

ABSTRACTS

Monday 11th September

10.30 – 12.00 USING HISTORIC PHOTOGRAPHY

Martyn Barber - “Quick! The Kodak”: Victorian and Edwardian Britain from the air

Although the first aerial views of a British archaeological monument were taken in 1906, the first ever aerial photographs in this country were taken over four decades earlier. During those years, numerous balloonists and photographers, both military and civilian, experimented with cameras and mapping techniques, while many of the resulting photographs were published in a variety of books, magazines and journals. But do they now possess anything more than curiosity value?

Bernhard Lucke - Landscape transformation in the Decapolis region (Northern Jordan) – utilising historic aerial photography to trace field patterns and their relation to soil properties

In the Decapolis region in northern Jordan and Israel, the Roman and Byzantine periods saw a remarkable urban development compared with earlier moderate towns and later nomadic herding. Numerous authors postulated that soil erosion due to mismanagement after the Muslim conquest in 636 AD led to a devastation of the area and explains the settlement history. However, a careful examination of soil development in relation to archaeological material on the fields revealed a very heterogeneous pattern and the erosion theory has to be rejected. Comparison of series of air photos since 1918 indicates that field systems might be related to historic predecessors, and that soil and landscape transformation processes are less strongly governed by land use than previously assumed. Small-scale differences of soil properties seem to be related to long-term ploughing, which led in the case of the Decapolis region to a levelling of a once undulating landscape. The partially present land degradation is unlikely to date from the Islamic periods, but could be related to increased extreme events, occurring during prehistoric droughts. Examination of the 1918 air photos proved extremely valuable, but developed to an adventure of its own. The collapse of the Ottoman-German front had created a chaotic situation. As well, the true number and fate of aerial photographs taken by the Allied forces seems unclear. The known pictures are distributed over several archives, and it would be worth to undertake a search and documentation to at least collectively register what is still there.

Ioana Oltean - Reconstructing the archaeological landscape of Southern Dobrogea utilising recent photographs from aerial reconnaissance in conjunction with archived aerial and satellite imagery: preliminary results, problems and potential

The recent integrated aerial photographic assessment of Southern Dobrogea is part of the British Academy funded research programme 'Contextualizing change on the Lower Danube: Roman impact on Daco-Getic landscapes' which intends to study the effect of the Roman policy of conquest and provincial administration on the native Daco-Getic settlement pattern on the Lower Danube. The methodology is based on extensive use of a range of aerial photographs varying from low altitude obliques obtained through aerial reconnaissance; to medium altitude vertical photographs produced by the German, British and American military aviation during the Second World War selected from TARA -Keele University; and even high altitude satellite photographic products (Corona) of the Cold War acquired from the USGS. The value of this approach lies not just in the merit that it enables for the first time extensive detailed mapping of large archaeological landscapes in Romania, but also in the fact that it allows the recovery of archaeological features in wide areas permanently wiped-out by modern development. This paper presents some preliminary results along with the problems raised by each method of data acquisition for this area.

13.30 – 17.00 ‘IS MAPPING WORKING – IS FLYING FAILING?’ – AN AARG DEBATE

Across Europe there are a number of established reconnaissance and air photo mapping programmes. At one level these programmes are highly productive, long-established ‘flagship’ projects for the institutions which run them. Annually they produce/discover an embarrassment of archaeological riches. At another level such projects can acquire a relentless momentum which allows little time for pause and critical debate. How is aerial archaeology working, or failing, in the early 21st century? Can it be improved upon and enlarged, or reduced in scale and redirected? How does bias affect the ‘science’ of aerial archaeology? Is there nothing to debate? This session is not intended to provide answers, but it is hoped to provoke honest reflection, hearty debate and an open forum in between discussion papers for thoughts to be aired.

Toby Driver – flying, failing, flying, failing continuum. A view from Wales

This paper will serve as an opener for the debate session, and aims to demonstrate the need for reflective debate within the discipline by looking at three themes closely tied to active reconnaissance work in Wales. The title reflects the imperfect routines we all work within, where considerable successes may be offset by occasional, or continuing, problems. Each theme, briefly summarised, could be expanded and talked about at length, drawing on contributions from other speakers during the afternoon, and this is the spirit in which the paper will be given. It will discuss firstly how well the reconnaissance programme is operating in Wales, and how work responds to new agenda like bias in aerial archaeology. It will secondly look at the potential role of vertical photography alongside observer-directed reconnaissance with reference to the flying carried out this summer. It will finally ask whether the products of our aerial photography are really hitting the mark; is the information feeding research as it is supposed to; is academia absorbing and teaching the nature of the discoveries which aerial archaeology has made in the last 3-4 decades? Are our products well enough known to the general public? It is hoped some or all of the topics introduced may begin to spark a debate.

