**Conference Session: CIfA2019 Archaeology: values, benefits, and legacies**

**ARCHAEOLOGICAL GEOPHYSICS: WHY DO WE DO IT? IS IT DONE WELL? DOES IT MATTER?!**

This document is intended to support the presentations in this session and to collate your views on these and other aspects of archaeological geophysics. It is hoped that you will use it to consider points for discussion and that you will fill in any sections relevant to you. Please return it to GeoSIG to allow us to take your views into consideration when revising our guidance.

All information supplied will be treated as confidential to be used solely by GeoSIG. It will not be used for marketing purposes. Feel free to remain anonymous but it would be useful to know what your job role is. The results will be made available as statistics and common themes when collated.

The points raised are not in any particular order and are not exhaustive. Please add or amend as you see fit. Ideally, we would hope that you will wait until the particular point has been discussed (although we may not have time to cover all of the points in detail in this session) as what you hear or see may change your opinion! If required, please feel free to add additional sheets.

If you want to take this away and consider the points before responding then please email us your responses, and any other points that you think we should consider to [ifageosig@gmail.com](mailto:ifageosig@gmail.com) by 12/05/2019. A digital copy is also available on our webpage [www.archaeologists.net/groups/geophysics](http://www.archaeologists.net/groups/geophysics).

|  |  |
| --- | --- |
| Name | Click or tap here to enter text. |
| Job role | Click or tap here to enter text. |
| Email address  *if you are happy for us to contact you for further information / clarification* | Click or tap here to enter text. |

# Technical Guidance

The EAC guidelines (2015) have, in some areas, superseded Historic England and CIfA guidance but they have not been widely publicised. They have been taken up by different geophysicists at different times and to differing degrees and they are being referenced in specifications but often alongside other guidance which they may sometimes contradict.

Within the EAC guidelines they suggest the use of different levels of survey, defined as Level 1 Prospection, Level 2 Delineation and Level 3 Characterisation, (with increasing survey resolution as the Survey Level increases), which had previously been detailed by Gaffney and Gater (2003). This approach has not been taken up widely in the UK.

|  |  |
| --- | --- |
| Are you familiar with the EAC guidelines? | Yes / No |
| Are you currently working to EAC guidelines? | Yes / No |
| Do you incorporate some aspects of EAC guidelines in your work? | Yes / No |
| Are you referencing EAC guidelines in specifications or briefs? | Yes / No |
| Are you referencing EAC guidelines in your deliverables? | Yes / No |
| Are you familiar with the Levels of Survey categorisation? | Yes / No |
| Do you think having different Levels of Survey, based on project specific requirements, would provide a more robust system for determining geophysical strategies (Not all surveys may require the higher Levels of Survey but justification should be given as to why a particular level has been chosen). | Yes / No |
| CommentsClick or tap here to enter text. | |

# Specifications / briefs / WSIs

The level of background information and the specification varies greatly on location, aim of survey, and (where appropriate) client. For instance, many counties in the UK have their own standardised specification, but this can differ widely from county to county.

*In your comments, please include your minimum requirement to undertake geophysical survey and if*

*you have any thoughts on how GeoSIG could help to standardise the approach in the UK.*

|  |  |
| --- | --- |
| Would you adopt / utilise a more uniform / standardised specification if you specify a geophysical survey? | Yes / No |
| Do you advise when a request for geophysics does not seem appropriate for the aim of the project? | Yes / No |
| Have you ever declined a geophysical survey as an inappropriate methodology for assessing a site? | Yes / No |
| Have you ever declined to carry out a magnetic survey if you believe a different technique would better achieve the project aims? | Yes / No |
| Do you feel that you are suitably qualified / experienced to write a specification or WSI for a geophysical survey? | Yes / No |
| CommentsClick or tap here to enter text. |  |

# Should a ‘standard’ sample interval for a geophysical survey be defined?

Does the spatial resolution of a survey matter (i.e. the distance between survey profiles) in terms of identifying archaeological features? Should this vary and / or be left up to the geophysicist to determine an appropriate interval or should it be specified?

The EAC guidelines say 0.5 m is optimal or a good compromise for Level 2 and 3 surveys. Were you aware of this?

