CIfA Chartered Institute for Archaeologists

The Archaeologist

Issue 114
Autumn 2021

In this issue:

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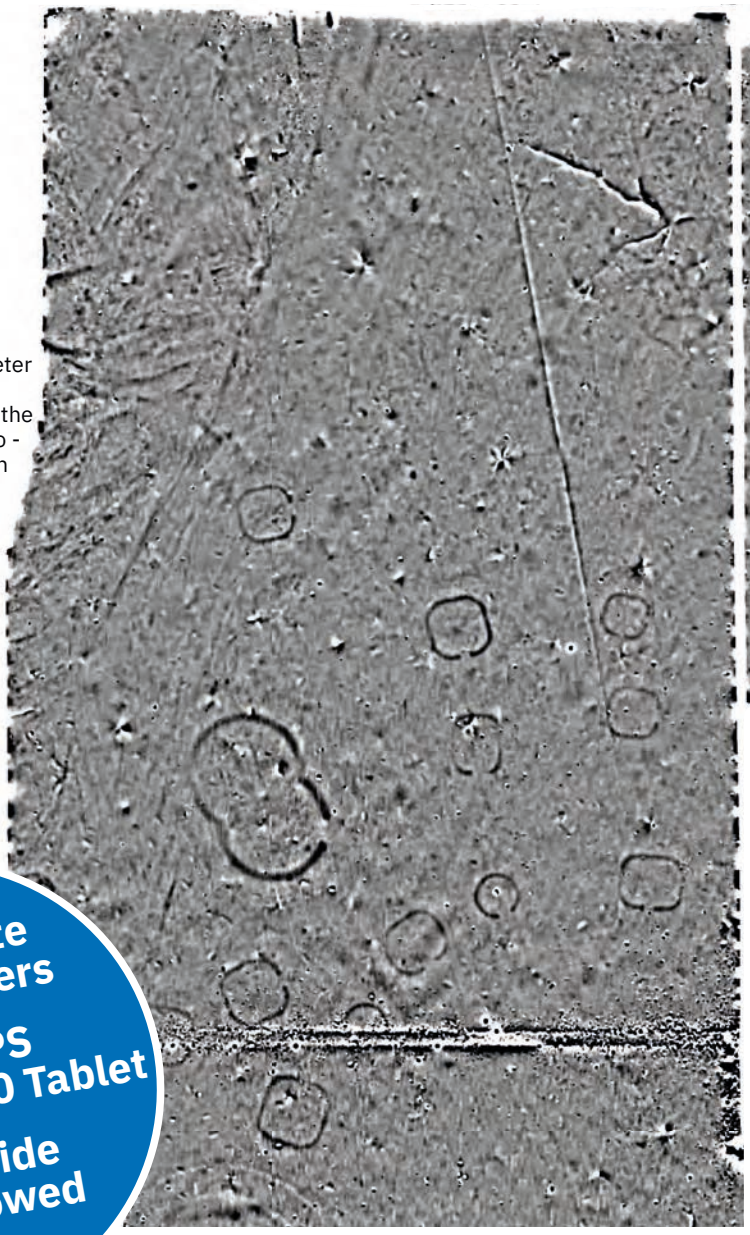
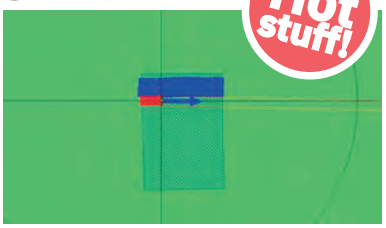
Magnetometers & Survey Solutions

"I'm very impressed with my SENSYS MXPDA magnetometer system. Its ease of use and durability have transformed the scale of the archaeology I do - giving me more time to be an archaeologist."

JARROD BURKS, PhD
DIRECTOR OF ARCHAEOLOGICAL GEOPHYSICS, OHIO VALLEY ARCHAEOLOGY, INC.



Hot stuff!



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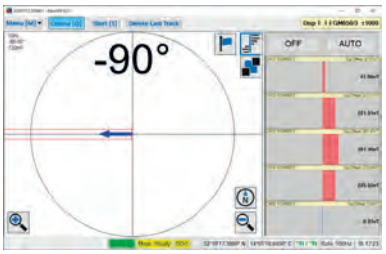

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Notes for contributors

Themes and deadlines

TA115 will look at the contribution archaeologists can make to climate change responses. Articles should, for example, focus on how archaeology can inform and add value to climate adaptation projects such as peatland restoration, woodland creation, wetland reinstatement, or building modification.
Deadline: 1 December 2021

Contributions to *The Archaeologist* are encouraged. Please get in touch if you would like to discuss ideas for articles, opinion pieces or interviews.

We now invite submission of 100–150-word abstracts for articles on the theme of forthcoming issues. Abstracts must be accompanied by at least three hi-resolution images (at least 300dpi) in jpeg or tiff format, along with the appropriate photo captions and credits for each image listed within the text document. The editorial team will get in touch regarding selection and final submissions.

We request that all authors pay close attention to CIfA house style guidance, which can be found on the website: www.archaeologists.net/publications/notesforauthors

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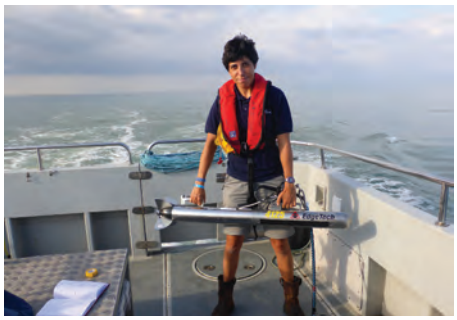
Cover photo: The Sensys MXPDA in use at Wormiston Rings (DP362904). Credit: HES 2021

EDITORIAL

Lucy Parker MSc MCIfA (4972), Archaeological Projects Team, Historic England



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For over 30 years, geophysical survey has played a major role in archaeology: in developer-led investigations, and as a fundamental element of research and community projects. I personally love the unassailable scale of access it gives to archaeological landscapes, and the detail that is achievable without damage. In planning this edition, I was drawn to a paper given by Aspinall and Haigh in 1997 reviewing 25 years of terrestrial archaeological prospection. They felt the future focus lay in the 'development of instrumentation and interpretative methodology'.

Almost 25 years later, have we fulfilled their expectations? Acquisition speed has increased exponentially through hardware advances. Nationally Significant Infrastructure Projects are collecting magnetic data equating to thousands of hectares of coverage over their lifecycles. Processing and interpretation methodologies keep pace, automatic processes are commonplace, and with advances in artificial intelligence for the interpretation of remote sensing there is real potential for their employment in the future.

No single approach suits all geologies, archaeological remains or research questions. We are led primarily by standards and guidelines, but are geophysical ones keeping up? The White Paper *Planning for the Future* and recommendations 11 and 21 in the *Tailored Review of Historic England* suggests revisions will need to include technical advances as well as potential changes to the planning system. In this *TA*, Alison James highlights the work updating Historic England's guidance document *Marine Geophysics Data Acquisition, Processing and Interpretation*.

Geophysical survey is often used within the UK planning process to establish the presence or absence of archaeological remains. Wessex Archaeology give a precis of the usage of geophysics in both terrestrial and marine environments. The possibilities of geophysical survey reach further than the planning process; Stefan Sagrott demonstrates how geophysics is used in assessing archaeological sensitivities of HES's properties. Ken Hamilton goes beyond site investigation, presenting the visualisation of historic shipwrecks to allow new audiences access to these protected wreck sites.

Is the perception of geophysics keeping pace with our advances? Nick Hannon discusses the five-year project to embed geophysical survey techniques within HES and to promote its use and best practice throughout Scotland's heritage sector, which has historically been cautious of these techniques because of variable geology and specific research questions, eg in the case of battlefield archaeology. Hannah Brown demonstrates the importance of the appropriate technique for the survey objectives which can provide crucial information to allow project designs to be more effectively complied. Kimberley Teale's reflection on a recent training session shows that the appetite for a broader understanding of geophysical capabilities spans the sector; demystifying archaeological geophysics can only lead to improved discussion and more successful geophysical surveys.

I am about to embark on a research project to examine the increased use of geophysical survey within England and how collaboration benefits our discipline. My 'future focus' is to maximise the effectiveness of the interpretation of geophysical datasets and to improve the integration of geophysical survey into archaeological investigation. In a small way I hope this aids the development and reliability of archaeological prospection in line with Aspinall and Haigh's aspirations.

Placing geophysical survey at the centre of archaeological and heritage services

Rok Plesnicar, Geophysicist; Nicholas Crabb ACIfA (8829), Senior Geophysicist; and Tom Richardson ACIfA (6261), Terrestrial Geophysics Manager, Wessex Archaeology

The advent of contemporary digital technologies such as GIS, remote sensing and geophysical survey has had a tremendous impact on archaeological practice. These tools have become commonplace, and they enable us to investigate beyond the 'site' to consider what is happening within the wider landscape. Geophysical survey, in particular, has made significant technological advances over the last 30 years, with new instruments and sampling strategies making fieldwork faster, more sophisticated, and more cost-effective.

Typical gradiometer setups used in terrestrial geophysics. L–R: Handheld Bartington Grad601 dual sensor system; Non-magnetic cart mounted Bartington Grad-13 sensors; All-terrain vehicle towed array with SenSys FGM650/3 sensors. In optimal conditions handheld systems allow for approximately 2ha of survey data to be collected in a single day, whereas cart-based system and vehicle-towed systems can facilitate more than 5ha and 10ha respectively. Credit: Wessex Archaeology

Terrestrial geophysical survey incorporates a variety of non-destructive methods used to identify subsurface variations through the measurement of physical properties of the ground. Each technique has specific advantages and limitations, and when deployed in appropriate conditions, they can be extremely effective. More recently, the towing of these instruments on vehicle-mounted arrays, and integration of GPS/GNSS data, enables rapid data collection at very high resolution, allowing for entire archaeological sites and landscapes to be mapped at unprecedented levels of detail. As such, it is fair to say that the evolution of geophysical prospection has been one of the most important methodological advances of field archaeology in recent times.

At Wessex Archaeology, geophysics is utilised alongside a range of archaeological and heritage services. This enables us to draw upon a breadth of experience and leads to a cohesive approach, where different disciplines meet throughout the lifecycle of a project. As these techniques are often deployed at the outset of a project, this can be critical in helping clients achieve successful planning outcomes, engage communities and stakeholders, and enhance the value of national historical assets.

The value of geophysics in the planning process

Today, geophysical survey plays a major role in developer-funded archaeology. It is now regularly deployed over vast areas, with preliminary results normally available shortly after completion. This allows for an initial assessment of the potential archaeological impact of a development scheme and facilitates a proactive planning approach that can maximise available resources and time. Surveys can be undertaken pre-planning or ahead of land purchases to inform development design, and potentially reroute schemes if significant remains are encountered. Effective interpretation of these datasets helps to focus resources in subsequent phases of investigation,

... it is fair to say that the evolution of geophysical prospection has been one of the most important methodological advances of field archaeology in recent times.

Multi-channel GPR survey in progress at Queen Anne's house in Greenwich, London (NHLE 1002060). The survey was undertaken using an Impulse Radar Raptor array, which contains eight transmitter and receiver antennae spaced 8cm apart, with a central frequency of 450MHz. Credit: Wessex Archaeology

Greyscale plot and interpretation of multi-channel GPR survey from Queen Anne's house in Greenwich, illustrating the location of the observation towers of King Henry's tiltyard. Digital data reproduced from Ordnance Survey data. Credit: Crown Copyright (2020) All rights reserved. Reference Number: 100022432.

either through the targeted application of complementary geophysical survey methods or by informing the location of intrusive evaluation or mitigation strategies. This can reduce costs for the client and provide enhanced detail of any archaeological remains that may be preserved in situ. For example, at the development site shown in the greyscale plot of magnetic gradiometer survey, an extensive and complex array of enclosures were discovered, with those in the east of the site forming a ladder settlement, dated to the Iron Age and Romano-British periods in subsequent evaluation trenching. The clarity and detail provided by the survey meant that the design of the development could be adjusted, leaving the focus of the settlement outside of the impact of the scheme.