Rog Palmer – Bugger spirals – have we made a circle?

The first thing I would like to do is establish who is, or ought to be, answering the question – “Is mapping working – is flying failing”..? Is it right that we judge ourselves and answer it, or should we look outside the AP world?

Most of us are collectors and organisers of data who do not seem to be generating archaeological questions about those data. We know that the aerial photographers chat to one another (during the summer) but are published photos of *Look what I found this summer* doing much for archaeology other than a bit of PR? Can that be said to provide evidence of successful ‘working’?

There is little contact between the commercial and government groups of mappers and very little is published. Is this another healthy sign of something ‘working’?

But if these are examples of ‘working’ – who are we working for? Do aerial specialists have much action or reaction with people in the greater archaeological world? Is it only me who thinks we should be part of that world? Are you happy to continue as a data collector and manager within a self-contained specialism? Do others use our input? Are we aware of current archaeological theoretical and research interests? Do we react with or to those current themes? Are we interacting with any archaeologists other than ourselves? Have we in the aerial world become locked into circle of our own making?

Original aspirations. Where aerial archaeology has come from:

Anthony Crawshaw – The rime of the ancient aviator

In this contribution I will try and describe the changes in the way that archaeological flying has been undertaken over the last thirty years. I will also comment on the possible results of such changes. I hope this will provide some information for an informed debate.

Cathy Stoertz - The Total Perspective Vortex - Aspirations, Reality and National Mapping

In *The Hitchhiker's Guide to the Galaxy*, Douglas Adams described an instrument of torture called the Total Perspective Vortex. It comprised a full-scale model of the universe, with a tiny arrow indicating "You Are Here" - anyone who entered the vortex was driven mad, because "if life is going to exist in a universe of this size, then the one thing it cannot afford to have is a sense of proportion". The contrast between the aspirations of large area mapping projects (particularly NMP), the needs and wishes of users, and the realities of publicly funded archaeology can produce a very similar effect.

RCHME produced its first large area medium-scale (1:10,000) maps of air photo information in the late 1970s spurred, to a great extent, by the creation of the County Sites and Monuments Records. About ten years later, the National Mapping Programme emerged as a framework within which RCHME/EH and others could record air photo evidence across the whole of England.

The original and continuing aspiration of NMP is to provide a national data base of archaeological evidence derived from aerial photographs. The earliest RCHME mapping went no further than that, but the objective of the fully-evolved NMP is to produce base-level analysis supported by enough research to interpret individual features, identify larger patterns and evidence gaps, assess the importance of features and landscapes and, most importantly, provide a framework upon which more detailed research can be based. The results of the primary analysis are made available to professionals and the public through the National Monuments Record, county SMRs/HERs, journal and website articles, occasional books, talks and many other channels.

The sphere of interest of aerial archaeology and National Mapping now reaches far beyond the narrow range of monuments that counted as archaeology 20 or 30 years ago. At the same time, the potential customer base is much more diverse than the original small group of fellow professionals. Large area mapping projects must respond to these changes if they are to continue to be relevant to 21st century users.

These aspirations are set against a significant shift in central government's approach to funding across all departments. In the current trend towards "enabling" rather than direct participation, the heritage sector has not escaped the application of business models and targets, the expectation of value for money and revenue generation, and the pressure to out-source activities once carried out in-house. The creation of original data, essential to any further revenue-generating research, is not an obvious money-spinner, and is increasingly difficult to retain as a core activity funded by central government.

In the face of these realities, my answer to the question "Is mapping working?" is - Yes, although there is still much more to be done, and much that could be improved.

National Mapping continues to try to fulfil its aspirations, and those of its users, in a climate of ever-diminishing resources of time, staff and funding.

(NB: I have expressed the above views as a private individual, and not as a representative of any organisation.)