What do you think a ‘standard’ profile spacing should be for:

|  |  |  |  |
| --- | --- | --- | --- |
| Magnetic surveys  Click or tap here to enter text. | GPR  Click or tap here to enter text. | EM  Click or tap here to enter text. | Earth Resistance  Click or tap here to enter text. |
| CommentsClick or tap here to enter text. | | | |

# Geo-referencing a geophysical survey

Which of the following statements do you agree / disagree with?

|  |  |
| --- | --- |
| Data should never be referenced just to local features. | Agree / Disagree |
| Data should never be referenced using tape measures. | Agree / Disagree |
| GNSS should always be used to georeference geophysical data to either UTM co-ordinates or Ordnance Survey National Grid. | Agree / Disagree |
| GNSS should be to RTK accuracy and be fixed either on a pole or to a known and fixed point on a multi-sensor platform. | Agree / Disagree |
| CommentsClick or tap here to enter text. | |

# Suitability of techniques

The majority of archaeological geophysical surveys just utilise magnetics. However, the wider use of multiple geophysical techniques can add value to some projects by identifying features that may not have been detected had just one technique (or a less suitable technique) been used; or they can enable a more reliable interpretation that could lead to a reduction in trenching or better target intrusive investigations (providing they are used correctly!).

*Where we have asked for percentages, please estimate as best you can.*

|  |  |
| --- | --- |
| What percentage of your geophysics fieldwork uses multiple techniques on one site? | % |
| How often do you suggest a different or additional technique for a survey? | % |
| How often is your advice adopted? | % |
| Do you feel those who specify / commission archaeological investigations are able to assess the suitability of geophysics at any given site without advice from a specialist? | Yes / No |
| Do you feel that there should be a greater role for a geophysical consultant to offer expertise to design an appropriate specification for a survey (including the level of survey and which techniques will be of benefit?), to assess data quality and the interpretation and advise on follow up work? | Yes / No |
| Do you consider the use of archaeological geophysics on brownfield or urban sites? | Yes / No |
| In terms of magnetic surveys do you think there is a significant difference in data quality between hand-held instruments and multi-sensor instruments? | Yes / No |
| CommentsClick or tap here to enter text. |  |

# Data display and assessing data quality

Data quality can vary. Sometimes this is due to site conditions but other times it is down to human error or lack of training / experience. There are many good surveys undertaken, some excellent ones and some poor ones

*Please include in your comments any further ways you think that overall data quality can be improved and how we can we help non-geophysicists recognise bad data or a poor survey?*

|  |  |
| --- | --- |
| Do you believe the surveys you undertake all conform to current guidance? | Yes / No |
| Do you believe that all field staff within your organisation (e.g. those who collect the data) are able to recognise when data is not of an acceptable quality? | Yes / No |
| Do you believe that all field staff within the archaeological geophysics sector (e.g. those who collect the data) are able to recognise when data is not of an acceptable quality? | Yes / No |
| How can we help non-geophysicists recognise bad data or a poor survey?  Click or tap here to enter text. | |
| CommentsClick or tap here to enter text. | |

*Any further comments on the need / usefulness of raw / minimally processed data and your understanding would also be of benefit to this study. Who do you think benefits from the inclusion?*

|  |  |
| --- | --- |
| Low quality data can be hidden behind displaying the data over a wide range of values. Should there be a 'standard' range in nT (for magnetic surveys), and anything other than this should be clearly justified within the report? | Yes / No |
| Does raw / minimally processed data need to be included in a report? | Yes / No |
| Can raw data plots confuse or detract from a report? | Yes / No |
| In light of deliverables being mostly digital at this time, should all plots still be presented at a maximum of A3? | Yes / No |
| Do your field surveyors all have access to digital information on site (as opposed to operating using paper / hard documents? | Yes / No |
| Are XY plots needed for interpretations of magnetic data for all sites? | Yes / No |
| Should XY plots be provided within the main body or Appendix of a report for all magnetic surveys?  If so what is the minimum scale that should be used? | Yes / No |
| Would it be acceptable to only provide digital / archive XY plots (i.e. no produced as a figure in the report) | Yes / No |
| What percentage of your surveys require a hardcopy report as a deliverable? | % |
| CommentsClick or tap here to enter text. | |

# What is needed to be an Archaeological Geophysicist?

|  |
| --- |
| How would you define an ’Archaeological Geophysicist’?  Click or tap here to enter text. |

Please score the following on how important you think they are for an Archaeological Geophysicist (0 - not important, 5 – critically important).

|  |  |
| --- | --- |
| Undergraduate degree in Archaeology |  |
| Undergraduate degree in Geophysics |  |
| Masters degree in Archaeology (general) |  |
| Masters degree in Archaeological Geophysics |  |
| Masters degree in Geophysics |  |
| Geophysical field experience |  |
| Geophysical processing and reporting experience |  |
| Archaeological field experience (other, e.g. digging) |  |
| “On the job” training |  |
| Structured and documented in-house training |  |
| External courses e.g. field schools |  |
| External courses e.g. software / hardware providers |  |
| Comments Click or tap here to enter text. | |

