Archaeology Above and Below Conference

April 2014

Acknowledgements

We would like to thanks all speakers who attended and contributed to our conference this year. We would like to further thank everyone who contributed to this edition and we are very excited to showcase your work in this publication. We hope to be welcoming you all back very soon and look forward to following your work.

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‘Rumour has it’

Justin Kenny, Kilberry Amenity & Heritage Group

The group, formed in 2012 as a village community group from the discovery of a Late Mesolithic flint, produced the catalyst for learning more about the historic sites in our community. Kilberry is a small village in north County Meath on a crossroads between the towns of Navan, Kells and Slane with 5 national monuments in the area.

There had always been rumours that a souterrain in the village was connected to a hilltop ringfort half mile away. The souterrain was no longer visible and its approximate location was only known from documentary sources. Labourers in the 1960s recounted discovering the mouth of a ‘cave’ in the same location. So with the help of Kevin Barton, a remote sensing project utilising LiDAR, earth resistance and electrical resistivity tomography (ERT) was undertaken. The results (Plate 1 & 2) showed a clear passage way with a possible chamber at the northern end.

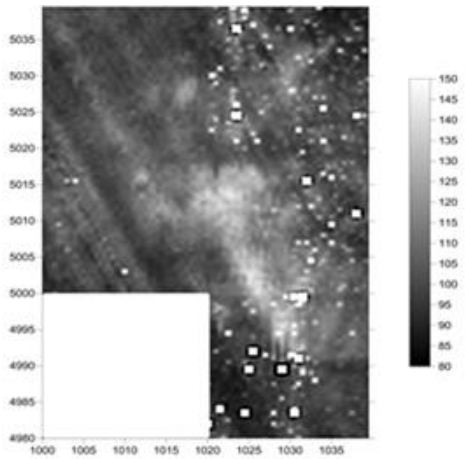


Plate 1

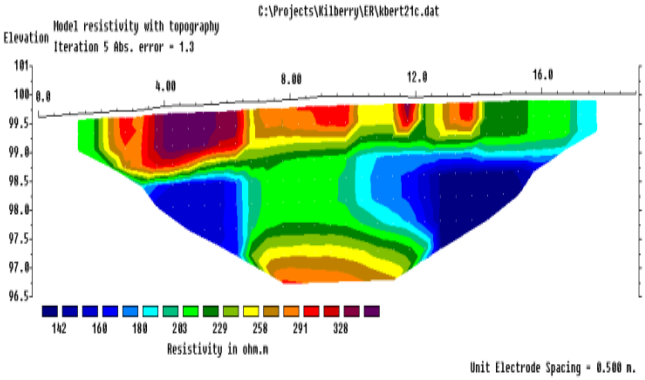


Plate 2

Our next project focused on Rathcoon mound a potential Bronze Age site (Plate 3). Fortune struck on the first day when a flint flake was found on the site of the mound! Over the weekend a combination of aerial photography, magnetic susceptibility, earth resistance and ERT portrayed a fascinating picture. The material which made up the mound is different to the surrounding soil and ERT surveying revealed an anomaly in the centre of the mound, a possible chamber, requiring further investigation.

Plate 3

Next our ambition is to survey a large ringfort, measuring 60m in diameter, and obtain the remaining LiDAR data for the village. These projects have been fantastic community events, galvanising the entire village’s interest and appreciation of the historic sites in their midst.

Balla Archaeological Remote Sensing Project; an Innovative Transition Year Module.

Kevin Barton[1], Teresa Walsh[2], Miriam Cooney[2] & Anna Finlay[2]

[1] Landscape & Geophysical Services, Claremorris, Co Mayo
[2] Balla Secondary School, Balla, Co Mayo

This ArchaeoLandscapes Europe (ArcLand) Project over two academic years (BARS_1 & 2) sought to promote the use of remote sensing by engaging with Transition Year (TY) students in the various aspects of heritage exploration, management and presentation. From the perspective of the school the project offered input to and integration of a number of curriculum subjects (Fig 1).

