Scaling up to meet the demand

Digital innovation within the UK's largest archaeological projects

Peter RAUXLOH, MOLA[1], UK

Keywords: *Innovation—assessment—digital—national—database—UAV—collaboration*

CHNT Reference: Rauxloh, Peter. 2021. Scaling up to meet the demand. Digital innovation within the UK's largest archaeological projects. Börner, Wolfgang; Kral-Börner, Christina, and Rohland, Hendrik (eds.), Monumental Computations: Digital Archaeology of Large Urban and Underground Infrastructures. Proceedings of the 24th International Conference on Cultural Heritage and New Technologies, held in Vienna, Austria, November 2019. Heidelberg: Propylaeum.
doi: 10.11588/propylaeum.747.

This paper will present innovations in digital data capture and management that have been brought about by the execution of two large linear infrastructure projects that are currently underway in the UK. It is meant as an honest and pragmatic contribution, being as much about innovation (major and minor) as the essential matter or applying and exploiting them in the context of these huge projects, and the success or otherwise achieved.

The first project is the building of a new road; the A14 Cambridge to Huntingdon Improvement Scheme (Fig. 1) in Eastern England. At some 23 km in length and comprising a total archaeologically excavated area of c.3.5 km dug by a team of 250 archaeologists (and a further 50 in support roles) over 18 months, this was one of the largest archaeological projects carried out in the UK in recent years.

The second project of interest, are the works in advance of the UKs new High Speed rail line (High Speed 2 [HS2] Phase 1 which runs due north from London to Birmingham 230 km).

The A14 project is now entering the post-excavation phase with site work now complete. Mitigation work on most HS2 phase 1 sites is yet to start, although there has been much excavation carried out on the two burial sites at either end of it (Fig. 2). The A14 project had been one of the largest archaeological projects ever undertaken in the UK; HS2 is an order of magnitude bigger.

There are a number of salient factors of such large-scale projects, primarily organizational and logistic in nature. These factors include the necessarily mixed nature of the archaeological workforce needed to execute such projects, and the need for formal joint ventures to ensure defense in depth and assuredness to the client that the work can be delivered.

As relevant are the increasingly specific requirements placed on archaeological contactors by the scheme owners, particularly with regard to matters such as the standing expectation to innovate, the desire to create less yet more targeted information and the exhortation to produce long term community benefit. Specifically, the General Written Scheme of Investigation for Historic Environment Research and Delivery Strategy for HS2 phase 1 (HS2 Ltd 2017) can be cited, which itself

[1] Museum Of London Archaeology Service

implements much of the ethos defined in the Social Value Act 2013 (UK Government, 2013). Four examples of innovation will then be discussed.

Fig. 1. Circular 'henge' monument thought to have been used as a ceremonial space (© Highways England) courtesy of MOLA Headland Infrastructure

Innovation in aerial survey

Aerial survey proved incredibly useful in maintaining control and providing context to a developing Project (Fig. 2), with multiple simultaneous excavation totaling c. 3.5 km^2. Planned enhancements to aerial operations include enhancing situational awareness, via live streams from the aircraft to remote persons responsible for monitoring progress and signing off areas, and the increasing affordable application of UAV bourne LiDAR. The *habitual* embedding of UAV bourne multi-spectral imaging into the evaluation phases of large mainstream infrastructure is also underway.

Collaborative Data Environments

The creation of web hosted archaeological collaborative data environment, (CDE) also proved invaluable on project in which different geographical dispersed organizations (constituted as joint-ventures which clients encouraged given the scale of works undertaken) and teams of lone specialists, all had to communicate effectively and record data to the same standard. Oracle based Infrastructure As A Service (IAAS) offerings, specifically DBAAS2 and Cloud Compute3 (Oracle, 2019) platforms were utilized. A number of factors proved pertinent; the need to re-engineer on-site based

workflows, the never-ending importance of training, and the practical matter of providing remote support to a dispersed team

Asset tracking

Following problems encountered in keeping track of thousands of environmental samples, and an initial attempt to extend database structures within the archaeological CDE to mitigate this, the problem was recast as simply one of logistics. This notion presaged the adoption of commercial asset tracking system with only slight adaptions being made to the archaeological data tables to enable the minimal level of communication required.

Fig. 2. Archaeologists excavating the St James Burial ground for HS2 (© HS2) courtesy of MOLA Headland Infrastructure.

Supporting assessments

Finally, these projects engendered improvements in the transition from the excavation into the post excavation and analysis phases, enabling the completion of a valid, and research-goal targeted assessment of the material's analytical potential to be made.

The need was to rapidly characterize the sites based on the *coarse,* yet abundant data captured during the excavation phase. Reporting routines based on eth CDE data sets had to evolve to enable statements to be made about both the broad dates of material and the key landscape features present on a site, with which object specialists could better assess the significance of their assemblage.

References

HS2 Ltd (2017). 'Historic Environment Research and Delivery Strategy Phase One August 2017', Available at https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/642655/hs2_phase_one_historic_environment_research_and_delivery_strategy.pdf (Accessed: 02 September 2020).

UK Government (2013). 'Social value act: Information and resources', Available at https://www.gov.uk/government/publications/social-value-act-information-and-resources/social-value-act-information-and-resources (Accessed: 02 September 2020).

Oracle (2019). 'Oracle Cloud Infrastructure products', Available at https://cloud.oracle.com/en_US/iaas (Accessed: 02 September 2020).