



Agenda Item 3: Activities for the development of the air navigation systems/services
3.3 Communications, Navigation and Surveillance (CNS)

FOLLOW-UP TO THE EVOLUTIONARY IMPLEMENTATION OF THE NAVIGATION SYSTEMS

(Presented by the Secretariat)

SUMMARY

This working paper presents an analysis of the follow-up plan for the Navigation systems implementation plan in the Caribbean Region, based on the results of the review of the CNS conclusions of the C/CAR WG and C/CAR DCA, NACC/DCA, as well as the GREPECAS mechanism.

References:

- Report of the GREPECAS/12 Meeting, (Havana, Cuba, June 2004).
- Report of C/CAR WG/5 Meeting, (Mexico City, Mexico, 9 – 13 February 2005).
- Report of the NACC/DCA/2 Meeting, (Tegucigalpa, Honduras, 11 – 14 October 2005).
- Report of the GREPECAS/13 Meeting, (Santiago, Chile, 14 – 18 November 2005).

1. Introduction

1.1 The Fifth Central Caribbean Working Group Meeting (C/CAR WG/5), held in Mexico City, Mexico, 21 – 24 February 2005, with respect to the navigation agenda items of their work programme, carried out the follow-up of those tasks in accordance with the CNS guidelines agreed by the First Meeting of Directors of Civil Aviation of North America, Central America and the Caribbean, (NACC/DCA/1), held in Grand Cayman, October 2002, as well by the GREPECAS conclusions. Subsequent to the celebration of the C/CAR WG/5 Meeting the NACC DCA/2 Meeting, Tegucigalpa, Honduras, 11 - 14 October 2005; and the GREPECA/13 Meeting, Santiago, Chile 14 - 18 November 2005; were held, in which appropriate guidelines to the work of the Central Caribbean Working Group were also issued.

1.2 Regarding to the Navigation systems, the C/CAR WG/5 Meeting carried out the follow-up to conclusions 12/45 y 12/46 of GREPECAS, also to the ICAO State Letter Ref.: AN 7/1.3.84-04/11, dated 27 February 2004 on the proposal for amendment of Annex 10 Vol. I related to the strategy and introduction for the introduction and application of non visual aids to approach, landing and departure; nevertheless the Draft Conclusions and Decisions on the Navigation systems were not adopted.

1.3 The NACC/DCA/2 Meeting updated its work in line with the GNSS as follows: *“States/Territories/International Organizations in common consent with the airspace users, should continue actions for the GNSS planning and implementation and achieve the satellite-based navigation”*.

1.4 Subsequently, the GREPECAS/13 Meeting adopted conclusions related with the navigation systems as follows:

GREPECAS/13 MEETING	
No.	CONCLUSION ON NAVIGATION MATTERS
13/84	<i>Studies for a CAR/SAM Regional SBAS solution</i>
13/85	<i>Foster the use of GNSS in diverse sectors of the States</i>

1.5 The second amendment to the Global Air Navigation Plan for CNS/ATM Systems (Doc. 9750-AN/963) is being reviewed by the Air Navigation Commission. This includes a review to the Navigation systems strategy.

2. Discussion

2.1 The Meeting should consider that in respect to the studies carried out by the RLA/00/009 and RLA/03/902 projects for a CAR/SAM regional SBAS solution, the GREPECAS/13 Meeting noted that it is technically and operationally impractical to extend the coverage of the wide area augmentation system (WAAS) and EGNOS system to the CAR/SAM Regions. Therefore Conclusion 13/84 was formulated – *Studies for a CAR/SAM Regional SBAS solution*, in which among other aspects, encourages the States/Territories/International Organizations to *“continue the GNSS introduction in a evolutionary and coordinated manner, according to the ICAO Global Plan, conducting studies for a regional SBAS solution consistent with the requirements and characteristics of the CAR/SAM Region; and applying other applications, also taking into account that added benefits should help to justify the cost of reaching the ultimate goal of migrating to the GNSS, once ground-based aids are dismantled”*. The complete texts of Conclusion 13/84 of GREPECAS are presented in **Appendix** to this working paper.

