

Towards a geophysical system for the remote autonomous monitoring of the near surface

Jonathan Chambers¹, Philip Meldrum¹, Paul Wilkinson¹, David Gunn¹, Sebastian Uhlemann¹, Russell Swift¹, Cornelia Inauen¹, Oliver Kuras¹, Luke Sibbett¹, Jim Whiteley¹, Nick Slater², Siobhan Butler³

(1) *British Geological Survey, Nottingham, UK*

(2) *ITM Monitoring, Uckfield, UK*

(3) *Canal & River Trust, Leeds, UK*

keywords: electrical resistivity tomography; autonomous monitoring; information delivery

It is increasingly being recognised that geophysical techniques can complement conventional approaches by providing spatial subsurface information for near surface environmental and engineering applications. Here we describe the development and testing of a new geophysical monitoring system - in terms of both instrumentation and processing workflow development. It is built around low-cost electrical resistivity tomography instrumentation, combined with integrated geo-technical logging capability, coupled with data telemetry and web data delivery. The development of this approach has provided the basis of a decision support tool for monitoring and managing a range of near-surface problems. The hardware component of the system has been operational at a number of field sites associated with a range of natural and engineered slopes for up to two years. An automated data processing and analysis workflow is being developed to streamline information delivery. The automated processing workflow architecture has been established and is currently being

implemented. A prototype system enabling delivery of processed geophysical results to a web-dashboard has also been developed. We report on the monitoring results from a number of our test sites, discuss the practicalities of installing and maintaining long-term geophysical monitoring infrastructure, and provide an overview of the data processing workflow and information delivery. Once automation of data processing and delivery has been completed, we will be able to provide a practical decision-support tool for near-surface monitoring applications.

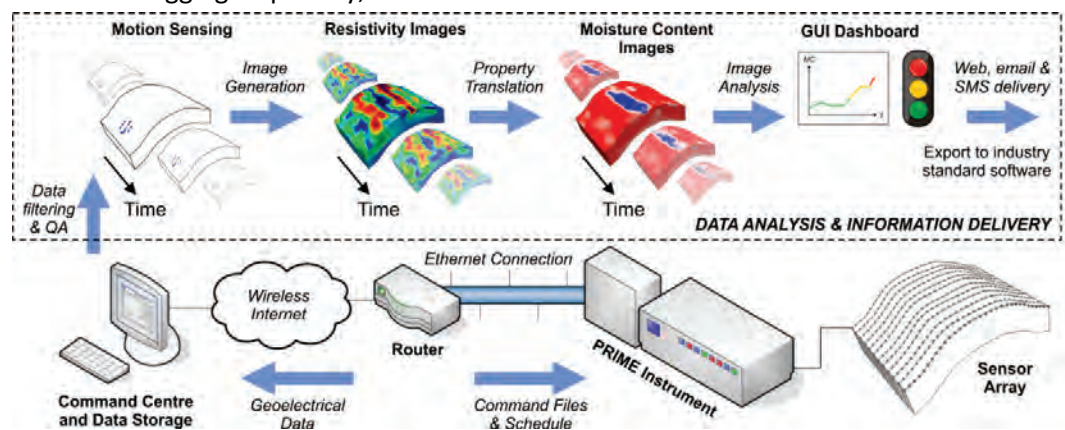


Figure: Resistivity monitoring system concept.