

LiDAR – a new survey tool for archaeologists

Over the past two decades, the UK government has commissioned numerous airborne surveys of low-lying countryside, on behalf of the Environment Agency; the main aim of this work is to provide detailed 3D surveys of land in floodplains, to aid awareness of the risk of flooding.

The surveys have all been based on 'LiDAR' – a principle broadly similar to radar but using visible light, with two significant benefits:

- It can create an extremely precise map of the surface, accurate to within an amazing $\pm 5\text{cm}$!
- Multiple reflections of the light signal from the airborne probe are returned (the first signal is returned by the tops of trees, bushes, hedges and buildings, but faint signals are also returned from the ground level). By subjecting these signals to sophisticated digital processing, it is possible to obtain a precise map of the countryside with all the vegetation removed – thus enabling hidden features to be seen even in dense woodland.

About 72% of Britain's land surface has been mapped by LiDAR surveys – and this huge archive of data has been made available at no cost to the general public, and may be downloaded from the Environment Agency website at <http://environment.data.gov.uk/ds/survey/index.jsp#/survey>.

CLASP is already working with LiDAR data

Over the last few months, CLASP has downloaded the LiDAR data-sets for most of Northamptonshire, and Gren Hatton and Stephen Young have been examining the data for some sites that are of special interest to CLASP, using the software tool 'Global Mapper'. Dave Hayward has also been using the LiDAR data to aid in preparing and submitting comments on planning applications for areas that may perhaps contain heritage features.

Global Mapper is a software tool specially developed for viewing and manipulating LiDAR data, and is used today by thousands of civil engineering companies, architects, landscape designers and archaeologists all over the world. The full programme costs about \$1000 to purchase, but a freeware version with limited features can be downloaded and used at no cost – and even with some of its major features locked out, CLASP has been able to make very good use of this freeware version of the software. The CLASP Trustees are currently evaluating whether to approve purchase of a full version of this software tool.

A big advantage of Global Mapper is that it is compatible with files created in MapInfo (and also with many other software programmes for landscape analysis). This means that anything that we have already imported into MapInfo – such as our geophysics survey data, coin and pottery distribution maps, geological data, OS map data etc. – can all be imported into Global Mapper and overlaid on top of the 3D LiDAR terrain map. If we go ahead and purchase the full version of Global Mapper, this would allow us to create and study 3D maps of the landscape with all our work displayed in three dimensions.

