAR/SAM Regions, independently from the WAAS and EGNOS, with its own solutions for solving its own problems, and proved successful using both a real signal and multiple simulations. Like all SBAS systems, it will benefit broad sectors of society, not only the aeronautical sector, although this is the one that has greater management capacity due to its connection with safety concepts. Accordingly, this sector controls the provision of SBAS services, whether directly (WAAS is provided by the FAA) or through a partnership (EGNOS is provided by ESSP, made up by navigation service providers).

SACCSA implementation will offer multiple benefits to many sectors. Starting with the aeronautical sector, it will permit the start-up of safe operations with LPV vertical guidance at airports not equipped with ILS and where, due to the complexity of the surrounding terrain or the reduced number of flights, the installation of such aid is not economically feasible. With SACCSA, LPV procedures may be designed to enhance safety, and it will be possible to increase the operating schedules at said airports, and make them more appealing by increasing the number of flights. Airport profitability will also improve since it will be possible to apply higher approach rates with LPV as compared with visual procedures.

From the multimodal perspective, the availability of a signal regulated under SoL criteria will permit its use in multiple fields, such as:

2.1 **Security**: real-time tracking of the position of official vehicles, VIPs, school buses, etc.

2.2 **River navigation**: control of ships and their position on the river; tracking of goods, guidance along the river course; collision avoidance systems, etc.

2.3 **Maritime navigation**: enhancing the precision of electronic charts, bathymetry, ship fleet control, collision avoidance systems, discharge control, surveillance and rescue, etc.

2.4 **Public works**: monitoring of structures, measurement and marking of points, positioning and management of machinery, guidance of heavy machinery, positioning and mapping, road/pathway/bridge maintenance, topography, etc.

2.5 **Oil applications**: platform control and positioning, pipeline control, truck fleet control, oil tanker position control, helicopter guidance, production tracking, locating of elements and components, etc.

2.6 **Power**: infrastructure installation/maintenance, electric power network synchronization, structure monitoring, production control, etc.

2.7 **Agriculture and cattle raising**: precision farming, automatic harvesting, production levels, surface control, fumigation, fertilization, surveying, land registry, herd control, product traceability, etc.

2.8 **Synchronisation:** time basis, banking networks, security systems, communication networks, etc.

2.9 **Science:** ocean height, wave height, wildlife tracking, seismic studies/volcanoes, atmospheric and ionosphere studies, attitude determination, earth crust movements, topography, geology, bathymetry etc.

2.10 **Rescue and emergencies:** outlining of areas, search with dogs (earthquakes), emergency service guidance, rescue resource optimization, reduction of performance times, quick location of emergency sites, emergency control systems, etc.

As may be seen, SACCSA is a system that would provide many benefits. Therefore, it should be assessed from the point of view of its benefits for society, beyond the strictly aeronautical benefit. This aspect will have a direct impact when conducting any type of study or cost/benefit analysis.

3) FUTURE STEPS FOR SACCSA IMPLEMENTATION

With the completion of studies, the initial phase of the project is concluded, which consists of theoretical analyses and development of mathematical models for subsequent development with acceptable levels of assurance of success. As has occurred with other SBAS systems, this phase would be followed by two new phases:

3.1 Test bed and cost/benefit study

The first step is to design, develop, and implement a test bed with limited but significant coverage within the interested CAR/SAM States (for instance, covering areas of maximum ionosphere activity, areas with scarce ground surface, optimum areas, etc.). Coverage could be then extended to States that might be later interested. This will permit an analysis and enhancement of the applied solutions, thus showing the capabilities and advantages of the system, and its possibilities and benefits for potential users.

This test bed will demonstrate the potential of the end system, in support of the cost/benefit analysis. It will contain significant elements of the SACCSA ground infrastructure to demonstrate the initial system operating criteria. Of course, based on the approach applied, costs will vary significantly, since it will depend on the use of existing network stations or use of dedicated stations located in the areas defined by the system.

The test bed will help provide testing services to potential users at multimodal level, thus demonstrating the social benefits to be derived, permitting their quantification and use in cost/benefit studies.

At the same time, and based on the results obtained from the test bed, a cost/benefit study will be conducted based on multimodality on the one hand, and the impact on the aeronautical sector on the other, and both at State and regional level. This study will be key for deciding, based on test bed results, whether or not to deploy and definitively implement the system.

3.2 **System deployment**

Once the activities mentioned in the previous paragraph have been concluded, and if the results are positive, the next step is the deployment of the various elements and definitive implementation of SACCSA as an operational system, as part of the global SBAS network and ensuring interoperability with the WAAS. This would generate a homogeneous service that would cover all the airspace of the States that participate in the implementation of the system and validate its operational use. An entity would be created to operate the system and provide the service to the various users, creating interfaces with the States (or the entity that represents them) and defining financing models for deployment and subsequent operation and maintenance.

THE MEETING IS INVITED TO:

Take note of the information contained in this working paper.

Discuss the next steps and define the future of SACCSA.
