

Archaeology Research Grant 2021

James O'Driscoll_ Final report

1. Title: Dr.
First name: James
Surname: O'Driscoll

2.

3. Grant programme: Archaeology Research Grant

4. Year awarded: 2021

5. Title of project: Geophysical Survey at Haughey's Fort, Co Armagh

6. Summary of report (Minimum allowed 100 words): This report outlines the preliminary results of the project, which aimed to employ geophysical survey techniques over the important Late Bronze Age hillfort of Haughey's Fort and its environs.

Haughey's Fort is one of the foremost prehistoric monuments in Ireland, set within a densely occupied later prehistoric landscape with other well-known contemporary monuments, such as the Creevroe earthworks and the man-made ritual pool of the King's Stables, as well as the Iron Age ceremonial complex at Navan Fort.

The results of this project has identified a number of exciting features of potential archaeological significant associated with the hillfort, including a number of possible large structures within the interior, possible craftworking areas, additional entrances and associated features, as well as pits/posts concentrated within the centre of the fort. The results will help us to significantly enhance our understanding of this important monument and its local environs.

Additionally, survey around the King's Stables and a portion of the Creevroe earthworks, immediately to the northeast of Haughey's Fort have added further insight into the local Late Bronze Age landscape. This has highlighted the orientation of the Creevroe earthworks in relation to the King's Stables, and its unusual placement with regards to Tray Bog, as well as a possible unrecorded extension of the earthwork, which possible splits in two, with the recorded section continuing towards the barrow cemetery to the north of Haughey's Fort, and the possible new extension turning east.

The project was successful in collecting new survey data which will help us to better understand the Bronze Age hillfort of Haughey's Fort and the surrounding monuments and landscape.

7. Please provide two appropriate images



8. Please outline the objectives of the project: The proposed project, undertaken by Dr. James O'Driscoll (University of Aberdeen), Dr. Patrick Gleeson and Dr. Alastair Ruffell (both Queen's University Belfast), seeks to address this issue through a series of systematic surveys which aims to better understand the nature and importance of Haughey's Fort by:

- mapping the hillfort using gradiometry survey techniques
- surveying the interior of the inner enclosure with electrical resistance methods.
- If applicable, using targeted surveys employing Ground Penetrating Radar, to map in detail and in three-dimensions, any anomalies identified in the former surveys which may be of specific archaeological interest.

This methodology builds on the success of the Navan Fort survey program (O'Driscoll et al. 2020) which has

shown the transformative effect that a multi-method geophysical survey approach can have on our understanding of even well studied and excavated monuments and landscapes. That survey has helped us to dramatically 're-imagine' Navan Fort, with the identification of previously unrecorded archaeological features such as enclosure underneath the Site B mound, up to four large palisaded enclosures that pre-date the hengiform enclosure, a possible large figure-of-eight monument at the summit of the interior, and stone-built rectangular structures near the Site A barrow. A similar program of geophysical survey at Haughey's Fort, therefore, may have similarly impactful results.

The survey program at Haughey's Fort is designed to map the hillfort using geophysical survey methods, to will allow us to answer the following research questions:

- As the hillfort has never been systematically mapped (either on the ground, from the air, or through geophysical survey methods), what is the exact extent, shape and morphology of hillfort?
- Are there other unrecorded features associated with the enclosing elements, such as the palisade identified by Conway (2006) following the line of the middle enclosing element?
- Where and how many entrances does the hillfort have?
- Is there a 'main' entrance, and if so, is this associated with an elaboration of the enclosing elements/additional entrance features such as gates, palisades, etc.?
- Are there any archaeological features or structures within the middle and outer enclosing elements, as suggested by Lipo's (2003) interpretation of the aerial photographic record?
- Within the interior of the inner enclosure, can we define the full extent of the large post structure identified by Mallory?
- Can we map the number of large pits within the interior of this structure, and other possible pit features within the hillfort?
- Can geophysical survey help us to better contextualise the nature and purpose of this structure?
- Are there other structures within the interior of the inner enclosure as identified in the aerial photographic record?
- Is there further evidence for large ritual structures?
- Is there any evidence for domestic habitation, hut structures, etc.?
- Can areas of craft- and metal-working, as hypothesised by Brandherm (2014) and (Warner 2014), be identified and mapped?

9. Please describe the methodology used in conducting the research

1) Sensys MXPDA multi-sensor gradiometer cart: An area of approximately 14.12ha, incorporating the majority of the hillfort, the area surrounding the King's Stables and a section of the Creevroe earthworks, was surveyed as part of this project. The entire survey area was mapped using a Sensys MXPDA 5 sensor gradiometry unit at a resolution of 0.5m traverse and 0.125m sample intervals. This system incorporates five magnetometers stacked 1m apart. The top sensor measures the Earth's magnetic field, which is measured in nanoTesla (nT), while the bottom measures the same field, but is affected by any buried feature closer to it (Aspinall et al. 2009). The Earth's magnetic field never stabilises at a fixed reading due to diurnal variations caused by solar winds and this can cause dramatic variations in the measurements (Aspinall et al. 2009). This is largely overcome by gradiometers, where the two magnetometers form an inherent spatial high-pass filter, largely cancelling out diurnal variations (Aspinall et al. 2009, 33). Data will be collected using the Sensys unit tethered with a DGPS, allowing for data to be collected without the need for grids. This significantly increased the speed and accuracy of survey. Collected data will then be processed in DLMGPS, Magneto and Geoplot 4 software to produce final images for interpretation and report writing.

