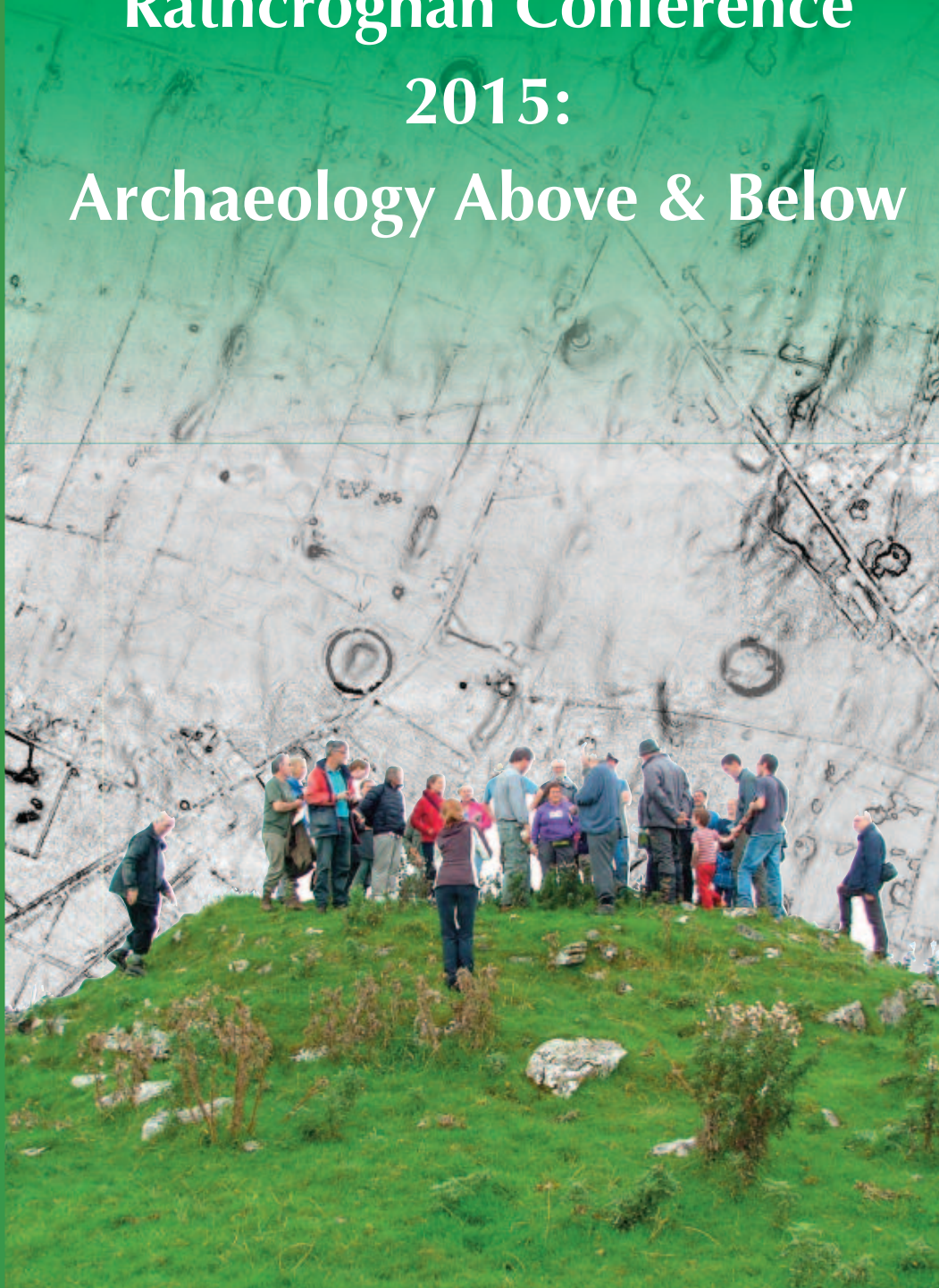




Rathcroghan Conference 2015: Archaeology Above & Below



11th & 12th April

Acknowledgements

We would like to use this book of conference proceedings as an opportunity to thank everyone who attended this year's **Rathcroghan Conference: Archaeology Above & Below**, both participants and attendees. We were delighted and privileged to welcome you all to Rathcroghan Visitor Centre in 2015 as we attempted to make our contribution to the very worthwhile and progressive field of community archaeology.

