ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA

EGNSS SERVICES AND APPLICATIONS

EGNSS data is nowadays a critical technology in a very wide spectrum of applications including, but not limited to, navigation, monitoring ground movement and the atmosphere.

The University of Bologna has great expertise on EGNSS data processing both for precise positioning (using several scientific software packages such as Bernese, Gamit, Gipsy-Oasis) and for navigation. This skill is fundamental to provide services in different contests. During the years, this technology has been applied on several research areas: the University of Bologna has gained a significant expertise covering a wide spectrum of applications.

The research of the University of Bologna covers a wide range of topics:

- Space: development of real-time accurate orbit determination techniques based on GNSS measurements
- Geodesy: studies related on definition and maintenance of Global and Regional Terrestrial Reference Systems (and frames)
- Geodynamics: study of the evolution of the plate tectonic motion trough a very dense network of GNSS permanent stations
- Geology: monitoring of landslides, subsidence, using both geodetic or low cost GNSS receivers
- Structural engineering: monitoring of structures (bridges, dams, towers) using GNSS permanent stations
- Navigation: development of technologies for accurate navigation systems integrated with other sensors for Safety of Life, mobile mapping or precision farming
- Atmosphere: mapping of Tropospheric and Ionospheric delay for meteorology, climate change and deep space navigation applications
- Antarctica: crustal deformation and Glaciological Studies

HIGHLIGHTS

GNSS data processing using scientific software packages in classical differenced approach and in Precise Point Positioning for both high accurate positioning and atmospheric parameter estimation (TEC, Tropospheric delay).

Simulation and data analysis center for satellites orbit estimation.

Infrastructures: The University of Bologna handles a network of 10 GNSS permanent stations mostly located in the Pianura Padana and disposes of a software package to deliver correction for Real Time applications.
Different research groups have established an **extensive network of collaborations** with several institutions and research centers at national and international level, such as: ASI (Italian Space Agency); PNRA (National Program for Antarctic Research); EUREF (Reference Frame Sub-Commission for Europe); NEREUS (Network of European Regions Using Space Technologies); NASA.