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# HeMOC: a Project to Develop a Multisensor Network for Monitoring Historical Cities

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## Abstract

Como is a well-known city located near the homonymous lake in the Northern Italy. Land subsidence has been affected its downtown, with effects on the conservation and safety of historical buildings, requiring the integration of in-situ and urban-scale monitoring of ground deformation. Supported by NextGEN-EU funding, the HeMOC project (“HERitage MONitoring in Como”) is developing a set of seven GNSS permanent stations to be implemented by the end of 2024 in correspondence of Cultural Heritage sites. These stations are based on low-cost GNSS technology developed by GReD S.r.l. company, providing 3D observations for monitoring buildings. GNSS-based observations will be also integrated with in-situ monitoring data and used for calibrating ground deformations obtained from Advanced DInSAR (Differential Interferometric Synthetic Aperture Radar) processing of high-resolution data. Results of monitoring sensors will be implemented in a digital platform for data archiving and visualization, which is developed by Dkr S.r.l. company. The implementation of the HeMOC project would represent a prototype to be potentially extended elsewhere.

## 1 Introduction

### 1.1 Motivations

In the second half of the last century, the historical city of Como (Northern Italy) has been intensely affected by the phenomenon of subsidence attributable to the combined action of multiple causes (ESKANDARI & SCAIONI 2023), as presented in Subsection 1.2. The phenomenon has slowed down in recent decades, remaining significantly in the “Convalle” area near the Como Lake. Subsidence has also affected the conservation and safety of the historic buildings in downtown, requiring the integration of deformation monitoring in situ and at urban scale. Until 2012, some measurements were carried out of a leveling network that extended over the entire city, and which made it possible to evaluate the extent of the phenomenon in the long term (COLOMBO ET AL. 1998).

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