The most widely used geophysical method in the UK is magnetic (fluxgate) gradiometer survey. This is because it responds well to the broadest range of archaeological features, is effective in most rural environments, and can cover large areas quickly (Schmidt et al 2015). Although results can be poor on some geologies and where there are extensive superficial deposits (eg alluvium), deeper geophysical methods (such as lower-frequency GPR, ERT, EMI) can delineate landforms and subsurface variation, which, in turn, can be related to archaeological potential (Carey et al 2018). The application of appropriate methods in different landscape settings can, therefore, be a powerful tool in managing the impact of developments on the historic environment.

Adding value to community projects

In addition to aiding development, geophysical survey can provide significant value to community and research projects. Since these are usually conducted on sites of archaeological interest, the aim is generally to provide a more detailed insight or specific interpretation. At Queen's House in Greenwich, London (NHLE 1002060) a multi-channel GPR survey was carried out, which confirmed the location of observation towers associated with a tiltyard constructed for jousting events in 1514–18 by Henry VIII. It also characterised several more recent features including the foundations of the former Royal Hospital School.

Rok Plesnicar

As a geophysicist based in the Salisbury office, Rok has helped to improve Wessex Archaeology's field practice establish more effective and efficient methods, both in the field and the office. He is particularly interested in the application of GPR and cart and vehicle-based systems.

Nicholas Crabb

Nicholas is a senior geophysicist with experience in directing geophysical fieldwork projects varying from small investigations of Scheduled Monuments and historic properties to large infrastructure projects. He is particularly interested in the application of geophysical and remote sensing techniques to investigate complex archaeological remains or areas of geoarchaeological potential. He is currently working part-time whilst studying for a PhD at the University of Brighton.

Tom Richardson

As Terrestrial Geophysics Manager, Tom acts as lead on projects from initial discussions with clients through to delivery of the final product. He aims to produce high-quality results that meet the client's needs by providing innovative survey designs and solutions.

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ALL AT SEA: ADDING ARCHAEOLOGICAL VALUE TO AN OCEAN OF BIG DATA

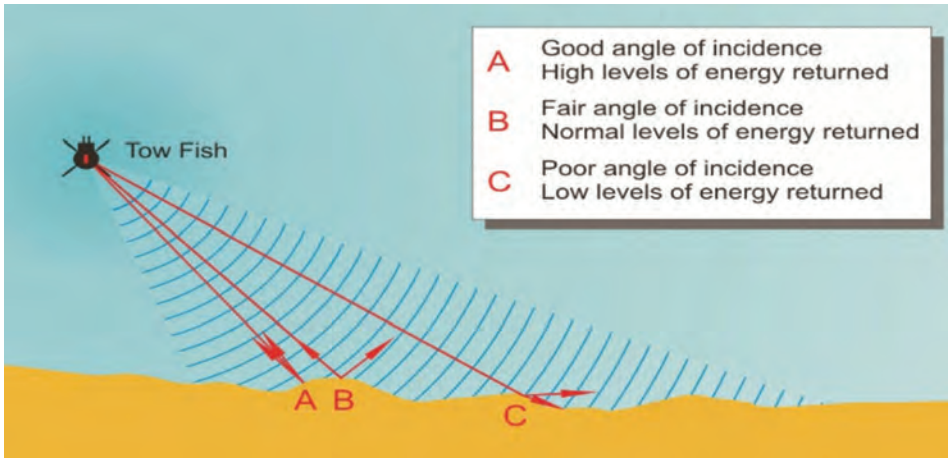
Scott Chaussée ACIfA (7007) and Tim Marples, with contributions from the Marine Geophysics team at Wessex Archaeology

In writing an article on marine geophysics, we thought it would be useful to provide a narrative in the form of a retrospective. The 'industry' has changed markedly over the last ten years, and continues to do so. There is continuity with aggregate extraction but the rise of offshore renewables, with power and data interconnectors, plus new concerned parties has created a new stakeholder landscape. In the age of climate change, infrastructure development is both required and nationally significant; it also occurs on a completely different scale.

We maintain a strong working relationship with dedicated site-survey contractors who collect the bulk of the data we assess. The increases in project scales have necessitated adoption of better technology and techniques, but also substantial increases in data volumes: marine geophysics datasets routinely approach of tens of terabytes. Big-data issues provide both challenge and reward, allowing for greater insight through high-resolution examination of the seabed over hundreds of square kilometres. In this article we look specifically at seabed assessments comprising SideScan Sonar (SSS), Multi-Beam Echo Sounder (MBES), and magnetometer data. Marine geophysics for archaeology requires the highest fidelity data density commercially achievable: we have no 'lower limit' of detection.

Our specialism is in teasing out the archaeological signal from the geotechnical and geophysical noise. The value-add for commercial clients is in timely avoidance and mitigation of potential archaeology before costly decisions are baked into the design. Fortunately, the data is usually acquired already for geological, engineering or Unexploded Ordnance (UXO) purposes and we are able to work with whatever is thrown at us; the higher resolution the better for heritage and all at small incremental survey cost.

Within Wessex, the Marine Geophysics Team is situated alongside our Terrestrial colleagues in our Geoservices directorate servicing internal and external clients with projects scopes that range from several days to year(s)-long assessment commitment. On a daily basis, our team routinely classifies the likely origin and significance of small (sub-metre) anomalies while features at the wreck scale - ship or aircraft – are the exception; but it is these exceptions that drive the enthusiasm of our team.



SideScan Sonar (SSS). Credit: Wessex Archaeology

As a suite of complementary techniques, marine geophysics is the only remote, non-intrusive method of risk reduction available to our clients and sits between desk-based research and focused ground truthing. In choosing a case study, we reference an older study encompassing the acquisition, processing, assessment, and mitigation/recommendation scope. Our chosen example was a survey undertaken in 2011 for the London Gateway Port development, which proposed to widen and deepen the approach channel to accommodate larger vessels, forming one of the largest dredging projects ever planned in the UK (Scott and Gane 2015).

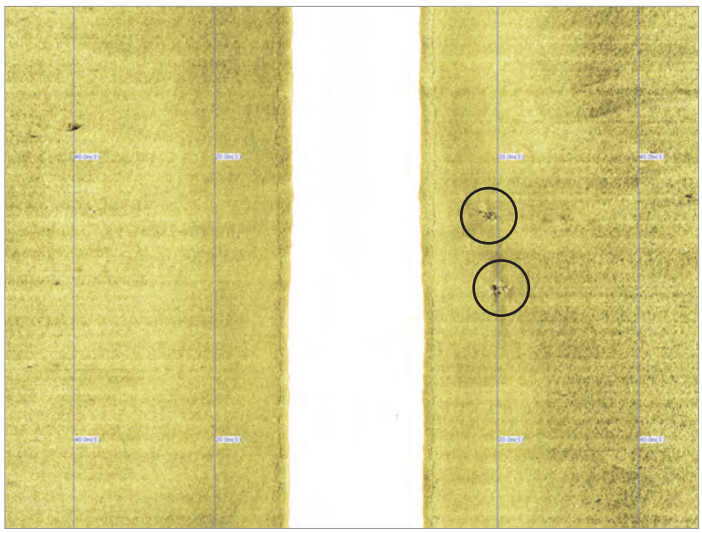
The geophysical assessment produced a total of over 540 anomalies. Two small SSS anomalies were located within 25m of each other. A small but distinct magnetic anomaly associated with the SSS features suggested the presence of ferrous material. Our team synthesises a wide array of documentary material to support our interpretations, including so-called 'strike reports' produced by dredge operators. A strike report is generated when unexpected material is recovered during dredging. In this case, a strike report corresponded with a dredging track over the area where the anomalies were detected.

Finds recovered by the dredger included fragments of aluminium airframe and parts from a large format camera, some stamped 'R8.88', which indicated that it must have come from a German Junkers 88 bomber (Ju 88), lost during World War II. Wessex's Coastal and Marine teams dived the locations identified in the geophysical data

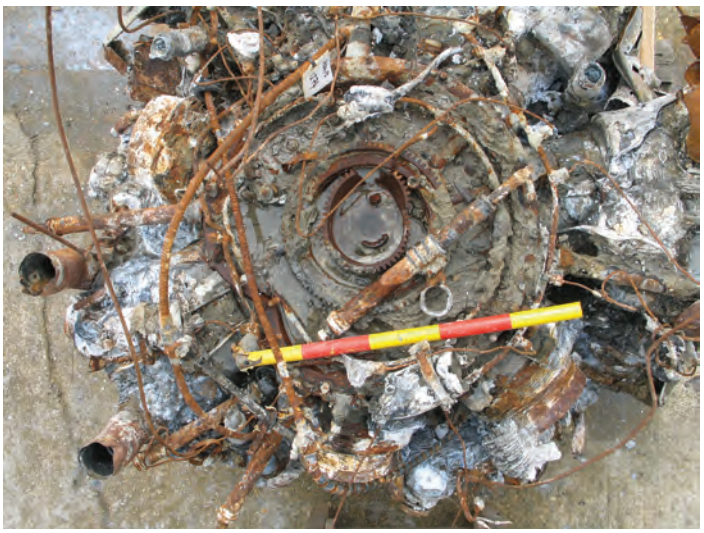
and observed further excavation by grab-dredger. The complete assemblage numbered 351 objects and comprised elements which helped identify the wreck as a Ju 88T; the only one of these known to have been lost was shot down by a Norwegian fighter ace on 20 April 1943 (Scott and Gane 2015: 80-86).

The sea has shaped human communities and their relationships with each other since the earliest times. Contributions of marine geophysics to the human story have ranged from elucidating submerged prehistoric landscapes to examining the tragic reflections of human conflict, demonstrated by wreckage of ships and aircraft. We are uniquely placed to continue sharing our privileged view of submerged sites and landscapes and generating value for the clients and communities we serve.

Steph Arnott on deck preparing for SSS data acquisition. Credit: Wessex Archaeology



Sidescan sonar waterfall image with anomalies indicated. Credit: Wessex Archaeology



BMW 801G-2 radial aero engine recovered from one of the locations identified in the marine geophysics. Credit: Wessex Archaeology

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Scott, G and Gane, T, 2015 'Aviation archaeology offshore', *Journal of Conflict Archaeology* 10(2).

Scott Chaussée

Scott is a marine geophysicist based in the Salisbury office. Marine Geophysics at Wessex Archaeology is a close-knit team that provides technical authority and subject-matter expertise in support of offshore projects including renewable energy, infrastructure, and community engagement.

Tim Marples

Tim is the manager of the Marine Geophysics team. He joined Wessex Archaeology in 2019 after over 30 years as a geophysicist in global oil and gas exploration, choosing to make a change in support of a more sustainable future.

The role of geophysical survey in managing the **Historic Environment Scotland** Estate

Stefan Sagrott ACIfA (7498), Senior Cultural Resources Advisor (North), Historic Environment Scotland

There are 336 Properties in Care (PICs) that form the Historic Environment Scotland (HES) estate, ranging from Mesolithic settlements and Bronze Age cairns through to medieval castles and 18th-century forts and industrial sites.

With most properties designated as Scheduled Monuments, non-invasive geophysical survey plays an important part in providing the information required for the Cultural Resources Team to deliver positive asset management supporting conservation work and visitor infrastructure improvements at the sites.

Despite what might be thought, many of the PICs have not been subject to extensive archaeological excavations. As monuments came into state care, the various predecessor organisations to HES undertook superficial clearance works, removing overburden and often chasing wall lines to make sites presentable to the public. Because of this, many of our sites remain archaeologically sensitive and archaeologically significant, with much more to learn about them from the archaeological deposits and features that survive below the ground surface. A number of the aims within the HES

Geophysical Survey being undertaken at Threave Castle, Dumfries & Galloway. Credit: Historic Environment Scotland

... many of our sites remain archaeologically sensitive and archaeologically significant, with much more to learn about them from the archaeological deposits and features that survive below the ground surface.

