International Civil Aviation Organization
Regional Group for Planning and Execution CAR/SAM (GREPECAS)
First Meeting of the Communications, Navigation and Surveillance / Air Traffic Management Subgroup (CNS/ATM/SG/1)
(Lima, Peru, 15 to 19 March 2010)

Agenda Item 4: **Review to pending matters of the ATM/CNS/SG, ATM/COMM, CNS/COMM and respective Task Forces, for consideration in the CNS/ATM Subgroup work programme**

Socializing and taking self conscious to all aircraft operators about the Navigation System Action Plan focusing on the evolution and use of GNSS

(Presented by Colombia)

SUMMARY

This working paper performs a proposal about socializing and taking self conscious to all aircraft operators about the Navigation System Action Plan focusing on the evolution and use of GNSS.

References:

- Project RLA/03/902 Augmentation Solution SBAS (SACCSA)
- GNSS-TF/4 Report
- National Air Navigation Plan for Colombia Version 3.0

***ICAO Strategic Objectives*:**	*A – Operational Safety* *D – Efficiency*

1. Introductioón

1.1 As it is well known the current air navigation aids (NDB, VOR, DME, and ILS) is on de-commissioning process at short, medium and long terms and are being replaced by Satellite Base Navigation GNSS. Therefore it is necessary that the aircraft operator be informed and took self conscious about the Navigation System Action Plan focusing on the evolution and use of GNSS.

1.2 Nowadays aviation industry has already implemented automation systems. The next generation aircrafts have automation systems composed by sensors integrated to FMS and ATN being able to perform PBN procedures.

1.3 However not all aircrafts currently are equipped to developed those capacities. That is the reason why the action plan to implement GNSS in avionics has to be gradual. For example, and taking into account the Colombian case, the aircraft operator that fly to East, West and South Regions of the country (Orinoquía, Amazon, and Chocó between others) are just equipped with NDB. Despite the fact that in these areas the ground segmented is equipped with DVOR/DME the correspondence avionics has not been implemented. In consequence the socializing and taking self conscious to these aircraft operators to implement BASIC GPS (RAIM) on a first phase, would be feasible taking into account the cost investment and operational benefits for operators and even States.

1.4 The VOR en Route will be de- commission at final mid term. The TMA VOR, DME and ILS will be gradual de-commission at long term.

1.5 New air navigation infrastructure and services have been developed and concern to GNSS systems implementation that will replace great part of conventional air navigation aids on ground.

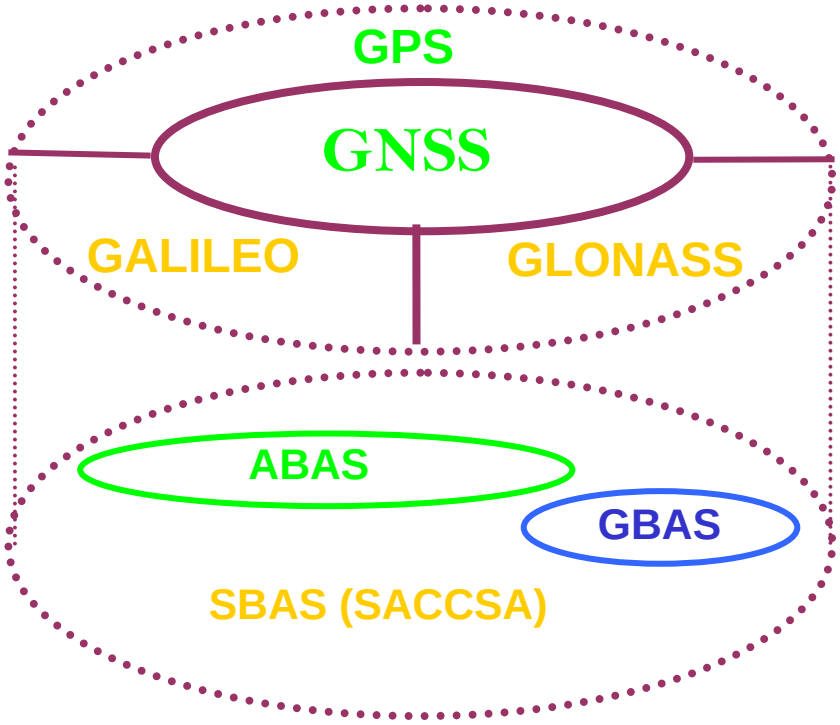


Figure 1. GNSS alternatives

1.6 The GNSS systems, illustrated on Figure 1, continue developing and improving. Therefore nowadays it is feasible to say:

a) The GNSS/ABAS (GPS BASIC-RAIM) is already available in avionics equipped with GPS/ RAIM and its use has been extended to several aircrafts due to the fact that there is legislation that supports its operation and the cost /benefit trade off is favorable for operators because ground infrastructure is not required. The next generation aircrafts are equipped with GNSS/ABAS integrated to FMS with advantages for PBN implementation and operational safety.

