



Offshore precision position and navigation services from the permanent GNSS network of the Regione Veneto

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**“EGNOS AND GALILEO FOR MARINE AND MARITIME APPLICATIONS:
OPPORTUNITIES AND CHALLENGES FOR EUROPEAN REGIONS”**

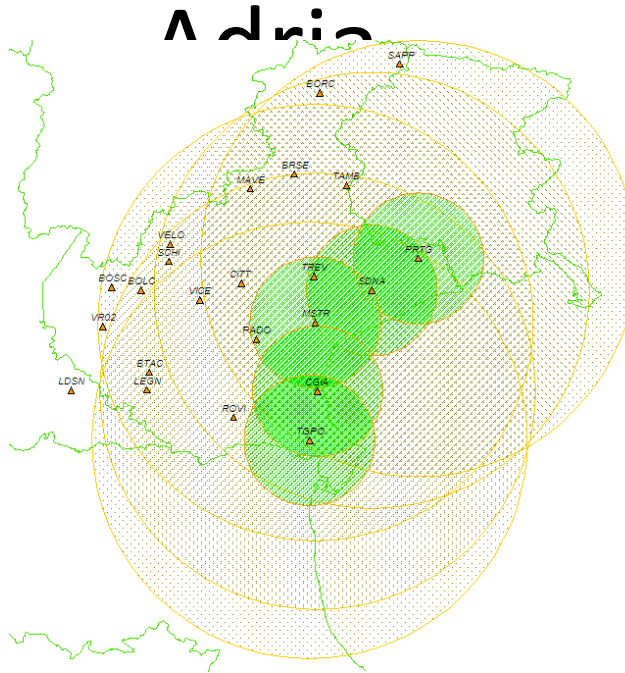
SESSION2b - Marine and maritime applications – Round Table

Outlook

- Availability of GNSS, particularly Galileo, must be matched by the development of specific services, especially for professional users
- GNSS data can conveniently be complemented by regional GNSS networks for integrity monitoring and precision correction data: key role of NEREUS!
- The GNSS network of the Veneto Region provides precision positioning services to land and maritime users, within NEREUS