Archaeological Principles, Standards and Operational Plan for Properties in Care align tightly with geophysical survey and what it offers:

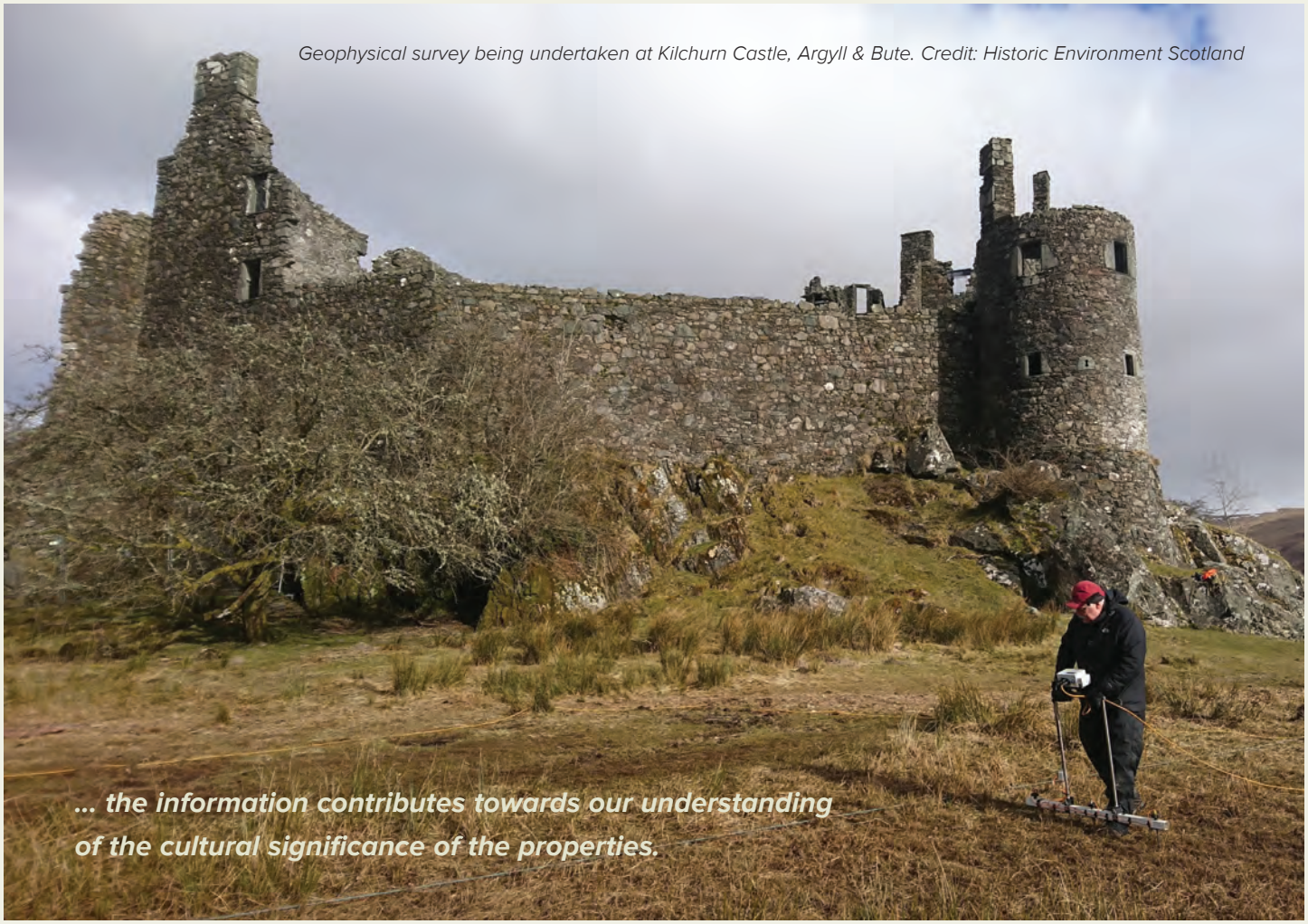
- To enhance our baseline understanding of the significance of the Estate and the risks to it
- To align the archaeological work with other programmes of work
- To facilitate positive asset management of the monument from an evidence-based perspective
- To facilitate increased activity and audience engagement at PICs through achieving better understanding of the parameters imposed by the archaeological evidence so increasing opportunities, for example, events, filming and outreach.

The first geophysical survey at an HES site that we have a record of was carried out in 1972 but it was not until the mid-1990s that it really took off, with surveys being commissioned by the then Inspectorate, and being carried out by university departments for research projects. This trend continues to the present day, although coverage of both individual properties and the estate remains relatively low, with only around 20 per cent of the PICs having had some form of geophysical survey, although this has greatly increased in recent years.

The information we gain from geophysical survey allows us to provide accurate advice on the archaeological sensitivities and ensure that the archaeology and cultural significance of the PIC is conserved. Further, the information contributes towards our understanding of the cultural significance of the properties, which is expressed through our Statements of Significance programme, and to the interpretation and visitor experience offered at our properties.

The relatively low cost, ease of deployment and rapid nature of results being available means geophysical survey is an ideal tool for heritage managers. For HES it is affordable and allows us to form a baseline for each property, gelling with the HES Conservation Principles, and this means that all work across the estate follows best practice whilst being underpinned by evidence-based decision making.

In 2018 we commissioned Rose Geophysics to undertake a geophysical survey at St Andrews Cathedral to develop a baseline understanding of the cathedral precinct and understand the early development of the site in the later 1st millennium AD. Gradiometer, resistance and Ground Penetrating Radar (GPR) surveys were all carried out. The latter revealed extensive burials of potentially two different phases and two possible structures of archaeological interest. One of these, to the northwest of the 12th-century St Rules Tower, is a rectangular structure some 20m by 8m on an east–west alignment at a depth of between 0.75m and 1.75m. The structure is especially intriguing as it located in a similar area and at a similar depth to likely



Geophysical survey being undertaken at Kilchurn Castle, Argyll & Bute. Credit: Historic Environment Scotland

... the information contributes towards our understanding of the cultural significance of the properties.

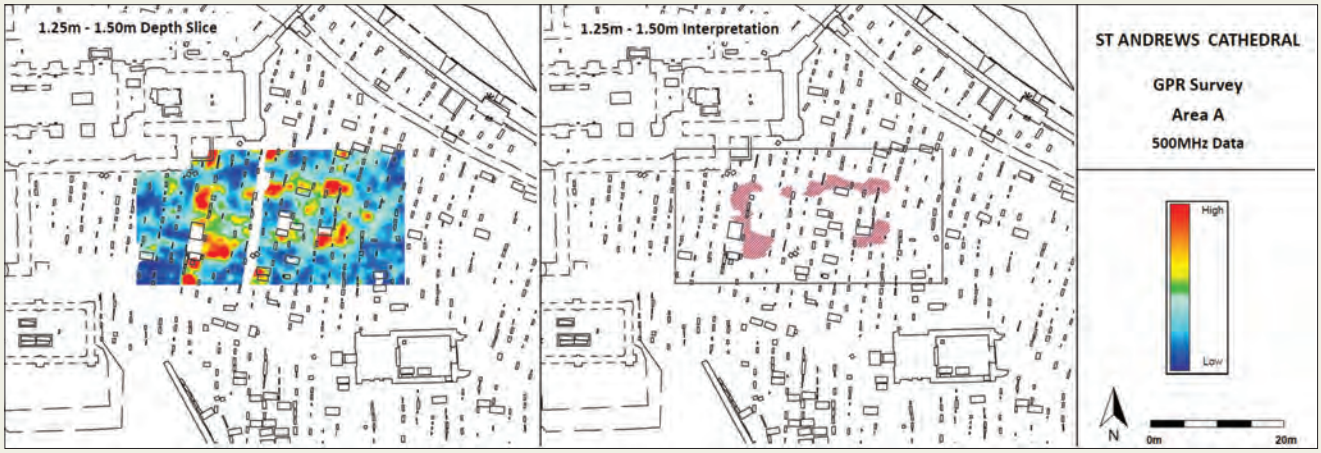
Gradiometer survey being undertaken at Doon Hill, East Lothian Credit: Historic Environment Scotland

Pictish sarcophagus discovered by grave diggers in 1833.

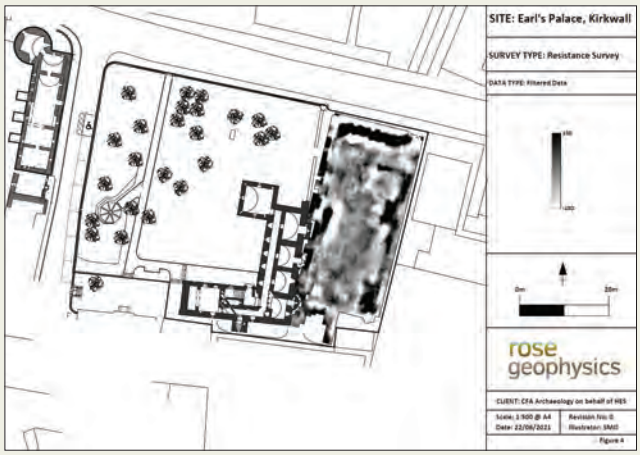
As demonstrated recently at the Earl's Palace, Kirkwall, geophysical survey can provide information rapidly where archaeological information and understanding is lacking. Here the survey was used to assess whether an area of the site earmarked to temporarily hold a portacabin for staff welfare was of archaeological significance. Previous investigations in the wider area following the removal of a modern tennis court had indicated that garden and landscaping deposits related to the main occupation of the palace lay at a shallow depth, but nothing was known about this specific location. Rapid resistivity survey was undertaken in one day by Rose Geophysics with the results made available the day after. Indicating that the specific area was not sensitive and that the portacabin installation could go ahead, the survey also 'tentatively suggested that more distinct anomalies have been noted which may be archaeologically significant, potentially indicating structures and walls associated with the former garden', providing us with baseline information and future research objectives.

Geophysical survey has an important role in engaging with communities, and in developing interest in STEM (Science, Technology, Engineering, Maths) amongst school pupils. In 2019 Historic Environment Scotland was approached by the recently reinvigorated Historic Hilton Trust (HHT) to develop a project around the spectacular carved stone and chapel site in Easter

GPR survey being undertaken at St Andrews Cathedral, Fife. Credit: Historic Environment Scotland



Depth Slice from GPR survey at St Andrews Cathedral. Credit: Historic Environment Scotland



Results of the resistance survey at Earl's Palace, Kirkwall. Credit: Historic Environment Scotland

Ross (the original stone is on display in the National Museum of Scotland). The site, which is an HES Property in Care, is owned by the HHT, who also look after the base of the Hilton of Cadboll stone following its excavation in 2001. There is a strong interest in archaeology and history amongst the local community, who have a deep connection with the site and are very proud of it. Initiatives include outreach with the local school and fundraising activities such as Picts in the Park, which was held in 2019.

A joint project by HES and HHT planned to start in April 2020 has been postponed because of Covid-19. A geophysical survey of the entire site is planned, involving local school pupils, to be followed up with some small-scale investigations. Working with the HES Learning and Inclusion team, the project hopes to develop its Junior Guide scheme with local children. At the heart of it is engagement with the local community, as they value the site highly and want to see it better understood and appreciated. We hope to be able to start the project later in 2021 once the Covid-19 situation has become clearer.

Stefan Sagrott

Stefan is an archaeologist in the Cultural Resources team at Historic Environment Scotland, where his work contributes towards the management and conservation of the archaeology and cultural significance of the HES estate. His job necessitates him having a broad range of research interests across many periods and he is particularly keen on the use of geophysics, airborne laser scanning and photogrammetry for cultural heritage survey and protection. Stefan is Treasurer of the CIfA Scottish Group.

Marine Geophysics Data Acquisition, Processing and Interpretation – the second edition

Alison James MCIfA (6059), MSDS Marine

Historic England has commissioned MSDS Marine and Spectrum Offshore to produce the second edition of Marine Geophysics Data Acquisition, Processing and Interpretation, first published in 2013.

The purpose of this guidance document is to describe geophysical surveying techniques that can reveal information about the historic environment as might be encountered on, within and beneath the seabed around England.