This book of conference proceedings provides an insight into the motivations and thoughtful research of people from all walks of life, each participant being motivated to help progress archaeology through creative and inclusive methods. This results in more and more people becoming inspired and getting involved in attempting to understand our past.

We hope you all enjoy these abstracts and that they might encourage to attend or participate in Archaeology Above & Below 2016.

See you all in April!

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Community Archaeology & Recording Graveyards in Co. Roscommon

Nollaig Feeney, Heritage Officer, Roscommon County Council

Community Archaeology projects carried out as actions of the County Roscommon Heritage Plan 2012-2016 include an annual Community Heritage Bursary and Heritage Research Bursary. The County Roscommon Folklore & Oral History Network is supported as an action of the Heritage Plan. This project has amassed a collection of over 100 oral history interviews from around the county which can be accessed free in any branch of the Roscommon Library Service. Other community archaeology projects carried out as actions of the Heritage Plan include Lissonuffly Church Conservation Project, Kiltrustan Church Conservation Project and Tulsk Priory & Grace Mausoleum Conservation Project. These conservation projects were carried out in conjunction with the local communities. Roscommon County Council works in partnership with St. Johns Parish Heritage Group and local landowners towards the conservation and interpretation of the deserted medieval walled town of Rindoon. Other community projects are carried out, as opportunity arises, such as part of the National Famine Commemoration which took place in Strokestown in 2014. Current community archaeology projects include the Roscommon Cross Slabs Photogrammetry Training Project and the community elements of the Ballintubber Castles in Communities Project.

Graveyard related actions planned for 2015 include reviewing and updating the 2005 Roscommon Graveyard Survey and linking it in with the new Roscommon Graveyards Map Viewer so that it is more suitable for publicity and promotion as a useful heritage tool and point of reference for those with an interest in graveyards in the county. This is an opportunity to create a 'go to' online archive for all information relating to each graveyard in the county.

With regard to memorial recording - The memorials of Kilkeevin Graveyard were recorded in 2012 as a pilot project carried out between Roscommon County Council and Trien Historical Group. On the basis of this the Roscommon County Council GIS Officer has devised a Roscommon Graveyards Map Viewer. This can link to geotagged photographs & display inscription survey results showing the location of the memorial on the RCC

Website. The photo of the memorial can also be viewed online. It is hoped that existing datasets can be converted for use on the new Graveyard Map Viewer and that training on this can be provided to community groups.

Call for offers of help! Do you have any graveyard data you can share? Could you assist in converting existing data to fit the new mapviewer? Could you gather new information?



Photogrammetry Training Project - Aughrim Graveslab photo view (L) and Photogrammetry view (R).

The Potential and Power of Community Archaeologies of the Recent Past: A Burren Story

Maggie Ronayne, Department of Archaeology, NUI Galway

Community archaeology is a growing field in Ireland and internationally, involving many different approaches and initiatives. Likewise, the archaeological study of recent centuries is becoming more common in Ireland. The local experience of major events and changes in the recent past can hold huge significance for communities. Sometimes parts of the story are known through oral memory, sometimes through historical sources. However, the stories are also tied into places and the landscape. As a field-based, hands-on form of investigation, archaeology can also add a great deal to our knowledge of these important 'memory places' while lending itself to a community-based approach. This lecture will outline a community archaeology approach to the study of 19th century rural Ireland and the Great Famine. It will include a case study from Ballyvaughan, County Clare where, since 2010, community members and archaeologists have been working together on the Burren Community Archaeology Project.



Our Monuments are Everybody's Monuments.

