

## **The SLAM Project, a Service for Landslide Monitoring Based on EO-Data**

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The SLAM project (Service for Landslide Monitoring) was launched in 2003 by the European Space Agency (ESA) for the definition of a service based on the integration of Earth Observation (EO) data within the current practices of landslide mapping and monitoring. The service is implemented for Swiss and Italian regions. For the Swiss territory the Cantons of Bern, Valais, Fribourg and Ticino have been selected as service cases for their significance in terms of landslide type and environmental conditions of various regions of the Alpine territory. Several cantonal users have been involved as partners of the project, in order to validate the provided products, to assess the quality of the services and to assure scientific aspects. The expectations of the users are connected to the possibility, by integrating EO-derived information within the current practices employed in the landslide risk management, of providing standard methodologies for landslide mapping and hazard assessment.

By considering the technical requirements imposed by the Italian and Swiss legislations two main products based on EO-data have been produced, related to landslide motion survey and landslide monitoring. The "Landslide Motion Survey" is a large scale product to support the geological risk service agencies in their activities related to the update of landslide inventories and the planning of structural intervention. The "Landslide Displacement Monitoring" allows the monitoring of areas of interest on a reduced scale basis. The objective is to accurately quantify the deformation field of unstable areas through the displacement rate measurement of some points located within the landslide body. The outputs are integrated with the in-situ observation to monitor the areas characterized with high hydrogeological risk and to test the effectiveness of structural interventions.

The innovative aspect of the SLAM project is the integration of Satellite Radar Interferometry (SRI) with the in situ documentation currently in use for the landslide monitoring. Satellite radar data of ESA ERS-1/2 satellites have been processed interferometrically by Gamma Remote Sensing. Different interferometric methodologies have been applied for the retrieval of surface displacements in the areas of interest in order to account for the varying landuse (villages, forest, meadows, permafrost) and meteorological (in particular snowcover) conditions. The major drawback of SRI, the incomplete spatial coverage because of signal decorrelation, is tackled by the integration with the methodologies currently in use by the cantonal authorities.

Significant results for areas in the Cantons of Bern, Valais and Ticino related to the assessment of natural hazards in the Alpine regions will be discussed in this presentation.

## **References**

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