



A DAY OF ARCHAEOLOGICAL GEOMATICS

June 29, 2012 Paul Commercial Archaeology, Community Archaeology, Day of Archaeology 2012, Digital Archaeology, Survey animation, Archaeological field survey, Archaeological sub-disciplines, archaeologist, Archaeology, Cartography, Chris Breeden, Chris Swales, Environment Agency, Geodesy, Geographic information system, geomatics, Geophysical survey, GIS, heritage data management, HTML, Karen Nichols, Ken Lymer, laser, laser scanning, LiDAR, Measurement, mobile computing, New Forest, photogrammetric systems, photogrammetry, Portland, project management, reflectance transformation imaging, remote sensing, RTI, Social Media, social media channels, spatial analysis, spatial technologies, SQL, St Georges Church

Well, firstly, I can't believe it's been a year since last time! Doesn't time fly? What's happened since then I hear you cry? I'm still the [Geomatics Manager](#) for [Wessex Archaeology](#), responsible for [GIS and Survey](#). The big news is my desk is now paper free and I'm trying to keep to a

paperless work regime, essential seeing as most of my workspace is taken up with computer equipment, leaving no room for unnecessary clutter. In the photo you can see not only my laptop but the recently rebuilt GISBEAST machine with it's quad cores, 64-bit OS and 12Gb RAM, tooled up with all the software I need to do what I do.

It's true, the closest I have come to excavation this year was indeed going through the stratigraphic deposits that had taken over my desk but that's not to say what I do isn't archaeology, it's just digital archaeology. And the survey work in particular gets me out of the office, not being office bound being one of the main reasons for my becoming an archaeologist in the first place... Thank goodness for the rapid and ever improving world of mobile computing and access to high speed mobile data is all I can say!

As with [my post from last year](#), my day didn't quite turn out as planned, but was interesting nonetheless and completely office bound, tied to my computers. I have a number of projects on the go at the moment, all of which are on the brink of completion, so my aim was to collate some figures and **statistics** relating to monument data for a stretch of the south coast from Kent round to the New Forest then get onto some **cartography**, **figure production** and **report writing**. To produce the figures, I needed to build some **SQL Queries** and undertake some **spatial queries** for a large amount of Historic Environment Record data. Probably not the most exciting thing to be doing on a Friday morning, especially not for the Day of Archaeology, but when you specialise in GIS, databases, spatial technologies and heritage data management, there is often quite a lot of nuts and bolts graft to be done to make sense of the archaeological record.

However, of more interest, a chunk of this morning was spent finalising a [project website](#), pretty much completed yesterday but needing some final amendments before being pushed to a wider audience today. I was also finalising fieldwork arrangements and prepping social media channels for the same geomatics and outreach project taking place in July for the [Festival of British Archaeology](#). I'm really looking forward to this one as it has some really good use of technology at its core, including some amazing **aerial survey** work using **Unmanned Aerial Vehicles**, plus some **spatial analysis** and **metric survey** including **Terrestrial Laser Scanning** (TLS); pretty much my favourite activities all in one project. It also includes a **geophysical survey** component so one of the aims is to look at the multiple layers of data and subject them to multivariate statistical analysis.



*Volunteers learning to use a Total Station Theodolite (TST) at St Georges Church, Portland
Image © Wessex Archaeology*

Another part of my day was then spent looking at some **rock art** which was recently recorded by **laser scanning**. The data from this has been visualised in a number of ways to get the most detail out of it. This was very much a team effort and full credit is due to those who contributed: Chris Breeden and Chris Swales (processing and registration of the scan data), Karen Nichols (virtual RTI), Ken Lymer (rock art guru) and me (project management, spatial analysis and visualisation). After registration and processing of the data, we output a **Digital Surface Model** (DSM) as a mesh and used this to produce a **virtual Reflectance Transformation Image** (RTI), through which we could move the light source around and investigate the surface detail and any rock art present. This technique was pioneered at Wessex Archaeology for use on virtual objects at any scale from flints to **landscapes** by **Tom Goskar**. As part of the spatial analysis, I then took the DSM and **normalised** it by elevation (after **Doneus & Briese**, 2006) to enhance the surface features. I also took the RTI data and produced a **Principal Components Analysis** (after Devereux et al, 2008). And of course, the usual **GIS** based derived products were used including **Slope** maps and **roving statistical windows** to enhance local views using local statistics on particular areas of rock art.



Laser Scanning.

Image © Paul

Cripps

In between times, I had a quick look at an upcoming project for which we will need some detailed **topographic data**. One option is to purchase **LiDAR** from the Environment Agency but unfortunately they do not have hi-res data, only 2m resolution data which is problematic for archaeological work (see **Crutchley**, 2010). This is a shame as the **EA LiDAR catalogue** is a very cost effective way of procuring good quality topographic data. So looks like I'll be helping to **specify** and **cost** alternatives, all part of the service, and I have a number of options up my sleeve.



Reflectance

Transformation

Imaging underway

at St George's,

Portland.

Image © Nicole

Beale

And finally, I set up some **animation paths** ready to render some **visualisations** of another **laser scanning** project. This project was undertaken in two phases, **the first is completed already** and the second about to be so. The overall project involved a **metric survey** of the churchyard including **training/outreach** activities and involvement from **Operation Nightingale** plus **laser scanning** of key monuments, a complete **photographic inventory** and some **Reflectance Transformation Imaging** (RTI), undertaken by the **Re-reading the British Memorial project** team. Oh, and we also did some **panoramic photography** since the churchyard is so beautiful and used some of the

gravestones to gather some test data for ongoing **R&D** into the application of **automated photogrammetry**; we now have the same monuments recorded using a number of photogrammetric systems, a Faro scanner and a Leica scanner for comparison. The bit I'm working on at the moment relates to **pointclouds** captured of some of the larger monuments, the aim being to produce some informative visualisations for now but the data also forms a robust baseline for future monitoring and conservation.

So that was it for my day of archaeology other than various meetings, briefings and other purely business stuff. And of course then getting home and putting the finishing touches to my **CAA papers** and doing a bit more **blogging** and **social media** to promote the **St Andrew's, Holcombe project** (bookings are now being taken for the participatory events, so get in quick, and no bookings required for the Saturday open lecture/talk events; plus they're all free and fun!). For those who do want to come to Holcombe, there's a map below to show the way, produced quickly and easily using **GoogleMaps** and some basic **HTML**.

I must also admit to spending a bit of time looking at some of the posts already up on the Day of Archaeology website and being impressed with the breadth and depth of content, not to mention the sheer volume of contributions this year. Congratulations to the organisers on a another highly successful event.

I look forward to next years Day of Archaeology!

References:

Crutchley, S. and Crow, P. 2009. 'The Light Fantastic: using airborne laser scanning in archaeological survey' Swindon: English Heritage.

Devereux B J, Amable, G S and Crow, P 2008. 'Visualisation of lidar terrain models for archaeological feature detection' *Antiquity* 82, 470–9

Doneus, M and Briese, C 2006. 'Full-waveform airborne laser scanning as a tool for archaeological reconnaissance', in S Campana and M Forte (eds) *From Space to Place: 2nd International Conference on Remote Sensing in Archaeology BAR Internat Ser 1568*, 99–105

Location map:

<https://www.google.com/maps/d/u/0/viewer?mid=1FRjcnva0nDKlJVcZyWo-hkrU0ec&ll=51.254764%2C-2.47596899999999637&z=17>

View [St Andrew's Church, Holcombe, Somerset](#) in a larger map