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Editorial

Welcome

…to the first digital AARGnews. Please let me know if you have had any problems accessing and downloading the issue – and of any changes you may suggest (I've already thought of some while putting this issue together). You’ll notice that we have more-or-less continued the style of paper issues for those who may want to print their copy, but have omitted the blank pages and moved all the ‘official’ stuff to the end. Despite the similarity of layout, putting this issue together has been somewhat experimental, especially as the final downloadable file will have been made in Vienna by Michael Doneus.

A reason to celebrate

2007 is the 50th year since the Russians launched the first satellite, Sputnik 1, on 4 October 1957. I remember the excitement and the scratchy ‘beep beep’ that was played frequently on the wireless news. Sputnik 1 had a diameter of 58 cm and weighed 83 kg – the same as your editor (the weight, not the diameter – and please don’t suggest where to put the rocket. Sputnik 1 had a mission life of three weeks and fell to earth some three months after launch. Thanks to the Cold War, satellite technology and its uses – especially those uses for seeing what the other side was doing – progressed impressively and by the end of the 1960s both USA and Russia had orbiting military sensors capable of capturing ground resolutions in the order of 2 m. Much of that material is now declassified and provided the best image resolution that was publicly available in the late 1990s, since when it has seen increasing use in archaeological surveys. This issue has a survey of those last 50 years by Martin Fowler to whom I am grateful for accepting my ‘offer’ to write.

So, happy 50th birthday to satellites and may we anticipate a time when there is a dedicated world heritage sensor orbiting the earth to monitor known sites and photograph large areas of the ground when conditions are suitable for new sites to be seen? OK, this may be a bit extreme but I wonder seriously whether the current high-resolution satellites offer a kind of time sharing option that heritage organisations might be able to use to rapidly and effectively record 100% of large areas, without observer bias, at times of year that maximise the archaeological potential of the imagery. Worth exploring? Go on, I dare someone to ask – please.

A better option, prompted by Bob Bewley’s remark to me about how much money he has to ‘spend’ as head of the UK Heritage Lottery Fund, is to persuade a consortium of HLFs to buy us a heritage satellite. I’m slightly serious as you can buy a small one for about $30 million although we may need a slightly longer lens than usual and, as Michael Doneus reminded me, a ground-based establishment to download, process and distribute data. We could perhaps name the thing OTTO – Overhead Terrestrial Traversing Observatory?

Culture 2000

…has finally come to an end (bar Chris Musson’s accounting and reporting) and the past year has seen a lot of activity. Courses with flying in Barth (again) and Foggia (again), two workshops at Poznan (again) and individual visits to Italy (again), Romania (again) and Spain (??). Plus, probably some things I’ve forgotten or not known about. The C2000 project has been very successful – with varying involvement, response and results
from participating countries – and has helped strengthen and consolidate the network of ‘participants’ that has been growing throughout much of Europe. Several of the tutors have made friends and ‘adopted’ countries which will allow the help and teaching to continue. I know, for example, that I’ll be quite happy to be invited back to Bucharest to continue to help those working in that country, Chris is unlikely to stop his frequent visits to Italy, and I await Wlodek’s offers to come and work with his students. One outcome of the C2000 process is the network of teaching Centres that we hope to establish. There will be more about this in the Education Debate at AARG in Copenhagen.

Exeter from 2007
Congratulations to Ioana Oltean who was appointed to a lectureship at Exeter and will begin teaching there soon after AARG. The Department of Archaeology (or whatever) immediately tapped into Ioana’s aerial experience and have established a 20-hour (I think she said) undergraduate course after saying that it had seemed to be a trendy subject but nobody had dared to teach it as it seen as technically scary. This is excellent news (not the scary bit) and will establish a second university in Britain which has a high-level of aerial teaching (Glasgow – Ioana’s former university – being the first with Bill Hanson’s post-graduate course) and – importantly – staff on hand to be quizzed by and to encourage students throughout the year.

WW2 photo intelligence
In CUCAP/ULM one day was a huge and old-looking book titled Photo Intelligence for Operation Overlord. This had been donated to CUCAP by one of the college libraries who had acquired it from one of their members whose father (Somebody Gilmour) had compiled the book. It makes an excellent guide to the interpretation now of military features then, with various types illustrated by photos and plans. Contents include a section on planning Overlord with pre-invasion photos plus some of the invasion itself and large pockets of stereo pairs (scanned by Chris Going if anyone wants to ask for copies…). Rose Desmond of CUCAP told me that Chris will eventually take the book to the Medmenham Collection where it will be available for public consultation.

This issue
As well as being the first digital AARGnews, it is a pleasure to welcome Lars Forseth from Norway who was persuaded to write for us after Nina Heiska spotted news of his finds on a German website (thanks Nina). We also have a (?)first) note by one of the external teams working on EH’s NMP with inclusion of a nice radar map to show their region’s topography. With Martin Fowler’s satellite history, ‘thousands’ of aerial photos and a bunch of C2000 and other workshop notes, that more or less gave me the 50 pages I’ve been thinking of as a suitable size per issue. I know that there is enough left over for half of the March issue and I’m grateful to those who willingly (or apparently willingly) write for AARGnews. We decided to omit the 10 pages of abstracts and revisions of papers given at the Is it working? Debate held at AARG 2006. These were intended as a lead-in to the Education Debate at AARG 2007 and they have now been posted on the redesigned AARG website. Thanks to those who rewrote their original abstracts.
Chairman’s Piece - September 2007

Dave Cowley

‘Chairman’s Piece’ is such a dull title (which may reflect its content), that I have spiced it up for this edition by adding ‘September 2007’, partly to mark the excitement that this is the first AARGnews in digital format. This is a very positive move for reasons that Rog Palmer spelled out in the last issue of this newsletter, and comments on in his editorial. For me, the main benefit lies in saving AARG a significant proportion of its annual expenditure, funds that can redeployed to support other aspects of AARG’s remit, such as student bursaries, summer schools, day meetings and so on.

