New visualisations, same data

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The OA WebMap interface on desktop and mobile

Data are at the core of what we do as archaeologists, so facilitating the effective interrogation, interpretation and understanding of those data is vital. As part of a new digital strategy, Oxford Archaeology (OA) has overhauled core internal workflow systems by developing a series of digital modules designed to enhance the value of its large range of field data.

In this article we discuss some of the motivations and aims of this undertaking, before looking at what we have currently achieved and how it is already benefiting our staff and clients.

MOTIVATION FOR CHANGE

We wanted to create a system that would give our site teams access to a range of spatial, contextual and other data to assist with archaeological interpretation and decision-making. This system needed to be deployable to projects of all sizes, not just large flagship excavations. Furthermore, the data needed to be made available on a timescale that could really make a difference to the way we dig our sites – in other words, while the excavation is still under way.

A secondary motivation for change was to update our ageing context database. Updating a primary database is a daunting task: the system must be suitable for the breadth of sites, varying in type, archaeological complexity, and work duration. In an industry where a single project can produce data over a span of years or even decades, it is no surprise to find conflicting data structures and bespoke databases.

Our existing systems had grown and changed over the years with the result that, while everything worked, the interaction between systems was frustratingly limited. Site survey particularly had limited connections to the other systems, and links between spatial data and site records were created as part of the post-excavation process. This approach is time consuming, prone to error, and limits the ability of site survey teams to contribute to analysis.

With the opportunity to update our core data systems, we wanted to ask: could we get the data to do more?

The development aim was to make our data work for us. The fundamental field data being collected might remain the same, yet we needed to increase their accessibility and provide meaningful feedback to staff while they were active in the field and the sites open. The idea would be for the data to help inform the fieldwork strategy rather than being simply a product of it. It was important that the systems should be easy for our staff to use and should not erect technological and skills barriers.

To this end we designed two tightly integrated digital modules which work well independently, but are far more powerful together: OA WebMap, which focuses on survey data, information retrieval and the end user, and the OA Digital Recording System, which captures a range of contextual data within a modern database design.

Undertaking a photogrammetry survey that will eventually be part of the site WebMap

OA WEBMAP

The OA WebMap module was envisaged as a means of providing a modern yet familiar interface to the spatial and contextual data collected within our fieldwork projects. A web-based approach was chosen to reduce the need for specialist software.

In the field our survey methodology was adapted to a more attribute-driven approach, allowing more consistency in data capture and quality control. The underlying data schemas are more tightly defined as the data moves from GPS to GIS to WebMap. This means that survey data sent back from the field can be uploaded into the WebMap database as soon as it is processed and checked, often before the surveyor is back in the office.

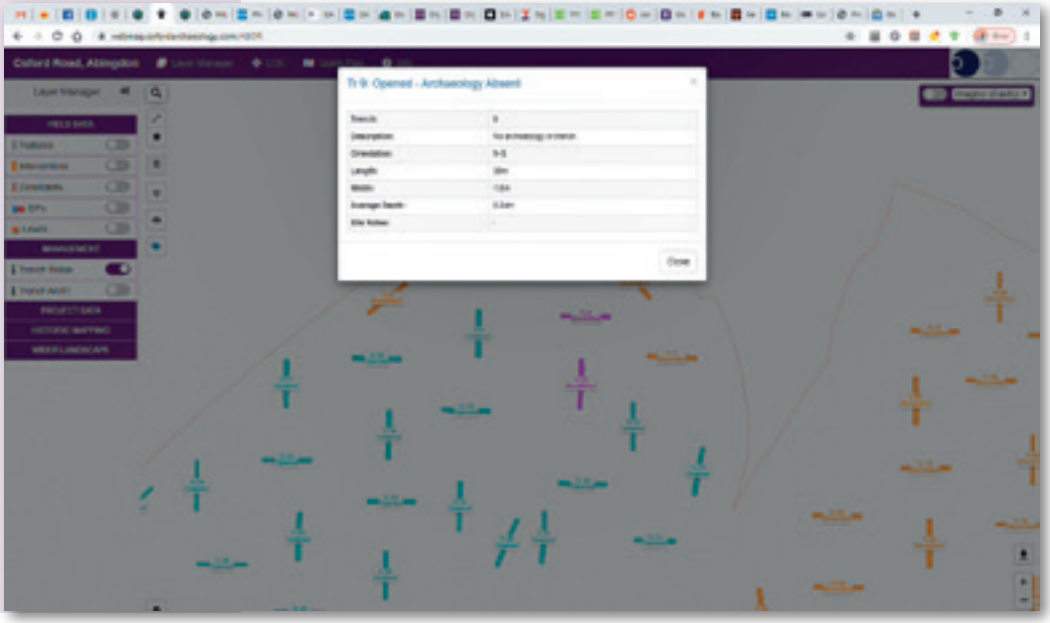
Once a site is uploaded into the OA WebMap system, the benefits to a user are many. Current site survey and related information can be easily viewed on any internet-enabled device by any member of staff. Site information is presented as categories of styled layers which can be turned on and off as desired to allow the user to visualise just the data they need.

The WebMap interface also allows for a more intuitive way to view site data, putting sites into wider landscape contexts and, with future development, will allow easy comparisons with other sites. The user can overlay the data onto aerial photographs, LiDAR, data relating to designated sites, and other publicly available datasets. We can even overlay features onto site-specific datasets such as geophysical survey results and orthomosaics generated through drone and photogrammetry techniques.

Further value is gleaned through giving access to clients and members of other teams. This allows clients, consultants and curators to keep up to date and obtain a much clearer understanding of the site than can be achieved through conventional means.

