

**INTERNATIONAL CIVIL AVIATION ORGANIZATION**

**RLA/00/009 COORDINATION MEETING ON GNSS AUGMENTATION TRIALS**

(Santiago, 1 to 3 August 2001)

**Agenda Item 3: Schedule of activities to be carried out**

(Presented by the Secretariat)

**Summary**

This working paper presents a summary on the tentative initial chronogram for the execution of the GNSS augmentation trials, which takes into consideration three main phases: installation of the reference stations (CSTB), training and execution of the trial.

**Reference:**

- RLA/00/009 Project.

**1. Background**

1.1 The transition towards the use of satellite technology in air navigation, in accordance with ICAO policy, has a high priority for CAR/SAM States. Logically, the first step for the transition is the establishment of a CAR/SAM trial platform to facilitate efforts leading to the investigation, development and implementation of an operational air navigation system.

1.2 The fulfilling of the regional GNSS augmentation project represents a great opportunity for CAR/SAM States to acquire the necessary practical knowledge to verify its operation, establish new procedures, compare it with current navigation systems, as well as define a regional and national navigation system.

1.3 The execution of the project would consist, first of all, in the installation of reference stations (WRS), the corresponding training and the execution of all trial-related activities at regional and national level.

## 2. Analysis

2.1 The memorandum of understanding between the FAA and ICAO for the execution of RLA/00/09 was signed on 4 June 2001. This memorandum establishes the terms and conditions for the loan of the equipment necessary at the reference stations, its installation and provision of other resources for investigation and development purposes.

2.2 The FAA will loan five single-strand NSTB reference stations, which, before remittance to the respective States shall be stored at the FAA William J. Hughes Technical Center in Atlantic City, New Jersey, United States.

2.3 For the installation of the reference stations, the FAA will provide four qualified specialists to perform the following activities on no more than two temporary duty assignments:

- a) Demonstrate the installation of a reference station at a site designated by ICAO (Buenos Aires, Argentina).
- b) Assist in the installation of the remaining reference stations.
- c) Provide the information necessary for the installation, operation and maintenance of the reference stations.

2.4 The FAA will provide five qualified specialists to conduct two training courses on the operation and maintenance of the reference stations and on the implementation of GNSS. Additionally, training shall be provided on installation of the reference station (paragraph 2.3.a)).

2.5 The execution of the trials will start once the installation of the reference stations is completed, as well as the training, and all trials to be made at regional and State level are defined. The execution of the trial activities is foreseen to start by mid 2002.

2.6 The first phase of the project is the identification of all the trials to perform at regional level, and of the States involved in the project on the basis of an initial quantifiable measure of success. During this phase, all regional and State procedures will be defined and developed, for their later verification through flight inspection trials.

2.7 The main objectives of the trials will have to take into consideration the following aspects:

- a) Demonstrate efforts toward seamless GNSS operation;
- b) Demonstrate expansion of service volume through international participation;
- c) Demonstrate that international GNSS compatibility is technically achievable;
- d) Demonstrate that, with vertical guidance. Precision approaches can be performed in Caribbean and South America using GPS-augmented signals broadcast from a wide area augmentation system;
- e) Test SIDS and STARS at some selected locations to demonstrate a seamless takeoff to landing capability;
- f) Measure the system accuracy and message performance via ground and flight tests in each participating State, for the following applications, as appropriate:
  - Long term performance data at local reference stations
  - Both precision and non-precision approaches at selected airports
  - Terminal area maneuvers at selected airports
  - En route routes over land areas
  - En route routes over oceanic areas
- g) Increase international understanding for sharing information between independent GPS augmentation systems, and the shared use of communication satellites;
- h) Promote international acceptance and use of augmented GPS in civil aviation applications;
- i) Collect and analyze operational performance of the wide area augmentation system with focus on feasibility of using a Wide Area Differential GPS System in the CAR/SAM Region;
- j) Foster international cooperation and contribute to the safety of the global transportation system through sharing of information, technologies, data, technical assistance, and training between countries and non-governmental agencies;
- k) Encourage future Satellite-Based Augmentation System (SBAS) flight tests.

2.8 The final report on the analysis made to the augmentation trials at regional and State level is expected to be obtained by the last quarter of 2002. This report will permit to define operational implementation strategies for a GNSS augmentation system in the CAR/SAM Regions.

