

Improvement of real time data transmission for the seismic monitoring based on the UMTS technology

Sara Lovati, Ezio D'Alema, Davide Piccarreda, Gianlorenzo Franceschina, Antonio Gomez, and Marco Massa
Istituto Nazionale di Geofisica e Vulcanologia, department of Milano, via Alfonso Corti, 12, 20133 Milano, Italy
(sara.lovati@ingv.it)

The seismicity of the Italian territory is monitored by the National Institute for Geophysics and Vulcanology (INGV) that, at present, manages about 400 seismic stations uniformly distributed throughout the national territory [RSN network, Amato and Mele, 2008; <http://inside.rm.ingv.it>]. All the remote seismic stations are now constituted by a high dynamic digital acquisition system coupled with a broad band or enlarged velocimetric sensor and in many cases also with a strong motion sensor. At present the INGV seismic stations send seismic signals directly to the data acquisition of the National Earthquakes Center of Rome [CNT, <http://cnt.rm.ingv.it/>] exploiting broadcast satellite systems, Wi-Fi and Internet connections and standard mobile technology (i.e. GPRS, EDGE 2G and UMTS or HSDPA 3G]. The latter one, even if is characterized by lower costs and easier installation procedures with respect to other types of transmission systems, it presents two main disadvantages that are possible temporary lacks of the UMTS/GSM signal or random blocks of the remote control device.

To overcome these inconveniences, and to improve the performances of a seismic network based on mobile data transmission, a remote system device, the Nethix-WE120 (<http://nethix.com/it/products-solution-it/we/we120>) was applied to about 30 selected accelerometric station installed in Northern Italy [Lovati et al., 2014]. The introduction in the acquisition chain of the new device allowed us to perform controlled remote reboot both of the router and the recording system, separately, with the main advantage to avoid, in some cases necessary, the manual reboot on site.

In particular, in order to continuously control the data transmission an automatic procedure was developed in order to check the routers performances. In case of failure the automatic system switch OFF and, after a set time (in general 3s), switch ON the remote hardware restoring the correct real time acquisition. The period of test allowed to make some statistical considerations comparing the number of maintenance works on sites before and after the installation of the remote control system. In our experience, it is evident as the monthly sum of actions on site for all seismic stations is drastically diminished after the first Nethix-WE120 installation, with strong advantages in terms both of cost and work-time.