2.2 Additionally, based on Conclusion 13/85 of GREPECAS – *Foster the use of GNSS in diverse sectors of the States*, the C/CAR WG Members should note this conclusion and recommend actions to their Administrations aimed at taking advantage of the GNSS benefits in diverse sectors of States and disseminate the results being obtained on the SBAS studies solution.

2.3 On the other hand, according to the navigation systems introduction and evolutionary strategy which is being consider by ICAO which would be incorporated as part of the second amendment to the Global Air Navigation Plan for CNS/ATM Systems (Doc. 9750-AN/963) and shortly will be

circulated to the States/Territories/International Organizations considering that airspace users need a globally interoperable navigational infrastructure that provides benefits in safety, efficiency and capacity. Aircraft navigation should be straight-forward and conducted to the highest level of accuracy supported by the infrastructure. To meet those needs, the progressive introduction of performance-based navigation must be supported by an appropriate navigation infrastructure consisting of an appropriate combination of global navigation satellite systems (GNSS), self-contained navigation systems (inertial navigation system) and conventional ground-based navigation aids.

2.4 GNSS-centered performance-based navigation enables a seamless, harmonized and cost effective navigational service from departure to final approach that will provide benefits in safety, efficiency and capacity.

2.5 GNSS implementation will be carried out in an evolutionary manner, allowing gradual system improvements to be introduced. Near-term applications of GNSS are intended to enable the early introduction of satellite-based area navigation without any infrastructure investment, using the core satellite constellations and integrated multisensor airborne systems. The use of these systems already allows for increased reliability of non-precision approach operations at some airports.

2.6 Medium/longer term applications will make use of existing and future satellite navigation systems with some type of augmentation, or combination of augmentations required for operation in a particular phase of flight.

2.7 Considering the ultimate conclusions of GREPECAS, the revised Global Air Navigation Plan for CNS/ATM Systems strategy, the Meeting should issue action proposals for the early introduction of the GNSS applications defined at a short-term must allow the early introduction of the satellite-based area navigation (RNAV) without any infrastructure investment, using basic-satellite constellations and the integrated multi-sensors systems, non-precision approach (NPA) and required navigation performance (RNP) procedures. Also, the Meeting should recommend actions to follow-up the GNSS evolutionary development for the introduction of a planned medium/longer term application.

3. Suggested actions

3.1 The Meeting is invited to:

- a) take note of the contents of this working paper;
- b) based on the current GNSS evolutionary status, consider and issue action proposals to implement in a short-term available applications of the GNSS, in conformity with the SARPs and ICAO guidelines, as well as the GREPECAS, taking into consideration that expressed in paragraphs 2.1 to 2.4, and the ATM requirements;
- c) follow-up the Navigation systems evolutionary development, in order to use medium/longer term applications considering paragraphs 2.1 to 2.4, the GREPECAS guidelines and the new ICAO SARPs; and
- d) review other issues if the Meeting considers necessary.

APPENDIX

GREPECAS/13 MEETING TEXT OF CONCLUSION 13/84

CONCLUSION 13/84 STUDIES FOR A CAR/SAM REGIONAL SBAS SOLUTION

That, since it is technically and operationally impracticable to extend the existing SBAS systems (WAAS and EGNOS) to the CAR/SAM Regions, according to the studies carried out, States, Territories and International Organizations:

- a) are urged to continue introducing the GNSS in an evolutionary and coordinated manner, according to the ICAO global plan; conducting the studies for a regional SBAS solution consistent with the requirements and characteristics of the CAR/SAM Regions; and applying other augmentations, also taking into account that added benefits should help to justify the cost of reaching the ultimate goal of migrating to the GNSS once ground-based aids are dismantled;
- b) are urged to withdraw from the work programmes of projects RLA/00/009 and RLA/03/902 - Phase II, those tasks related to studying the feasibility of extending the current EGNOS and WAAS to the CAR/SAM Regions;
- c) that participate in regional projects RLA/00/009 and RLA/03/902 under the coordination of the GNSS Task Force, are urged to coordinate their efforts and actions in pro of the study of a SBAS solution; and
- d) interested in participating in the activities of Project RLA/03/902, are urged to consider the revised quotas for joining this project.*

**Note: The revised quotas for States/Organizations to join Phase II of Project RLA/03/902, are based on the following criteria:*

- a) Members of Project RLA/00/009: US\$25,000*
- b) other States/Organizations: US\$35,000*

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