Clare Tuffy, Visitor Services Manager, Office of Public Works

The ancient monuments of Brú na Bóinne were designated as a World Heritage Site by UNESCO in 1993. This designation recognises Brú na Bóinne not just as an important part of the heritage of Ireland but also of significance in the shared heritage of all humankind. The monuments are also situated in a rural community in Co Meath where people live, work and play.

What economic benefits do such monuments bring to local communities and what are the disadvantages of living in the shadow of a well loved iconic site like Newgrange?

How do heritage sites like Brú na Bóinne contribute to a community's sense of identity and how can local communities be encouraged to feel connected to what happens at the monuments? Do children growing up in the area feel that they live in a special place?

Brú na Bóinne management has always encouraged the local community to come to the monuments, enjoy them and use the facilities.



How can archaeological remote sensing be used by schools and local community and heritage groups?

Kevin Barton

Landscape & Geophysical Services, Claremorris, Co Mayo. www.lgs.ie

This presentation reviewed some examples of satellite imagery, airborne LiDAR scanning, aerial photography and ground geophysical techniques that have been or are currently being used by individuals, schools and community and heritage groups.

Satellite imagery in the form of freely available Digital Globe images is being successfully used by the New Irish Digital Archaeological Survey (NIDAS) Project. Images are viewed in Google Earth to identify archaeological features in the landscape that are not recorded in the Record of Monuments and Places (RMP) or Sites and Monuments Record (SMR).

Crop and soil marks discovered in imagery over County Antrim, shown in the NIDAS Antrim Inventory (NIDAS 2015) were abstracted, presented and discussed.

LiDAR data, available at low cost from Ordnance Survey Ireland, offer the possibility of exploring local landscapes to identify low topographic profile sites that can be further investigated by fieldwalking and other remote sensing methods. The ability of the LiDAR technique to reveal features and sites obscured by vegetation was illustrated with an example from the Hill of Slane Archaeological Project, County Meath (Figure 1).

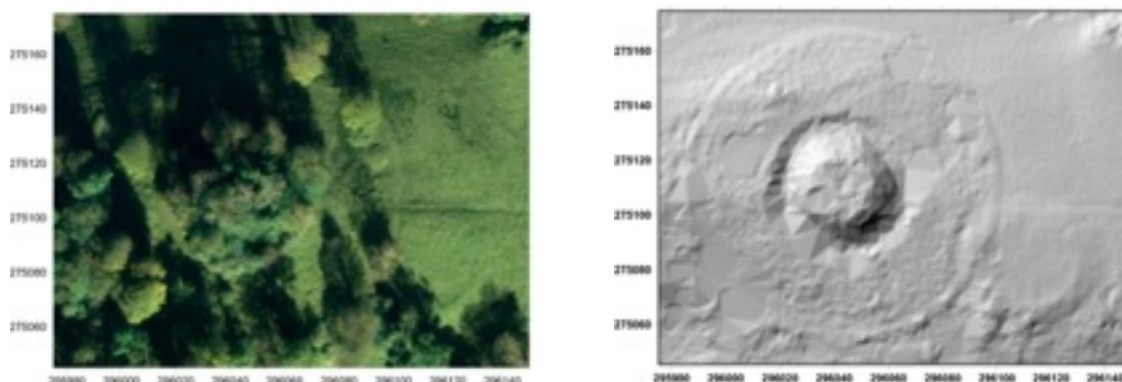


Figure 1 : Hill of Slane, County Meath. Left - Vertical aerial photograph. Right - Shaded-relief LiDAR image revealing the motte, surrounding ditch, outer enclosure and possible barrow in the southeast (adapted from Brady et al 2013) [Aerial photograph and LiDAR data courtesy Ordnance Survey Ireland].

Kite and pole aerial photography were introduced and discussed in terms of its low cost and accessibility to schools and community groups. Oblique photographs using kite aerial photography from the Hill of Slane and the Hill of Tara was used to illustrate the technique. Rock art from Drumcoggy,

County Mayo, which proved difficult to photograph using ground-based photography, was successfully captured using pole photography.

