

# **GNSS IMPLEMENTATION, PLANS AND PROJECTS IN COLOMBIA**

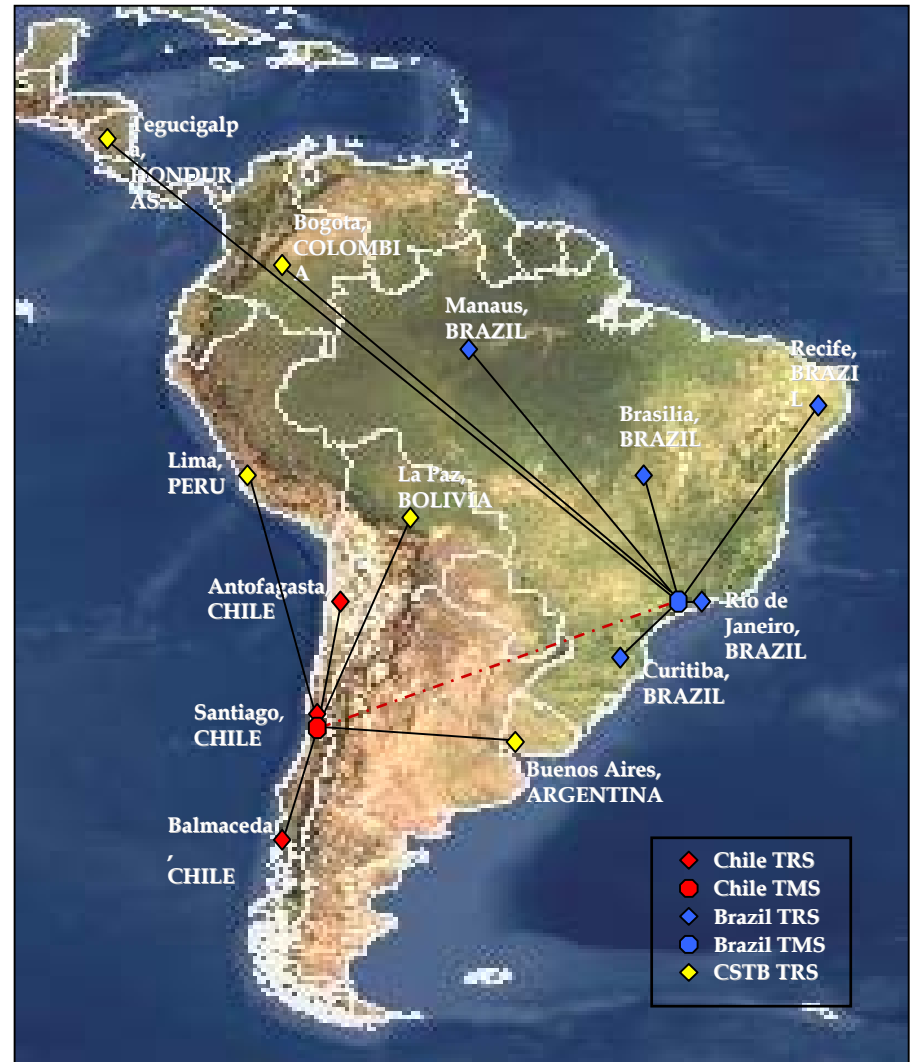
# Colombia's special conditions



# SATELLITE-BASED AUGMENTATION SYSTEMS (SBAS)

## Project RLA/00/009 WAAS Caribbean and South American Test Bed (CSTB)

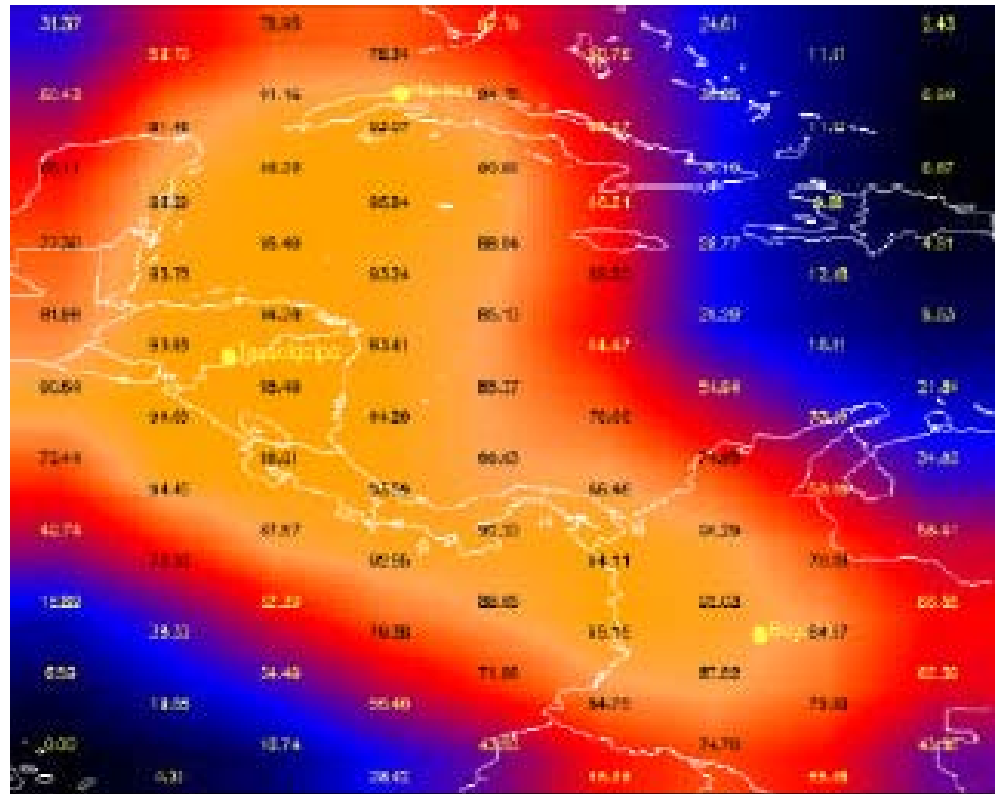
- Test Bed Reference Station in Bogota (FAA – UAEAC)