Where we are now. Aerial reconnaissance. Flying in circles?

Pete Horne – Going round in circles

English Heritage undertakes around 300 hours of archaeological aerial reconnaissance every year. With a 100 years of aerial photography of archaeological sites, something like 1,000,000 oblique aerial photographs of historic sites and landscapes, and at least a further 3 or 4 million vertical photographs available for study do we really need to carry on going round in circles?

This paper will look at the way in which the English Heritage flying programme works and why it is still a vital part of the English Heritage Aerial Survey team's work.

Where we are now. Air photo mapping.

Cinzia Bacillieri - Does scale matter?

My talk makes a comparison of the world of commercial PI and mapping with that in government circles. Why it's done, how it's done, external relations, timescale and product. I conclude with a look into what the future holds for anyone wanting to pursue a specialism in the aerial world.

Where we might go... future progress

Anthony Beck – Feet, planes and satellites...isn't it all just remote sensing?

I've often thought the Aerial Archaeological Research Group was missing out on a trick. Why just aerial? Aerial archaeologists belong to remote sensors whom employ different sensors at any platform both above *and* below ground. New remote sensing technology is proliferating and will impact on aerial archaeology: Will high resolution satellite imagery replace aerial photography? The newer LiDAR sensors have the potential to measure crop marks. Should we use it? What about newer technologies? Can hyper-spectral sensors allow the detection of features earlier in the growing season or in difficult clay environs? Will Google Earth lead to mass redundancies in aerial archaeology?

This presentation will consider sensors, technologies and platforms not normally in the aerial archaeologists armoury and will point out some of their weaknesses and strengths. We will also look at how fusing multiple remote sensing systems can have interpretative synergies. The different techniques have different success and failure rates depending principally on ambient environmental conditions. However, the current state of knowledge of an area is critical. The UK is suffering from diminishing returns from intensively surveyed, and arguably well understood, areas and a backlog that may take decades to interpret: should we be developing techniques that will enhance returns in more marginal environments? Many other countries face the opposite problem: how can we distil best practice so that large swaths can be systematically surveyed. It simply may not be good enough to provide skills, a plane and a camera and tell them to get on with it! This will be discussed in light of problems faced by the author on a landscape survey project in India.

Rog Palmer – Breaking the circle

Our escape from the circle begins a few comments made to me by a PhD student. Her key points are that:

- Nothing has changed for the past 30 years in the AP world.
- No stories are being told and there is no critical thinking about what they are producing.
- Aerial archaeology needs to get some new blood in fast.
- Stamp collecting gets us nowhere if we don't hypothesise about what it means.
- I'm just flabbergasted at how insular the AP world is.
- This isn't really anything to do with 'archaeology'.

There is truth in those comments, and the remaining part of my talk suggests how we may remedy them? Yes, very little has changed during the past 30 years (other than adapting to technological changes). Yes we (in Britain) have written no stories and I don't think there has been any critical thinking. The few purely theoretical contributions from Wlodek, Lidka and Kenny have had virtually zero impact on the rest of us, and as far as I am aware there has been no critical thinking about what we produce. Acquiring *useful* new blood is difficult when the only opportunities seem to be in government service (i.e. they do not think, they 'do')

After putting most of us in the dustbin, I end by making three suggestions that may help us regain a step in the archaeological world:

- Do not expect government departments or commercial people to make any input to archaeological research.
- Follow and learn from examples of research that is being done in Europe that uses APs as one component in a broader investigation.
- Teach archaeology, not method and theory.

Tuesday 12th September

9.00 – 12.30 NEW PROJECTS & POSTGRADUATE RESEARCH

Michael Doneus, Martin Fera & Martin Janner - LiDAR-supported prospection of woodland

To explore the potential of LIDAR for archaeological prospection in a densely forested area, a project was launched beginning of 2006 at the Department for Prehistory and Early History in Vienna. Within the project, we try to evaluate an approx. 190 sq km forest area within the Leitha mountain range, 40 km southeast of Vienna. During the first phase of the project, a test scan covering two 4 sq km large areas was performed. The areas were carefully chosen and represent different kind of canopy (bushes, trees with and without brushwood) above already known archaeological sites (earthwork, round barrows, ruined buildings, stone quarry and single walls). The scans were realized using the latest generation of Airborne Laser Scanners, which digitally sample and store the entire echo waveform of the reflected laser pulses. After analysis of the waveform, it became clear that full-wave scanners provide a more reliable classification of the laser points and a higher accuracy of the terrain points in comparison with the conventional LiDAR data. This is especially important for the archaeological interpretation of the data.