The last six months have seen activity on a number of fronts, principally in planning for our annual conference and in taking the AARG/EAC Aerial Archaeology Working Party forward.

AARG 2007 - Copenhagen

The provisional programme for this event has been posted and covers a wide range of topics, with particular emphasis on Education and a distinctive Baltic flavour. In addition to papers reporting on work in Denmark and adjacent areas, for the first time there will be a session on archives that aims to give delegates hard data (i.e. finding aids) on the 1940s archival holdings for their countries. This is an excellent development that will facilitate access to these important archives.

The programme reflects AARG’s membership, with a predominance of speakers drawn from ‘Continental’ Europe, and a range of papers and posters reporting on work that takes in an even wider geographical area. This is a welcome manifestation of AARG as a solidly European organisation with an increasing international membership.

Much of the organisation of the practicalities of the conference has fallen to our hosts in Copenhagen, and in particular to Claus Dam, to whom our thanks. This has been a very useful (and successful) exercise in collaboration between the AARG Committee and local hosts, in this case LAND - The Danish National Network for Aerial Archaeology (http://luftark.net/). Claus has also been successful in attracting the support of National Danish Agency for Cultural Heritage, COWI, Holstebro Museum and Moesgård Museum, to all of which we are very grateful. This is undoubtedly a model that will serve us well in the future.

AARG/EAC Aerial Archaeology Working Party

The Working Group dealing with the Education component of this Working Party has been hard at work under the able guidance of Ioana Oltean. The broad scope of the WG has been defined and a very useful round table meeting held, hosted by the Department of Archaeology at Glasgow. Further work by members of the WG is ongoing as I write, preparing for the Education session on the first conference day in Copenhagen. This session will present the progress of the WG to date, to stimulate discussion and, where necessary, identify additional areas of potential interest. We will circulate paperwork outlining aspects of the Education session to delegates before the conference to allow for preparation of considered responses (homework!), which should, I hope, ensure a high standard of discussion. Our thanks are due to Glasgow University, through the good offices of Bill Hanson, for providing the facilities...
for the round table, and to Historic Scotland, though the equally good offices of Noel Fojut, for funding the travel and accommodation costs of some of the WG members.

The Copenhagen conference should be a major milestone in the progress of the Working Party as a whole, with the Education session providing a major focus. In addition, it will see the initial stages of convening a WG on Standards, kick-started with a keynote address from Catherine Hardman of The Archaeology Data Service, University of York (http://ads.abds.ac.uk). I will be looking to convene the WG at, and immediately after, the conference, so if you have an interest in this area and are prepared to do some work, please let me know.

Visualisation workshop: Hull, 12 December 2007
The prospect of a workshop on aspects of visualisation organised by AARG and Hull University and hosted by Hull at the HIVE (a venue in their Computer Science facility) was floated in the last AARGnews. This is now going ahead and there is an advert for it elsewhere in this newsletter. We are exploring sources of funding to support student attendance at this event and the procedures for application are detailed at the foot of the workshop advert.

Some thoughts for the future…

… on the conference
As a committee we have already made it clear that the conference venue should not be located in the UK in preference to other countries where hosts can be found. 2008 should see us in Ljubljana, and beyond that we are open to suggestions for venues and will be looking to plan further ahead, rather than from year to year, which should make organisation easier.

As we are doing with Education, the conference should be an opportunity for us as a community to develop agendas and take issues forward in a coordinated way. Following the formation of the Standards Working Group later this year, one of its principal objectives will be to work towards a major presentation at the 2008 conference. This strategic and cumulative approach can also be brought to bear in developing workshops as a part of the conference and I anticipate that the digital session at Copenhagen this year may well become a regular, practical component to help us explore a medium that is at once widespread, but has also raised many questions that we are only beginning to look at.

… on partnerships and developing our role
The partnership with the EAC on the Aerial Archaeology Working Party is a new development for AARG. As an organisation we have been very good at grass-roots contacts. However, developing relations with other organisations and lobbying for aerial archaeological issues has tended to be sporadic and generally pursued at an individual level. The positive influence for aerial archaeology that we may be able to exert at a high level into the administration of heritage agencies across Europe through the EAC, for example, can complement our grass-roots expertise. This requires attention and a longer-term view (as we are doing with the Working Party) to ensure that we get things done and produce useful outcomes.

The C2000 ‘European Landscapes’ initiative has been a tremendous success and I have no doubt that its benefits will continue to be felt for many years to come. Workshops such as
those held under the C2000 umbrella during this year in Germany, Italy and Poland are crucial to developing expertise and encouraging the ongoing and worthwhile use of aerial imagery. With C2000 coming to an end AARG will need to give thought to initiatives that will help to maintain this momentum. The creation of European centres of excellence for Aerial Archaeology, which will be discussed during the Education session in Copenhagen, has the potential to foster regional expertise within the context of a broader pan-European network. AARG has played a significant role in fostering such networks, and I trust that this role will remain as strong as ever.

As an organisation we should also be looking to strengthen relations with other like-minded organisations such as ISAP, with the AccessGrid network (see AARGnews 34) as one example of an area where collaboration could be very positive. I will also explore again the potential of contributing to, or joining the EAA for a conference, perhaps in 2009, again in the spirit of cooperation and integration, while ensuring that we retain our own distinct identity.