The Balla Archaeological Remote Sensing (BARS 1 & 2) Project introduced kite aerial photography and ground geophysics to secondary school students in County Mayo. Remote sensing techniques offered the possibility of cross-curriculum projects which interested both teachers and students in the school. Transition year students took part in field surveys and subsequently processed and visualized their data. The project was presented at the K2U2 Conference (TotP 2013). A BARS2 component in 2014 was the Archaeology Above and Below event which was a one-day schools invited seminar and two-day community conference (ArcLand 2014).

Sliabh Coillte Heritage Group (SCHG 2015), County Wexford has been active in heritage studies for over 20 years. The current project is investigating a large enclosure on Great Island for which substantial documentary evidence has been gathered. Analysis of the evidence has raised questions which are being addressed through remote sensing surveys. Analysis of LiDAR data showed there was a previously unknown feature in Kilmokea Enclosure. The feature was investigated using the earth resistance method during a series of weekend training workshops (Figure 2). The earth resistance results showed there are many features hidden beneath the soil in the enclosure.



Figure 2 : Tuition on the earth resistance survey technique during a weekend training workshop at Kilmokea enclosure.

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Using open source and low cost software to visualise photographs and LiDAR data from archaeological sites

Kevin Barton,
Landscape & Geophysical Services, Claremorris, Co Mayo. www.lgs.ie

This presentation consisted of a live demonstration of two pieces of software.

The first piece of software demonstrated was QuiKGrid (Coulthard, 2015). QuiKGrid is an open source program which will read a set of scattered data points (x, y, z) which represents a surface. The program will generate a grid from this data and then display the surface as a contour map, or as a 3D representation. LiDAR data from Rathmore mound in the Rathcroghan Complex (Waddell et al 2009) was inputted into the program and 2D and 3D images produced (Figure 1)

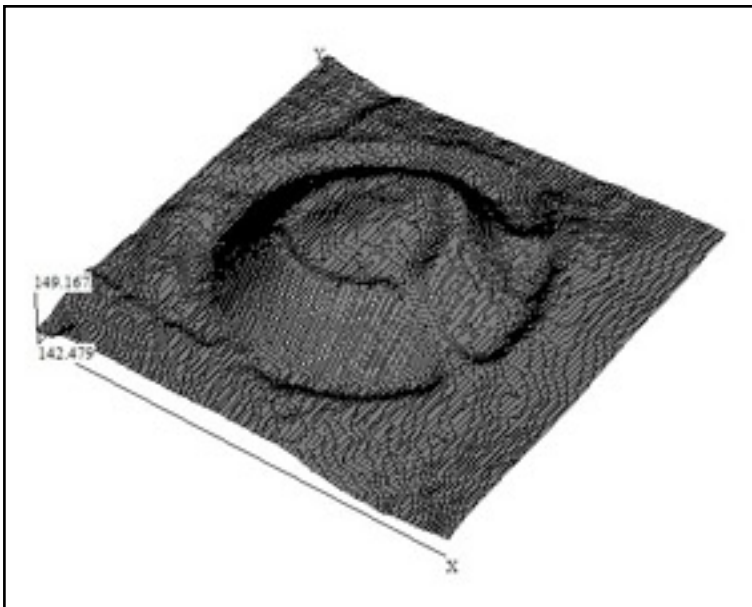


Figure 1 : 3-D Wireframe model of Rathmore mound visualized using LiDAR data processed using QuiKGrid software. (LiDAR data courtesy Ordnance Survey Ireland).

The second piece of software demonstrated was Agisoft PhotoScan (Agisoft 2015) which is a commercial software package that has some low cost options. PhotoScan performs photogrammetric processing of digital images and generates 3D spatial data to be used in GIS applications, cultural heritage documentation and visual effects production as well as for indirect measurements of objects of various scales.

There is a free 30 day demo version that has partial functionality but does not allow printed or digital output. The standard version at 179 USD offers partial functionality and the ability to output the data. The professional version at 3499 USD offers full functionality. The standard version is adequate for most applications.

A set of 5 overlapping photographs of a carved stone head (Figure 2) which is set into the graveyard wall on the Hill of Slane was used to demonstrate making a 3D model output as a PDF file.