The UK is in a very active phase of marine planning and development and up-to-date information is required about the use of marine geophysical survey techniques and methodologies. In November 2020, the UK government published *The Ten Point Plan for a Green Industrial Revolution*, of which Point 1 is 'Advancing Offshore Wind'. There is therefore a pressing need to produce an updated edition of *Marine Geophysics Data Acquisition, Processing and Interpretation*, so that survey campaigns conducted to support maritime development projects can reveal or otherwise demonstrate the presence of historic and archaeological sites and places.

Prior to the commencement of offshore development projects, geophysical and hydrographic data is the primary dataset from which archaeologists can determine the presence, location and extents of material of potential archaeological interest and recommend appropriate mitigation strategies. Ensuring that geophysical and hydrographic data is collected, processed and interpreted to defined standards and specifications across the sector ensures that mitigation recommendations will be consistent and provide the highest level of protection for the historic environment.

The updated guidance will be aimed at all user groups including developers, surveyors, archaeologists, curators, early career professionals and students. It will provide guidance for the offshore development sector, and will serve as a useful reference for those conducting geophysical surveys directed at archaeological sites as well as for others conducting surveys to optimise the principle of 'collect once, use many times'. The guidance will present all aspects of the data collection, processing and interpretation process from survey planning through to reporting. Each section will be written with each user group in mind, with information being presented logically and coherently.

The project is a partnership between MSDS Marine and Spectrum Offshore. These organisations bring a wealth of skills to the project and represent an opportunity for knowledge and skills transfer in the heritage sector. This partnership will ensure that the guidance is suitable for use within the archaeological sector, as well as benefitting from input from a professional, experienced and respected survey contractor. This approach means that the guidance will consider the real-world implications and requirements of data collection for offshore developments and the synergy between all end users of the data. Thus, its implementation will be feasible, proportional and robust.

The guidance is being developed with input from the whole sector through a targeted programme of stakeholder workshops, consultation and webinars. In autumn 2021 the project team will be hosting an online workshop to gather information from the sector to feed into the guidance review. At present this is planned for 25 November 2021, so save the date! This will act as a focus group discussion to explore issues in depth and to seek the views of stakeholders, as well as to generate new ideas relevant to the guidance. Following the workshop an updated guidance document will be produced for sector consultation in early 2022.

The guidance will then be presented to the sector in spring 2022 through an online webinar that we are proposing to run as CIfA-approved CPD.

If you would like to be kept updated with the progress of the project, or to be added to the list of stakeholders for consultation, please email info@MSDSMarine.co.uk

SEEING THE UNSEEABLE: USING GEOPHYSICAL DATA TO VISUALISE HISTORIC SHIPWRECKS

Ken Hamilton MCIfA (2169), National Listing Adviser, Historic England

Of the 37,000+ known ships lost in English territorial waters, 54 are listed as Protected Wrecks on the National Heritage List for England. Protected Wrecks are restricted areas protected under the Protection of Wrecks Act 1973. While a licence to visit a Protected Wreck is freely available through Historic England (https://historicengland.org.uk/advice/planning/consents/protected-wreck-sites/applying-for-licensing/), the logistics of visiting many of these wrecks can be challenging, and impossible for those who cannot dive. Virtual Dive Trails have been commissioned to enable access for all to Protected Wreck sites. The first Historic England Virtual Dive Trail was launched in April 2014, and to date 18 Virtual Dive Trails have been created (https://historicengland.org.uk/get-involved/visit/protected-wrecks/virtual-dive-trails/).

Shipwrecks can be hard to visualise. Large scale photogrammetric mosaics, like that of the SS *Thistlegorm*, are only viable for coherent wrecks with a certain level of visibility and are less informative for more dispersed wrecks or those in difficult conditions. As a result, multibeam echo sounding (MBES) has been used to create most of the models used in the trails and to present the wrecks.

... the logistics of visiting many of these wrecks can be challenging, and impossible for those who cannot dive.

3D model of the sea bed around the wreck of the Association, built from MBES data. Archaeological features have been enhanced and can be identified by clicking on the numbered information points. Full model available at https://vdt.cismas.org.uk/trails/association/. Credit: CISMAS/Historic England

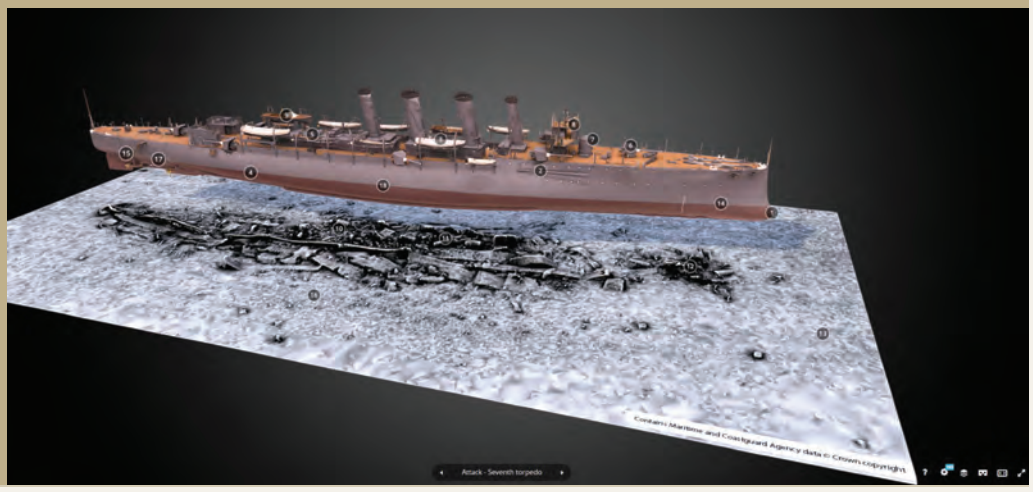
Geophysical data is used in different ways, depending on the requirements of the wreck being showcased. For example, five wrecks in the Isles of Scilly (including the *Association*, the flagship of Sir Cloudesley Shovell, which sank in a storm in 1707) use MBES data to construct a 3D model of the seabed, with points of interest marked. Large objects detected by the surveys are visible on the model, but are highlighted and numbered, allowing greater detail about the history of the ship, the wreck, its discovery and investigation to be explored. Archaeological features are more prominent on the *Wheel Wreck*, where a large mound of mining equipment is visible in the data. A separate visualisation of the cargo mound of the *Wheel Wreck* has been further enhanced with photogrammetry to produce a stunning model that can be viewed in 3D.

Other dispersed and multiple-focus sites such as the *Rooswijk* (a Dutch East Indiaman sunk in 1739) and the *London* (a second-rate ship of the line sunk following an explosion in 1665) use data plots as maps to bring the viewer to different parts of the wreck and to show how parts of the wreck assemblage relate to each other over a relatively large area of sea bed. This is particularly important for the *London*, where diving conditions are extremely difficult and few people can access the site in person.

Metal wrecks offer different options as most survive as relatively complete remains. The virtual dive trail of the wreck of SM U-8 (launched in 1911 and sunk in 1915, the first U-boat to be sunk in English territorial waters) was constructed using diver photogrammetry laid over MBES data. The resulting model concentrated only on the wreck itself, rather than on the surrounding seabed. Accurate technical information from dockyard drawings allowed the creation of two models, pre and post wreck, that can be compared online.

Photogrammetric overlay of MBES data of the cargo mound of the Wheel Wreck*, showing a pumping engine packed for transport. Features can be identified by clicking on the numbered information points. Full model available at https://vdt.cismas.org.uk/trails/the-wheel-wreck/. Credit: CISMAS/Historic England*

The data are used here not only to record the sites, but to present them in an easily interpretable manner to non-specialists with an interest in marine heritage.



3D model of the 1911 builders' model of HMS Falmouth positioned over MBES data showing the wreck today. Features can be identified by clicking on the numbered information points. Full model available at https://historicengland.org.uk/research/current/discover-and-understand/military/the-first-world-war/first-world-war-home-front/what-we-already-know/sea/hms-falmouth/. Credit: Fjordr Ltd/Historic England

A broadly similar approach was taken with the wreck of HMS *Falmouth* (a Town-class cruiser sunk in 1916 and now a Protected Place under the Protection of Military Remains Act 1986). Although not presented as a dive trail, a digital 3D model was created of the ship based on the builders' model and scaled and aligned over multibeam imagery of the wreck in its current form, with additional information available by clicking at relevant points on the model.

It is clear from these examples that the capabilities of geophysical data extend far beyond prospection and site investigation. The data are used here not only to record the sites, but to present them in an easily interpretable manner to non-specialists with an interest in marine heritage. They contribute to the interpretation of the site and (certainly for steel wrecks) can illustrate site formation processes in a clear visual manner. There is scope to add time depth to the trails, using geophysical data to illustrate change in the condition of wrecks and across the sea bed over time.

The dive trails are a key part of affording greater access to marine heritage. The original dive trails (designed to help divers navigate historic wrecks) were recognised by UNESCO as being examples of best practice for audience engagement and the virtual dive trails extend that engagement to those who do not or cannot dive.

It is clear … that the capabilities of geophysical data extend far beyond prospection and site investigation.

Historic England staff demonstrating the dive trails using virtual reality. Most of the 3D models created for the virtual dive trails are VR compatible, allowing for a completely immersive experience without getting wet. Credit: Ken Hamilton

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Ken Hamilton

Ken is a National Listing Adviser in the National Listing and Marine Team at Historic England, working on a wide range of projects and casework on and off shore. Ken has worked in field archaeology, geophysics and civil engineering and has worked in heritage management for the last 17 years.

Geophysics at Historic Environment Scotland

The CMD Mini Explorer in use at Wormiston Rings (DP362905). Credit: HES 2021

Nick Hannon PCIfA (7693) FSA (Scot), Geophysical Survey Officer, Historic Environment Scotland

Historic Environment Scotland (HES) has an active long-running archaeological survey programme that includes field work and aerial reconnaissance but has only recently incorporated geophysics. Thanks to funding from the Historic Scotland Foundation, in July 2020 the Survey and Recording team at HES embarked on a new project focused on geophysics. This aims to embed geophysical survey within HES and promote its use and best practice throughout Scotland's heritage sector. I have been employed as a dedicated geophysical survey officer to provide day-to-day management for the project as well as advice and training to staff throughout HES. The team has also acquired a Sensys magnetometer cart system for use over large areas, as well as a CMD mini explorer electromagnetic instrument for more targeted surveys. A ground penetrating radar system is also soon to be added to the toolkit.

One of the key aims of the project is to support the production of guidelines for the use of geophysical survey in Scotland, working with stakeholders across the heritage sector. These guidelines intend to provide advice specific to practitioners working in Scotland and build upon the existing CIfA and European Archaeological Council (EAC) advice. Future professional and academic partnerships are also being explored.

A small number of surveys have already been completed by the team, and planning is underway for other work throughout Scotland. These cover a wide range of landscapes and types of sites, from small single-day area surveys to larger survey campaigns. Every project has two key aims. The first is to address a range of archaeological research questions to help improve our understanding of the landscape and sites surveyed and ultimately inform their future management. The second aim is to provide testbeds for methodological research to improve the use of geophysical survey techniques in Scotland. This includes the investigation of once heavily ploughed areas that have now been laid to pasture, looking at the impact of seasonality on survey results, and the exploration of environments considered challenging for geophysical

The Sensys MXPDA in use at Wormiston Rings (DP362904). Credit: HES 2021

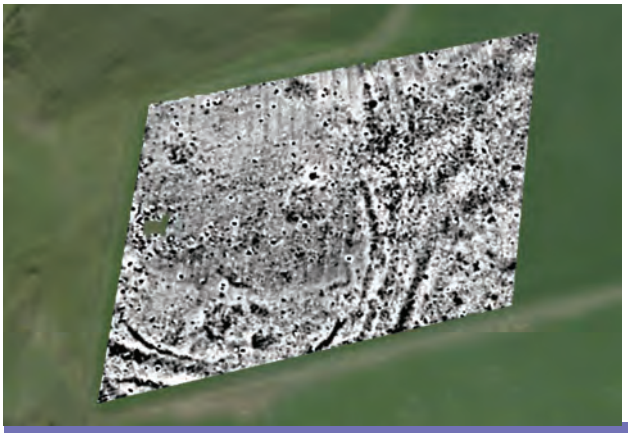
techniques, such as peatlands. The project also aims to explore ways in which geophysical survey results can be integrated with data obtained through other survey techniques, such as LiDAR data and multi-spectral imagery.