Book advert

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Sputnik at fifty: the archaeological legacy of the world’s first artificial satellite

Martin J F Fowler

Introduction
On the 4th of October 1957, the world’s first artificial satellite, Sputnik1, was successfully launched into earth orbit from the Tyuratam (Baikonur) proving ground in the former USSR and heralded the start of the ‘Space Age’. Weighing approximately 84kg, the world’s first artificial satellite orbited the earth for 96 days before it decayed after achieving 1400 orbits. Fifty years later, over 30 countries have launched over 8000 satellites and spacecraft and we all benefit from the use of space including telecommunications, weather forecasting and earth observation (Verger et al. 2003).

Satellite technology contributes to archaeology in many ways, whether it is the use of the Global Positioning System (GPS) for precise navigation and site location, email communicating and web browsing over the Internet, or the detection of archaeological features on satellite imagery. On the 50th anniversary of the launch of Sputnik 1, this note reviews briefly the archaeological legacy of the satellite in the form of the growing use that has been made of images acquired from low earth orbit to detect and identify archaeological features.

The early days of satellite remote sensing
Less than 3 years after the launch of Sputnik 1, the first photographs of the earth’s surface from space were taken by the US Discoverer XIV satellite on 18 August 1960. However, these and subsequent photographs acquired by the clandestine CORONA photoreconnaissance satellite programme were highly classified and unknown to the civilian community and it would not be until the launch of the US Earth Resources Technology Satellite (ERTS), the forerunner of the well-known LANDSAT programme, in 1972 that relatively high resolution satellite images of the earth’s surface would became available for civilian use.

The archaeological potential of the imagery that would be provided by an Earth Resources Observation Satellite (EROS), as the ERTS programme was then known, had been recognised in a note that appeared in Antiquity some five years before the satellite was launched (Thompson 1967). It identified that a single satellite image would cover the same area that conventional aerial photography would need some 500 photographs to cover and therefore had the potential to be an effective resource for archaeology, although in a comment on the note St Joseph hinted that the low spatial resolution of the imagery could be a limiting factor. Indeed, the early attempts to use the imagery that was subsequently acquired by ERTS were constrained by the 80m spatial resolution of the Multispectral Scanner (MSS) carried on the satellite with all but the largest of archaeological features, such as the pyramids at Giza (Quann & Bevan 1977), being detected. Nonetheless, some success was achieved with MSS imagery, as well as with multispectral images from the 30m resolution Thematic Mapper (TM) sensor carried on versions of the LANDSAT series of satellites from 1982 onwards, through the use of image processing techniques and modelling to predict areas of high archaeological potential (e.g. Ebert & Lyons 1980; Custer et al. 1986; Cox 1992).
An example of the LANDSAT TM product covering the area to the northeast of Salisbury, Wiltshire is shown in Figure 1. The image is a false colour composite created by displaying three of the TM bands (visible red, near infrared and mid-infrared) as blue, red and green (Fowler 2002). Different types of land cover are apparent depending on their spectral characteristics with fields under arable at the time of image acquisition appear orange, red and pink, and woodland areas appear green and brown. In contrast, fields of low vegetation cover appear light blue and built-up areas, such as the city of Salisbury, appear darker blue. The area of chalk downland on Porton Down can be readily discerned as a tract of green colour and, having been under military control for the past 75 years, has avoided the ravages of modern agriculture and represents an area of considerable archaeological and natural history value and potential (Ride 2006). The prominent archaeological feature on image is the former Iron Age hillfort and later medieval site at Old Sarum. The courses of three of Roman roads that have been fossilised in the landscape as field boundaries and modern roads can also be identified as linear features radiating from Old Sarum.

With the advent of 25m resolution multispectral and 10m resolution panchromatic imagery from the French SPOT satellite in 1986, relatively smaller archaeological features came into focus (e.g. Shennan & Donoghue 1992), although the archaeological utility of satellite imagery remained constrained by the relatively low spatial resolution of the satellite products.
Recently, 15m ASTER imagery covering 14 spectral bands has become available from NASA’s TERRA satellite. A false colour composite of part of the area covered in Figure 1 illustrates the differing land cover in the area but also shows further detail of Old Sarum as well as the Iron Age hillfort at Figsbury Ring (Figure 2). The latter is visible on the image as a result in the differences in the near infrared reflectance of the vegetation in the inner ditch and the ramparts of the hillfort compared with the grass of the berm (Fowler 2002). Similar examples have been observed on near infrared LANDSAT TM imagery in the vicinity of Stonehenge where islands of older grass covering Bronze Age round barrows can be discerned within arable fields and areas of more recent grassland (Fowler 1995).

**Radar imaging**

By way of contrast to the relatively poor results that were being obtained from LANDSAT, spectacular results were being obtained from the Shuttle Imaging Radar (SIR-A) flown on board the Space Shuttle flown in 1981, which vividly demonstrated the radar’s ability to detect subsurface features in hyperarid regions (McCauley et al. 1982). Radar images of the southeast Sahara Desert in Egypt revealed ancient river systems covered by 2m deep sand and subsequent excavations to verify the age of the palaeodrainage systems revealed numerous stone age artefacts. The flight of the second SIR-B sensor in 1984 further supported the SIR-A findings (McCauley et al. 1986) and, ten years later, the SIR-C radar revealed details of the Cambodia’s ancient city of Angkor including the huge ceremonial complex, reservoir systems and canals (Figure 3) despite being shrouded under a dense rainforest canopy (El Baz 1997). More recently, radar imagery from the ERS-2 satellite has been used to monitor erosion of the Nasca pampa in Peru to help preserve the spectacular geoglyphs of the ‘Nasca lines’ (Lefort et al. 2004) and data acquired by the Shuttle Radar Topography Mission (SRTM) has been used to detect settlement mounds in the Middle East (Sherratt 2004) as well as ancient water channels in Mesopotamia (Hritz & Wilkinson 2006).
In from the Cold
Following the end of the Cold War, high-resolution satellite imagery from the Russian space programme became available commercially in the 1990s. Of the various products that were marketed, digitised KVR-1000 photographs with a spatial resolution of approximately 2m were found to have greatest potential for use in archaeology. A study of a KVR-1000 photograph covering the environs of Stonehenge showed that it was broadly comparable with conventional medium scale aerial photography and capable of detecting both upstanding features as highlights and shadows and plough-levelled features as crop and soil marks (Fowler 1996).

