



## VENETO GNSS NETWORK AND THE EUROPEAN STANDARD INSPIRE

A real time service for precisely georeferencing spatial data, in compliance with the INSPIRE coordinate system ETRS89

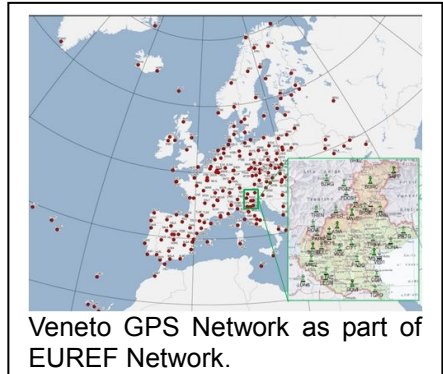
### The challenge

The existence of several datums has posed in the past serious difficulties in sharing spatial databases.

The European Directive INSPIRE (2007/2/EC, <http://inspire.jrc.ec.europa.eu/>) defines the rules to use the European Terrestrial Reference System 1989 (ETRS89) and the European Vertical Reference System (EVRS) as horizontal and vertical datums, respectively.

The Directive is aimed at making uniform use of regional reference systems by adopting a unique reference system for the European plate (ETRS89). Moreover, all member states must use a national network and ensure the free access to cartographic data. In Italy INSPIRE was implemented by Legislative Decree No 32/2010 and by Ministerial Decree of November 10, 2011 (Italian Official Gazette No 48 of February 27, 2012 – Ordinary Supplement No 37).

Every region is in charge of implementing the European regulations at a regional level. Therefore, the Veneto region set up a GPS network as a geodetic infrastructure for topographic and cadastral surveys aligned with the National Dynamic Network RDN. This network was approved in 2009 as a national realization of the ETRS89. Both these networks are based on the GNSS satellite technology and ensure a precise and reliable service shared at European level.



Veneto GPS Network as part of EUREF Network.

### Benefits to citizens

The main benefit consists in the possibility for users to determine the coordinates of a point directly in the European system according with INSPIRE. Once the points are surveyed, the user transforms them into the national reference system Gauss-Boaga/Roma 40. Spatial data georeferencing is extremely useful in the applications listed in Annexes 1, 2, 3 of INSPIRE. Other applications include:

1. Seismicity (plate motion monitoring), subsidence and landslides. Deformation motions are typically of the order of millimeters per year and are measurable in terms of variation of the relative distance between two permanent GPS stations acquiring data with continuity.
2. Professional activities involving precise positioning such as life safety, transportation, railway applications, ship docking.

The Veneto GPS Network insures sub-centimeter precision in all the aforementioned applications.

*“Veneto GPS Network offers a free and reliable service for land surveying”*

**M. Fabris**, Geomatic Survey Laboratory, University of Padova

# GMES Domain: Land Monitoring

## User service application: INSPIRE

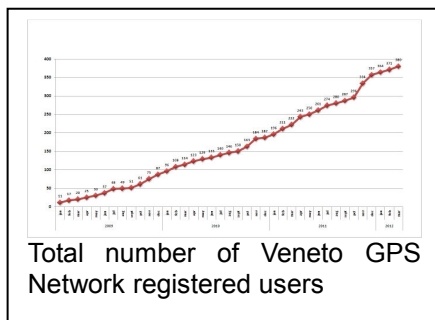
### The GMES solution

Veneto GPS Network is made up of 24 stations uniformly located throughout the region and provides the whole area with a 24/7 service coverage. The permanent GPS stations belonging to Veneto GPS Network host receivers and antennas of different brands. Moreover, its services are offered to end users actively involving bodies which already run permanent stations in the region. Veneto GPS Network activities include technical management of hardware and software devices for GNSS data production and GNSS data processing. These data are centralised and distributed to users through the two following main services:

- Dissemination of real-time differential corrections (RTK). This service allows the network members to receive real-time corrected coordinates for a surveyed point by connecting to the network server. The service is free upon registration
- Daily publication of the data provided by the GPS permanent stations on the Veneto GPS Network website (<http://147.162.229.63/>). These data are freely available and can be downloaded to post-process surveyed points using differential correction techniques.

Furthermore, daily checks are carried out to control the data quality and to verify their completeness. The network offers helpdesk assistance to professionals and gives information about access procedures. Finally, the network promotes training courses on its use, in particular for professionals, schools, universities, drainage boards and research institutions.

These precision surveying techniques are essential for planning and managing a territory through the correct use of environmental resources. GPS networks are deployed in many professional sectors as they allow to work more efficiently. It is expected that they will keep expanding.



### Outlook to the future

Veneto GPS Network is doomed to grow up, both in the number of stations and in quality of services. In addition to the American GPS and the Russian GLONASS satellite systems, also a European satellite system, GALILEO, will be soon operating. GALILEO will provide with improved positioning/timing services and allow higher accuracy in precision surveying techniques.

Finally, Veneto GPS Network is actively testing the Precise Point Positioning (PPP) technique for real-time correction of a single point by using broadcast ephemeris and orbit/clock corrections data streams.

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