In the case of operators that do not have VOR/DME available it would be necessary to evaluated at the financial and technical level the GPS/ RAIM implementation feasibility.

b) The GNSS/GBAS (Ground Based Augmentation System) is on certification phase for GBAS CAT 1 and expecting to be implemented on short time with cost and operational benefits.

In Colombia, there are some airports where it is not feasible to implement ILS CAT 1 due to geometry aspects such as reflection areas, topography and obstacles between others. Some of these terminals are located in Cartagena, San Andres, Pereira and Villavicencio, then Civil Aviation of Colombia is on feasibility studies to implement GBAS CAT 1 into these airports supported on the recent GBAS CAT I FAA certification for some USA terminals. In the GBAS CAT 1 feasibility study, it is also taken into account El Dorado Airport due to its high operation rate incremented year by year and to be implemented cohabit with current ILS until its life cycle expires.

According to GBAS training and improving in its knowledge, it would be able to take decisions that will affect GBAS plan of action in Colombia. Aspects such as GBAS coverage in Colombia has to be analyzed because there are airports that are near each other such as:

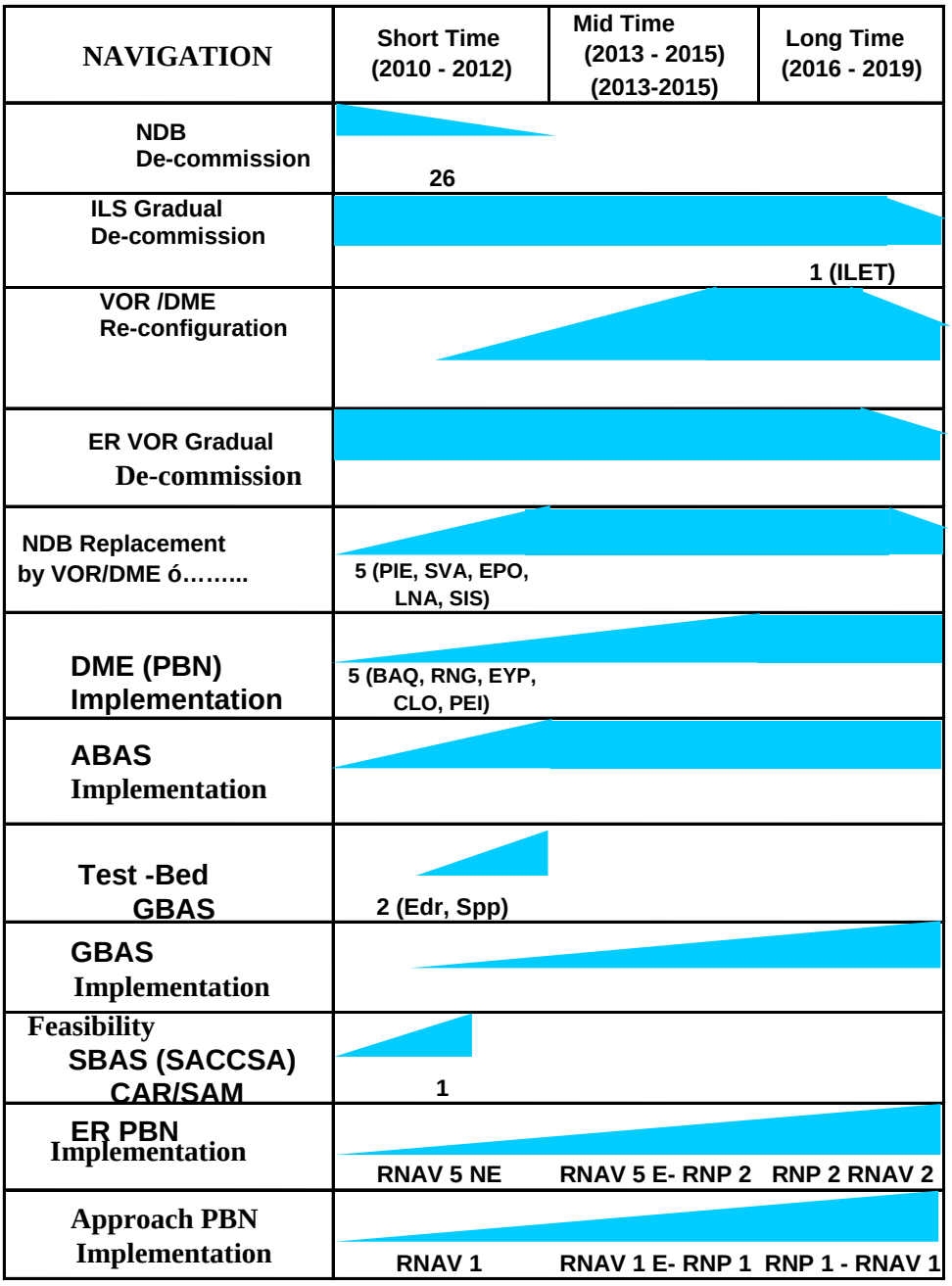
- El Dorado and Guaymaral airports and Madrid Air Base.
- Rionegro airport and Olaya Herrera airport in Medellín
- Cali airport and Marco Fidel Suárez Air Base
- Villavicencio airport and Air Base in Apiay