Rachel Opitz - Early results from the LiDAR survey of the Lower Tiber River Valley

The Lower Tiber River Valley LiDAR survey presents an opportunity to assess the ability of lidar to detect a variety of archaeological features, both buried and on the surface by comparison with extant fieldwalking and geophysical survey results. The reasons for the appearance and non-appearance of known sites are explored, with particular attention to the problems of surface site detection in wooded environments and buried site detection in heavily ploughed or eroded areas.

Timothy Akers - ADSP (Aerial Deep Scan Programme) used to detect wrecks large and small

The detection of wrecks sites whether ancient or modern has always been a perplexing challenge. Research and history of the period, and area, are the keys to good detection of the type of vessels sought. However, to pinpoint to the nearest meter of an exact location is far more complex and many problems are encountered. The standard and accepted form is to trawl using side scan or Doppler multi-head transducer systems over the intended search area. This is both expensive and time consuming, and prohibits random searches.

ADSP is complex though considerably cheaper than the convention system; its ability to be remote and accurate surpasses the need to expensive search patterns over the target area. The system uses multi-SAT systems not compatible to each other, though a link and once the concept application is understood by the operator can be used on any subsurface target within the target range of the SAT been used from 0.1m to 444m (surface to subsurface). Licensing fees and equipment buys are the most expensive outlays but even so the system is cheaper relative to the current standard search patterns and is not affected by weather of surface or underwater conditions.

Too good to be true some have said, and certainly I expect similar comments but as you will see when it works it has excellent, beyond belief clarity and when it doesn't it's because the operator or client does not understand its limitations under certain conditions and that rational explanations explain the very real problems in search bottom profiles which are not universally complete. The systems portfolio is limited to the type of test sites used and its ability to explore new undiscovered sites of archaeological, geological or other maritime

related subjects. There is no other system currently in operation in the UK if not the world and this programme's development will revolutionise the way we look and search for archaeology. Examples will be given to show the diversity of the system at work including its limitations and the problems associated to miss match and modern demands of global GPS location techniques. The test sites on land have surpassed my expectations and depths of over 22.9 (75 feet) have been achieved in substrata penetration. The images are colour coded and each stratification layer can be identified the system requires the direct use of either 35 mm B/W film or digital images for best effect and quality.

Kirsty Millican - Contextualising the cropmark record: the timber monuments of the Neolithic of Scotland

The Neolithic period in Scotland is well known for its stone and earth monuments, many of which have been extensively studied over the years. However, it is becoming increasingly clear from the large number of sites recorded as cropmarks and a small number of excavations that monuments were also built of wood and played an important part in Neolithic communities. These timber sites have been recorded as cropmarks since the beginning of aerial survey in Scotland, but despite the rich record held by the National Monuments Record of Scotland there has not yet been any analysis or synthesis of these sites as a whole. This paper will outline my PhD research which aims to identify, examine and interpret the Neolithic timber monuments of Scotland as a whole for the first time and begin to integrate them within our understanding of the Neolithic of Scotland.

Esben Mauritsen - Searching for the Viking Age: aerial archaeology in Southern Jutland and Schleswig

In Denmark Viking Age settlements have proved hard to find. Although the number of known sites has increased over the last twenty years due to extensive rescue excavation activity, the Viking Age settlements are still lacking compared to other periods and to what one should expect. Various plausible explanations could be mentioned, but one major reason is that the sites are almost invisible to traditional field walking. However with aerial archaeological survey it is completely the opposite. Substantial timber structures and especially the large number of pit houses on some sites is the reason why Viking Age settlements have a relatively high find frequency in the otherwise limited Danish aerial archaeological research. This paper will present the results from the first season of a low budget, non-profit aerial archaeological student project that is aiming to investigate and find known and unknown sites from the Viking Age in particular, as well as sites from other periods.

