BSG British Society for Geomorphology

UNIVERSITY OF Southampton

British Society for Geomorphology

Environmental Sensing Workshop

- Aerial Photography
- Terrestrial Laser Scanning
- Structure for Motion
- Acoustic Doppler Velocimetry
- Ground Penetrating Radar

Environmental Sensing in Geomorphology

As part of the British Society for Geomorphology Annual Conference, an 'Environmental Sensing in Geomorphology' workshop will be held. The workshop aims to provide geomorphologists with an overview of some of the current state of the art technologies in Environmental Sensing, with a particular focus on the collection of high-resolution topographic data. The workshop includes fieldwork, data processing, integration and comparison of different data sources, and data visualisation. Emphasis will be placed on means of capturing surface topography, but attention will also be given to the integration of topographic data with specialist techniques such as flow velocity measurements and shallow geophysical data.

The workshop is open to all and is aimed at those with an interest in environmental sensing but with little practical experience. The workshop will incur a charge of £20. Please also note that delegates will need to cover their additional subsistence and accommodation (this can be booked at the Glen Eyre residences through the conference website) on the 6th September.

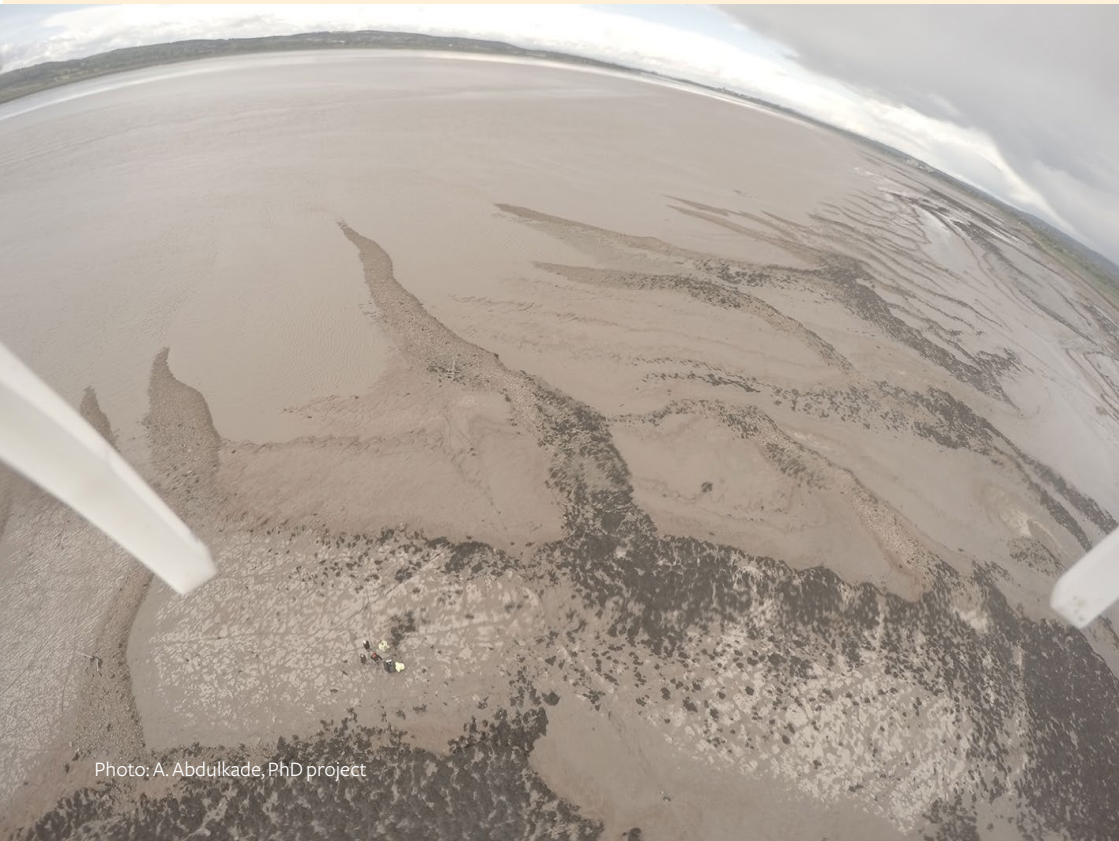
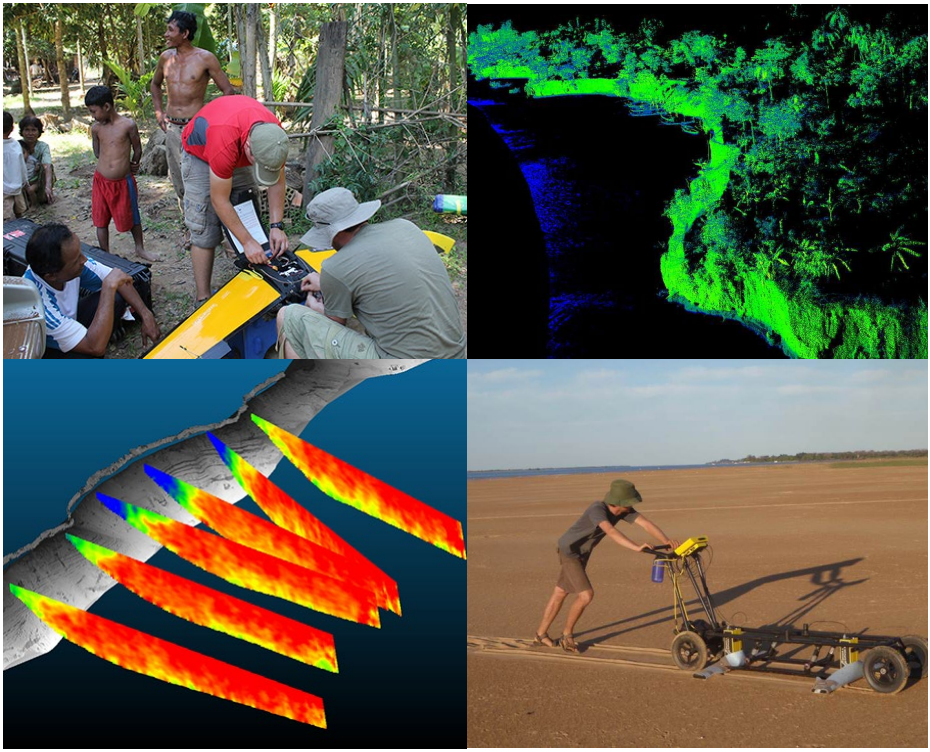