The last aim was the focus of a recent single-day survey undertaken at Wormiston Rings, a hillfort in the Scottish Borders. Alongside magnetometry and electromagnetic survey, multi-spectral and thermal imagery was collected from a UAV, which add to a site record that includes high-resolution LiDAR and traditional aerial photographs. This survey revealed a complex arrangement of enclosing ditches and internal features, adding significant detail to our understanding of the site, and it is helping us learn how to integrate data from multiple sources.

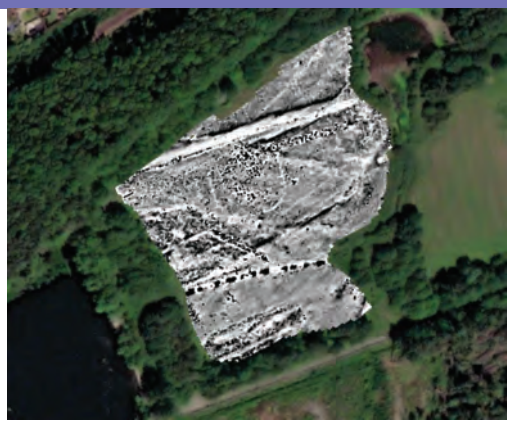
A larger multi-site research project is also underway at various locations within the Antonine Wall World Heritage Site, where the project aims to use geophysical survey to address research and management objectives. Sites to be surveyed include Cleddans fortlet, Duntocher fort, Kinneil House and Seabegs Wood. Results from an early element of this work at Kinneil House have provided promising information, adding detail to our understanding of a site that has already been thoroughly investigated. The survey revealed a previously unknown site, probably of later prehistoric date, just north of the Roman frontier as well as an unexpected 10m^2 ditched feature attached to the rear of the frontier's rampart east of Kinneil fortlet.

Future surveys are planned at sites such as Machrie Moor stone circles on the Isle of Arran, to investigate a peatland environment and help with the management and understanding of a monument that is the care of HES. The area around the Holywood cursus monuments in Dumfries and Galloway will also be targeted to study the relationship between cropmark information and geophysical survey results. Surveys are also planned in the hills to the east of Kirkcudbright, Dumfries and Galloway, to investigate the immediate environs for selected examples of the area's well-known prehistoric carved stones, building on the success of HES's *Scotland's Rock Art* project.

Although this exciting project is in its early days, the team have already made good progress and have a busy calendar of fieldwork planned for the next four years, so watch this space.



Gradiometer data for Wormiston Rings showing the multi-phase ditch systems of this Iron Age enclosure. Credit: HES 2021



Gradiometer data for Kinneil fortlet showing the line of the Antonine Wall and the Roman Antonine period fortlet. Credit: HES 2021

Nick Hannon

Nick works for Historic Environment Scotland as their Geophysical Survey Officer within the Survey and Recording team. He brings a wealth of experience to the role, having previously worked in both commercial and academic archaeology, specialising in the use and analysis of remotely sensed data. Nick earned his PhD from Canterbury Christ Church University, where he investigated remotely sensed data covering the Antonine Wall World Heritage Site.

GEOPHYSICS | SHARING IS CARING

Kimberley Teale ACIfA (6144), Programme Manager – Digital, DigVentures

I love geophysics. I love the questions it can answer without destruction, and the pictures it can paint of landscapes. As professionals, we know that geophysical surveys add value to projects far beyond just ascertaining whether archaeological remains or gas pipes are present on site. If used as part of a multi-disciplinary approach, geophysical surveys can help answer the seemingly unanswerable.

Outside of the profession, there is a growing awareness of its potential and a desire to understand what geophysics does and how to interpret the data. For years, geophysics has been utilised by amateur archaeology groups, by university students and research groups, and by commercial companies to satisfy planning conditions for construction. By bringing geophysics to the primarily community-based work of DigVentures, we have found that it is being utilised by a much wider audience than expected, for adjacent professions or to satisfy curiosity. We recently delivered two seminars covering 'an introduction to geophysics', where we explained the basics of geophysical survey and data interpretation and presented the audience with geophysical results to interpret. Some 435 people signed up for the events, with reasons cited including 'to learn about geophysics as I commission surveys for work', 'it's closely related to my work' and 'to understand the data'.

Out of 269 registrants for the first event, 33 classed themselves within the archaeology discipline either as students or as professionals. Other participants stated occupations including consultants, design managers in construction, engineers, historians and town planners. Out of 166 registrants for the second event, 11 classed themselves within the archaeology discipline, with other participants stating occupations of architects, county councillors, local government and HER officers.

Our seminar registrants expressed thanks at being taught skills previously assumed only for specialists. Many had never really understood the data, or understood that different techniques could achieve different results, especially when used together. Understanding that a one-method-fits-all approach isn't the best approach was key. The overwhelmingly positive feedback we received from the participants suggests we have provided the foundations that will help heritage professionals make informed decisions about the need for geophysics, the most suitable applications, and the use of multi-disciplinary approaches.

Screen shots from the online seminars covering 'An introduction to geophysics'

Kimberley Teale

Kimberley is an archaeological geophysicist experienced in project management and delivery, with a demonstrated history of working in the heritage sector. With a background of running large-scale infrastructure and linear survey schemes, she is committed to providing high-quality data and deliverables. Digital innovation and development are a key part of her role, and she is integral to the development of DigVentures' non-intrusive digital survey techniques and their GIS capabilities.

The bespoke Magnitude Surveys' incarnation of the magnetic 'workhorse': four fluxgate sensors with GPS that can be mounted on a hand-pulled cart, carried by hand or towed behind a quad bike, depending on the terrain. Credit: Magnitude Surveys Ltd

Multichannel GPR in use at Ripon Cathedral. Credit: Magnitude Surveys Ltd

TAILORING SOLUTIONS TO STREAMLINE OUTCOMES

Hannah Brown ACIfA (9599), Reporting Officer, Magnitude Surveys

Arguably PPG 16 was the principal catalyst through which geophysical survey came into its own as an archaeological tool, at least in the British Isles. This piece of planning guidance led to the mainstream use of cost-effective non-intrusive prospection, primarily by means of magnetometer survey; five years later, the fluxgate magnetometer was described as the 'workhorse' of British geophysics (Clark 1996, 69). As the case studies below demonstrate, in addition to increasingly sophisticated options for large-scale magnetic survey, we are now in a position where appropriate alternatives can be deployed at a commercial scale or combined to provide complementary information to tackle project-specific questions. Meanwhile, aerial remote sensing methods offer opportunities for rapid capture of high-resolution data, such as multispectral imagery or detailed topographic survey, to augment subsurface investigation. In other words, we are no longer reliant on the old magnetic 'workhorse' alone.

Effective geophysical survey has never been a case of 'one size fits all'. Happily, technical innovation has focused less on the quest for a 'Universal Ditch Detector' (Gaffney & Gater 2003, 180) and more on instrumentation and software that allows increasing nuance and discrimination in the resulting interpretation. Alongside the applied expertise of geophysicists across the sector, its use in heritage management is invaluable, providing clients with a means of de-risking, developers with more sustainable

heritage strategies, and the public with lower costs and higher quality mitigation. In the light of attempts to 'streamline and modernise' the planning process (MHCLG 2020, 4), the value of geophysical contributions is more important than ever.

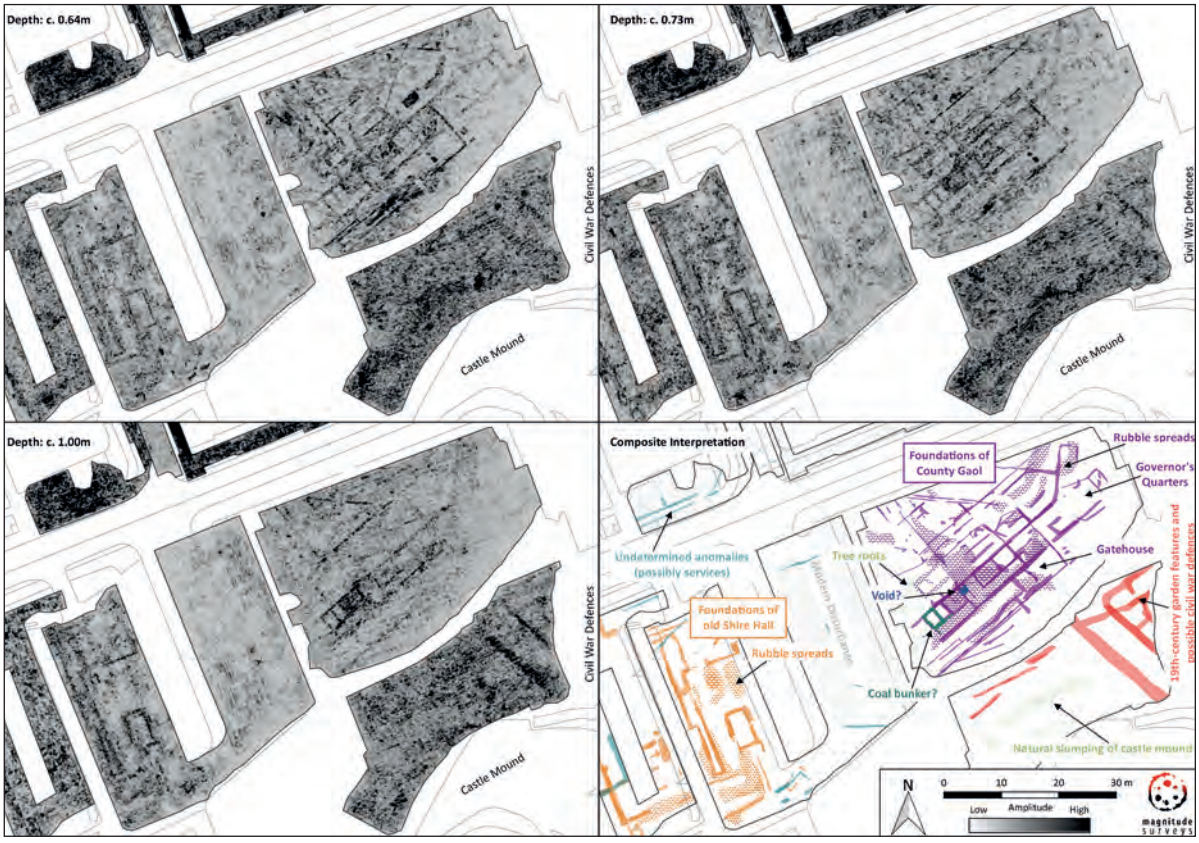
Magnetometry remains an indispensable option in many cases, working on the principle that human activities can cause magnetic enhancement, which can then be detected. The resulting data, when interpreted by a skilled professional, can potentially reveal a range of information about the subsurface, including the location, extent and character of archaeological remains, but also the local geology, modern features and agricultural activity. The current 'workhorse' is already a world away from the 1990s hand-held instrument. Mounting multiple sensors on carts with satellite guidance is now the norm, and magnetometry rightly plays an effective role in mitigation for large infrastructure and development projects.

While familiarity (and a demonstrable track record) has made magnetometry synonymous with archaeological geophysics, there will always be circumstances in which the technique 'doesn't work'. This might, more fairly, be considered a problem of over-expectation by those commissioning the surveys (or over-promising by survey operators) rather than dismissed as a 'failure' of geophysics. In most of these cases, the instruments record data as they should, but if the magnetic contrast between a feature and its surroundings does not exist – either because the enhancement itself is minimal, the feature is deeply buried, or the background is magnetically 'noisy' – it cannot be identified as anomalous.

Magnitude's 2019 survey around Shire Hall, Cambridge, (for Cambridge Archaeological Unit) is a typical example of a case in which magnetometer survey would not produce useful information, with sensors swamped by interference from the surrounding modern clutter of a city-centre location. Instead, a ground penetrating radar (GPR) survey was undertaken over approximately 0.8ha, in advance of building improvements on a site that required excavation. The area was known to have seen multiple phases of use (from a late prehistoric defended settlement to civil war stronghold, via a Roman fort and two castles), but the GPR survey focused on several substantial 19th-century buildings that occupied the site prior to the construction of the current Shire Hall by the County Council in 1928.

