

GIMS: an innovative cost-effective system to monitor ground deformations, based on GNSS, InSAR and inertial measurement units

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Forum topics	<input type="checkbox"/> Energy in 21st Century	<input type="checkbox"/> Cultural Heritage in Digital World
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Abstract: (250 to 500 words: for each heading use the bullet points or narrative - the submission including graphics should not exceed one page)

Problems - Issues / Challenges-Needs	Geological, hydrological, geotechnical, and environmental phenomena causing deformation of the Earth surface (subsidence, landslides, floods, sinking) are happening at an increasing rate, also due to extreme events likely to be driven by climate change, as well as rarer geophysical phenomena (earthquakes and volcanic eruptions). These phenomena govern negative and sometimes destructive impacts on land, structures (dams, bridges, buildings), infrastructures (roads, railways, channels, pipelines, energy infrastructures); in addition, structures and infrastructures can undergo an obsolescence process, eventually leading to a collapse.
Solutions - Methods / Results - Findings	The main objective of the GIMS project is to build and commercialize an advanced low-cost system based on GNSS (including Galileo), Copernicus SAR and other in-situ sensors, like inertial measurement units, for the purpose of monitoring ground deformations with a focus on landslides and subsidence. The system will recover displacements with millimetric level accuracies and daily acquisition rate. Moreover, the integration of in-situ accelerometers will give real-time alerts in case of sudden movements. The observations of these three different monitoring techniques, namely GNSS, SAR and accelerometers, are complementary in time and space and can be integrated to obtain a better understanding of the monitored processes and a more complete knowledge of the deformation phenomenon.
Novelty - Value / Relevance to ...	The main novelty lies in the design, development and testing in operational environment of an integrated cost-effective monitoring system based on GNSS, SAR and IMU equipment, including a new active compact reflector for SAR. The project involves researchers and industrial developers from different fields: radiofrequency analysis and related hardware design, telecommunications, SAR and GNSS data analysis, accelerometers signal processing, geostatistics, geology. Pilot tests will be conducted in the two selected sites in Slovenia where landslides could pose serious hazard to local inhabitants and infrastructure.
Forum statement	A project to design, develop and test in operational environment a cost-effective displacement monitoring system based on GNSS, SAR and IMU sensors.

Keywords: (up to 5 keywords)
GNSS; SAR; IMU; monitoring; landslide

Graphics: (please use the gray area below for representative graphics or graphical summary: select the gray area below and paste your graphics)