Figure 2 : Left - Carved stone head from the Hill of Slane. Right – 3-D model of the stone head.

References

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Further community surveys, “The Ringfort” concludes a trilogy of events

Justin Kenny, Kilberry Amenity & Heritage Group

The Ringfort project concludes a trilogy of remote sensing surveys on three known monuments in Kilberry, Co.Meath. This was undertaken by a local community group that is now established and rooted in the task of adding to the story of the area around its village. One which is steeped in history, from the Mesolithic to the Neolithic, Bronze Age and right through to the Norman conquest.

The Site is situated on high ground (110m) with a commanding south facing view of Tara, the Wicklow hills, Loughcrew to the west and in a field of shale rock which is prominent to the east. The site was heavily overgrown and it took a while to prepare for the project. The diameter, approximately 61 meters, is adorned by twenty nine beech trees that have an estimated date, by counting the rings on a fallen section, to be between 140 and 180 years old.

The banks vary in height; from 1.5 m at the south to 3.0 m at the north end of the site. It is on the south side that the location of the entrance is situated. Lidar Data that was purchased by the group has shown a ditch like feature around the site.

We had the help of the local transition year students and found them to be extremely enthusiastic. The project proved to be physically challenging due to the terrain. Over 6,500m² was surveyed both inside and outside the structure using many different non-invasive remote sensing techniques that include, Magnetic susceptibility, Earth resistance & Electrical resistivity tomography.

Results have shown areas of high resistance along the east and northern edges which indicate a stone revetment. To the north of the site high resistance is indicated, suggesting the possibility of a souterrain like feature. Further work is needed to clarify. Two large areas of saturation are clearly present as well as tree root balls, which would be in keeping with local tales of a larger number of trees in the centre of the structure many years previous. The west of the mound notable “fist “size stones on the field edge, whereas the east side had little or no evidence of this. The magnetic gradiometry did not give much indication as to the presence of the ditch, however there is evidence of a ditch in the results from the “ERT” sections that were produce during the project.

One of the most notable finds during this project was the many lithic's collected around the site during the survey bringing leading questions as to the "Ringforts" date and place in local History.



Ogham in 3D and surveying Oweynagat

Dr Nora White, Principal Investigator on the Ogham in 3D project at the Dublin Institute for Advanced Studies (DIAS)

The Ogham in 3D project, based in the School of Celtic Studies at DIAS, aims to create 3d models of as many of our surviving ogham stones (3d technology for a 3d script) and to make these freely available to everyone on the Ogham in 3D website (<http://ogham.celt.dias.ie>). This website, which was launched in 2013 and is a work in progress, bring together searchable information relevant to ogham from various disciplines (Celtic linguistics, archaeology, history, genealogy, geology, epigraphy, etc) and aims to reach a wide range of audiences, from groups/schools interested in their local ogham stones, to