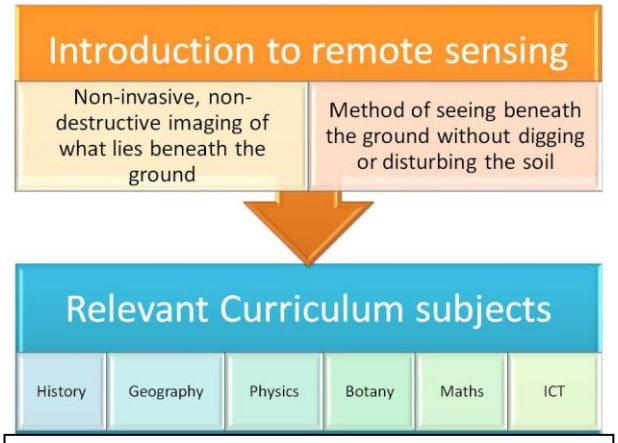


Figure 1: Transition year curriculum subjects.

The Project sought to answer some archaeological questions; BARS_1 involved the investigation of a possible moated site reported in documentary sources and aerial reconnaissance, BARS_2 investigated geophysical anomalies in part of a monastic enclosure previously reported in an MSc thesis. TY students carried out most of the steps involved in an investigation using remote sensing techniques (Fig 2).

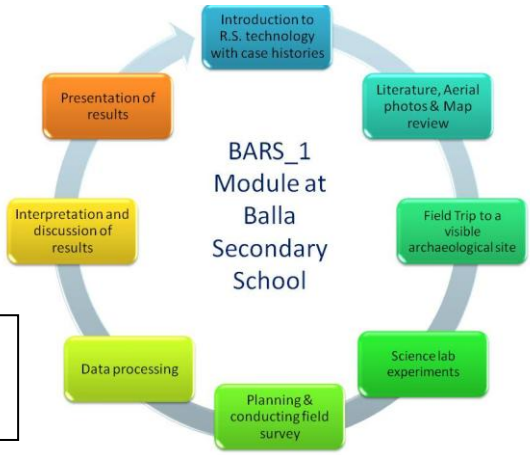


Figure 2: Some steps involved in carrying out an archaeological investigation using remote sensing.

In addition to class work the TY students had hands-on experience of carrying out a field survey (Fig 3) including some Kite Aerial Photography (KAP) as well as processing the field survey data using open-source software.

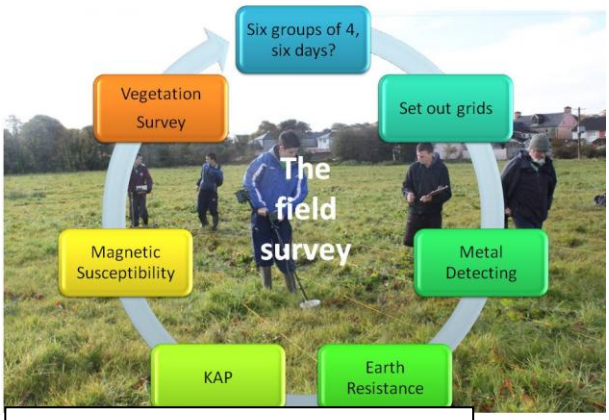


Figure 3: BARS_1 & 2 fieldwork.

The data were interpreted and presented in PowerPoint and poster format (Fig 4). The Project was presented at ArcLand Conferences in Dublin, Balla and Tulsk.

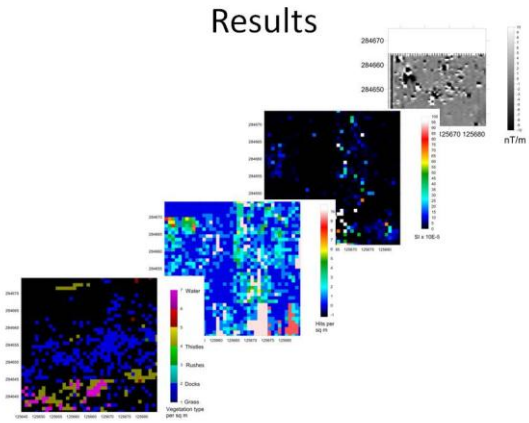


Figure 4: BARS_1 Results.