GNSS Positioning in the Northern

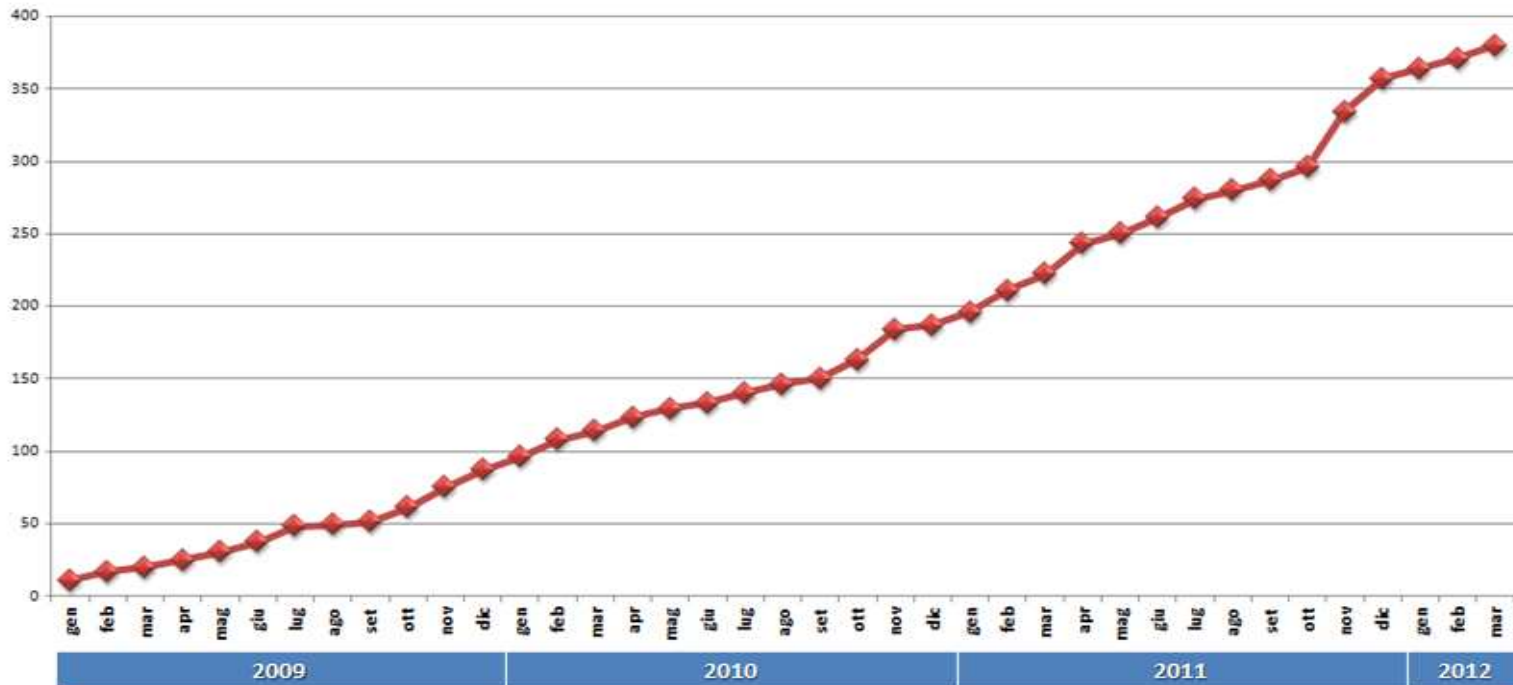
- GNSS network of the Regione Veneto includes several stations with 100 km coverage in the Northern Adria sea
- Regional initiative inserted into NEREUS activities since 2009



Services offered at no cost to registered users include:

- Real Time RTK corrections over NTRIP (EUREF and industrial standard: requires internet connection)
- Georeferencing compliant with INSPIRE (EU directive: ETRS89)
- Support for post processing
- Help desk

Growing interest for land users



Ca. 400 registered users of (mostly) land oriented services (GIS, Cadastre, aerial survey..)

Increase on rate of growth (nov. 2011) in the occasion of special training courses offered to land surveyors

Proposal: offer similar courses to maritime users

Possible maritime user areas

Requirement: Real Time, <1 m accuracy; RTCM SC 104 2.3 and 3.x

- **Exploration.** Modern seismic exploration depends upon seismic streamers many kilometers long which, in turn, depend sensitively on the position of the vessel with respect to the center of the earth
- **Drilling.** Drill ships are placed and maintained in position by dynamic positioning systems that depend upon augmented GNSS systems. Down-hole positioning depends upon inertial systems, which are calibrated by the use of augmented GNSS systems.
- **Production.** Production platforms are placed, maintained, and monitored with the use of Differential GNSS systems integrated with acoustic systems.
- **Station Keeping.** Supply vessels, crew vessels, special-purpose vessels, and helicopters are positioned relative to the drill rig, seismic vessel, production platform, and pipeline-laying vessel by precision GNSS data fused with other sensors such as lasers and microwave distance-measuring equipment. In all of the applications listed above, at various stages, vessels require station keeping with other vessels to very precise relative distances and velocities.
- **Containment and Recovery.** When there is a requirement for a flotilla of vessels, there are as many as a hundred large and small vessels in a relatively small area, with the need for central control and collision-avoidance systems. These systems also depend upon having precise GNSS, mostly using precision data broadcast by a permanent GNSS network.

Conclusions

- GNSS service managed by the Regione Veneto through the University of Padova is already operational. Free access to registered users
- Standards: RTCM + NTRIP + INSPIRE
- Needed, possibly through NEREUS
 - Coordination with Croatian and Slovenian Maritime Authorities
 - Training courses for dissemination of the information