An example KVR-1000 photograph centred on the location of an Iron Age enclosure and field system at Mount Down, some 8km to the west of Winchester, Hampshire, is shown in Figure 4. Clearly visible on the photograph are a range of archaeological features, both plough-levelled and in relief, including the Iron Age enclosure and ‘Celtic’ field system first photographed in the 1920s by Crawford and Keiller, as well as a Romano-British enclosure and associated field system and the Roman road from Winchester to Old Sarum. Despite the relatively high quality of the KVR-1000 product, the limited coverage that is available, both spatially and temporally, has precluded its use in archaeological studies although photography of the former Greek and Roman city of Zeugma on the Euphrates was found to be of great help in understanding the area and its sites (Comfort 1997).
Around the same time that the Russian products became available, some 866,041 photographic images that had been collected between 1960 and 1972 by the US CORONA, ARGON and LANYARD photoreconnaissance satellite programmes were declassified and transferred to the US National Archives and Records Administration (NARA) in 1996 with copies being available at modest cost from the US Geological Survey (USGS) EROS Data Center.

The archaeological potential of these photographs was recognised long before the material was placed in the public domain. Writing in the Central Intelligence Agency’s classified house journal *Studies in Intelligence* in 1977, an imagery analyst described the use of satellite photographs to image a number of Roman sites in Jordan and argued that such satellite images had great potential for archaeological discovery (Poirier 1977). Since the US intelligence community did not have the analysis resources to evaluate the mass of photographs collected, Poirier suggested that photographs should be provided to suitably cleared members of academia for research use. Unfortunately, the strict security that surrounded the photographs precluded this vision for nearly 30 years.

Following the declassification of the photographs from CORONA, their archaeological potential was quickly appreciated and a growing number of researchers are now using the material in support of archaeological studies (see Fowler 2004 for a recent review), and from...
1998 for a few years it seemed as though every issue of *Antiquity* included a paper containing a CORONA photograph. Notwithstanding the poor quality of many of the photographs that were acquired by the early CORONA missions and presence of cloud cover on a significant proportion of the frames, the low price (initially $18 for a photographic copy subsequently rising to $30 for a digital scanned image of a frame), wide coverage and ready availability from the USGS makes the CORONA archive of 826,553 frames particularly attractive for use in areas where there is a shortage of conventional aerial photographs. To date the photography has been used predominantly to detect upstanding archaeological features in the arid regions of Middle East and Asia Minor (e.g. Kennedy 1998; Philip et al. 2002; Ur 2003; Gheyle et al. 2004). However, CORONA photographs are not limited to the detection of features in relief, and in more temperate regions plough-levelled archaeological features can also be detected as crop marks (Fowler & Fowler 2005).

An example of the quality of the photographs that are available from the later CORONA missions can be seen in Figure 5, which shows the environs of the Iron Age hillfort at Bury Hill near Andover, Hampshire. The circular outline of the hillfort can be clearly seen together with indications of an area of ‘celtic’ fields to the south of the hillfort that were mapped by Rog Palmer during his seminal study of the environs of Danebury (Palmer 1984).

Figure 5. CORONA KH-4B satellite photograph of the environs of the Iron Age hillfort at Bury Hill, near Andover, Hampshire. The photograph was acquired on 17 August 1968 during Mission 1104. Data available from US Geological Survey, EROS Data Center, Sioux Falls, SD, USA.
In 2000, a further 48,000 intelligence satellite photographs that had been acquired by the GAMBIT surveillance system and a mapping camera carried on the KH-9 system were declassified and copies transferred to NARA and the USGS. GAMBIT complemented the area search coverage of CORONA with photographs that had initially a best spatial resolution of 1.2m, subsequently improving to approximately 0.6m. To date, limited archaeological use has been made of this high-resolution photographic resource (Ur 2005). However, given the growing interest in the archaeology of the Cold War (James 2002; Schofield and Cocroft 2007), since the GAMBIT photographs were primarily targeted on sites of intelligence interest in the USSR, they represent a unique resource for use in studies of Soviet materiel culture dating from this period (Fowler in preparation).

**Commercial satellite systems and the Internet**

The highest resolution satellite images that are currently available to archaeologists are commercial products acquired by the Ikonos and QuickBird satellites. Launched in 1999 and 2001, these satellites acquire images with spatial resolutions of 1m and 0.6m respectively for panchromatic imagery, and 4m and 2.4m for multispectral colour imagery and have clear archaeological utility (Lipo & Hunt 2005; Kennett et al. 2006; Beck et al. 2007). High-resolution panchromatic-sharpened natural colour images can be produced from these images and, as illustrated by the IKONOS image of Stonehenge shown in Figure 6, are capable of showing a range of archaeological features. A number of upstanding and plough-levelled archaeological features are clearly visible on this image as are a series of recent evaluation trenches associated with planning for the re-routing of the A303 trunk road.