Could you fill in each of the boxes below, where you think they are applicable, to indicate what you think the minimum requirement is to carry out the particular task.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Task** | **Qualification** | **Experience (Yrs)** | **CIfA Grade** | **Training** |
| Undertake a geophysical survey |  |  |  |  |
| Lead teams in the field |  |  |  |  |
| Process data |  |  |  |  |
| Manage a survey |  |  |  |  |
| Interpret data and write a report |  |  |  |  |
| Design a specification |  |  |  |  |

# Monitoring

Discussions and presentations that GeoSIG have had with development control archaeologists have indicated that they want to have a greater understanding of geophysics. In particular having assistance in recognising low quality survey data, whether a survey meets industry standards and being kept up to date with current practices. The production of a checklist has been discussed to help them check that reports meet essential criteria.

|  |  |
| --- | --- |
| Would a pro-forma statement that summarises essential criteria committing that the work conforms to best practice and those undertaking it are suitably experienced and qualified to produce the report have benefit to the sector? | Yes / No |
| Do you believe the use of checklists would help a non-geophysicist assess whether a survey and report meet the required criteria? | Yes / No |
| Will they encourage a company to have better practices if they / their staff have to sign to say they have done a survey as best they can? | Yes / No |
| Do you believe that additional checklists / paperwork will have no discernible benefit? | Yes / No |
| CommentsClick or tap here to enter text. | |

Please score the following on how important / relevant you think they are would be if included in a pro-forma sign-off sheet (0 - not important, 5 – critically important).

*Please include in your comments other potential inclusions that you would prioritise.*

|  |  |
| --- | --- |
| A statement of quality |  |
| The range of values the data is displayed at |  |
| How site conditions affected the data |  |
| Names and relevant experience of all staff involved |  |
| Were XY plots used in the interpretation |  |
| A statement that the report complies with EAC guidance |  |
| A statement that the report complies with updated CIfA guidance |  |
| Summary of the main processing steps |  |
| Justification for choice of technique/s |  |
| What sample interval was used and justification |  |
| How and where the project is archived |  |
| Comments Click or tap here to enter text. | |

# Archiving

Archiving has been considered by GeoSIG for a number of years but has still not been addressed adequately. Raw data can now be in a wide variety of formats and with rapid changes in technology and innovation the amount and type of data is also likely to continue to change and increase.

Cost is also a factor. Large amounts of digital data are expensive to archive and with higher resolution surveys the amount of data increases.

|  |  |
| --- | --- |
| What should archaeological geophysicists be archiving? *(This could include materials used during project, deliverables and / or data)*Click or tap here to enter text. | |
| Where do you think the archive should be held?Click or tap here to enter text. | |
| How long do you think an archaeological geophysics archive should be held? (please include justification) Click or tap here to enter text. | |
| What do you believe the standard format of archived data should be (given different equipment types and systems produce different ‘raw’ data formats – some which are specific to that system)?  Click or tap here to enter text. | |
| Could restrictive archiving requirements stifle innovation or lead to lower resolution surveys being undertaken? | Yes / No |
| CommentsClick or tap here to enter text. | |

# Health and safety

Is health and safety taken seriously enough in archaeological geophysics?

Surveyors need to take responsibility for their own safety by not surveying if there is an unacceptable risk of injury. But they must be supported by their company, which must in turn be supported by whoever commissions them and / or arranges access to survey areas.

Do you survey or think it is acceptable for surveys to be undertaken over:

|  |  |
| --- | --- |
| Ploughed fields | Yes / No |
| rough harrowed / very uneven ground | Yes / No |
| very soft / boggy ground | Yes / No |
| fields with horses | Yes / No |
| fields with cattle | Yes / No |
| fields with sheep | Yes / No |
| Fields with dense / high vegetation | Yes / No |
| Steep slopes | Yes / No |
| Fields where you need to climb over fences or gates | Yes / No |
| Fields where pesticides have, or may have been recently sprayed | Yes / No |
| Comments Click or tap here to enter text. | |

If a surveyor gets injured whilst carrying out a survey due to ground / site conditions who is responsible?

|  |  |  |  |
| --- | --- | --- | --- |
| The surveyor | Their manager | Their company | The company who commissioned the survey |

# Additional comments

Click or tap here to enter text.