Photo: A. Abdulkade, PhD project

Workshop programme

The event will begin on the afternoon of **Sunday 6th September** (**1300-18:00**) with data collection in the field. We depart at 13:00 from Building 44 at the Highfield campus, and start at 14:00 at the Old Station Beat on the River Test, Bossington estate, Horsebridge, which is close to the John of Gaunt Inn, in Horsebridge. Lunch is not included in the workshop. Although transport will be provided from the University, if they wish participants are of course free to make their own way to the field site if they wish – though please advise the workshop convenors in advance if you intend to do this. Participants who travel independently and plan to have lunch in the pub before the fieldwork should not that lunch reservations are advised. Parking is available across the road from the pub. The fieldwork ends around 17:00, with transport from the nearby pub back to the university campus planned around 18:00, to arrive back at the University by 1900 latest.



Photos from top left to bottom right: C Simpson, STELAR-S2S project; C. Hackney, STELAR-S2S project; C. Hackney, STELAR-S2S project; Paraná River Project

The technologies that will be demonstrated and used in the field are:

- Unmanned Aerial Vehicles for (UAV's) – Peter Morgan
- Cameras and Structure for Motion software (SfM) – Chris Hackney
- Terrestrial Laser Scanning (TLS) – Julian Leyland
- Ground Penetrating Radar (GPR) – Arjan Reesink
- Acoustic Doppler Current Profiler (ADCP) – Steve Darby

Weather permitting, a quadcopter and a fixed-wing UAV will be used / displayed to collect aerial photography (Hackney & Clayton, 2015). Such aerial imagery forms the basis for Digital Elevation Model development with SfM software on Monday (Michelletti et al., 2015). A Leica Terrestrial Laser Scanner (TLS) and a Differential Global Positioning System (DGPS) will be used to collect further topographic data. A simple Ground Penetrating Radar setup (Sensors & Software Pulse Ekko Pro) will be used to collect short reflection profiles that illustrate subsurface structures, and common mid-point profiles that are the basis of velocity analyses (Robinson et al., 2013). A SonTek M9 RiverSurveyor® Acoustic Doppler Current Profiler (ADCP) will be used to collect velocity profiles across the River Test.

Photo: C. Simpson, fixed wing UAV in the sky

The workshop will continue on the morning of **Monday 7th September** (0900 – 1230), prior to the start of the main scientific programme. The morning contains two seminars, coffee, and one hands-on session with topographic data. The programme for Monday is:

- Developing Digital Terrain Models using Structure for Motion software (Dr C. Hackney)
- Analysis of topographic point cloud data using CloudCompare software (Dr J. Leyland)
- A hands-on session with CloudCompare and multiple types of field data (Dr Hackney and Dr Leyland)

Photo: J. Nield, Iceland

The Structure from Motion session will focus on how to develop Digital Elevation Models from photographs, and will explain some of the key abilities and limitations of this technique. The CloudCompare session and hands-on session will introduce point cloud processing in CloudCompare and provide a methodological basis for comparing data from different sources, such as those used in the field. For example, how do TLS data compare to SfM data? Expert users of the various techniques will be at hand to answer any questions. The workshop ends by noon, leaving time for lunch and allows people to also attend the Early Career Researcher workshop on Monday afternoon.

For further information, please contact Dr Arjan Reesink (bsg2015@soton.ac.uk).

References

Hackney, C.R. and Clayton, A.I. (2015) Unmanned Aerial Vehicles (UAVs) and their application in geomorphic mapping. Geomorphological Techniques, Chap., Sect.1.7, ISSN 2047-0371, 12 p.

Micheletti, N., Chandler, J.H., and Lane, S.N. (2015) Structure from Motion (SfM) Photogrammetry. Geomorphological Techniques, Chap.2, Sect. 2.2, ISSN 2047-0371, 12 p.

Robinson, M., Bristow, C., McKinley, J., and Ruffell, A. (2013) Ground Penetrating Radar. Geomorphological Techniques, Part 1, Sec. 5.5, ISSN 2047-0371, 26 p.