POLITECNICO DI MILANO

Advanced Research Intelligent Embedded Systems

Intelligent systems for rockfall monitoring: the Gallivaggio deployment

Description

Mount Móta séca, San Giacomo Filippo, north Italy, overlooks the road leading to the Spluga alpine pass and the sanctuary of Gallivaggio, destination of pilgrim groups. The rock face is subject to rock falls.

The deployed system for rock fall monitoring is based on a hybrid wireless-wired sensor network that acquires micro-acoustic emissions associated with the generation of micro-cracks and their coalescing in larger fractures. The system also measures more traditional information related to the enlargement of fractures, changes in inclination and temperature. Units are connected with a CAN field-bus configuration to a gateway mounting a UMTS radio for remote communication. The user can remotely control the operations of the sensor network by sending commands that affect the modus operandi of the remote units electronics. All modules composing the monitoring system are designed to operate in harsh environments, harvest the required energy with an intelligent MMPT-based mechanism for on photovoltaic cells and react to environmental and system level changes when needed.

Sensors

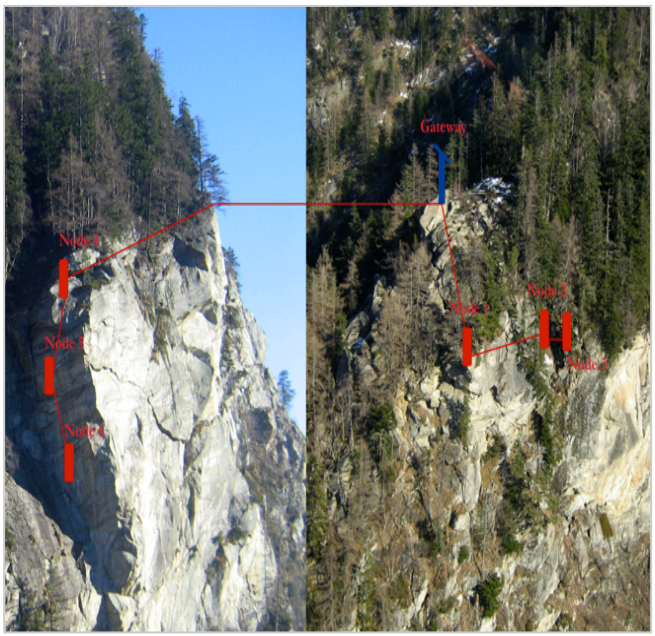
Microfracture investigation:

- 6 Accelerometers (MEMS)

Fracture enlargement investigation:

- 6 Inclinometers (MEMS)
- 6 Crackmeters (wire crackmeters)
- 6 Thermometers (6 digital integrated sensors)

A wired sensing unit



Deployment area

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