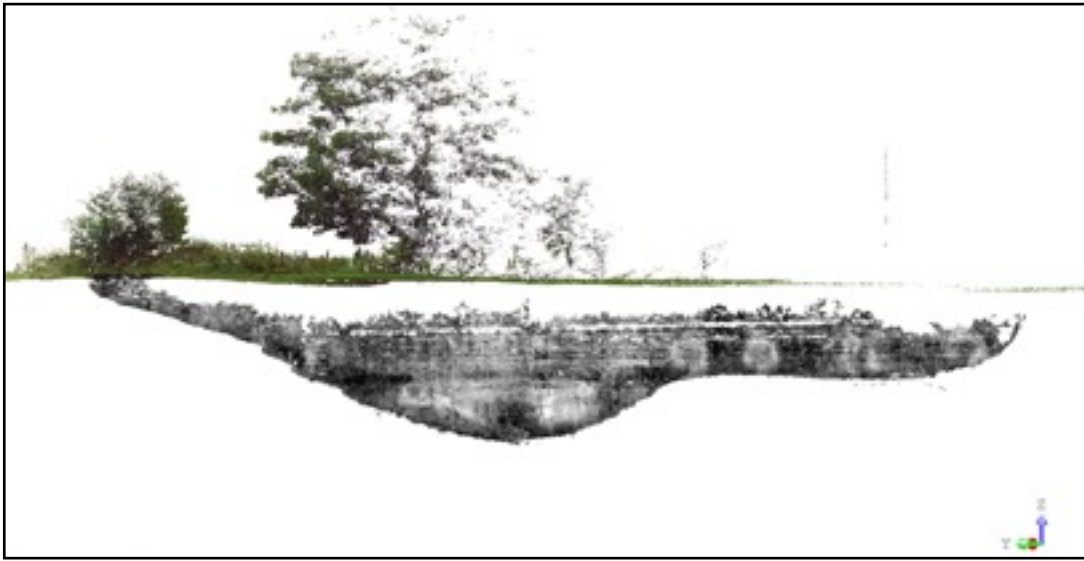


Oweynagat Survey

tourists curious about this unique monument, to students and researchers of the various aspects of ogham. The current phase of the project, focusing on ogham stones in state care, is funded by the Department of Arts, Heritage and the Gaeltacht through the National Monuments Service. Since

2012 we have been collaborating with the Discovery Programme to capture and digitise 73 ogham stones in state care at various locations around the country, along with any others that might be in the vicinity. In cases where ogham stones are situated in a wider archaeological context, such as at an ecclesiastical site, or built into a souterrain, we endeavour to capture that wider context in addition to the individual ogham stones. Field work at Rathcroghan last summer was a wonderful example of this where two ogham stones were built into in a souterrain which continues into a natural cave: Oweynagat, well known in early Irish literature as an

entrance to the otherworld and a major archaeological feature in the wider Rathcroghan Complex. This paper presented the work of the Ogham in 3D



project in general along with the process and results of the Oweynagat survey in particular. Records of the two ogham stones (Rathcroghan I: VRAICCI MAQI MEDVVI 'of Fráech, son of Medb' and Rathcroghan II: incomplete [... MA]Q REG[A]S MU[COI] ...), including 3d models of the stones, are now available online. As the souterrain and cave were also scanned, a 3d model of Oweynagat is also available on the Ogham in 3D website.

Kite Aerial Photography: how to get started, its uses and safety

Jim Knowles, West Lothian Archaeological Trust

Jim Knowles, Trust Archaeologist and Secretary of the West Lothian Archaeological Trust, presented a talk on Kite Aerial Photography: How to get Started, Its uses in Archaeology and Aspects of Safety. The presentation outlined how Jim became a kite photographer himself and explained the basic equipment required to get started. The talk progressed to identify the uses of KAP in archaeology, its practical, economic and ease of use. There were also an introduction into more advanced areas such as photogrammetry, remote controlled rigs, multi-spectral use and 3d modelling. The final session of the presentation focused upon aspects of safety, hazards, best practice and Civil Aviation Authority law.

Kite Aerial Photograph of Cairnpapple Ceremonial Complex, West Lothian, Scotland.