GPR works by sending pulses of energy into the ground and compiling the returning reflection. The results show strong reflections caused by the buried masonry of foundations. By analysing the three-

Effective geophysical survey has never been a case of 'one size fits all'.



Detail from the indicative timeslices and composite interpretation (c 0–1.4m depth) from the GPR survey conducted at Shire Hall, Cambridge. Credit: Magnitude Surveys Ltd; contains vector mapping provided by the client

Simultaneous collection of magnetic (vertical white sensors) and EM (horizontal orange sensor) data on a larger scale. Credit: Magnitude Surveys Ltd

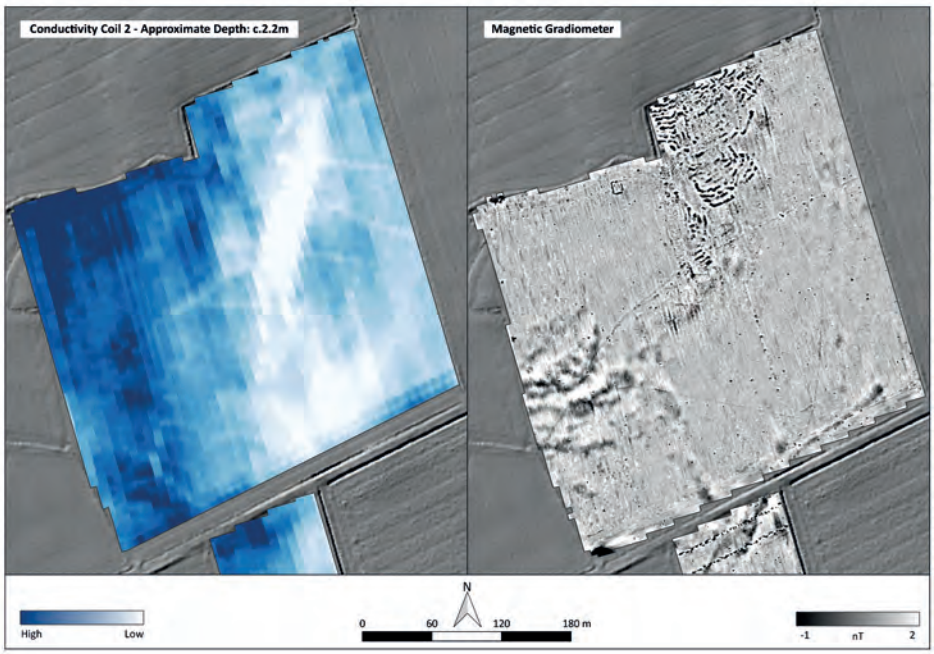
Handheld electromagnetic induction instrument being used to investigate earthworks possibly relating to a medieval manor, Buckinghamshire. Credit: Magnitude Surveys Ltd

dimensional dataset alongside the historical sources, it was possible to differentiate between the remains of the 19th-century county gaol and the former law courts. The GPR survey identified specific features known from floor plans and previously unknown structural remains. In addition to mapping the lateral extent of archaeology, GPR also offers indications of depth, preservation and stratigraphy, in this case identifying buried ground surfaces and probable levelling events. As well as informing practical heritage management and responsible development in the immediate term, the geophysical data also have value in providing a more tangible way to visualise and understand the local civic environment.

Whatever the technique, geophysical data will always be a plot of soil properties, as opposed to a ready-made map of buried features. Accordingly, the wider the range of physical properties measured during the survey, the less ambiguous the interpretation. For example, electromagnetic (EM) survey collects data related to the electrical conductivity and magnetic susceptibility (linked with, but crucially different to regular magnetic survey) and multiple depths, by way of induction coils carried over the surface. Depending on the resolution and coil separations, this method can be applied to investigate targets ranging from individual archaeological features to wider palaeolandscapes. Earlier this year, Magnitude surveyed at Thorpe Marsh, South Yorkshire, on the edge of the Humberhead Levels; following specific discussions about the aims of the project with the consultant, Landgage Heritage, simultaneous EM and magnetic survey was conducted over approximately 120ha. The EM data, interpreted in conjunction with digital elevation data and existing borehole records, provided significant context for the magnetic results

and markedly refined our understanding of the evolution of the natural and human landscape. This allowed us to determine the character and distribution of superficial deposits, which in turn afforded a more confident explanation of the detailed magnetic results, including areas that would appear archaeologically 'empty'. The survey objectives focused on buried geomorphology as a proxy for areas with higher potential for earlier prehistoric activity, which typically does not leave features with strong enough contrasts to be directly detected. The synthetic interpretation provided a strong foundation on which to base future intrusive work and devise mitigation strategies.

Despite the emphasis of current government publications on 'standardising' the planning process, bespoke geophysical solutions will always increase the value of the data, and multi-method surveys will generally prove more useful than the sum of their parts. These benefits will increase further with continued cross-sector dialogue and integrated programmes of work.



Comparison of detail from the electromagnetic and magnetic datasets collected during the Thorpe Marsh survey. Credit: Magnitude Surveys Ltd; contains LiDAR data. © Environment Agency copyright and/or database right 2021
Hannah Brown

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Hannah Brown

Hannah ended up in archaeology via a modern history degree at Oxford University, where 'modern' includes everything since the Romans. After an MA in Medieval Studies, she decided to specialise in archaeological geophysics and completed an MSc at the University of Bradford in 2011. Since then, she has worked for several commercial units in the UK and Ireland and is now the Reporting Officer for Magnitude Surveys. As a result of her PhD, she is a prehistoric field system geek, and is particularly interested in human use of landscapes, GIS analysis and interdisciplinary approaches.

The way we assess competence for CIfA applications is changing...

what you need to know

CIfA accreditation (Practitioner, Associate and Member grades) is how archaeologists demonstrate to their clients, their employers, peers and the public that they have the knowledge, skills and integrity to meet professional standards and to deliver value to society. Working to professional standards requires professional competence: archaeologists need to be technically skilled and they need to understand and apply ethical principles to their work. These ethical principles are set out in the *Code of conduct* and the standards for technical competence form the basis of the competence matrix that all applications for accreditation are measured against.

The competence matrix does not currently include specific reference to the need to work in accordance with the *Code of conduct* and this is something we have sought to address. Following discussions with Advisory Council, we have amended the competence matrix to include consideration of professional ethics for Practitioner, Associate and Member applications. At Practitioner and Associate level, applicants will be asked to address these new requirements in their statements of competence. This information will be supported by evidence of ethical working in the examples of work they provide, in their CPD records (where applicable) and by their references. For applicants at Member level, a professional review interview will be introduced, recognising the greater level of personal accountability required at this grade.

The target date for introducing the new system is **April 2022** but we recognise that more time may be necessary and there is scope to extend the timeframe if necessary. These are significant changes to the way we assess competence and they will not come into effect until we have the support in place to help members and applicants demonstrate their ethical practice, regardless of career stage. We already have some fantastic resources to support ethical practice on our website (www.archaeologists.net/membership/ethics) but these will be supplemented and supported with training where necessary.

We want all archaeologists to have the opportunity to demonstrate their professionalism and to be recognised for the high levels of skill they possess and the contribution they make to society.

As well as introducing the new requirements, we are also focusing on identifying and removing actual and perceived barriers that might make it harder for some archaeologists to demonstrate the competence requirements, particularly at Member grade, with the help of Advisory Council and our Special Interest Groups.

Over the coming months, we will be producing information and guidance aimed at specific grades of membership to support the changes. If you are thinking about applying or upgrading your accreditation, sign up to our Professional Pathways bulletins (www.archaeologists.net/join/pathway) to get more advice and support, as well as the latest information on when the changes will come into force.

For a sneak preview of the new competence matrix, please see www.archaeologists.net/sneakpeek/revisedmatrix

First historic environment apprentices pass **Gateway**!

CIfA has been actively engaged in the development of alternative entry routes into careers in archaeology and the historic environment for many years. It's nearly 20 years since we worked on the development of National Occupational Standards and an NVQ in archaeological practice, 15 years since we developed a structure for formalised workplace training placements and just short of ten years since we started working with Historic England and sector partners on the development of apprenticeships. Achieving change in the way that new entrants into a sector are recruited and trained takes time and a lot of effort, but when all that hard work comes to fruition, it's worth celebrating.

We have previously reported on the approval for delivery of six historic environment Trailblazer Apprenticeships by the Institute of Apprenticeships and Technical Education (IfATE), covering archaeology, conservation and historic environment advice. We're delighted now to be providing end-point assessment for the very first apprentices to have completed their training programme as Historic Environment Advice Assistants and to have passed 'Gateway' – the point at which they are judged by their employers and training providers to have gained the knowledge, skills and professional behaviour required to be competent and to be ready for formal assessment.

Getting to this point has been a huge collaborative effort on the part of Historic England, acting as coordinator for the programme and employer for many of the apprentices, and Strode College in Somerset as training provider. And, of course, not forgetting the apprentices themselves – many of whom are completely new to the historic environment sector and have embraced the challenges of a brand new programme as well as Covid restrictions, which have impacted on their work.

Over the course of the next three months, the apprentices will be assessed against the knowledge, skills and behaviour criteria set out in the apprenticeship standard by our small team of assessors, all historic environment sector experts in their own right. Rigorous monitoring, moderating and standardisation processes, as required by IfATE, will ensure that the assessment is fair, robust and consistent. Successful completion and a pass or distinction will allow the apprentices to be professionally accredited by CIfA at Practitioner grade.

A second cohort of Historic Environment Advice Assistant apprentices is currently being recruited. Hot on their heels, we expect recruitment for the first cohort of Archaeological Technician apprentices to start later this year. The first cohort of Archaeological Specialist apprentices, following a three-year, Masters'-level programme, will also be commencing this September.

The delivery of apprenticeships is one way we can ensure that the sector has access to the high-level skills it needs to meet demand and provide benefit to society. Providing alternative routes into (and through) a career in archaeology is also key to diversifying our sector and ensuring we are able to draw on a far wider pool of talent. We hope that more will follow.

Apprentices at St Andrews Church, Taunton. Credit: Historic England

Can you keep *a secret?*

Non-Disclosure Agreements and commercial archaeologists

Joe Abrams, MCIfA (1829), Abrams Archaeology

A Non-Disclosure Agreement (NDA) is a legal document that businesses can use when sharing sensitive information with another organisation. An NDA may control how information is used and set rules on how it is kept confidential.

Archaeologists are most likely to encounter an NDA in the procurement and/or implementation stage of certain projects. These are likely to be of a certain scale (eg infrastructure), or when involving sensitive locations. The term NDA appears in the media in different contexts and, partly because of the wider uses of the term and the practices around it, there can be a certain amount of anxiety, even stigma, around signing one.

What should an NDA cover?

This will vary as it will be tailored to the specifics of a project and the entity or entities sponsoring it. However, amongst the topics we should see covered are:

1. What form will the sensitive information take? Is it written or verbal communication/s? Is it administrative documentation, reports and drawings?

2. For how long will the obligations last? Normally, this would be for several years and that is relevant for archaeologists who have obligations outside the NDA to archive and publish archaeological material and findings

3. How will information be stored? For how long? And how will it be destroyed?

4. Some NDAs will require that the existence of the NDA itself should not be disclosed. This can be for the protection of commercially sensitive information (eg a nascent joint venture). Is this the case, and why?

5. A section on permitted disclosures and exceptions to non-disclosure, allowing an organisation the flexibility to share information with specific sub-contractors

6. Understanding that exceptions to non-disclosure are necessary to allow disclosure under other circumstances, including where required by law or by the rules of a court. This last point should provide comfort where individuals may be concerned in relation to the principles of whistleblowing. An NDA needs an agreed means for an individual, or organisation, to be able to co-operate with a legal investigation, or the rules of a court.

Ways of approaching the checking of an NDA

Frame of mind – Firstly, we have almost certainly sought out the *opportunity* associated with the NDA. Our organisation may have worked hard to be considered eligible for the tender or project. The NDA may have been anticipated as part of this. We should note then, that we may be primed to agree, or find a way to agree, and this is worth reflecting on; this solution focus needs to run in parallel with careful checks on the details.

