

MONITORING OF STRUCTURES AND ENVIRONMENT

RESEARCH GROUP: Maurizio Barbarella, Stefano Gandolfi, Luca Poluzzi, Luca Tavasci, Andrea Lugli
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The needs of monitoring structures and territory stabilities is recently often required. If the monitoring interest few isolated points the GNSS systems can be a powerful technique for their characteristics that combine high performances (at centimetre level for real time and millimetre level for long periods observation) with flexibility and costs. A first experimentation conducted by the DISTART researcher has been performed on buildings over a landslide located in the Apennines mountains. This experimentation has demonstrate the possibility to reach real time centimetre level of accuracy using low cost receiver and monitoring the position of sensors from a remote location.

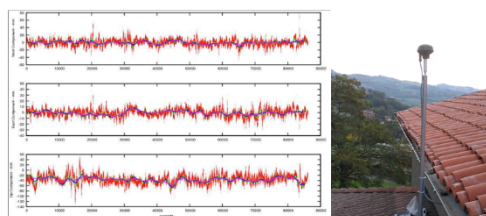


Fig. 1. Example of GNSS time series for buildings monitoring (picture by Gandolfi).

Now the experimentation is moving to the optimization of devices, instrumentation and software procedure in order to improve the accuracy maintaining the low cost aspect that is fundamental for a large diffusion of this method.

The final aim is to realise a monitoring system that can monitor, from remote, many structures at the same time in real time and control any movements of them. A central aspect consist in the definition of some procedure able to alert population or public authorities in case of danger. In figure 1 is reported an example of the first experimentation with the monitored buildings and obtained results. Is almost ready the realization of a real-time monitoring system for one of the most important towers of the City of Bologna both for early warning system and for the study of their low movements.

Concerning the monitoring of the territory (and in particular of landslides), Terrestrial Laser Scanner can be employed. As example a landslide in

an area located over a railway has been surveyed using TLS from 2010 to 2012. All the derived products DSM and DTM obtained removing vegetation has been referred to the ETRF00 assumed as enough stable in the surveyed area. The comparison of the different surveys has evidenced the areas with movements respect the stable ones. Particularly interesting the information relative to the kinematic of landslide respect to the stable area.



Fig. 2. Lower part of the landslide in proximity of the railway and chromatic representation of block movements (picture by Barbarella).

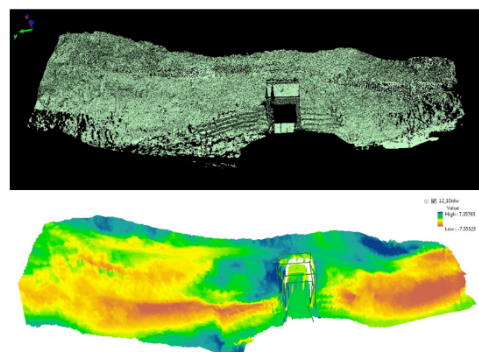


Fig. 3. Lower part of the landslide: 2012 TLS cloud and representation of the movements respect 2010 (Barbarella et al. 2015).

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RESEARCH PROJECTS

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INFRASAFE - POR-FESR (2014-2020) - Monitoraggio intelligente per infrastrutture sicure (<http://www.infrasafe-project.com/>)

LINKS AND CONTACTS

maurizio.barbarella@unibo.it

stefano.gandolfi@unibo.it