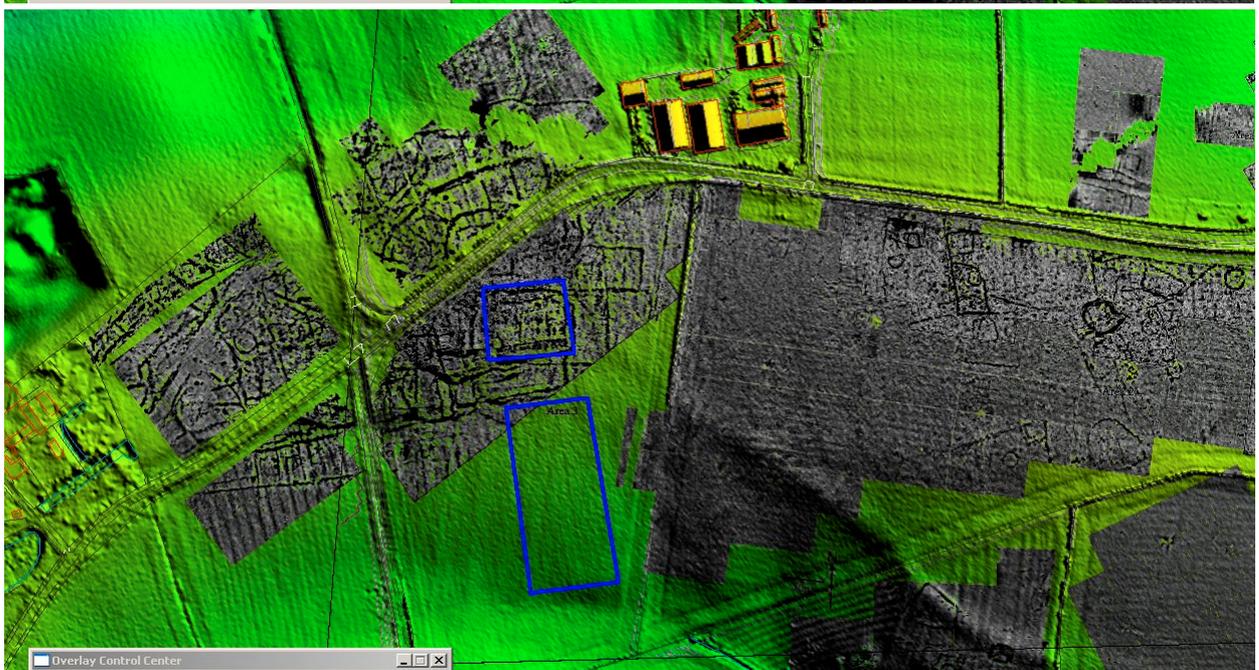
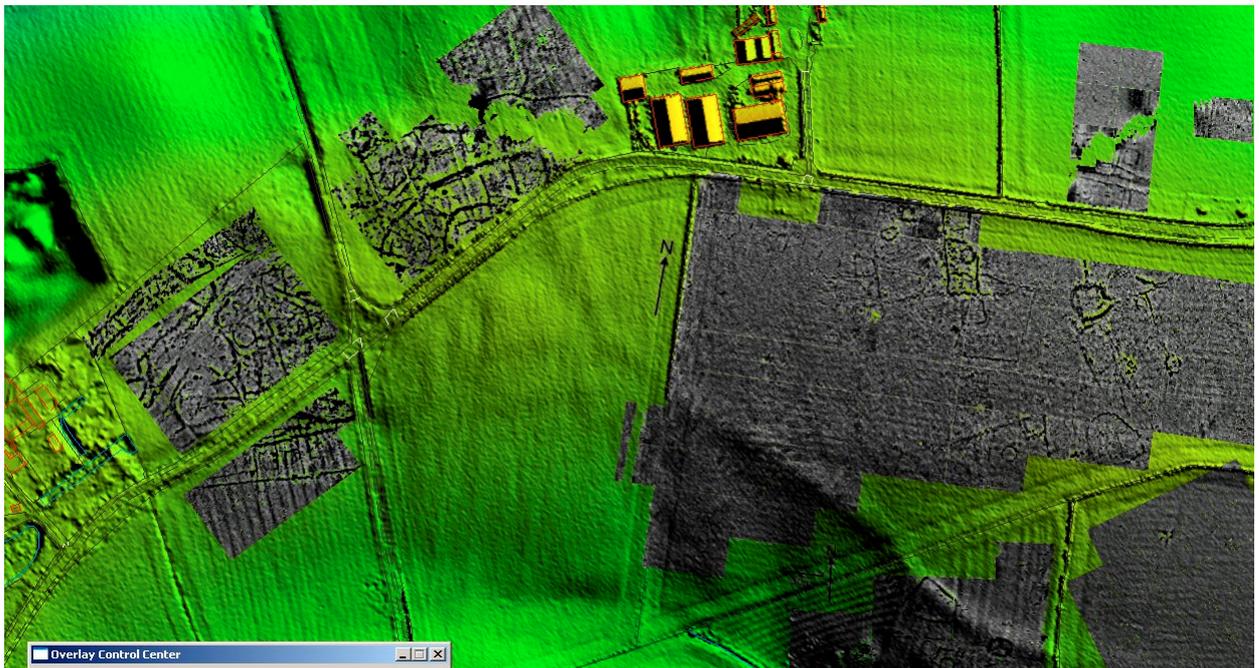
Example: Bannaventa and Thrupp Grounds

This year's CLASP fieldwork programme will include work at Thrupp Grounds adjacent to the Bannaventa complex – and study of the LiDAR data for the Bannaventa and Thrupp Grounds areas has revealed signs of some interesting features that will help to guide and influence our fieldwork at these locations.

The LiDAR illustrations below show that we have located what appear to be possible building platforms in the field known as 'Top Seed', together with clear signs of what appears to be a trackway leading from these building platforms to the north gate of the Bannaventa camp.

You can also see, in the second image below, that the more northerly of these possible building platforms coincides precisely with clear traces revealed in our geophysics plots for the upper part of

the field ... and we are now reviewing the need to carry out further geophysics in the lower part of the field, to look for traces of further buildings.



Other features revealed in the LiDAR images for the southern part of the Bannaventa complex include:

- A sub-circular rampart-like feature at the 98m OD contour, which is intersected at its western terminus by the line of the original Roman Watling Street.
- Clear traces of the original course of the Roman Watling Street, in a field south of the promontory and to the west of the current modern road.

We are hoping to investigate both of these features in due course. Meanwhile, the LiDAR tools have already proved themselves to be a powerful aid to our toolkits for desktop study and analysis.