



## Intelligent systems for rockfall monitoring: the St. Martin deployment

## Description

The San Martino, north Italy, is a mount overlooking the city of Lecco subject to the rock fall risk.

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 dedicated directional WiFi radio link oriented towards the Lecco campus of Politecnico di Milano. 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.

## <u>Sensors</u>

Microfracture

- investigation:5 Accelerometers
- (MEMS)

3 Geophones

Fracture enlargement investigation:

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



A wired sensing unit

Web interface

Deployment area

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