Martin Godja - The Sacred Hill of Říp Area: A New Landscape and Settlement Project

13.30 – 15.30 DIGITAL AERIAL PHOTOGRAPHY

Digital cameras are being increasingly used in aerial archaeology. Although discussions on this topic are still mainly based on pros and cons about digital versus analogue photography, we probably won't be able to have the free choice in near future. The question whether to use digital cameras or not, will be rather decided upon by the market. We therefore have to be prepared that rather sooner than later, digital photography will become a necessity for aerial archaeologists.

Taking and managing digital photographs pose new problems and there are many unsolved challenges coming with it. Issues of hardware, long term storage, standard formats, handling and post-processing of digital images, digital archives, or the question of authenticity have to be discussed.

This session should be a start to share our knowledge and experience with using digital cameras. It contains papers on various aspects and issues of the digital workflow, ranging from data formats to practical aspects of capturing digital images, issues of storage and archiving, dissemination of digital images, and new features that can be helpful in the daily workflow.

Geert J. J. Verhoeven - JPEG, TIFF or RAW? It's All About Quality and Quantity

Current Digital Single-Lens Reflex cameras (DSLRs) can use three different file formats to save the captured images: JPEG, RAW and/or TIFF. As JPEGs are typically 24-bit files created by applying the lossy JPEG compression algorithm, the file sizes of these images can be rather small, allowing even modest memory cards to hold a lot of them. That is also the main reason why JPEG is the most commonly used format in digital photography worldwide. However, JPEGs have all in-camera settings applied to the images and some data is thrown away permanently, something that goes to a certain extent also for the much larger and often lossless TIFFs.

Therefore, most professional photographers prefer shooting RAW images, often described as the "digital photography's equivalent of a negative in film photography". As RAW files contain the absolute maximum amount of data generated by the sensor, they offer tremendous flexibility in both processing and post-processing. Rather large file sizes, the required special RAW conversion software, proprietary file formats and extra time-efforts remain on the other hand hurdles often too difficult to take for a lot of photographers.

Aerial photographers who started shooting digitally should be familiar with RAW and the other file formats, as their implications on the digital workflow and archiving afterwards cannot be neglected. This lecture aims at both explaining how these different files are created by the camera as well as addressing the major advantages and drawbacks of all three.

Damian Grady - Guidelines on capture and basic archiving

Toby Driver - Working with digital aerial photography in Wales, from cockpit to web

This paper will briefly review the working methods using digital photography for aerial reconnaissance in Wales, to provide a model which can be compared and contrasted with other practitioners in Europe. It will show how contact sheets are generated from digital pictures for future quick reference, and how recent innovations in the SWISH partnership between the Royal Commissions in Wales and Scotland has developed the coflein website (www.coflein.gov.uk) where digital photographs taken both in the air and on the ground by

Royal Commission staff are now uploaded to the Internet for public use within a month of cataloguing.

Michael Doneus, Irwin Scollar - Using GPS with digital Cameras

The presentation will show new aspects of using GPS with digital cameras and how current mapping software is already making use of the EXIF header.

When archiving aerial photographs, we are often faced with the problem that in certain areas, where it is difficult to locate the image because of missing distinct features. Similar problems occur when mapping images in areas where field boundaries are either non-existent or too far from the area of an image for use in mapping.

With the Nikon D2X DSLR camera, direct GPS recording is available. NMEA 0183 compliant GPS units can be connected via a GPS cable to record latitude, longitude, altitude, heading (direction) and UTC (Coordinated Universal Time) information for each shot. The information is stored in the EXIF header of the digital image. With a simple script for ArcView 3.x the position of these digital images can be mapped as a point theme. But also positions of images from cameras without GPS recording can be mapped. To get good estimates of the camera positions, however, a GPS-flightpath with recorded GPS time is necessary as well as the offset value between camera clock time and GPS timer. The offset value can be specified by taking a photograph and noting the time the GPS displays.

The EXIF header has also advantages when mapping photographs. In Irwin Scollar's new version of AirPhoto the GPS data can be already displayed. Additionally, the software uses the EXIF focal length data so that this doesn't have to be entered by hand when using Fischler-Bolles rectification. The next version of his RadCor program will get the focal length actually used at the moment of exposure and add automatic radial correction features. And finally, in his new Bundle Adjustment version of AirPhoto, it might be possible to use this GPS data for use in the full position determination of the rectified set of images if the timing is accurate enough, and if the GPS heights are also recorded.

