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A new low-cost GNSS instrument for monitoring of ground motions and critical infrastructures within the Greek “Supersite”

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There is a continuous need for integrating multi-parameter instrumental observations and measurements with Satellite Earth observation data towards continuous monitoring of the environment and infrastructures. This task attains more importance within the tectonic and seismically active area of the Greek "Supersite" (Corinth Gulf, Ionian Islands, etc.). The significant level of geohazards in this region have made necessary the implementation of new technological approaches that could offer reliable augmentation to permanent networks (both geodetic and seismological). In this contribution, we demonstrate the design, construction and installation of a new technological infrastructure that is based on the collaboration of a multidisciplinary research team and on low-cost equipment. Our low-cost instrumentation includes a multi-GNSS dual-frequency chip (Ublox ZED F9P module) mounted on a Raspberry-Pi 4 compute module IO board together with an industry-standard MEMS accelerometer. It provides signal tracking for most of GNSS systems (GPS, GLONASS, Galileo and BeiDou). The GNSS data are collected 24/7/365, quality-checked and processed by use of open-source software. The combined-synergistic use of these new sensors is compatible with ground motion data provided by GNSS reference stations and accelerometers used by seismic agencies. Current work includes the collection, homogenization, processing and archiving of daily data from three test sites using 4G telemetry. The GNSS data support the on-going, pre-operational monitoring of three test sites together with InSAR Copernicus data (Tsironi et al. 2022).

Tsironi, V., Ganas, A., Karamitros, I., Efstathiou, E., Koukouvelas, I., Sokos, E. 2022. Kinematics of Active Landslides in Achaia (Peloponnese, Greece) through InSAR Time Series Analysis and Relation to Rainfall Patterns. Remote Sens., 14(4), 844. <https://doi.org/10.3390/rs14040844>