TY students 'learnt by doing'. They encountered many new concepts and learnt new skills during the phases of the project (Fig 5). In an Irish context the further development and sustainability of a remote sensing module for TY students depends on a number of factors which include those given in Fig 6.

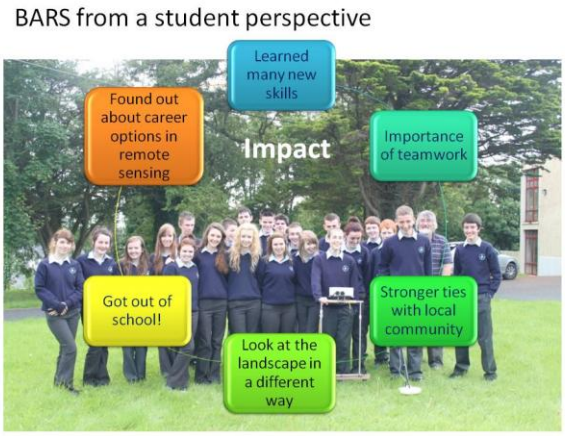


Figure 5: TY student perspective.

- Design and testing of a remote sensing module
- Training of teachers
- Use of KAP, LiDAR data and internet resources to initially introduce remote sensing in schools
- Discussion with the National Monuments Service on the issuing of Consents to carry out remote sensing surveys
- Availability of low cost geophysical field equipment
- Use of open source software

Figure 6: Factors in development of a TY module.

Acknowledgements: Thanks to the TY students, landowners in Balla and Mayo Abbey, Balla No Name Club and Mayo Abbey Community Centre. John Wells is thanked for the donation of the KAP equipment.

The Atlas of Hillforts in Britain and Ireland – an exercise in Citizen Science

Dr Ian Brown, University of Oxford.

Hillforts are one of the most prominent forms of prehistoric and early historic monuments across many parts of Britain and Ireland. They are poorly understood in terms of documenting and analysing their characteristics across regional and national boundaries. The Atlas of Hillforts in Britain and Ireland is a major initiative between the universities of Oxford and Edinburgh, supplemented by work in Ireland by the University of Cork, and funded by the Arts and Humanities Research Council, to record and describe hillforts. The aims are to:

- Simplify and unify the various national and local records.
- Identify and maintain regional and local differences.
- Produce a resource for scholars and the public.
- Perform analyses at a range of scales.
- Offer a new synthesis of hillforts.

Outcomes will include a paper atlas, with hillfort analyses, and a website, with database and Google Earth, which will enable users to search information on sites and their characteristics. All will be lodged with ADS (Archaeology Data Service).

Coupled with the above, is an exercise in "Citizen Science'; a new term for an old practice, in effect public participation in the project. Interested participants, both individuals and groups, are helping us to gather data directly on site for subsequent analysis. Hopefully, people will learn more about hillforts in a structured way and improve their understanding and appreciation of these monuments. Important to the project is the recording of erosion and general damage to sites, with an aim of improving their future conservation and management. This is proving very successful in England and Scotland in particular, and is beginning to 'take off' in Wales and Ireland, and the Atlas team has been asked to speak at many events and gatherings.

One of the principal problems encountered with Atlas data collection has been defining what exactly we are looking at, and how is it possible to know what a hillfort is. There are many thousands of what may be termed 'defended enclosures', characterised by enclosure by bank, wall and ditch, many of which cannot be termed 'hillforts'; the small Irish ringforts of example, but how do we conveniently categorise such sites from hillforts *per se*. As a result, for the exercise, therefore, hillforts are being defined by the following:

- Landscape position and especially their prominence.
- Substantial scale of enclosing works.
- Size (generally above 0.2ha).