In case that GBAS were not feasible for the airports mentioned, it would be a solution to implement GRAS that covers airports that are far from each other such as the following cases:

- Santa Martha, Cartagena and Barranquilla airports.
- Manizales, Armenia, Pereira and Cartago airports and Palestina airport in future time.

c) The GNSS/SBAS (Space Based Augmentation System) is being developed through SACCA (Augmentation (Solution for Caribbean, Central and South America) Project Phase III. The Phase II results have generated expectations to continue with the feasibility, cost/benefit analysis and its multi sector applications. Colombia ratifies its cooperation on SACCSA Phase III Development and considers that the financial support to this phase is invaluable and represents a cost/benefit trade off that involves training, participation in forum to exchange ideas, expertise improvement and so on.

d) The Air Navigation Plan for Colombia is a dynamic and flexible document that is updated periodically according to the operational requirement.



2. **Discussion**

Proposal for socializing and taking self conscious to all aircraft operators about the Navigation System Action Plan focusing on the evolution and use of GNSS

2.1 GNSS/ABAS: Socializing and taking self conscious to all aircraft operators that do not have GPS (RAIM) avionics implemented to realize it in the short time (2010-2012) in order to confirm the safety operational advantages and the cost/benefit trade off comparing it with the conventional navigation aids performance in a short, medium and long term gradual de-commission process.

2.2 GNSS/GBAS: Socializing and taking self conscious to all aircraft operators that do not have GLS (GNSS) avionics implemented to realize it in the short time (2013-2015) in order to confirm the cost/benefit trade off and the safety operational advantages such as the GBAS capacity to perform multiple approaches, one GBAS can be used for several runways, enhancement on ATM, environmental impact and maintenance cost decreases.

2.3 GNSS/SBAS: Socializing and taking self conscious to all aircraft operators to inform them about the Phase III SACCSA Project development. The Phase 3 results are estimated to be available by 2011 and depending on its feasibility could be implemented by 2016-2019.

2.4 GNSS/PBN: Socializing and taking self conscious to all aircraft operators that have automated navigation system (navigation sensor integrated to FMS and ATN) to use PBN procedures.

Proposal to Conclusion 1/X **Socializing and taking self conscious to all aircraft operators about the Navigation System Action Plan focusing on the evolution and use of GNSS**

To:

a) invite States to start a complete socializing and taking self conscious to all aircraft operators about the Navigation System Action Plan focusing on the evolution and use of GNSS;

b) invite ICAO to develop training GNSS (GBAS/SBAS/ABAS) courses, seminaries and workshops in the short term (2010-2011); and

c) invite IATA to support the GNSS training and socializing and taking self conscious process that are organized by States in a short term (2010-2011).

3. **Suggested Action**

3.1 The Meeting is invited to:

a) To take into account the information performed on this working paper.

b) To broadcast on States, OACI and IATA internet web site, the proposal to socialize and taking self conscious to all aircraft operators about the Navigation System Action Plan focusing on the evolution and use of GNSS.

c) To improve the organization of training courses, seminaries, workshops and conferences to broadcast the GNSS knowledge and information, using easy media to access to internet web site.

d) To take note about the necessity to make the GNSS knowledge reachable to all aircraft operators.

- END –