- Flight Inspection Plane Equipped for CSTB on-fly evaluation (FAA – UAEAC).
- FAA GPSsolution Software and SUN server for Processing and data analysis.



# SATELLITE-BASED AUGMENTATION SYSTEMS (SBAS)

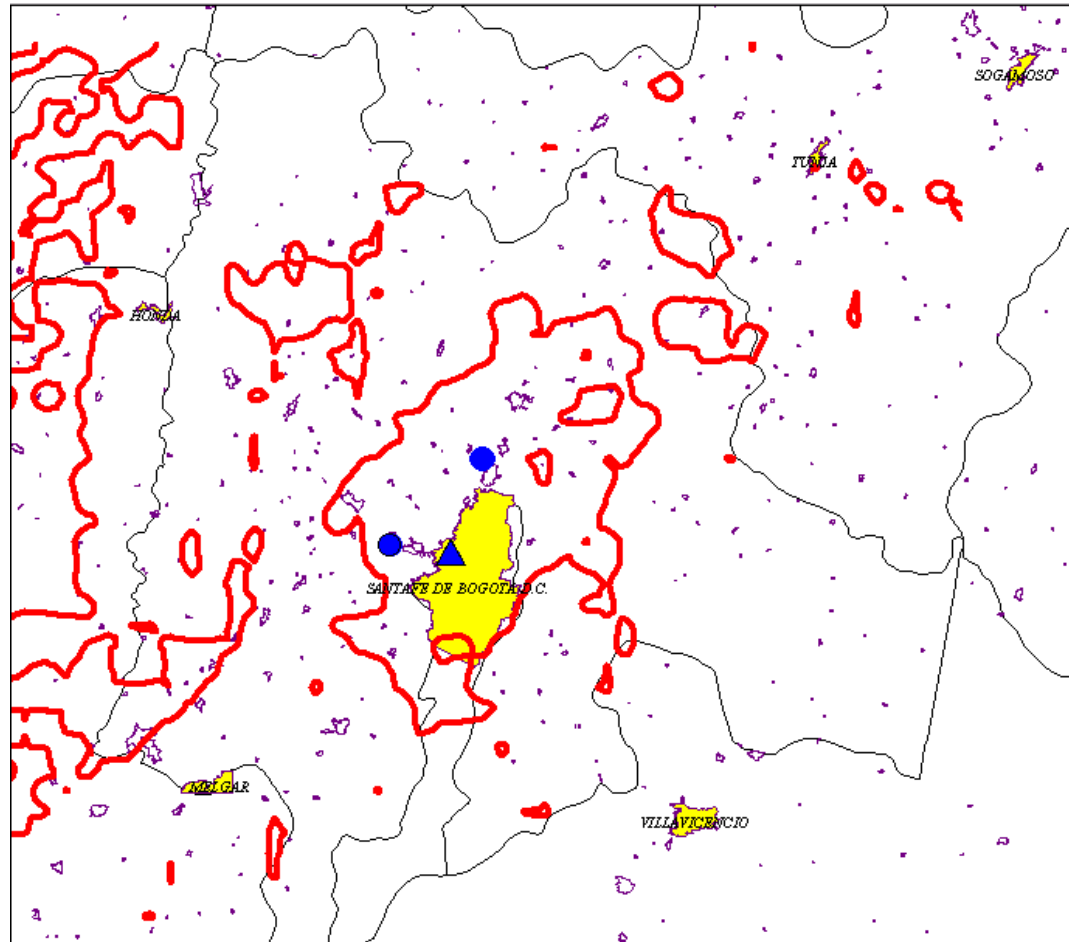
Project: RLA/03/902 EDISA  
(EGNOS Demonstration In South America)