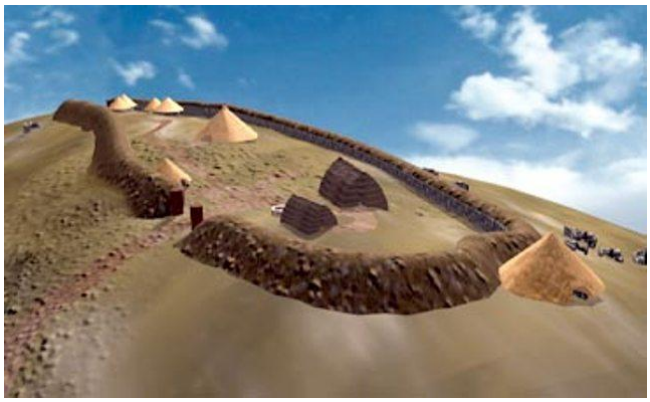
Their landscape position and prominence and substantial scale of ramparts and ditches are the most important, as there are many very small sites, as in Northumberland for example, that show these characteristics well, but are below 0.2ha in size, and are best described as hillforts.

Information for the Atlas is being analysed and entered remotely, recording detailed characteristics, ramparts, entrances, location, condition, land use etc, and this is being coupled with Citizen Science site survey as it comes in via on-line and paper copy survey forms.

What are the conclusions of the Citizen Science exercise so far so far?

- Good response and enthusiasm of participants.
- Obvious attraction of being part of a research project.
- The importance of existing groups.
- The importance of personal contact and support.
- Feedback suggests structured data important.
- The impression so far is that Citizen Science will definitely provide useful and new information that can be incorporated into the wider project.

And as for the Atlas database? All is on schedule for a late 2016 completion.



"Mapping and interpreting the archaeology of the Blackstairs Mountains through Aerial Remote Sensing & Citizen Science"

Séamus Ó Murchú

The Irish landscape we see today has been formed and manipulated by thousands of years of human activity. While much of this activity was focused on the lowlands, the uplands were also utilised at various times in the past for various purposes. The fragile ecosystems that survive in the uplands today are not the last vestiges of natural habitat but landscapes which have been heavily influenced by phases of settlement, abandonment, agriculture and industrial activity. Although the Irish uplands have received greater archaeological attention in recent years they remain relatively unexplored archaeologically. This has given rise to an archaeological record which does not match what survives on the ground and thus a poorer understanding of the past in these areas.

This paper is based on a small aspect of a larger PhD research project in UCD which investigates the archaeological potential of the Blackstairs Mountains as an underexplored upland landscape in Ireland. Here the use of open source remote sensing datasets (Bing & Google Imagery) for rapid reconnaissance and local communities as information sources and reporters are discussed as a cost-effective means of landscape investigation. Local engagement is of particular value in reporting, interpreting and monitoring archaeological sites and adds life and personality to the past.

Figure 1 Hillwalkers at Hut Site Dranagh Mountain, Carlow

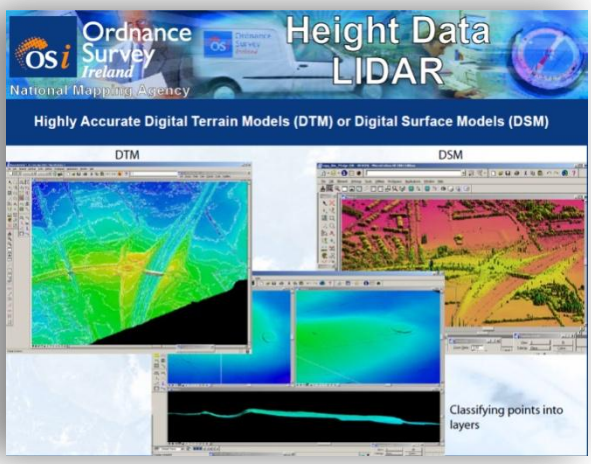
Figure 2 Bing Image of former farmstead, field systems and cultivation in area of rough grazing today, Cloroge Beg, Wexford