![Figure 6. IKONOS 1m pan-sharpened natural colour satellite image of Stonehenge acquired on 27 March 2002. © GeoEye 2002. Extract from a larger image downloaded from the GeoEye website (http://www.geoeye.com/).](http://www.geoeye.com/)
Concurrent with the availability of these high-resolution satellite images has been the increased availability of satellite imagery over the Internet. Whilst it has been possible to search, preview and order satellite images online for the past decade, satellite images of the earth’s surface are now readily available through ‘virtual worlds’ at the Google Earth, NASA World Wind and Microsoft Virtual Earth websites (see Table 1). Both sites have global satellite coverage based on 15m resolution pan-sharpened natural colour imagery derived from the LANDSAT 7 Enhanced Thematic Mapper sensor and the Google Earth sites also includes areas of high resolution imagery acquired by the QuickBird satellite together with mosaics of conventional aerial photographs. Some QuickBird imagery is available on NASA World Wind through a Microsoft Virtual Earth plug-in, but the coverage is considerably less than that provided by Google Earth. Whilst the QuickBird imagery included on both sites has been compressed and is of a lower spatial resolution than the original product, it is nonetheless capable of being used to detect archaeological features (Beck 2006), as well as providing many hours of distraction!

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Table 1. Some sources of satellite imagery available on the Internet.

Archaeological utility and look ahead
Whilst orbital constraints can limit a satellite to collect single pass images, acquired at a specific time of the day, from a (largely) vertical perspective and with the ever-present prospect of cloud cover at the time of pass, satellite imagery is now well established as an archaeologist’s toolkit. The ‘Open Skies’ nature of the satellite perspective allows otherwise ‘difficult’ areas to be imaged (e.g. those with airspace restrictions, political restrictions, inhospitable areas, etc.) and the large areas that are covered by single images makes them well suited for use in placing archaeological features in their context in the landscape. In addition, the extensive historical archive of images that date back to the early 1960s has the potential to contain evidence of features that have since been destroyed through land use changes, such as from urban expansion.
As to the future, in 2003 Verger et al. identified two main development trends from the growth in satellite remote sensing over the previous 10 years. These comprised the exploitation of the improving resolving power offered by sensors to survey the Earth on a large scale and the exploitation of the global scope of the technology through a wider range of spectral bands and more sophisticated sensors. Both of these trends have the potential to impact significantly on the archaeological applications of satellite remote sensed imagery.

Further improvements in the spatial resolution of satellite imagery will enable smaller archaeological features to be detected thereby reducing one of the major limitations compared with conventional aerial photographs. The launch on the 15th of June 2007 of the TerraSAR-X satellite carrying an X-band synthetic aperture radar system with best spatial resolution of 1m will give a new perspective on archaeological features by providing radar imagery that has a 10-fold higher resolution than previous products (Figure 7). Similarly, the forthcoming GeoEye-1 satellite, scheduled for launch later this year, will be able to collect images at 0.41m panchromatic and 1.65m multispectral resolution, although GeoEye’s current operating licence with the US Government does not permit the commercial sale of imagery below 0.5m resolution and therefore the panchromatic product will be re-sampled to this resolution.

Figure 7. TerraSAR-X image of the Pyramids at Giza acquired on 2nd July 2007. Image downloaded from the Infoterra website (http://www.infoterra.de/).
In addition to improvements in the spatial resolution of satellite products, improvements in the spectral resolution of satellite imagery should improve the ability to detect archaeological features through differences in the spectral properties of vegetation associated with plough-levelled features. Since differences in the reflectance in the infrared part of the spectrum of healthy crops compared with water stressed crops have been shown to account for the appearance of crop marks on panchromatic CORONA photographs (Fowler & Fowler 2005), high spatial resolution hyperspectral imagery, in which reflectance data are collected from many tens of spectral bands, should have the potential for improved detection of crop marked features. ASTER data, such as that shown in Figure 2, hints at the potential of such imagery but is constrained by its low spatial resolution. Hopefully, future developments in sensor technology will overcome this limitation, and developments in the availability of remote sensed imagery through Internet sites such as Google Earth and NASA World Wind, together with the routine integration of remote sensed data with a range of other spatial datasets through the use of Geographical Information Systems (Wheatley & Gillings 2002), will provide a more powerful tool for archaeologists to exploit in the future.

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Flying to the past in Nord-Trøndelag

Lars Forseth

In a slow precise movement the helicopter turns, just having lifted off the ground of the helipad at Stiklestad. As the pilot increases the speed I sense the power of the machine, and as we gain height I have an uneasy feeling of “hanging in the air” – no wonder – the door normally to my left is gone and there is nothing more than my seatbelt restraining my body and stopping me from falling out of the machine! We have just taken off from a helipad at Slåttelid, just west of Stiklestad, Verdal in Norway. I and a colleague have hired the helicopter to do the first of 6 aerial photo flights this year in Nord-Trøndelag looking for archaeological sites.

I have had a certain exposure to this method before. As a student in Oslo in the early 1990's I did a series of flights along a projected gas pipe from lower Telemark to the border with Sweden in Østfold (Halden). We did find some sites but 1990 was not ideal. I had heard lectures about this method from Kristian Keller and Harald Jacobsen (now director at AmS in Stavanger) who both had used the method with success. When I started to work in Nord-Trøndelag (as the county archaeologist), I tried to get money for flying, but did not succeed until 1996. Then I could do 3 or 4 flights, but found little (one cropmark at Alstadhaug, Levanger and one at Mostad, Frosta). It was 1997 we should have done the flights! That was an unusually dry year in Nord-Trøndelag.

