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## Radar science forewarning us of landslides and avalanches

The Linear Synthetic Aperture High-resolution Radar (LISA) is an innovative software that allows scientists to monitor landslides and avalanches using advanced radar technology.

The software was first pioneered at the European Commission's in-house scientific service, the Joint Research Centre (JRC), which holds the world's largest databank of ground-based landslide and avalanche images. Scientists successfully adapted their existing technologies used for environmental risk monitoring in Europe to create the first ever Ground-based Synthetic Aperture Radar (GB-SAR). Advances continued and in 2003 the JRC created a spin-off company called Lisalab Srl. which has since cultivated project-based partnerships in countries such as Norway, Japan and the USA. The JRC has also undertaken high-resolution radar monitoring of Italy's Mount Stromboli volcano.



**Joint Research Centre (JRC)**  
– the European Commission's in-house science service

LISA maximises advanced radar imaging techniques to measure minute changes in areas from a few meters in diameter to a few kilometres. Radar is particularly suited to potential landslide and avalanche monitoring because it can be done remotely, is non invasive and can be performed day and night. It also allows for a maximum flexibility in viewing geometry.

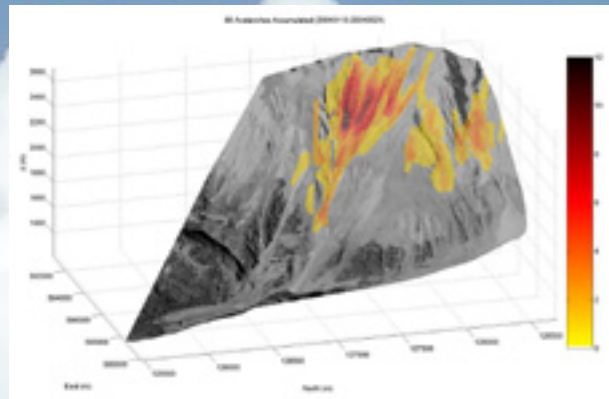
The LISA software is fine-tuned to monitor ground displacements in real-time with very high precision. Deployed at a safe distance from the risky area, different versions of the instrument are adapted to the specific project. This can be for short, medium or long term observation. It can equally take into account difficult environmental conditions such as terrain and temperatures below zero.

For example, LISA has been deployed in the Alps in partnership with the Italian Department of Civil Protection. Its focus was to measure the ground movement on Mount Stromboli's slopes to provide early warning for emergency action. In particular, the upper part of the volcano's craters was observed. The accuracy and quality of the scientific data obtained proved instrumental and could be fully integrated into a complex civil defense mechanism, providing fundamental information to decision-makers.



### ***Did you know?***

The United Nations, World Bank and European Union have decided to pool resources into one post-disaster recovery and reconstruction response team rather than three or more. The aim is to harmonise standard scientific procedures for assessing damage to infrastructures, economic losses, and the needs of affected communities. The work of JRC scientists in devising new methodologies to translate pre- and post-satellite images following the January 2010 Haiti earthquake greatly facilitated the international response and is seen as a best practice model to follow.



### ***Background***

Since pioneering Ground-Based Synthetic Aperture Radar in 1995, the JRC has been directly and indirectly involved in the creation and spread of similar technologies worldwide.

LISA is one of a range of technologies developed by the Joint Research Centre for environmental and risk monitoring in Europe as part of the GMES (Global Monitoring of Environment and Security) initiative. This is the European Programme for the establishment of a European capacity for Earth Observation.

Environmental information is of crucial importance. Not only does it help scientists understand our planet and its climate, it helps us measure the role played by human activities in these changes and take necessary steps to protect our well-being and security. The JRC's spin-off company Lisalab Srl, created in 2003, has an exclusive license for the commercial use of the technology and is working globally.

Improved natural disaster preparedness and response relies on sound scientific intelligence being shared and optimised by an international community acting in a coordinated way. This is increasingly the norm. As the European Commission's in-house science service, the JRC plays a crucial role in making available to all advances in geo-spatial and information technologies. Equally, it has developed and operates sophisticated alert systems ranging from forest fires and floods to droughts and wind storms. As part of the Global Disaster Alert and Coordination System, the JRC is often being called upon to represent the EU as a first responder when natural disasters actually happen.