

Real time monitoring system for the landslide in the hamlet of Ponzano (Civitella del Tronto)



On February 12, 2017, an **extensive landslide** occurred in the hamlet of Ponzano (Civitella del Tronto). The instability resulted from the effects on the ground of combined actions caused by the **earthquake** activities of the previous months and by the **extraordinary snowfalls** occurred in the area during last winter.

The implemented **monitoring system** mainly aims at evaluating in time the need to **evacuate further areas** or, on the contrary, the possibility to let the evacuated population safely come back to their houses.

Summary

Location: Ponzano, Civitella del Tronto, Italy

Conclusion: 2017

Focus: Geological and hydrogeological risk

Challenges:

- Extensive landslides and hydrogeological instability
- Real time monitoring system for the landslide in the hamlet of Ponzano

CAE solutions:

- Wireless Sensor Network technology (WSN) W-Point
- Mhaster station equipped with rain gauge, air thermometer, clinometers
- Data transmission via radio and GPRS

FEATURES

The system was installed within a few days after the landslide occurred. The landslide activity is still developing, making it impossible to intervene with structural works or with an in-depth monitoring, as the equipment would turn unusable in a few days. In this phase the system is monitoring **24h/day the status of the buildings** located near the landslide area, as well as the rainfalls, as rain is actually the main priming phenomenon for landslides.

Once again, also for this project, we used the well consolidated **Wireless Sensor Network technology (WSN)**, in order to create **Mesh networks** and reduce the use of cables in the landslide area. The sensor networks aim at collecting data that will be transmitted to the **Functional Centre** of the Regional Civil Protection Department and to the **Municipal Operative Centre**, through a redundancy radio and GPRS system.

This system is based on a **modular structure** that will allow us to expand or modify it any time, without interfering with the general functioning of the network, in order to adapt it to any possible future needs that may occur after the landslide stabilization.



COMPOSITION

A MMASTER station is operating in the “northern area” of the site, equipped with a **PMB20** rain gauge, a **TS** air thermometer, five **clinometers** for the structural monitoring of buildings located in the area, and three high-performance inclinometers installed on poles fixed in the ground.

A MMASTER station is operating in the “southern area” of the site, equipped with a **THS** thermo-hygrometer, two **clinometers** for the structural monitoring of buildings located along the top of the landslide, and four high-performance inclinometers installed on poles fixed in the ground.

All the apparatus installed are **self-powered** and the two stations transmit data with a redundant **radio** architecture and **GPRS**, to Functional Centre of the Regional Civil Protection Department and to Municipal Operative Centre.

