

## The Establishment of the CyCLOPS Integrated Strategic Research Infrastructure Unit for Deformation Monitoring Activities: Considerations, Performance Assessment and Initial Results

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**Abstract.** CyCLOPS is a novel strategic research infrastructure for studying solid earth processes and geohazards, such as earthquakes and landslides via the integration of the two most prominent space-based Earth Observation deformation monitoring technologies; Global Navigation Satellite Systems (GNSS) and Interferometric Synthetic Aperture Radars (InSAR). CyCLOPS was designed and developed by the Cyprus University of Technology Department of Civil Engineering and Geomatics (CUT-CEG) in collaboration with the German Aerospace Center (DLR) and supported by a wide range of national stakeholders. The objective of this endeavor is to augment the national geophysical and geodetic infrastructure and actively contribute to the growing demand for more precise positioning services aligned with important global frameworks and initiatives, such as the UN SENDAI Framework for Disaster Risk Reduction and the recommendations of the UN-GGIM (and its Subcommittee of Geodesy). In this context, a network of Tier-1/2 permanent GNSS Continuously Operating Reference Stations (CORS) co-located with permanent Trihedral Corner Reflectors (TCRs), precise weather stations and tiltmeters was established throughout the government-controlled areas of the Republic of Cyprus. Furthermore, the infrastructure is augmented by a mobile segment of GNSS receivers and CRs, which are deployed in areas of interest. One of the major challenges faced while setting such an integrated infrastructure was the selection and layout of the permanent sites for the co-located sensor configuration to achieve maximum performance and deliver the most possibly precise deformation products. Therefore, key parameters, such as monumentation specifications, equipment orientation and localization were seen, studied and dealt in accordance with the most stringent specifications set by international standards (i.e. UNAVCO, IGS and EPN) and scientific literature. Concordantly, the objective of this paper is to present an overview of the system architecture, the considerations followed and developed en-route to its realization and an initial performance assessment during the first months of its operation.