### 3. Action suggested

3.1 The meeting is invited to:

- a) Note the information presented in this working paper; and
- b) Analyze the programme schedule presented in **Appendix A**; and
- c) Approve the definit execution chronogram for RLA/00/009 Project.

**APPENDIX A**

**PROGRAM SCHEDULE: RLA/00/009 PROJECT**

**PHASE 1: INSTALLATION OF THE CAR/SAM TEST BED REFERENCE STATION (CSTB)  
(JUNE – OCTOBER 2001)**

<b>Activities</b>	<b>Activities Dates</b>	<b>Remarks</b>
Adherence of States to the RLA/00/009		Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Panama, Paraguay, Peru, Uruguay, Venezuela, COCESNA, Cuba and USA.
States that have confirmed the participation to UNDP.	1 June 2001	Argentina, Bolivia, Brazil, Chile, Colombia, Panama.
Signature of the Memorandum of Understanding NAT-I-9015	4 June 2001	Memorandum of understanding between FAA and ICAO for the execution of the RLA/00/009 project.
Storage of the CSTB equipment.	15 August 2001	Five (CSTB) will be available at the FAA Technical Center of Atlantic City. 2 complete racks (Argentina and Colombia) 3 racks without receiver (Bolivia, Peru, COCESNA.)
Shipment of the CSTB to locations participating in the test.	16 August 2001	The locations will be Argentina, Bolivia, Colombia, Peru and COCESNA.
Preparation of the sites	15 August 2001	The site preparation will be in Argentina, Bolivia, Colombia, Peru and COCESNA.
Implementation of the communication lines.	1 September 2001	That implementation will depend of the action made by the Aeronautical Administration with the communication service providers.
Coordination Meeting	1 - 3 de August 2001.	The meeting will be in Santiago (Chile). The agenda of the meeting is related principally with the revision of all the activities necessary to carry out the project.

Activities	Activities Dates	Remarks
Installation of the first CSTB and Training. The first installation will be in Argentina.	5-7 September 2001	The FAA will carry out these activities. During that event, the technicians from the State involved will be trained in the equipment and on the form to make the installation of the CSTB.
Installation of all CSTB	30 September 2001	At that date we expect the culmination of the installation of all the CSTB.

**Phase 2: Training Program (September 2001- March 2002)**

Activities	Activities dates	Remarks
<b>Course 1</b> Installation of a CSTB	5-7 September 2001 Buenos Aires, Argentina	The States involved will be acquiring all the tools necessary to make a CSTB installation.
<b>Course 2</b> WAAS functioning. Performing data reduction and analysis.	3-7 de December 2001 FAA Technical Center Atlantic City	The participants will be acquiring the necessary knowledge to understand the WAAS functioning. At the same time they will take note of the interpretation and analysis of the processing data of the augmentation system.
<b>Course 3</b> Operational Requirements	Brazil, Rio de Janeiro 12-16 March 2002	In this course the participants will take knowledge about the form to make operational procedures with GNSS.

**Phase 3: Test Execution (January - November 2002)**

<b>Activities</b>	<b>Activities dates</b>	<b>Remarks</b>
Identification of the specific test and evaluation in a Regional context.	January 2002	Regional identification and evaluation for the specifics tests. Definition of the quantifiable measure of success. Development of a regional test schedule.
Execution of the Regional Test Plan.	June 2002	Complete the specific testing and demonstration objectives for the Regions.
Regional flight test report.	August 2002	Preparation of a report on detailed test results and analysis for the Regional flight test, showing how each objective has been successfully demonstrated for the Region.
Identification of the specific test and evaluation in a State context.	January 2002	Identification of the specifics objectives for test and evaluation in each of the participating States. Definition of the quantifiable measure of success. Development of a test schedule.
Execution of the States test plans.	August 2002	Complete the specific testing and demonstration objectives in each of the participating States.
States flight test report.	September 2002	Preparation of a report on detailed test results and analysis for each States, showing how each objective has been successfully demonstrated for the Region.
Final analysis of the Regional and States flight test.	November 2002	The final analysis will permit to define the strategies for the operational implementation in the CAR/SAM Region.