Figure 3 Turf Cutters Hut on Blackrock Mountain ridgeline, Carlow

The Use of Technology in Archaeology

LiDAR & Digital Globe RGB & CIR (Colour Infrared)

by Dominic Cronin

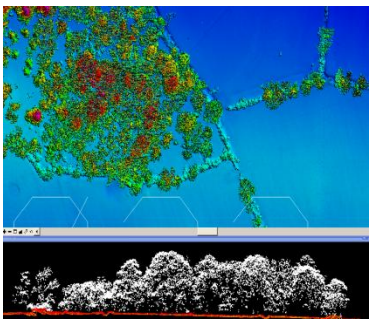


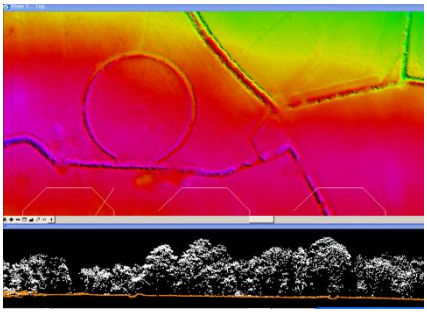
LiDAR is a remote sensing technology that uses laser scanning to collect height or elevation data. The laser scanner emits 150,000 pulses every second creating a point cloud of millions of pixels collected in X,Y,Z (easting, northing and height). These points are the objects the laser hits after it is emitted from the scanner. After capturing the raw point cloud each point is then classified into different layers i.e. Ground, Buildings and Vegetation. The final outputs from the point cloud are either a Digital Terrain Model (DTM) or a Digital Surface Model (DSM). These outputs are of high accuracy and can deliver vertical accuracies between 7cms to 25cms. Prices are competitive, with portions of the country already captured and available.

Lidar Surveying helps overcome one of the major limitations of traditional mapping in that it accurately represents the 3rd dimensional aspect of the landscape. In so doing, it allows the user access to more accurate information, thus leading to improved decisions. Accurately mapping the height of objects facilitates better assessment of the following

- Flood Mapping
- Noise Mapping
- Volumetrics
- 3D Modelling
- Forestry mapping
- Quarry Mapping

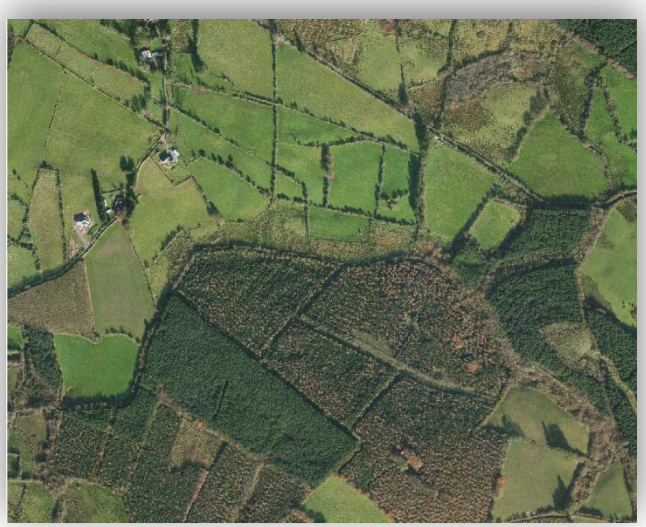
Its power, accuracy and versatility can best be seen from the following example, where an ancient ring-fort is hidden to ordinary photography but not to LiDAR.





Digitable Globe RGB & CIR (Colour Infrared)

In addition to the photography OSi are also offering Colour Infrared Imagery (CIR) which offers the user information never revealed before. Colour infrared imagery is taken from a section of the electromagnetic spectrum not visible to the naked eye and therefore opens up a mass of intelligence unobtainable from standard imagery. Infrared allows dramatic information to be displayed to customers wishing to analyse the imagery for a variety of different reasons. Every type of land cover absorbs a particular portion of the electromagnetic spectrum, transmits another, and reflects the remaining portion which is what is displayed in the infrared image.



Other areas that may benefit from the use of Colour Infrared imagery are crop identification and inventory, soil and water analysis, health and degradation of bogs. It may also prove particularly useful to those investigating drainage and areas of potential flood risk. **Infrared imagery** is available for all areas covered by the Orthophotography at a resolution of 60Cm.

