REGINA

GNSS Network for IGS and Navigation

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The Centre National d'Etudes Spatiales (CNES), in partnership with the Institut National de l'Information Géographique et Forestière (IGN), develops its monitoring infrastructure of GNSS systems in order to generate data and products for scientific uses and contributes to improvements of navigation techniques.

This infrastructure is named REGINA and is composed of about forty GNSS stations which provide a homogeneous worldwide coverage and the multi-visibility of GNSS satellites. It is also composed of mission centers located in CNES and IGN, and real time processing centers of GNSS data. The main purpose of REGINA is to contribute to scientific community through International GNSS Service (IGS) centers.

HOSTING SITES

The hosting sites of REGINA stations are selected to represent a network that provides a homogeneous coverage of the Earth. These sites are chosen for their geographic situation, the reduction of geometric masks and the presence of others measurement techniques (DORIS, Laser, VLBI, etc.). Agreements are established with local organisms to assure the exploitation of stations and the availability of the services. The global repartition of REGINA stations ensures a visibility of each satellite by at least 6 stations (DoC > 6).
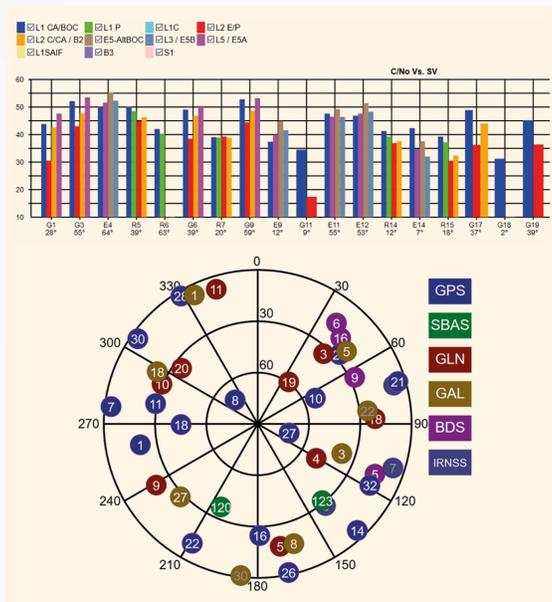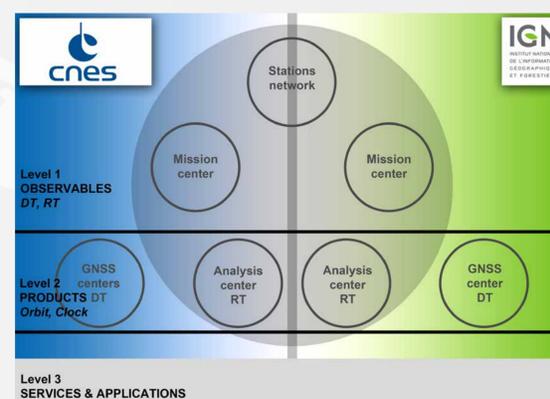
STATIONS

REGINA stations are composed of high precision receivers which allow the acquisition of signals from all GNSS constellations (GPS, GLONASS, GALILEO, BEIDOU, QZSS, NAVIC) and SBAS in visibility SBAS (EGNOS, WAAS, GAGAN, MSAS, NSAS, SDCM, BDS-BAS, KASS, GATBP). Collected data are transmitted in real time (1 Hz) and in delayed time to mission centers which take care of the broadcasting.


ARCHITECTURE

REGINA architecture in composed of redundant resources of CNES and IGN in order to ensure a great availability of service. Data are transmitted in parallel on the Internet to CNES and IGN centers.

DATA PRODUCED BY REGINA

> Generation and dissemination of NTRIP/RTCM/MSM real time streams.
> Generation and dissemination of RINEX delayed time files.
> Generation and dissemination of real time orbits and clocks corrections.
> Broadcasting of these data via IGS, EUREF and RGP centers.
> Users access on CNES and IGN servers.
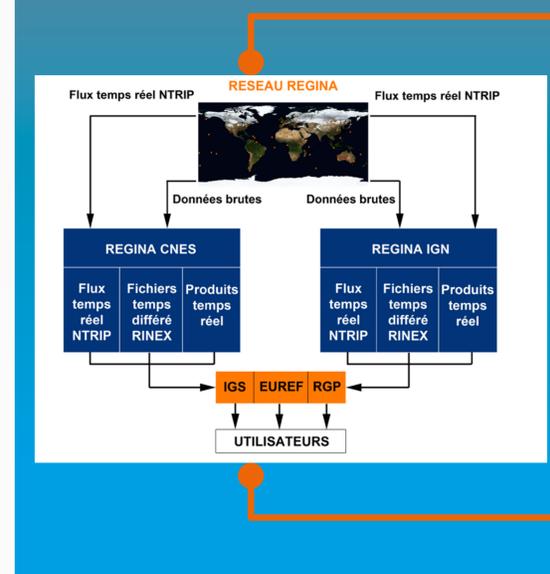
OBJECTIFS

The purpose of REGINA is to provide data and products free of charge to scientific community to realize the following objectives:

> Development of scientific applications under IGS for many areas: navigation, geodesy, geodynamic, altimetry, reflectometry, meteorology, etc.
> Development of PPP (Precise Point Positioning technique) taking advantage of orbit and clock corrections provided in real time.
> Contribution to the precise characterization of GNSS systems particularly inter-system biases allowing combined use.
> Improvement of the realization of International Terrestrial Reference Frame (ITRF) via the colocation with other measurement techniques like DORIS, VLBI, Laser.
> Evaluation of GNSS systems performances.

MISSION CENTER

Mission Centers are located in CNES, Toulouse and IGN, Saint-Mandé, and are already operational centers of IGS. They allow:

> Stations network monitoring.
> Configuration of receivers.
> Collect, use, control and broadcast of delayed and real time data.
> Storage and archiving of delayed time data.