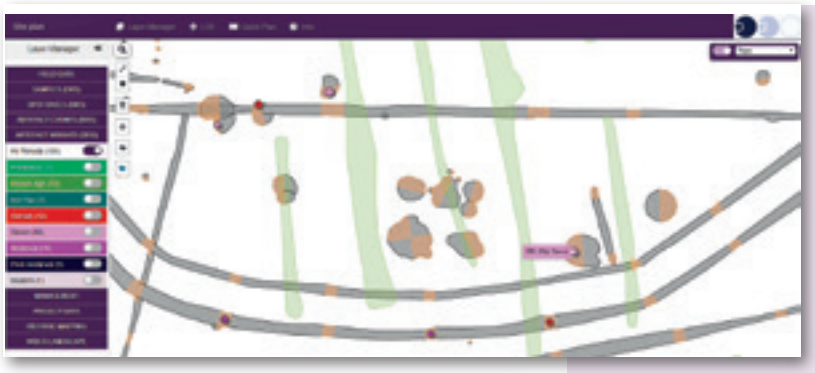
WebMap's true benefit, however, is how it provides visual access to site context information gathered using the accompanying Digital Recording module.

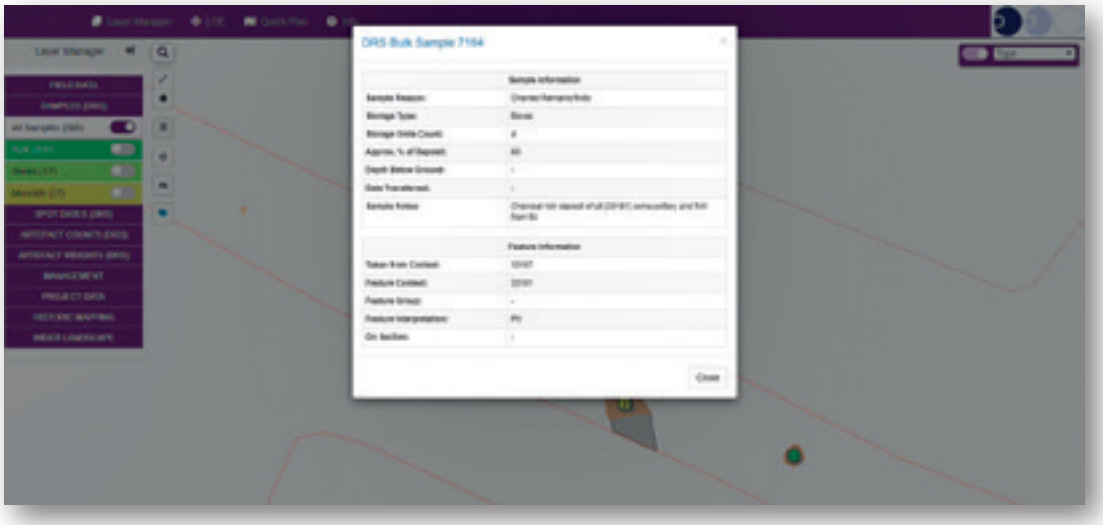
Trenches visualised by status, and example of information pop-up



THE OA DIGITAL RECORDING SYSTEM

The OA Digital Recording System (OA DRS) module was conceived to gather the core context data and to allow a number of useful tasks to be completed. It allows site index data to be entered into a web-based database, directly from site, using an interface optimised for tablets, mobiles or Chromebooks. It can be used off-line, with the data syncing once connections are re-established. Data such as trench descriptions, environmental sample data





Top left: Example of feature context pop-up showing information retrieved from the OA DRS

Top right: Example of the sample pop-up, showing both sample and related feature information

Example of spot dates displayed by weight, and mouse roll-over tooltip

and pottery and context spot dates can all be entered rapidly by an authorised user on any web-enabled device.

The database validates entries and provides common filters and export functions, allowing staff to access their data from any device.

THE FULL SYSTEM: OA WEBMAP AND OA DRS

The true benefit of the system is that contextual information is automatically linked in real time to spatial data collected by our survey department; this can then be interrogated via OA WebMap. When a site has data entered into both modules it opens up new avenues of interrogation and new data management options.

Within WebMap each trench can be clicked to view the current trench data, which will reflect the final trench table used in any report. The presence and absence of archaeology and the current field status of the trench (opened, recorded, backfilled) can be displayed using distinct colours to aid site management.

Context information becomes accessible through WebMap by simply clicking on a feature. Any associated record will be retrieved and shown in a pop-up. This information can also be used to search the map for a feature using the context number, group number or feature category.

The system will automatically match registered environmental samples and artefact spot date entries to features. Using the context relationships, it will auto-generate a point at the centre of the corresponding feature, providing real-time point distributions.

The environmental sample points are automatically coloured based on the sample type, and detailed sample information can be viewed with a click. Individual sample types can be displayed.

Spot dates offer more display options, allowing the records to be displayed and coloured by period, or sized dynamically based on their count/weight values as entered into the OA DRS.

CONCLUSIONS

The creation of a new system allowed us to evaluate what core data was needed in order to provide a more dynamic field methodology. The new systems provide a higher level of data validation and integrity during the fieldwork phase, removing some of the delays usually seen in projects. Survey becomes an integrated part of a wider system that pushes data to the forefront. The platform also provides the basis for future refinement and expansion, allowing a much greater range of information to be made accessible through OA WebMap.

While these developments may not be ground-breaking in terms of technological advancement, they do represent an internal paradigm shift within the company, adding extra value to any project for both our own staff and for external parties.