Romain Dancre, Unsplash

Checking and consultation where needed – Some Registered Organisations have vast amounts of experience of this, with individuals who have encountered many types of NDA. Other organisations may encounter them infrequently. Each organisation must identify individuals with appropriate skills and experience to carry out this task, and/or to reach out to external legal advisors where needed.

CIfA Code of conduct – Accredited members of CIfA are expected to adhere to the *Code of conduct*. This is relevant to what members can sign up to in an NDA and it is a good example of where fluency with the *Code* is important. Some of the specific areas where we may benefit from this are

- ***confidentiality*** – Rule 1.10 begins '*A member shall not reveal confidential information unless required by law*' and the sentiment of such a phrase could be found in many NDAs, so as a sector we often behave in these ways anyway and it is worth reflecting on how familiar some of the practices required by an NDA are already
- ***dissemination of archaeological information*** – Rule 1.10 refers to Principle 4: '*The member has responsibility for making available the results of archaeological work with reasonable dispatch*.' By so doing, the *Code* reminds us of our principal responsibilities to the public. Pointing out to a client or employer the potential ethical consequences of confidentiality, where it may affect this timely dissemination, is an obligation
- ***sharing research*** – Rules 4.1 and 4.3 describe our obligation to share research with colleagues, and 4.2 and 4.4 sharing that research with the public. Rule 4.7 states that a member must honour contractual obligations: '*A member shall respect contractual obligations in reporting but shall not enter into a contract which prohibits the member from including their own interpretations or conclusions in the resulting record, or from a continuing right to use the data after completion of the project. While a client employer may legitimately seek to impose whatever conditions of confidentiality they wish, a member shall not accept conditions which require the permanent suppression of archaeological discoveries or interpretations.*' This is very relevant for NDAs if they potentially prohibit the dissemination of archaeological research. There must be an understanding that any withholding of archaeological data is for good reason and for an agreed length of time
- ***professional ethics*** – On occasion, complex situations can arise, where right and wrong are not easily perceived and may not even be fixed. These situations may mean that an individual experiences an ethical dilemma. *'A member may find themselves in an ethical dilemma where they are confronted by competing loyalties, responsibilities or duties. In such circumstances a member shall act in accordance with the Principles of the* Code of conduct.'

  Principle 1, Section 1.13

Knowing all this gives us clarity and helps us to move out of the individual experience of the dilemma. There is our individual experience, there are the interests of our company/employer and there are the responsibilities we have to our professional body. In such circumstances, help is at hand. The CIfA website has excellent resources on this topic including digital training modules, articles and a practice paper (https://www.archaeologists.net/membership/ethics).

Joe Abrams

Joe is a Director of Abrams Archaeology. He is on the Advisory Council of the CIfA. He has worked in the commercial archaeological sector for over 20 years and held senior posts in several archaeological consultancies and contracting companies. Joe takes an active interest in the understanding and application of professional ethics within our sector.

A NEW COMMITTEE FOR **EQUALITY, DIVERSITY** AND

In *The Archaeologist* 112 (page 24) we reported on the priority tasks being undertaken by the Equality and Diversity Steering Group appointed by the Board of Directors. One of these tasks has been to look at future arrangements for equality and diversity advice to the CIfA Board of Directors.

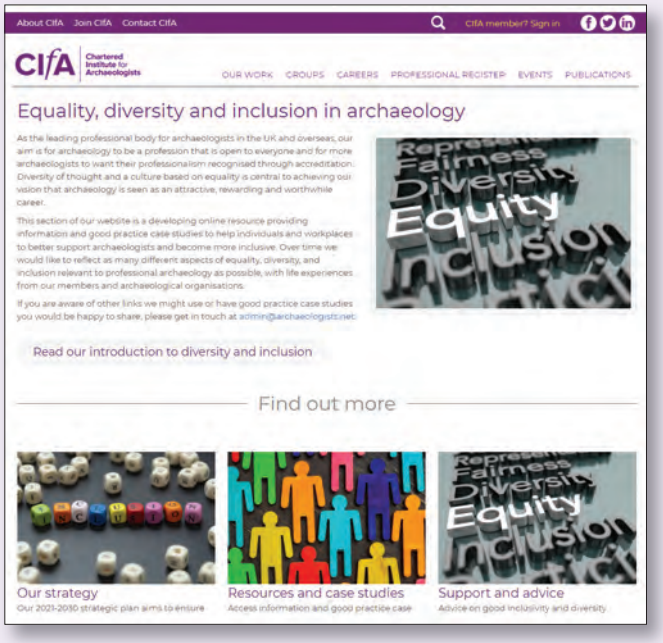
In April, the Steering Group made a recommendation to the Board that a new standing committee for Equality, Diversity and Inclusion (ED&I) should be added to the CIfA governance structure. This recommendation was made following consultation with CIfA's existing Equality and Diversity Group committee. It reflects our recognition that EDI is not a special interest but essential for all archaeologists, and it will be embedded, through the new Strategic Plan, into the business plan of the Institute.

The purpose of the EDI committee will be to support the Board of Directors in delivering its strategy for equality, diversity and inclusion. The committee will also be expected to deliver at least one event per year relevant to the EDI strategy and/or policy, potentially in collaboration with other organisations.

Alongside the committee, the Board will also look to commission external advice in the form of paid-for expertise from suitably qualified professionals. This will be on an ad hoc basis as needed, driven primarily by the Business Plan and specific issues identified by the Board or EDI committee. External expert advice will be required where it is important to ensure good practice is being followed, where it is important to demonstrate that independent advice or action has been taken, and where it would not be reasonable to expect a voluntary committee to have the necessary expertise. An example of this has been the use of expert advice in developing the new equality, diversity and inclusion pages on the website.

Committee members will be appointed by the Board of Directors in November as is the process for the Validation, Registered Organisation and Degree Accreditation committees. Committee members will be asked to submit a personal statement to demonstrate both their interest and experience regarding EDI issues in line with the requirements in the new EDI committee regulations. The key difference to the other Board committees is the number of committee members. This is set at a maximum of six individuals, including the Board ED&I Champion. If you are interested in volunteering for the committee please see the website at www.archaeologists.net/organisation/committees or email alex.llewellyn@archaeologists.net for more details.

Once the EDI committee has been appointed, the current Equality and Diversity Group will be dissolved as agreed by the Group membership at their AGM last April. The Board and CIfA staff would like to thank the committee members of the Group, both past and present, for all the important work and awareness-raising they have carried out since the Group was established in October 2015.



Member news

Donal Lucey MCIfA (11626)

Graduating from Trinity College Dublin in 2006 with a degree in Archaeology and History of Architecture, I gained my first fieldwork experience on motorway schemes. After several fieldwork posts in Ireland and the UK, I switched to a consultancy path in 2012. I took up my current role of Senior Heritage Consultant at Arcadis in 2019. The team is enthusiastic, forward-looking, and very supportive! I'm working on some exciting and complex NSIPs and new town developments. I am passionate about community engagement and volunteer with Archaeologists Engage and the Bristol and Avon Archaeological Society. I also volunteer as Excavation Co-Director for Project Nivica Archaeology in Albania.

Joining CIfA was something I have aspired to do for many years. The joining process made me reflect on the variety of skills and experience I have built up over the years and the many people I have learnt from along the way. Looking forward, achieving MCIfA is not a bookend to career progression – it is a springboard; it gives far greater weight to my advice on conservation of the historic environment and offers additional assurance to those I partner with to deliver volunteer projects.

Donal Lucey. Credit: Donal Lucey

John O'Keeffe MCIfA (10860)

I joined the Discovery Programme: Centre for Archaeology and Innovation Ireland in November 2020 as its new Chief Executive Officer. Before this I was Principal Inspector of Historic Monuments and an Assistant Director of Historic Environment Division in the Department for Communities in Northern Ireland. I have worked across a very wide range of historic environment activities, including public engagement, regulation, conservation, strategic spatial planning, and land management. In addition to my qualifications as an archaeologist, I am also a Chartered Construction Manager (through the Chartered Institute of Building) and a keen advocate of interdisciplinary working that recognises the contributions archaeology can make to, and derive from, other professional and subject-based activities.

Esther Robinson Wild MCIfA (7764)

As part of a recent strategic review of my company, I decided that it was time to apply for an upgrade to Member of CIfA, having been an Associate for several years. Upgrading, with its recognition of the achievement of a high level of professional competence, shows a continuing commitment to my company's success. In my experience, having worked in the finance, real estate and now heritage sectors, clients and stakeholders are reassured by accreditation and through my Member grade status they will know that my skills and experience have been peer reviewed and evaluated, and that I continue to adhere to a set of regulations, standards and guidelines.

As a historic environment practitioner, I strive to promote professionalism in archaeology through the work I undertake and how I engage with my clients and stakeholders. Given the opportunity, I aim to make people aware of CIfA, my accreditation, and the regulations, Standards and guidance. The historic environment is undergoing constant change, as are working practices, and I'm interested in how CIfA continues to respond to change particularly through its strategic vision, advocacy and engagement. I contribute to CIfA's work and pursue my interest as Treasurer of the Buildings Archaeology SIG and as a Board of Directors member.

Esther Robinson. Credit: Esther Robinson

In my new role I am looking forward to advancing archaeological research across Ireland, making available the data and outcomes of the Discovery Programme's work of the past 30 years. I am particularly looking forward to facilitating the development of a strategic Archaeological Research Framework for Ireland, which will also involve engagement with professional bodies including CIfA over the coming years.

John O'Keefe. Credit: John O'Keefe

Member news Obituaries

Don Henson MCIfA (1721)

In April this year CIfA staff were saddened to learn of the loss of Don Henson – CIfA member, frequent collaborator, and friend.

Don Henson was one of the Institute's early members. His passion for communicating archaeology leaves a legacy of many hundreds of people whom he inspired to take an interest or start careers in the discipline. Across the profession, this influence, as well as his kindness, generosity, and unique flair for life – and love of good beer – will not be soon forgotten.

A full obituary, written by Professor John Schofield for *The Guardian*, can be read at https://www.theguardian.com/science/2021/may/20/don-henson-obituary.

Don Henson. Credit: Roger Martlew

Peter Clark BA FSA Scot FSA MCIfA (370)
by Professor Paul Bennett MCIfA (26)

Extract from the full tribute

It is with immense sadness that I record the death of Peter Clark, Deputy Director and Director of Post-Excavation and Research, Canterbury Archaeological Trust. An archaeologist and academic of great standing in the UK and in Europe, Peter has left an unrivalled legacy of Transmanche publications, together with fond memories in all who knew him for his enthusiasm for archaeology, the recording of urban stratigraphy, for prehistoric boats, family life and Blues music.

Peter attended William Palmers' Endowed School for Boys, where his love of history was stimulated by his father's interest in the subject and holiday visits to castles, stone circles, hill forts and museums. Critically, whilst at school, he was given an opportunity to join a local dig near Orsett and it was here that his love of archaeology began.

He went on to study archaeology at Durham University. He participated in excavations on Orkney, developing a love of the Isles and of Scottish history that saw him return at various stages in his life for work, holidays and as a tourist guide.

His first professional excavations with the Department of Urban Archaeology (DUA) in London was pivotal in terms of his professional and intellectual development. He often recounted that there was a real 'buzz' at the Moorgate excavation and the Billingsgate Market site, where his skillsets and knowledge increased dramatically. It was here that he developed a passion for the recording of complex stratified urban deposits, and other tools and methodologies that are now commonplace.

He moved to Ayr where he directed his first excavation, before returning to Durham and meeting Caroline, his life partner and future wife; they married in 2012.

Peter and Caroline moved to Perth where he worked in post-excavation for the Scottish Urban Archaeological Trust (SUAT), becoming post-excavation manager. He brought new methods from his time with the DUA, transforming the way that urban archaeology was conducted in Scotland. Peter was immensely proud of his Fellowship of the Society of Antiquaries of Scotland, and his love of the Isles remained with him to the end.