Nord-Trøndelag (NT) is a county in Norway, 22,396 sq.km. and situated just north of Trondheim with the Trondheim fjord going deeply into the southern part of the county. To the east of the fjord lies “Innherred” an open landscape of gently rolling hills and rich agricultural land. The climate is a wet Atlantic one and agriculture is an important part of the local economy. This is largely explained by mild Atlantic climate and good soils in Innherred and the lower Namdalen. Namdalen is the northern part of the county, bisected from west to east by Namsen – the famous salmon river. In the late 19th century so called “salmon lords” (ie English gentlemen) came to hunt and fish along Namsen. British Museum still have some artefacts given to it by such “gentlemen” who also dabbled in archaeology. Both Innherred and Namsen are rich in archaeological remains. Mostly from the Iron Age and mostly single burial mounds or cairns or burial fields. The farm is, and was, the basic settlement and production unit during the Iron Age. Bronze Age cairns are found along the coast of the Trondheim fjord – as is rock-art. The rock-art site of Bardal in Steinkjer has figures from both the late stone age and Bronze Age.

The large number of archaeological sites recorded in NT in the national monuments database (see http://askeladden.ra.no; > 7000 records for NT) also means that agriculture removed many sites before recording started. So I thought aerial photos should work – showing such disturbed sites as the usual cropmarks and soilmarks. But 1996 gave very little and I did know that dry weather should present us with better opportunities. 1997 was such a year – did not get money for flying; 2002 was also a “dry” year – no money (and I was working at Kaupang for Dagfinn Skre). 2007 had a very dry June; and June is the most critical month for cereal crops in NT. During the first flight we had very good examples of cropmarks. These were used to get money from Riksantikvaren (www.ra.no – equivalent to English Heritage) and the agricultural service (http://www.slf.dep.no). Altogether 10 hours have been flown and about
35 sites with ca 160 cropmarks have been recorded. Well over 7700 photos are now on disk – about 30 GB - but hard drive storage is cheap these days!

With a wet Atlantic climate many archaeologists in Trøndelag probably thought that aerial photography would not work as a method. Our flights this season should show that this is wrong. In NT agricultural production in Innherred consists of a mixture of cereals (barley, oats and rye) and milk/meat production. This gives a landscape which mostly consists of cornfields along the coast, and where fields for grazing and grass increases further inland and in the hills.

**Aircraft**

Helicopter. I have read that this has not been regarded as an ideal platform, but there are no small airplanes with pilots certified for photographic flights close to Steinkjer (where the HQ of the county council are located). So that was the sole option. It is expensive; but has worked well!

**Cameras**

One Nikon D200 digital SLR, 10.2 Mpix, with a 18-70 zoom lens. And I forgot to turn off auto focus; but it did not screw up more than ca 5% of the photos. We captured the photos to jpg files, not RAW. We also used a Canon EOS 350D (some RAW was taken with this camera on one flight) and a Nikon D70. The D200 was a lucky buy this spring as we decided to buy a camera for rock art documentation (and houses). The choice was based on the fact that this was one of two cameras that would accept a GPS for coordinate recording (the Exif standard allows for this now - but I will have to write my own Python scripts to get at the coordinates (Lat/Long)!). We bought 5 new CF cards 1 GB and 2 GB cards so we now have about 15 GB storage to bring with us.

**What have we found? (see photos)**

We have now located about 36 localities – or sites. Most of these are single burial mounds or some larger collections of mounds. Most of the sites found are in locations that were regarded as having a high probability, or where written records suggested that a burial field or mounds were likely to be found. Most sites consists of single or collections of burial mounds. These are usually of the typical “doughnut” shape. This shape is caused by the “ring ditch” surrounding many burial mounds in NT. We have also located about ten possible houses of different types at six sites.

Round burial mounds or cairns dominate the recorded archaeological record of NT in the National monuments database (http://askeladden.ra.no). Most of these are from the Iron Age. But some of the cairns close to the coast are from the Bronze Age – i.e. those that lie 15 meters or more above sea level today. But there are other types of burial mounds. Both long, boat-shaped, mounds and cairns do exist. The unusual “star-shaped” mounds seen in the photos from Stiklestad and Vinne are a type that is generally rare in Norway, but not so rare in NT. Several burial fields in NT – both in Innherred and Namdalen – have one or more of these mounds. Generally the younger Iron Age dominate the archaeological record, i.e. with regard to finds in the museum. Most burial mounds and fields therefore seems to date from that period. But some of the larger burial fields have finds from the early Iron Age – most of these from the Roman period (ie 0-400 AD).
Several well-known localities were overflown. Like Alstadhaug—a site containing a large (54 m diameter) burial mound and a medieval church—both lie at the top of a ridge (a moraine). In the landscape here, we found several mounds spread around the church and large burial mound. Even in a potato field we could see some cropmarks (potato marks?) of burial mounds. A general observation is that the clearest cropmarks were on soils that dries out rather easily. The drought in June was very severe, maybe the most severe in 100 years.

Another well-known site is Skei (Sparbu parish, Steinkjer in NT). This is possibly the largest burial field in NT. It has not been surveyed since a map was made in the 1930’s and the exact number of burial mounds it contains is not known—but possibly it contains about 100-120. (The county council have this year started a programme to survey the burial field—and the new owners have started to remove some of the trees covering the field and will convert the wooded areas to pasture.) Skei also contains a circular “courtyard” site; six houses placed in a semicircle. The houses and burial field seems to date from the younger Iron Age. We found cropmarks of several mounds to the north of the existing burial field.

