

Remote Sensing for Catchment Management

1st May, The Leeds Club

Remote sensing – Exactly what is it? What kind of information can it provide end users? How can it help achieve environmental benefits? What types of technologies are used within remote sensing? And what are the emerging technologies within this arena?

Remote sensing is a technology that has the ability to increase the information available to monitor and detect environment change, thereby improving decision making in the management of land and water resources. In spite of the advances of remote sensing technology, its potential has not been fully utilised in the area of catchment management for example. This conference will therefore focus on presenting a range of remote sensing applications from catchment and asset management, to more unusual applications such as archaeology which is of regulatory relevance to the water and environmental sectors.

Those who will benefit from this conference will include environmental regulators, water utilities and catchment management stakeholders.

Programme

9.30 – 10.00 Registration & Coffee

10.00 – 10.15 Welcome and conference overview

Chair – Siraj Tahir, Head of Consulting, Isle Utilities

10.15 – 10.50 APEM case studies: leakage detection and diffuse pollution management

David Campbell, Principal Remote Sensing Scientist, APEM Ltd

A series of three case studies will be presented where remote sensing has been successfully utilised. These will include:

- Aerial survey to identify and target diffuse pollution sources.
- Thermal imaging to detect leaks in heated effluent pipes.
- Colour and near infra-red imaging to identify leakage in water pipes

10.50 – 11.25 From Remote to Local Delivery – Remote Sensing and its Application to Natural Flood Management

Karen Pinkerton,¹ M. Kelly², Karen Potter¹ and Paul Hodgkiss³, University of Liverpool, ²Aberystwyth University, ³Waterco

Research sponsored by the Welsh Government/NERC Knowledge Transfer Partnership (KTP) is developing a systematic approach to delivering a more "natural" and cost effective approach to flood risk management. The KTP is also working with the University of Aberystwyth's WISE Network, which has assisted with access to and the ability to manipulate powerful spatial data. This is contributing to the delivery of flood risk alleviation through the implementation of land use change. The combination of remote sensing and hydraulic modelling is strengthening the understanding of the natural environment and the impacts that washlands, flood restoration, wetland and woodland creation can have on the whole catchment.

- 11.25 – 12.00 **Archaeological Remote Sensing**
Josephine Janik, Archaeologist, Mott MacDonald
- This session will examine how remote sensing surveys can accurately provide information in archaeological study areas on the form, location and extent of the possible archaeological features. This information can be used to mitigate the impact of proposed schemes where necessary and can help the water and environmental sectors achieve the regulatory requirements of considering cultural heritage assets.
- 12.00 – 12.15 Discussion and questions**
- 12.15 – 13.15 Lunch**
- 13.15 – 13.50 **A water utility perspective on the potential of remote sensing**
Geoff Cooper-Smith, Engineering Delivery Manager, United Utilities
- This presentation will explain the reasons for United Utilities interest in remote sensing. In addition to identifying potential applications, and the associated benefits, examples of work undertaken to date will be explained and evaluated. These include an evaluation of opportunities at Blackburn WwTW, around impounding reservoirs and catchment monitoring. It will describe how images and information can be analysed and collated to provide an integrated, coherent, picture for interpretation and includes use of high definition visual, topographic, thermal and near infra-red images. The benefits arising from this work will also be outlined, ranging from quantification of spoil volumes through to identification of poorly performing assets, confirmation of dispersion model accuracy and highlighting of threats to works.
- 13.50 – 14.25 **Risk mapping to support pro-active catchment management and drinking water safety planning**
Neasa Revens, Catchment Advisor, Severn Trent Water
- Agricultural land use in high risk fields and catchments can have serious implications for drinking water quality, threatening compliance with drinking water standards and challenging the requirement of the Water Framework Directive (WFD) that additional water treatment is avoided. This session will present the work undertaken by Severn Trent Water, using satellite remote sensing to identify high risk fields for pesticide loss based on remote sensing derived land use data. Archival satellite imagery has been used to produce annual land use maps between 2007 and 2011 supported by CEH Land Cover Map 2007 (LCM2007) baseline land parcel mapping. Land use data has been overlaid with inherent field risk (soil type, slope and proximity to water) to develop pesticide risk maps used for Drinking Water Safety Planning risk assessment and to target future farmer engagement and intervention. Findings are being shared with the wider water and pesticide industry to promote innovative yet sustainable approaches to pesticide management.
- 14.25 – 14.45 Coffee Break**
- 14.45 – 15.20 **Intelligent Remote Asset Monitoring Using Distributed Temperature Sensing (DTS)**
Rémy Schilperoort, Royal HaskoningDHV

This session will explore the Distributer Temperature Sensing (DTS) technique for non-intrusive continuous monitoring over several weeks for multiple sewers within a network. This technique allows the temporal variation in sewer conditions to be monitored, unlike more traditional methods such as CCTV inspections which only give snapshots in time. The high density of data and its continuous nature enables precise location of problems and identification of the conditions under which the malfunction occurs. Over the past 5 years, DTS has been used successfully in over 30 locations across Europe to identify adverse performance and malfunctions, including illicit connections of foul water discharge into storm sewers and extraneous inflows in the sewer network leading to frequent flooding or high demand on pumps.

15.20 – 15.55 **WFD Remote Sensing Pilot Study Initial findings from the Leam Catchment**
Crispin Hambidge, Geomatics, Environment Agency

This session will present the findings of the pilot study in the Leam Catchment, the prime objective of which was to demonstrate the value of outputs from remote sensing as integral operational tools in the day to day management of WFD catchments. Using LIDAR, WorldView-2 and hyperspectral data, a whole range of catchment management applications were explored, so that the value of the initially expensive remote sensing datasets could be maximised; if the number of uses of data doubles, then the initial capture costs effectively halve. The data sets were appropriate for farm-scale to regional scale modelling that could aid in the following: targeting catchment walkovers, habitat assessments, risk mapping and informing stakeholders with the best available evidence.

15.55 – 16.05 Questions and discussion

16.05 – 16.15 Summary and close

Delegate Rates

Full delegate - £295 (+VAT)

Students, academics and charities - £100 (+VAT)

Register online at www.aquaenviro.co.uk