- a flight demonstration with an Aircraft equipped with a NOVATEL OEM4 Receiver and a reference receiver on ground (NOVATEL OEM4).
- a static demonstration based on post-processing analysis of the EDISA user receiver (NOVATEL OEM4 Receiver)



# GROUND-BASED AUGMENTATION SYSTEMS (GBAS)

- Memorandum of Cooperation NAT-I-0023 ANNEX 1 “LOCAL AREA AUGMENTATION SYSTEM” Method of sharing and development of local area augmentation technologies for GNSS.
- Ground - based Regional Augmentation System (GRAS): First Contacts with Analysis Unlimited and Air Services Australia for Working in this aspect.



# USER - BASED AUGMENTATION SYSTEMS (UBAS)

- Following recommendations from ICAO Circular 267-AN/159.
- RAIM availability Graphic Information System (RGIS) Volpe National Transportation Systems Center.
- Trained people in GNSS RNAV procedures.



# GNSS TRAINING

- Research and Development in GNSS with Universities and Research Institutions.
- Master Specialized Personnel on the National Civil Aviation School (ENAC)
- Specialized training at the FAA Training Center Oklahoma City
- Sequential schedule of courses for training of human resources.

# CONTACTS WITH OTHER FIELDS OF THE ECONOMY

Constellations	Augmentations	Application
GPS GLONASS GALILEO	SBAS WAAS EGNOS MSAS GAGAN QZSS GBAS LAAS DGPS GRAS UBAS	Transport Geodesy Civil works Search and rescue Communications . . .



# CONTACTS WITH OTHER FIELDS OF THE ECONOMY

- Next works
  - Meeting between Main Directors
  - Inventory and Diagnostic
  - Operational and user requirements
  - International Agreements
  - Interministerial follow up

# IV CEA

- Proposal for GNSS International transport seminar:
  - State of the art in Satellite Navigation
    - Constellations.
    - Augmentations (DGPS, NDGPS, GRAS, private proposal SBAS, etc.).
    - GNSS interoperability
  - Aviation
    - State of the art of the technology
    - National experiences in the use and implementation of GNSS.
    - Regional GNSS infrastructure
    - Research and Education in GNSS
  - Maritime
  - Rail Ways
  - Vehicles
  - Public Transport
  - Multimode Transport
  - Proposals for regional projects in Satellite Navigation (workshop).
- Evaluation of GNSS technical scenarios for the CAR/SAM Area.

# CONCLUSIONS

- It is appropriate for States which are neither owners nor developers of a given GNSS technology to evaluate each of the possible technological solutions with respect to satellite navigation in order to have more information with which to form a judgement at the time of defining the most suitable technological solution according to cost/benefit criteria.
- Work and progress in GNSS do not necessarily require large investments on the part of States; tasks such as linking up with universities and research centres and appropriate training of human resources are very significant elements in the transition to and contribution of States in GNSS.
- The linking-up and management of satellite navigation at the State national policy level and the integration of institutions and other projects related to satellite navigation have made it possible to have greater effectiveness and drive in the transition to and implementation of GNSS. This must be seen as a good strategy to benefit the GNSS implementation plans in civil aviation.
- Colombia presently has the experience, the infrastructure and sufficient trained human resources to offer GNSS training and instruction to States that require it. Because of the low level of the cost of living in Colombia, our country stands out as a high-level place with the capability for many States to receive appropriate GNSS training economically.