One of the many uses of CIR would be to assist in identifying healthy vegetation or forestry using the reflected Infrared signature of the vegetation depending on the amount of naturally occurring chlorophyll produced. Healthy green vegetation appears as rich red/pink colours on an Infrared image. The colder green/blue colours represent areas of poor growth, bare earth and soil or water surfaces. In the case of Forestry this can be particularly useful in identifying potentially devastating tree disease in time to prevent contagion amongst the crop.

SLIABH COILLTE HERITAGE GROUP

WHAT DOES THE KILMOKEA ENCLOSURE ENCLOSE?

The group are currently conducting a geophysical study within the North West quadrant of the Kilmokea Enclosure in Great Island, Co Wexford.

The enclosure is a large oval shaped site of approximately 7 hectares, 300m North West by 270m East West. There is a stream running northwards from a double spring which is located in the centre.
Early in 2013 we purchased the LiDAR data for Gt Island from Ordnance Survey Ireland. After studying the images from the processed data we identified a rectangular shaped anomaly in the North West quadrant which lies close to the stream. This appears to be part of a larger, possibly square shaped site.

The Kilmokea Enclosure is recorded as an Ecclesiastical Enclosure from the Early Christian Period. However there is some evidence from a recent nearby archaeological excavation to suggest that there may have been a Bronze Age settlement there. There is also evidence that the site was used by the Vikings, Normans and in the Medieval Period.
By using LiDAR, Earth Resistance and Magnetic Susceptibility in a series of weekend workshops, we are peeling back the various layers of history and discovering previously unrecorded archaeology inside the enclosure.

Dundonnell & Its Place in Thirteenth Century Ireland

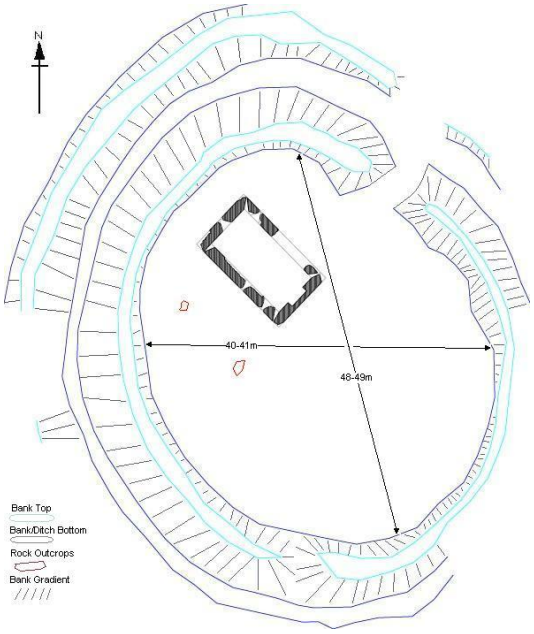
by Daniel Curley

Rathcroghan Visitor Centre & NUI, Galway

The purpose of this talk is to provide a fleeting spotlight and analysis on a monument whose study I would hope may be seen as a template for the type of study that can be embarked on by individuals or groups wishing to understand more their landscape.

Dundonnell Castle presents itself on the archaeological record as a heavily misunderstood and underestimated monument, and the delivery of this paper is an attempt to develop a greater knowledge and encourage debate as to its position and importance during its postulated second-phase, an Anglo-Norman ringwork castle, located in what is deemed to be a key strategic location in the troubled frontier lands west of the River Shannon, and in very close proximity to two vital land routes for the region, the *Slighe Mhór* and 'Route 9' of Linda Doran's "Medieval Communication Routes through Longford and Roscommon and Their Associated Settlements".

The paper delivers an evaluation of the monument and its environs based on the multi-disciplinary approach espoused by the MA course in Medieval Studies provided by NUI, Galway. The author deemed this approach to be the most progressive in terms of furthering our knowledge of the monuments that inhabit our landscape.