Also Stiklestad is a well-known site in NT. In 1030 Olav Haraldson (later canonised as St Olav (or Olaf? in the Anglo-Saxon world)) lost a battle here, and was killed. This had little to do with the conversion to Christianity, and more to do with politics and the farmers general mistrust of the king’s policies towards them in Trøndelag. Around Stiklestad there are a large number of great burial mounds. On a field west of the parsonage at Stiklestad lies a small burial mound known as “Dag Ringsønn’s haug” (Haug means mound). In 1774 C Lyng made a map of the burial field of which this mound is the sole survivor. His map shows 15 mounds;
round, long and star shaped. On photos taken this summer we can see about 25 mounds, a far larger number than Lyng recorded in 1774. This shows how agriculture has removed mounds since at least the 18th century in Norway.

**Post-flight processing**
Now an archaeologist from Trondheim is cataloguing the photos. We have also bought a license for AirPhoto and it works well. The finds are recorded at http://askeladden.ra.no - only in Norwegian; but you can ask at www.ra.no and get a password. Some of the photos will go to Riksantikvaren (the equivalent of English Heritage for Norway) and be displayed on their photo site (you get there from the site in askeladden.ra.no via a link on a sites page). We are planning our own site for photos; but this will have to be discussed and planned internally.

We have now made a preliminary catalogue of the photos. We have also surveyed some of the cropmark sites on the ground. It was a special experience walking in the still standing corn and observe what I had seen from the air. We used an RTK GPS to survey the cropmarks.

It will take a lot of time to finishing cataloguing and write a report of this summer’s photos. Completion of the report will probably have to wait until next year.

**Conclusions**
Summing up I would say that this summers finds shows us that, given the right conditions, we can use air photography in NT. The conditions are first a dry June or May-June; and second to have cereal crops grown on soils that dry easily in a drought. Given this year’s finds I also hope that the directorate for cultural heritage might be interested in setting up a programme for regular use of this method. It would be interesting to take photos of some of the sites found this summer early in the spring next year just after ploughing to see if soilmarks of them could be recorded.
The Archaeology of a Forgotten Landscape.
Air survey and landscape archaeology in County Durham

Richard Hewitt, Gemma Pallant and Sally Radford

Introduction
In 1989, Still et al. presented the results of a decade of aerial survey in Cleveland and the adjacent areas of the Lower Tees Valley in North Yorkshire and County Durham, noting in the process that “County Durham has fared less well so far as air survey is concerned” (Still et al. 1989, 1). Though some limited aerial reconnaissance has been undertaken since this time, the county remains under-investigated in comparison to other areas. Interpretation and transcription work was, prior to March 2006 when the work described here began, also scant. Both the County Durham Sites and Monuments Record (SMR) and the National Monuments Record (NMR) recorded many cropmark, soilmark, and earthwork sites of unknown date as single points with no mapped detail and only basic descriptions. The presence of so many cropmarks and earthworks, about which so little was known, was a clear indication that landscape-scale archaeological study, beginning with systematic investigation of aerial photographs, had the potential to substantially improve our understanding of the archaeology of the county.

The following article presents some preliminary results from the County Durham Archaeological Assessment project, an Aggregate Levy Sustainability Fund (ALSF) project incorporating detailed air survey undertaken in accordance with National Mapping Programme (NMP) standards and procedures (Figure 1). We aim to demonstrate the effectiveness of air survey and archaeological landscape study as an assessment tool for both research and cultural heritage management. Together, they have the power to greatly enhance our knowledge of parts of the country that, though rich in archaeological remains of all types and periods, have not yet received the attention they deserve. In this article, the results of the first phase of aerial photographic survey and assessment have been discussed. We hope to follow this up with a second article in a future edition of AARGnews in which dissemination of the work and its utility for cultural heritage management will be explored in more detail.

Figure 1: County Durham Archaeological Assessment in the context of North East England. Phase I study area (Magnesian Limestone Escarpment) shown in red.
Archaeology in County Durham

Durham is an unusual county in many respects, and in archaeological terms it is something of an under-achiever. Canon William Greenwell (1820-1918), who lived in the county, but made his name mostly by excavation elsewhere, famously commented that the county “is strangely deficient as well in the weapons and implements of stone and bronze using people as in the dwelling places of the living and the graves of the dead” (Greenwell 1877, 440; cited by Young 1987, 22). It is true that the surviving prehistoric monuments of this county are less impressive than those of neighbouring counties, but Greenwell’s supposed “deficiency” is no longer borne out by the evidence. County Durham, as the Sites and Monuments Record will testify, has a wealth of Mesolithic sites, especially along the coast, such as the important narrow-blade site of Filpocket Beacon (Jacobi 1976). It also has polished stone axeheads, cup and ring marked rocks, round barrows, cists, at least one palisaded site (West Brandon), an iron age hillfort (Shackleton Beacon), and an abundance of prehistoric enclosed settlements.

For the historical period, Durham is not really deficient either. It has two north-south Roman communication arteries, Dere Street, and to the east, the rather enigmatic Cade’s Road. The Dere street forts of Piercebridge, Binchester, Lanchester and Ebchester are well-known locally, though research along Hadrian’s wall has tended to cast the forts of its southern hinterland into the shadow. What appears to be a Roman “small town” hitherto unknown in the county, was recently discovered astride Cade’s road at Sedgefield, neatly explaining the bend in the road at this point (Mason pers comm.). For the Early Medieval period there are cemeteries and a fine Anglo-Saxon stone church as at Escomb, though ordinary settlement sites are all but non-existent. For the Later Medieval period, the county has not only the World Heritage site of Durham Castle and Cathedral, but also many well-preserved deserted and shrunken settlements. These are most abundant in the south-east of the county, many with vast field systems surviving intact around them. County Durham is also home to a number of important historic parks and gardens, the world’s first railway, and an astonishing collection of planned industrial settlements. Fine pithead baths still stand at some former colliery sites such as Dawdon and Elemore, executed under the influence of the Dutch architect Dudok in the International Modern Style (a modernist architectural style developed in the 1930’s influenced by Frank Lloyd Wright). Some remnants of World War II military sites, such as filling factories and proofing ranges also survive. Overall, it is clear that County Durham lacks, not archaeological sites, but archaeological research. An early perception of deficiency has led to a county-wide lack of research and this in turn has reinforced the perception of deficiency, which has tended to discourage archaeological research.