2) Geoscan RM85 attached to a cart based system employing a square array: The entire area within the inner enclosing element of Haughey's Fort, was mapped with electrical resistance, with readings taken with a Geoscan RM85 electrical resistance meter attached to a cart system employing a square array. As the results of this survey were not particularly exciting in terms of archaeological anomalies present, a second electrical resistance survey using a twin probe configuration was undertaken over a 120m by 60m area to compare the results. Archaeological features can be identified by a number of geophysical techniques, all of which detect specific physical discontinuities found within the subsoil. These anomalies can be caused by the distribution of moisture, due to the presence of archaeological features, and their physical properties. In the case of earth resistance, 'the electrical resistance of the ground is almost entirely dependent upon the amount and distribution of moisture within it. Buried remains affect this distribution, and can be detected with instruments' (Clark 1990, 27). This technique is traditionally much slower than gradiometry survey, however, the incorporation of a cart system allows for much larger areas to be surveyed at a higher resolution. A series of 50m by 50m grids will be established for electrical resistance survey, which will be tied into National Grid using D-GPS. Collected data will then be processed in Geoplot 4 software to produce final images for interpretation and report writing.

3) We had originally planned to complete targeted GPR surveys of select areas inside the hillfort, though time restrictions meant that only a number of profiles across the interior and outer enclosing elements were completed.

10. Please outline the findings of your research and/or milestones achieved

Originally, we had planned to survey approximately 12ha of land using magnetic gradiometry, which would incorporate the entire area of Haughey's Fort. However, due to issues accessing two fields on the southern side of the hillfort, only 9ha of the hillfort were surveyed, though this still represents the large majority of the site. As such, additional time was available to survey the areas around the King's Stables and a section of the Creevroe earthworks to the east of the hillfort, with a total of 14.12ha surveyed as part of the project. Further, the entire interior of Haughey's Fort was surveyed using the electrical resistance square array cart, and a 120m by 60m area surveying using the more traditional twin probe array to compare the results. Three GPR profiles across the interior and northern side of the hillfort, incorporating the outer enclosing elements was also

completed.

While the electrical resistance results were disappointing (only identifying a small portion of the southern section of the inner enclosing elements and geological responses), the gradiometry survey has revealed a significant number of geophysical anomalies which may be of archaeological importance. The majority of the hillfort was surveyed, revealing most of its shape and perimeter. Interestingly, all three enclosing elements are evenly spaced, contra to the prior held belief that the outer two enclosures were more separated from the inner example. We have also noted a number of distinct and curious kinks and sharp changes of course in the perimeter of these enclosures. We have also noted a series of corresponding breaks in the outer two enclosing elements, which may indicate these are original features. A notable break aligned with the King's Stables at the northeast is particularly interesting, given there is a c. 75m long linear feature associated with this that may represent a metallised surface of some kind. Given the elaboration visible in this entrance, it is clear that this was an important thoroughfare, and this further links these two important sites (Haughey's Fort and the King's Stables) together.

Within the interior, there are a number of small (c. 6–9m diameter) structures visible and these probably relate to domestic wooden structures. If these can be proven through excavation to be contemporary with the larger wooden structure partially excavated by Mallory (1990), then this would be one of the first Irish hillforts to produce both secular buildings and larger non-domestic structures, an interesting juxtaposition which has not often been evidenced. A number of other features are visible within the interior, including various large pit-like features, possible craftworking areas to the north-east of the interior, as well as a possible craftworking area within and around the middle enclosing element at the north. Additional survey around the King's Stables and sections of the Creevroe earthworks reveal the unusual course of the linear earthworks which appear to abut the northeastern side of Tray bog, and possible branch off to the east. A number of unrecorded enclosures and/or large barrows were recorded near these earthworks.

11. a) Please provide details of the dissemination of the outcomes from this project (inc. publications, presentations, outreach, media etc.) including details of any social media/web platforms used to publicise this project

As the data collection and initial processing of the data has only just been completed (undertaken in the middle of October 2021), there have been no publications associated with this work. It is anticipated that the results of this project will be published in the Emania journal, which will specifically outline the geophysical survey at Haughey's Fort. The surveys will also form an important part of a broader synthesis which will focus on the internal activity at Irish hillforts, which is aimed to be published a national journal such as JIA or PRIA.

The results of the surveys will also be made available to the nearby Navan Centre, which will allow the general public and local stakeholders to access to this research.

During data collection, we used Twitter and Facebook to publicise the project, incorporating the relevant RIA media tags into these social media outputs. It is hoped that a number of public talks outlining the results of this project will be undertaken over the coming year.

b) No. of Academic Papers/articles published: 0

c) No. of Lectures given/outreach events involved in: 0

d) Media Coverage (article in local newspaper, feature on University website etc.): 0

e) How will you continue to communicate the results of your project and what are your publication plans?

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15. How did the award enhance your professional development (e.g. in terms of specific opportunities, opportunities for enhancing skills, collaborations with others etc.)?

The project helped in terms of creating stronger links to other researchers and institutions and enhancing these collaborations. It also allowed for the collection of data that will be integral to a number of future publications, and as such, will have a positive future impact on my archaeological career.

16. What plans (if any) do you have to further your proposal/project?

Next year we hope to apply for further funding to complete a survey of the barrow cemetery to the north of the site surveyed in this project, as well as continue survey work around the Creevroe earthworks. This will complete our surveys in and around Haughey's Fort and Navan Fort, and we will then begin compiling the data and individual papers into a monograph.