Is there life on MARS? - Drogheda Museum and the Millmount Archaeological Remote Sensing (MARS) project

Betty Quinn[1], Brendan Matthews[1] & Kevin Barton[2]

[1] Drogheda Museum Millmount & [2] Landscape & Geophysical Services

Millmount

Situated on high ground on the south side of the River Boyne and within the townland of Lagavooren, in Drogheda Co. Louth, there is a steep sided mound known as Millmount measuring almost 16 m high. According to the ancient manuscripts and annals of Ireland, there are specific references to a burial tomb or cave at Drogheda. This is mentioned alongside the pre-historic tombs of the Boyne valley, namely Newgrange, Knowth and Dowth, which are situated less than 10 km upstream from Millmount.

Folklore in the Drogheda area also recalls that the Viking leader Turgesius had a fortification at the Millmount in the 9th century; however there is no apparent record of this in any of the ancient manuscripts or annals and no archaeological remains of Viking activity and or settlement has ever come to light. By the latter half of the 12th century the Normans had invaded Ireland and by the mid 1180`s the Norman Lord, Hugh de Lacy, had begun to lay out the foundation plans for the town of Drogheda. During this period there was a fortification constructed of wood erected on top of the mound. During this period the mound was known as the Castle-Motte of Drogheda. Then at some period in the 13th or early 14th century, there was a stone tower erected on the summit of the Motte. Throughout the following centuries the site at Millmount reverted back to a barracks whenever the threat of trouble, rebellion, or unrest arose. In 1808, a Martello-type tower was erected on top of the mound at Millmount and this same tower was shelled and badly damaged during the Civil war in Ireland in 1922. Some restoration work began on the tower in the late 1960`s and it was finally revamped and opened to the public in the year 2000.

MARS Project

The Project is investigating the mound and its internal structure to see if there is evidence for its use as a tomb and for possible hidden fortifications. Topographic data derived from LiDAR and Ground Penetrating Radar (GPR) are being used to investigate the mound and the area surrounding it. Preliminary GPR results indicate the mound may be largely constructed of clay which has resulted in a subdued geophysical response. The GPR response in the area surrounding the mound is very complex with evidence of possible ditches and foundations. Some of the latter may be due to recent utilities and services which make it difficult to differentiate them from more ancient features. Further topographical and geophysical survey is planned to try and resolve the subdued GPR response and eliminate recent features from a final interpretation.

For the moment there is evidence for 'Life on MARS' but it will take a little longer to indicate the type of 'Life'.

Plate 1 The road is laid on top of the original ditch at Millmount; the only bend within the medieval town of Drogheda.

Plate 2 Superimposed map line showing the original line of the medieval town walls and gates at Drogheda.

Plate 4 Millmount Mound with Ground Penetrating Radar Survey in Progress, Conor Brady

Plate 3 Millmount Mound and Martello-type tower today.

The Scottish National Aerial Photography Scheme (SNAPS)

www.snapscheme.info

John Wells, Jim Knowles, Ron Dingwall and Cade Wells

West Lothian Archaeological Trust

The Scottish National Aerial Photography Scheme is a project of the West Lothian Archaeological Trust, a Scottish Charity (No. SC043118). The Trust promotes the use of high resolution, low-level, kite aerial photography both within and outside the visible spectrum. The Trust acts a focal point for the West Lothian Archaeological Group, a collective of independent individuals in the UK and Ireland who have an interest in applying kite aerial photography (KAP) in an archaeological and heritage context.

In 2012, terminally ill Trust and Group co-founder and former teacher, Rosie Wells, asked for some money to be set aside for funding a pilot project to investigate, and introduce cheap, simple, low–level aerial photography techniques to children and students.

The project was initiated in May 2013 with starter and standard KAP kits being donated to a wide range of groups and individuals, with over 140 kits having been allocated, so far. The project is partly to establish a reliable system for working with children and to encourage the progression to more interesting techniques, such as working in the near infra-red. To encourage feedback an annual photographic competition was also initiated.

John Wells and co adjusting camera for the flight.