In January 1991, Peter was appointed Deputy Director and Post-Excavation Manager at Canterbury Archaeological Trust. The Trust's workload was expanding at an unprecedented rate at that time because of PPG 16 and the inclusion of archaeology in most proposals for development. This meant that there was a growing backlog of post-excavation work. Peter's arrival, with his background in excavation and post-excavation management, made a perfect fit. Peter immediately expanded the Trust's computing facilities and set about strengthening the research and publication side of the Trust's work.

In September 1992, whilst conducting fieldwork during the construction of the A20 at Dover, a perfectly preserved Bronze Age boat was discovered, now known to be one of the earliest sea-going vessels in the world.

The discovery proved to be a major turning point in Peter's academic life and career. With funding from English Heritage, he was asked to direct the scientific recording of the boat – through the conservation process in Dover and in the laboratories at the Mary Rose Trust, to publication, including the building of a full-sized replica of a central section of the boat as an 'archaeological experiment' by a specialist team led by ancient-woodworking specialist Richard Darrah. This work culminated in an award-winning and highly regarded volume, *The Dover Bronze Age Boat*, published in 2004.

Peter was a committed member of the Chartered Institute for Archaeologists, joining in 1985 as a Member (MCIfA). A group representative on the Advisory Council and a member of the International Practice Group committee, he was an early advocate of CPD and helped to develop standards for the archaeological profession. He was a significant figure in the profession for many years and a great source of wisdom, kindness, and enthusiasm to all, particularly early-career colleagues. He was made Fellow of the Society of Antiquaries in recognition of his standing in the archaeological and academic community, an honour he was particularly proud of.

Peter's death was totally unexpected and shocked us all. He had many plans and so much more to give. Days before his death we were discussing a new proposal to revitalise the Dover Boat Gallery, to incorporate new technology, new ideas about the Middle Bronze Age, a new film to introduce the replica boat and above all, from Peter's perspective, to make the boat archive accessible to all. This work will continue in his memory.

Peter was a man whose professionalism, friendship and willingness to help has left an indelible mark on those he has touched throughout life. A loving and gentle father, a professional archaeologist and academic with a legacy of work on the Transmanche zone, prehistoric navigation, and the theory and practice of stratigraphic analysis, Peter leaves a big hole in the profession on both sides of the Channel, and an even bigger one at Canterbury Archaeological Trust.

Peter died on 2 May 2021 following a fall at home. He is survived by his wife Caroline and son Jamie. His ashes were buried at sea by fellow crew members paddling the replica of the Dover Bronze Age Boat.

The full tribute can be read on Canterbury Archaeological Trusts' blog at https://www.canterburytrust.co.uk/post/peter-clark-a-tribute-paul-bennett.

Peter Clark working on the boat in 1999. Credit: CAT

Peter Clark on Abugnata Gallo-Roman barge. Credit: CAT

New members

Member (MCIfA)

11748 Stephen Baker
11751 Chiara Botturi
7837 Fay Bowen
11869 Matthew Brudenell
11864 Wilfried Hessing
6382 Guy Kendall
10843 Andreas Koenig
11754 Karina Laenger
11753 Stefanie McMullen
11661 Frances Murphy
11870 Vicky Nash
2375 Jim Stevenson
11868 Debbie Taylor
11866 Mara Tesorieri
1661 Steve Williams
11867 Liz Williams

Associate (ACIfA)

11865 Christian Adams
8412 Lauren Beck
11841 Stuart Forsythe
2720 Tim Havard
11819 Jessica Hoeppner
7481 Emma Ings
10337 Carley Noga
11889 Chelsi Slotten
11749 Shantanu Subramaniam
11956 Xenia Tselepi

Practitioner (PCIfA)

11915 Laura Anderson
11829 Adrian Arenas
11836 William Baker
11708 Antony Baxter
11026 Linda Marie Bjerketvedt
11919 Joshua Blackstock
11528 Rebekah Booth
11663 Matthew Bosomworth
11783 Darroch Bratt
10142 Rachael Breen
10751 Thomas Brown
11914 James Chapman
11715 Martina Costarelli
11780 Samantha Coxon
11953 Luca Desibio
11963 Max Du Bois-Jones
7940 Jack Easen
11782 Jessica Elleray
11067 Phineas Elmore
11837 Hannah Epicheff
1584 Damian Evans
11699 Joshua Frost
11875 John Gardner
11833 Elliot Grater
11912 Joanna Hameed
11920 Naomi Hann
11828 Nick Haslam
11799 James Henderson
11785 Diana Hepworth
10806 Jennifer Hulse
11913 Petra Jones
11723 Connor Kenway
11910 Samuel Kinirons
11750 Malgorzata Krawczyk
9196 Michael Lynes
11831 Hector Martin
10638 Stephanie Matthews
11714 James McCallum
11713 Jade Melany
9918 Imogen Newman
11863 Hayley Nichols
11798 Robert Otter
11718 Abby Pendlebury
11725 Nicholas Pryke
11797 Michael Romanowski
11712 Ana Sanchez Flores
11917 Charlotte Self
9414 Stella Sudekum
11784 William Tamblyn
10361 Isobelle Ward
11727 Edwin Whyatt
11832 Jake Wilson

Affiliates

7008 Janet Bailey
11823 Emily Bates
968 Bob Bazely
11765 Andy Blair
11873 Emma Brown
11796 Jayne Burland
11840 Ann Catten
11847 Isobel Christian
11946 Dena Collins
11822 Elizabeth Darlington
11899 Chloe Deeks
11854 Benjamin Ellis
11792 Michael Franz
11902 Oliver Garbett
11897 Theodora Gerafenti
11928 Mallory Goodine
11806 Alex Green
11925 Joshua Gregory
11886 Jordyn Heimbigner
11824 Jessica Horridge
11818 Laura Hunter
11924 Steven Jeffrey
11825 Ariadin Jones
11770 James Lancaster
11947 Mathilde Laval Karlsen
11891 Bethany Moate
11952 Anastasia Nelson
11775 Jenni Perales
11955 Natalie Robinson
11884 Chunxiao Ruan
11763 Matthew Scandrett
11745 Eleanor Smart
8918 Amy Smith
11934 Antonia Stamatelopoulou
11960 Angela Stewart
11878 Fabiana Tambasco
11821 Emily WoodsMCIfA

Students

11859 Amos Aldridge
11959 Majad Ali
11908 Nidha Amer
11815 Summer Austin
11852 Roberto Biosa
11857 Lydia Bossons
11791 Jacob Brader
11876 Kayleigh Bradshaw
11764 Charlotte Breen
11980 David Britten
11786 Laura Brown
11803 Georgia Caine
11888 Amelia Cameron
11948 Anne-Marie Campbell
11885 Emma Challoner
11931 Yuhao Chen
11820 Simona Chesters
11937 Hollie Christelow
11877 Brett Colburn
11789 Benjamin Coleman
11744 Olivia Collier
11848 Oscar Crimes
11903 Laura Csontos
11976 Ariane Da Silva Palmas
11962 Liam Devall
11882 Alice Dixon
11767 Sophie Driver
11939 Aaron Dunn
11756 Sue Dyke
11942 Jamie Dyke
11918 Jessica Elkin
11881 Linden Ellicott
11772 Charlie Forsyth
11926 Paul Foster
11817 Joellen Fowler
11855 Andrea Frankham-Hughes
11936 Alex Gardner
11811 Jack Goodman
11843 Elinor Griffiths
11949 Ryan Guy
11773 Luke Hall
11807 Steve Hall
11896 Emilia Hawthorne
11892 Nina Herer
11979 Dominic Heslam
11954 Christopher Hodgson
11794 Sam Hope
11851 Holly Hughes
11904 James Johnson
11788 Aedan Jones
11771 Charlotte Joyce
11778 Emily Kelso
11922 Lauren Kennedy-Drury
11906 Dominic Khayat
11940 James King
11774 Kezia Kirtland
11801 Fedor Kiyanenko
11929 Wiktoria Klimek
11856 Rebecca Logan
11945 Yu Long
11893 Hannah Lycett-Smith
11809 James MacDonell
11923 Bhumika Mahesh
11839 Valorie Mallory
11858 Holley McCoy
11813 Kenneth McElroy
11814 Rory Mcinnes-Gibbons
11879 Sarah Mersereau
11795 Chelsea Miller
11126 Marianne Moedlinger
11853 Jessica Mosiango
11768 Bryony Moss
11932 Nanci Munroe
11860 Lois Newton
11927 Michael Nianias
11943 Adam Nightingale
11933 Zoe Nixon
11752 Kathrine Page
11880 Eva Perez Chirinos de Andres
11812 Courtney Piper
11938 Erin Pritchard
11787 Kayleigh Raine
11777 Leah Rawlinson
11887 Madison Reavis
11776 Amara Reed
11944 Dominic Reynolds-Grey
11742 Helen Ridout

8157	Kathleen Rogan
11746	Rachel Rutherford
11895	Jasper Sandford-McFadden
11747	Jack Saunders
11804	Bianca Schueng Zancanela
11793	Robert Simmonds
11845	Laura Slow
11758	Nicholas Smith
11894	Paul Soames
11898	Makenzie Sorensen
11759	Laura Spence
11790	Taran Spivey
11826	Max Szynalski
11816	Samira Talbi
11930	Lucy-Anne Taylor
11743	Rebecca Thompson
11849	Jade Thorne
11757	Simon Tingle
11802	Emily Wain
11862	Catherine Wake
11842	Emily Walsh
11901	Alice Ward
11779	Simone Wason
11762	Marcie Weeks
11935	Rhian Whiston
11907	Nathalie Wilborts
11900	Andrew Williams
11808	Callum Wilson
11766	Danlei Zhou

Upgraded members

Member (MCIfA)

4585	Simon Hughes
10604	Sarah Wolff

Associate (ACIfA)

7387	David Astbury
8689	Georgina Barrett
5313	Sarah Doherty
7479	James Evans
9493	Connor Law

Practitioner (PCIfA)

10409	Megan Clements
11231	Rosemary Fletcher
10705	David Havard
10930	Sabrina Ki
11018	Martina Locatelli
11016	Roland Tillyer
10944	Leanne Tindle

NOTICEBOARD

Innovation festival week

Our second virtual festival celebrating innovation in archaeology will be held **11–15 October 2021**.

The innovation festival will provide the opportunity to showcase and celebrate the innovative practices and approaches being used across the historic environment sector, whilst tabling for wider discussion some of the identified barriers and challenges to implementing innovation in archaeological research. This week-long virtual festival will comprise a mix of short sessions each day including presentations, workshops, opportunities for open discussion, CPD and knowledge transfer.

Find out more at www.archaeologists.net/innovation-festival

Innovation week will also include our next **Annual General Meeting**. This will be held online at 12:30pm on **Tuesday 12 October** and all members are invited to attend. The AGM notice and other documentation is on our AGM website page www.archaeologists.net/cifa/agm

Ethics workshop series

One of the hallmarks of professional institutes and registers is that they have developed codes of ethical behaviour binding on all those they accredit. These rules are created by professionals to deal with complex situations where right and wrong are not easily perceived and may not even be fixed.

Our online ethics workshops, run in collaboration with colleagues at the Register for Professional Archaeologists, are for anyone interested in understanding and discussing ethical issues in professional archaeology, at all levels of the profession. Using case studies developed from real-life experiences in archaeological practice, participants will use ethical guidance and experience to formulate and discuss their reactions and solutions to these ethical quandaries.

Look out for the confirmed workshop dates on our event calendar and book your place at www.archaeologists.net/events

CIfA 2022 Conference

Sponsored by Towergate Insurance

27–29 April 2022
Apex City of Bath Hotel + online

Encouraged by the success of our first digital conference in 2021 and the gradual safe return to live events, we are delighted to announce that we intend our 2022 conference to be delivered as an integrated live and digital conference experience. Our hope is that our hybrid programme will continue to increase the accessibility of the conference by offering the flexibility to attend online or in person at the Apex City of Bath Hotel, UK.

The conference theme is **Making a difference: the value of archaeology** and we will incorporate keynote addresses, wide-ranging sessions and training workshops in an integrated live and virtual forum.

Find out more about our developing programme, call for papers and booking information at www.archaeologists.net/conference

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