International Civil Aviation Organization
CAR/SAM Regional Planning and Implementation Group (GREPECAS)
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Punta Cana, Dominica Republic, 28 March – 1 April 2011

Agenda Item 3: Performance framework for Regional Air Navigation Planning and Implementation

3.1 Global, inter-regional and intra-regional activities concerning air navigation systems in the CAR/SAM Regions

GPS-ENHANCED AIRCRAFT GUIDANCE SYSTEM PROJECT

(Presented by Colombia)

SUMMARY

The "GPS-enhanced aircraft guidance" system project will improve the operational minima at low traffic density airports in a cost-effective manner, thus contributing to safety.
The "GPS-enhanced aircraft guidance" system contributes to improve the competitiveness of Colombia in the area of air transport. It represents a big challenge and takes advantage of:

- Installed infrastructure, such as the GEORED network of the National Geological Institute (*Instituto Geológico Nacional – Ingeominas*),
- Knowledge about the equatorial ionosphere and the research capacity of the National University of Colombia (*Universidad Nacional de Colombia*),
- Operational knowledge of the civil aviation of Colombia for the solution of air navigation issues.

Strategic Objectives:	A: Safety – Enhance global civil aviation safety D: Efficiency – Enhance the efficiency of aviation operations
References:	Global Air Navigation Plan National Satellite Navigation Plan (*Plan Nacional de Navegación Satelital – PNNS)* Air Navigation Plan for Colombia – PNA Colombia

1. INTRODUCTION

1.1 The "VISION OF COLOMBIA - II CENTENNIAL – MAKE USE OF AIRSPACE POTENTIAL TO CONTRIBUTE TO THE SUSTAINABLE DEVELOPMENT AND COMPETITIVENESS OF THE COUNTRY", hereinafter called Vision 2019 document, formulated by the Colombian Airspace Commission (*Comisión Colombiana del Espacio – CCE*), proposes important objectives upon celebrating 200 years of independence. The GPS-enhanced aircraft guidance project is related to two of them:

a) an economic system that provides a higher level of wellbeing, where growth is based on scientific and technological development, the appropriate infrastructure for the development of the country is created, and a sustainable growth strategy is defined, especially for air navigation;
b) an efficient society at the service of its citizens, especially the aeronautical community and the users of air transport in Colombia.

1.2 Likewise, based on the operational requirements of the Air Navigation Plan for Colombia, especially the navigation requirements formulated in Chapter 4 of the Plan, this project addresses particularly navigation during the approach phase in low traffic density airports.

1.3 The Vice-President of Colombia has established several specific objectives, particularly:

- Formulate and develop the National Satellite Navigation Plan.
- Capacity-building at national institutions for the implementation, evolution, and use of global navigation satellite systems (GNSS).
- Promote the use of satellite navigation technologies that provide greater social, environmental and economic benefits.
- Pool efforts and investments across institutions and sectors for the implementation and use of satellite navigation systems.

1.4 These specific objectives are consistent with ICAO strategic objectives and its consolidated vision and mission statement. Especially Objective A: Safety – enhance global civil aviation safety, and Objective D: Efficiency – Enhance the efficiency of aviation operations.

1.5 The GPS-enhanced aircraft guidance system is a project that constitutes a big challenge, and takes advantage of:

- Installed infrastructure, such as the GEORED network of the National Geological Institute (*Instituto Geológico Nacional – Ingeominas*),
- Knowledge about the equatorial ionosphere and the research capacity of the National University of Colombia (*Universidad Nacional de Colombia*),
- Operational knowledge of UAEAC for the solution of air navigation issues, which contributes to improve our competitiveness *vis-à-vis* the aeronautical community.

1.6 Since 2009, Colombia has been participating, through this project, in the International GBAS Working Group - IGWG, to improve the GPS signal during the approach and landing phase.

2. DISCUSSION

2.1 The implementation of new CNS/ATM technologies for air transport requires a significant financial effort by both civil aviation authorities and aircraft operators. All efforts must be based on detailed planning of operational requirements in order to meet the expected demand at both national and international level.

2.2 Likewise, growth of air operations varies worldwide, or even within a country, where different geographical areas and airports have different growth rates. In Colombia, there is a marked difference between international airports like El Dorado in Bogota and the others.

2.3 Deficiencies and obsolete equipment have also been identified in the existing systems. In some regions, systems cannot be installed and/or maintained for purposes of improving navigation capacity during the approach and landing phase.

2.4 The GNSS is a possible solution, which must be enhanced based on navigation performance and aeronautical communication requirements.

2.5 Colombia is particularly committed to the search of mechanisms to reduce fatalities resulting from air accidents, which mostly occur in the general aviation.

2.6 Therefore, the Civil Aviation Authority of Colombia has decided to seek less expensive alternatives to serve low traffic density airspaces with special terrain and atmospheric conditions that, in light of cost analysis, are unsustainable.

2.7 This initiative contributes to enhance the efficiency of operations in those areas that normally suffer closures or where no successful approaches are achieved, thus contributing to operational risk management.

2.8 In this manner, Colombia supports air traffic management, improves GNSS performance during the approach phase, and adopts new technologies based on the planning and implementation of air navigation systems, in keeping with national requirements. These scenarios are open for analysis by the international community.

2.9 The phases of the project are as follows:

1. Phase I: Analysis and design
2. Phase II: Preliminary design simulation
3. Phase III: Pre-operational - certification
4. Phase IV: Operational

2.10 Phases I and II will be completed by December 2012. The civil aviation authority of Colombia will periodically inform the aeronautical community about progress made in project results.

3. CONCLUSION

3.1 The development and growth of international air traffic is not homogeneous. ICAO signatory countries are committed to the implementation of CNS/ATM technologies in order to achieve the strategic objectives adopted by ICAO, especially Objective A: Safety – enhance the safety of global civil aviation, and Objective D: Efficiency - Enhance the efficiency of aviation operations.

3.2 The Republic of Colombia invites ICAO Member States to analyse the proposed scenario, as a possible solution for low traffic density airspaces, with a view to improving safety, reducing the likelihood of occurrence of air incidents or accidents, and offering a low-cost technological solution.

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