Archaeological Fieldwalking or Systematic Surface Collection Survey

Conor Brady

Archaeological fieldwalking or surface collection survey is a very low-cost, rapid method for archaeologically exploring the nature of past settlement and activity at a large scale or landscape level, particularly during prehistoric times. It is an ideal way for those interested in archaeology and heritage to take part in archaeological work. However, in order to safeguard the quality of the data being gathered and maximise the potential knowledge arising from this, it is important that there is a properly thought-out research design and a suitable methodology. Artefacts collected must be mapped with appropriate accuracy usually using some form of grid (Figure 1) in order to be able to interpret the significance of their findspots in the landscape (Figures 2 &3). Although currently an unlicensed activity, those who discover archaeological artefacts have certain legal obligations under the National Monuments Acts. There are also issues surrounding the proper processing, analysis, storage and reporting of artefactual assemblages that must be thought through in advance of any survey. Once these basic considerations are met, this can be an extremely informative exercise and can add another dimension to our understandings of how our ancestors used the landscape.

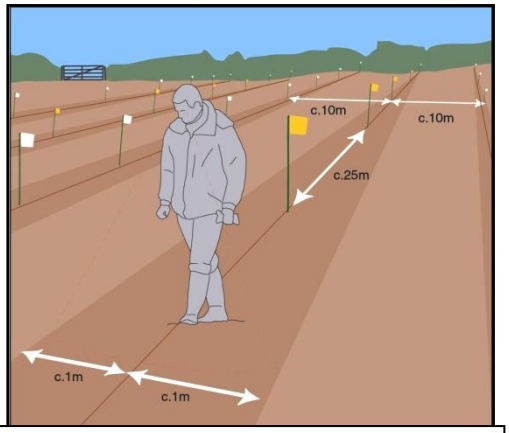


Figure 1: A field survey grid. Every find can be localised to within an area measuring

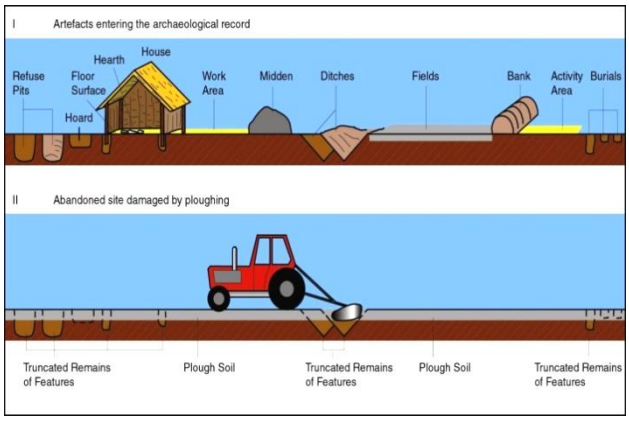


Figure 2: Artefacts entering the ploughsoil (after Hasselgrove 1985).

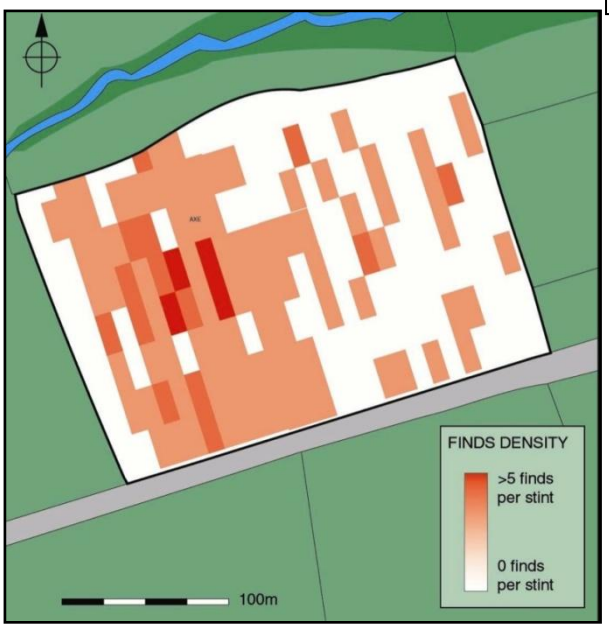


Figure 3: Plot showing the density of finds collected across a field surface.

Sponsors of the Rathcroghan Visitor Centre and Complex