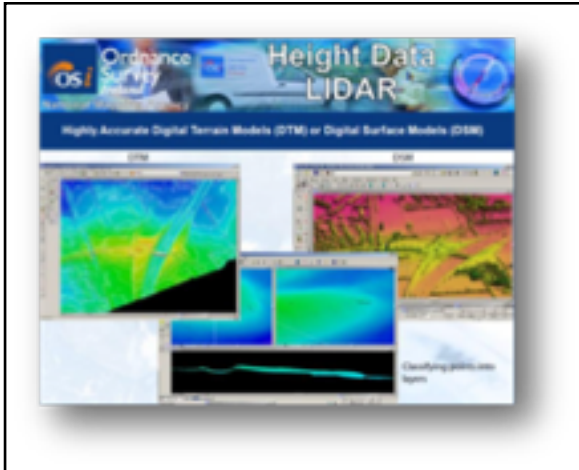


The Use of Technology in Archaeology

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

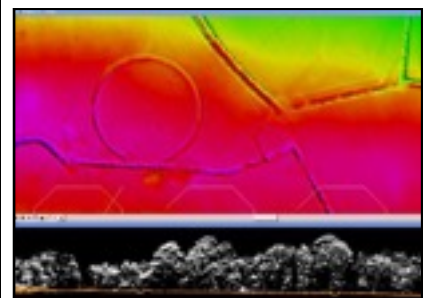
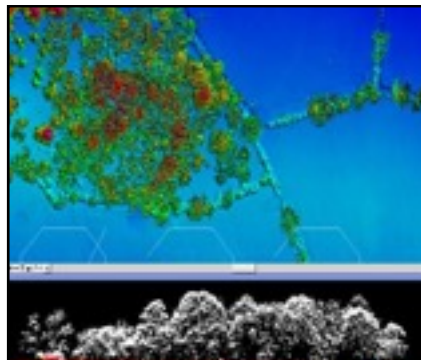
☒ Flood ☒ Noise ☒ Volumetrics ☒ 3D Modelling Mapping Mapping

☒ 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.

- 7

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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.



KAP in Co. Roscommon and best practice in flying kites

Frank Scott, Public Relations Officer, Roscommon Heritage Group

I met John Wells last year at Cruachan at the Above and Below Conference and after talking to him he sent me one of his Kite sets. The photos I was showing gave an view of how I got on over the year.

As Roscommon has so much Archaeology I started at Roscommon Castle and started to learn the craft of Kite Air Photography, also known as K.A.P.

I had been taking around 40 shots each time the kite went up and so deleted many shots that did not look very good on site however a trip to Rathbrennan looking to capture both Ringforts in one frame I was not able to see the pictures on the screen well so I did not delete any and when they were put up on the computer I found a shot of what may be another feature that has not been seen before. So now I do not delete until all pictures are viewed on the large computer screen.

I had some shots of our new Civic Offices as it grew out of the ground, as part of our future heritage and some shots where I was flying under dark clouds and I got hit by a form of lightning.

There were some nice shots taken at Rindoon too. Day two saw us go to Carnfree with a group to let them have a go at this form of photography, we got some great shots on the day.



Levallinree Crannóg Settlement, Turlough, Co Mayo and a whistle stop tour of some high profile archaeological monuments with Kite and Camera.

Christy Lawless, Field Archaeologist

In August 1983 the water level of the lake was at its lowest perhaps for hundreds of years. This was due to the outlet of the lake been cleaned by the Moy drainage scheme. During low water levels that summer a treble palisade of split oak stakes protruded from the silt around the perimeter of the large island on the lake. The discoveries that followed in the subsequent years show that Levallinree Lake and the surrounding landscape was a very important high status area.

A total of six crannógs have been discovered on Levallinree Lake. There are two obvious islands on the lake which are crannógs. The larger island has well preserved crannóg features such as the treble palisade that surrounds a circa 1.50m high cairn of stone that are mixed with oak timber. This island has one large mortised oak beam protruding from under the island at water level. A number of artefacts were recovered during low water level. The second island on the lake is a crannóg cairn that has a wooden habitation layer 1m below water level. Scuba diving has revealed the remains of 2 other crannógs that are now below water level. There are a further two crannóg sites on the dry shoreline, There is a large stone fort, a cashel, situated 70m from the east shore line which is the land- base site associated with the crannógs.

The townland name has added further to the interpretation and status of Levallinree Crannóg Settlement. Levallinree translates in Irish Leath- Bhaile an Riogh which means 'Half Town of the King' or 'Half Quarter of the King'. Archaeologists agree that Levallinree was a royal seat, perhaps the seat of an ancient tuath.

Aerial photography has always played a part in my archaeological field work. The introduction of Kite aerial photography has added a new dimension to this work. To demonstrate the benefits and details in kite aerial photography the talk will include a whistle stop tour of some high profile archaeological monuments such as Turlough Round Tower, Rathlacken Court Tomb, Nymphsfield Stone Circles, The Deserted Village Achill Island, Creevykeel Court Tomb and Stague Stone Fort, Co Kerry.

