International Civil Aviation Organization
ICAO South American Regional Office
Eleventh Meeting of the Civil Aviation Authorities of the SAM Region (RAAC/11)
(Santiago, Chile, 6 – 8 May 2009)

Agenda Item 2: Review of the implementation of the Regional Air Navigation Plan

a) Review of improvements to the regional ATM

STUDIES AND TESTS FOR THE IMPLEMENTATION OF GBAS SYSTEMS IN CHILE

(Working paper presented by Chile)

SUMMARY

This working paper presents the decision to implement the Ground Based Augmentation System, GBAS, with the purpose of obtaining a navigation solution in terminal areas by the use of precision procedures.

1. Introduction

1.1 Taking into account the final results of the RLA/00/09 Project and its impact on the implementation of the GNSS Augmentation systems in the CAR/SAM Regions, we may conclude that the tests performed to provide a (mathematical) model that allows to infer the delay produced by the ionospheric and tropospheric layers have confirmed that in the southern hemisphere it is not possible to use, at least at a reasonable cost, an SBAS system to achieve precision approaches and that based on the decision model for Availability, only non-precision approaches may be conducted.

1.2 The Dirección General de Aeronáutica Civil (DGAC) of Chile subscribed a Memorandum of Cooperation with the la FAA, in May 1998, which sets forth the terms and conditions of the collaboration to be provided by the FAA for the development of the Global Navigation Satellite System (GNSS).

1.3 The Dirección General de Aeronáutica Civil of Chile subscribed a Memorandum of Cooperation with the FAA, during FIDAE 2008, which sets forth the terms and conditions to share information related to policies and procedures in the development of LAAS and ADS-B. The DGAC signed an agreement with United States Trade and Development Agency, (USTDA), an organization of the ministry of Commerce of the US, to develop a technical assistance project in air navigation technologies which was internationally bid and awarded to a firm called Innovative Solutions International (ISI).

1.4 Chile joined the GBAS Working Group in the 7th Meeting held in Rio de Janeiro, Brazil and participated with the DECEA of Brazil, becoming acquainted with the steps and progress made by Brazil in the implementation of a system. Recently, in April 2009, Chile participated in the 8th meeting of the GBAS Working Group held in Palermo, Italy.

2. Need for a Ground Based Augmentation System (GBAS)

2.1 Although the main airport of the country, Comodoro Arturo Merino Benítez, Santiago, has two parallel runways, it does have limitations to conduct simultaneous approaches, especially due to the protection areas of the missed approach of runway 17 R. This limitation is a serious hindrance to the growth of aviation activity which, according to tendency of the demand, for the year 2018 would present a situation of saturation regarding the maximum operations per hour handling capability.

2.2 The special characteristics of a GBAS system, would allow the development of procedures for operating both runways simultaneously, which would increase substantially the airport capability, projecting its saturation point several decades forward. Also, it would allow an increase in the availability of operations when, due to fog, visibility restricts the use of the airport.

2.3 In addition to the situation of the main airport of the country, it has been considered that, in a second stage, GBAS systems could be implemented in other 5 airports and 6 aerodromes which show favorable conditions for this type of technology or which do not allow procedures based on traditional navigation aids.

2.4 Advantages of the establishment of a Ground Based Augmentation System (GBAS).

- A GBAS station will support several runways at an airport.
- Inspections and maintenance requirements of a GBAS system are greatly reduced when compared with ILS.
- The signal is more stable and there is less interference with preceding aircraft and/or vehicles in sensitive areas, reducing the scalloping effect.
- GBAS supports the approach, landing and departure phases and surface movements within the coverage area.
- GBAS provides GNSS augmented information and transmits this information to aircraft every second, providing accuracy and required integrity for the precision of established procedures.
- GBAS is an aid for the approach that protects the vertical descent in the procedure.
- It makes possible to design approach, missed approach, SID or STAR curved procedures (TAP procedures).
- It makes possible to provide guidance on the ground for taxiing under reduced visibility conditions.
- Precision measured in test flights, shows a very good accuracy in the vertical path, of + - 2 meters at the touchdown point and + - 4.5 meters 20 MN from landing.
- Increases the handling capabilities of an airport by allowing simultaneous precision procedures in runways.
- It makes possible to design, publish and operate CAT I and, in the future, CAT II and III precision approaches for an airport runways.
- It makes possible the design of SIDs, STARs and Missed Approaches with the same precision (RNP 0.03), in the whole terminal area.

3. Implementation Schedule

- February 2009, the study for the implementation of a GBAS begins, with the visit of a multidisciplinary team, that collected operational, meteorological, statistical, navaids, radar coverage, air carriers, environmental studies and organizational structures data, and ionospheric information of the WAAS project and others.

- Additionally, a test equipment for the study of reception of the satellite signal was installed at AMB airport to know whether it is affected by the effects of the ionosphere in the sector.
- A visit is made to most of the locations proposed for future installation of G-BAS G-BAS, Concepción, Temuco, Puerto Montt, Balmaceda, Coyhaique, Cochrane.
- 2010 / 2011, a GBAS system would be purchased for installation at Santiago AMB airport.
- 2010 / 2012, completion of pilots and ATC training.
- 2010 / 2012, preparation of instrument procedures.
- Conduct of Test Flights for subsequent certification of instrument procedures and publication for AMB airport.
- 2012 al 2020, implementation in the rest of the country.

4. Conclusion

4.1 The Dirección General de Aeronáutica Civil de Chile plans to implement the GBAS system at Santiago AMB airport by 2012 and subsequently at other airports and aerodromes of the country.

4.2 To achieve this objective, it is mandatory to wait for the results of the project being conducted by ISI and which ends in July 2010.

5. Suggested Action

5.1 The meeting is invited to:

a) Take note of this working paper.

b) Discuss as a feasible solution to conduct precision approaches based on the GBAS.

c) Share the experiences that CAR/SAM States have with this type of solution for air navigation in terminal areas.

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