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Monitoring and Early Warning System in Earth Management
-Based on self-organized fusion sensor networks-

The devastations and destructions caused by **Geohazards**, such as tsunamis, earthquakes and landslides are increasing since the last years verifiable. Apart from socio-economic factors, like increasing population and concentrations of settlements on endangered areas, extreme weather conditions are the main reasons for this ascent. But these occurrences are not only concentrated on the high mountain ranges with steep slopes and strong relief. In February 2003, a landslide in the middle of Germany near the village of Wolfstein-Roßbach damaged some houses (one of them totally). Another example is the Manshiet Nasser failure in Cairo in September 2008, where a large rock tilt buried many houses. This few examples show the devastating effect of geohazards in settlement areas and the need for precise monitoring and early warning systems to protect human life and property.

Existing monitoring systems for early warning in areas prone to geohazards are often monolithic systems that are very cost-intensive, considering installation as well as operational expenses.

In this presentation, a new type of early warning and monitoring system in earth management using low-cost sensors from industry in a wireless Ad-hoc, Multi-Hop sensor network will be introduced. The self-organizing and self-administrating structure of such a system allows the setup of a very flexible sensor network, with independently working nodes due to their own energy supply. Micro sensors (MEMS) are used for tilt, acceleration, height and elongation measurements to observe surface deformation and joint's opening. Due to the fast data transfer, a special data infrastructure for processing and visualization process, monitoring and also warning in real time is possible. Sensor and data fusion are realized to minimize the false alarms and improve the criteria under which an early warning can be issued.