SENSUM project, Smart SENSing of landscapes Undergoing hazardous hydrogeomorphic Movement

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An increase in storminess under climate change and population pressure are resulting in an increase in landslide and flood events, in the UK and globally, and threatening the defences put in place to mitigate these hazards. Monitoring of unstable hillslopes and flood-prone rivers as well as structures designed to protect these is vital. Furthermore, as landslides and floods are both triggered by heavy rainfall, often occurring simultaneously, and may interact to generate cascading hazards, we need integrated approaches for their management.

A key objective of the SENSUM project (Smart SENSing of landscapes Undergoing hazardous hydrogeomorphic Movement, https://sensum.ac.uk) is to develop a smart sensor to be embedded within boulder and wood debris in landslide and flood prone sites to detect and track hazardous movement. These low-power, low-cost devices communicate this in near real time via Internet of Things networks. Several wireless sensor networks (WSNs) have been installed on landslides and in flood-prone rivers around the UK, involving insertion of devices into debris, installation of long-range wireless network gateways, and camera installation for validation of movements. The developed system architecture also permits straightforward integration of additional third-party sensors and open data. We aim to build a dataset with which hazardous movement can be detected using machine learning and communicated in near real time via alerts and web services to relevant stakeholders. This effort will be complemented by laboratory experiments.