Kite Aerial Photography in the Near and Thermal Infra-Red

John Wells

West Lothian Archaeological Trust and the Scottish National Aerial Photography Scheme (SNAPS)

Aerial images taken in the infra-red can reveal features which are not normally apparent in the visible part of the spectrum.



Near infra-red light is reflected by healthy plants, so anything below the soil which modifies a plant's growth, like a ditch or building foundations, can be apparent in the patterns seen in grass or crops, as illustrated in figure one. This approach to aerial photography can be very cheap and is part of SNAPS (www.SNAPScheme.info). Unlike normal crop marks, features can be observed through the seasons.

Thermography, which is imaging in the thermal infra-red, is more complex. Although there can still be a reflected component in sunlight, here the heat emitted by vegetation, or from the ground, is what is of interest. There are two main components.

Thermal inertia, the storage heater effect, can be detected when there is a change in ambient temperature and a differential heating or cooling of subsurface objects, relative to the surface of the ground. Figure two shows subsurface wall foundations, under grass, which have warmed during the day but, in the cool of evening, have retained more heat compared with the surrounding soil.



Thermography also reveals differences in the temperature of crops, and other flora, which can result from differential transpiration. The amount of water emitted by a plant will depend on what is available to the roots and will vary depending on underlying features. For example, a ditch may be water rich and a wall's foundations dry. Plants that emit more water will be cooler.

The cost of thermal imagers is now comparable with normal cameras, as sensors have recently become available for mobile phones. However, the resolution of thermal imagers is low, so they are best used for low-level aerial thermography.

A Closer Look at some Roscommon Castles

Karen Dempsey, Doctoral Researcher, UCD

Although the type of castles traditionally known as ‘hall-houses’ have belatedly become a topic of interest in castle studies, understandings of these freestanding thirteenth-century buildings remain poor. Recent work, both in England and Ireland suggests that these castles are chamber-towers which were accompanied by external timber-built halls.

This radically alters our understanding of these buildings and how people inhabited these spaces. Furthermore this appears to have been confirmed by new geophysical investigations conducted at a number of sites including Castlemore and Castlesampson both located in Co. Roscommon. The results of the geophysics at both these sites and their implications will be discussed in this paper.

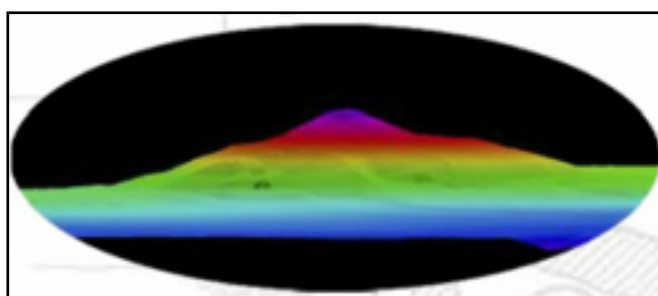
This research has been funded by the Irish Research Council and Roscommon Heritage Bursary 2014



Preliminary Results from the Prehistoric Burial Mounds of County Westmeath project, 2012-2014

Dr David McGuinness
Independent Archaeological Researcher

Since its inception in 2012, this County Council-funded and community-based project, run collaboratively with Westmeath Archaeological & Historical Society, has sought to examine the morphology and classification,



archaeological context, siting and distribution of the earthen barrows and related monuments of this rich grassland county, some of which are on or close to royal sites documented in medieval Irish vernacular literature, others being referred to in the *Táin Bó*

Cúailgne. Work so far has been weighted towards recording what is proving to be a remarkably diverse range of earthworks, some virtually unique in appearance, and attempting to classify these according to existing schemas, particularly that of the Archaeological Survey of Ireland (ASI). With Mullingar-based geographer Seamus O'Brien, the project is also making significant observations on the setting of barrows in the heavily glaciated Westmeath landscape. Preliminary observations on the broader archaeological context of the barrows suggests a significant association with monastic sites of the early medieval period, contributing to the long neglected theme of the Pagan-Christian transition in Ireland