Study area and landscape background

The first phase of air survey and archaeological assessment was undertaken for a study area of 425 km$^2$ (17 Ordnance Survey quarter sheets), situated at the western edge of the East Durham Limestone Plateau. This comprises a gently rolling plateau of Permian age Magnesian Limestone which dips eastwards towards the coast and can be broadly divided into plateau and escarpment areas. To its western edge, a pronounced, irregular ridge known as the Magnesian Limestone Escarpment dominates the surrounding area attaining heights of almost 200m OD (Figure 2). East of the escarpment, the spur and vale topography which is most evident at its northern end, gives way to lower ground overlain by thick glacial drifts with the limestone rarely exposed at the surface. The study area (Figure 2) takes in both the escarpment itself and this area, referred to by the Durham County Council Landscape Character Assessment as the Clay Plateau, to its east. To the south, the study area also

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incorporates part of the low-lying area known as the Lowland Carrs, in which the important palaeoenvironmental sites of Preston, Morden and Nunstainton Carrs are located.

Following the success of the first stage of the project, which was completed in March 2007, mapping and assessment of a further 300 km$^2$ was commissioned, mostly focused around the major river valleys and the exposed coalfield to the west of the East Durham Plateau. This work is presently ongoing, and only the results for the first phase of this work are discussed here.

Figure 2: County Durham Archaeological Assessment study area (phase I), showing topographic relief. The Magnesian Limestone Escarpment is clearly visible as the block of higher ground running south-west to north-east through the centre of the study area.
Air Photographic coverage
All readily available air photographs were consulted from four main sources. The NMR was the primary source, holding 1027 specialist oblique and 7693 vertical photographs for the study area. An additional 228 oblique and 118 vertical photographs were held for the study area by the Cambridge University Unit for Landscape Modelling (ULM). Two local archives, at the Museum of Antiquities, Newcastle University, and the University of Durham, were also consulted. Eighty one specialist oblique photographs held by the Museum of Antiquities were consulted, but these showed little information not shown by the NMR and Cambridge collections. Thirteen specialist oblique photographs were identified within the Durham University collection. These photographs added significant additional information, primarily because they showed sites that did not appear on photographs in any other collection. The vertical photographs held by the NMR comprise mainly RAF and Ordnance Survey sorties with some Meridian Airmaps photographs, together ranging in date between 1945-1995. The specialist oblique photographs range in date from 1941-2003 and include specialist military photographs and those from recent reconnaissance, for archaeological and other specialist purposes, such as an air survey of hospital buildings.

The NMR and Cambridge collections comprised mostly post-war RAF photographs and was noticeably lacking in specialist coverage. The gazetteer of AP sites in Clack and Hazelgrove (1982) was a useful source of reference information and drew the investigators’ attention to the important Durham University AP collection. Overall, the NMR and Cambridge collections, which comprised the bulk of the coverage, seemed to be poorer for this area than for other NMP projects. To see if this impression was correct, figures for photographic coverage by square kilometre were calculated for the Durham project and some other recent and ongoing NMP projects. The results of these calculations are shown below.

These results certainly suggest that the Durham Phase I study area, centred on the Magnesian Limestone Escarpment, lacked AP coverage in comparison with several other areas of the country for which NMP work had been undertaken. Coverage was better for the Phase II study area, though this area was still less intensively flown compared with the West and South Yorkshire study areas (West Yorkshire Magnesian Limestone and Lower Wharfedale projects), and with coastal areas (North East RCZA and Yorkshire and Humberside RCZAs). This pattern probably reflects the situation generally, with many other areas of the country better served by
existing air photo coverage than this part of the North East. It is also notable that the study area was scarcer in oblique photographs than other areas. Vertical photographs have proved to be an invaluable resource to all NMP projects, and are often the source of most ridge and furrow, much of the Post-Medieval agricultural and industrial detail, and numerous 20th century military features (MacLeod pers comm.). However, oblique photographs often reveal archaeological features better because variations in light and shade achieved by an oblique view may pick out areas of detail more effectively than a vertical photograph.

For this reason there seems to be a strong case to be made for more aerial photography, particularly obliques, to be carried out in this area in future. The low level of air photo coverage in the study area in comparison to other areas of the country suggests that we should be wary of talking about scarcity or deficiency of archaeological sites in this area.

**Summary of Results**

Air survey has proved itself particularly adept at identification of settlement sites. The phase I study area contained 25 enclosed sites of probable Iron Age or Roman date almost all of which have been discovered by aerial photographic survey over the last 30 years. The majority of these were rectilinear ditched enclosures, which are typically thought to belong to the Iron Age or Roman period. Despite evidence from local pollen diagrams indicating woodland clearance, the spread of pasture and cultivation of cereals by the Middle Bronze Age, there are no certain examples of Bronze Age settlement sites in the study area (Bartley et al. 1976). However, identification of sites from aerial photographs is heavily reliant on morphology, which cannot in itself provide accurate dating. Very few prehistoric settlement sites have ever been excavated in the county. The rectilinear enclosed settlements at West Brandon and Coxhoe are notable exceptions, and at both of these sites the excavators noted early phases represented by gullies or curvilinear ditches, for which a Late Bronze Age date might be considered (Jobey 1962; Haselgrove and Allon 1982; Jobey 1983). On this basis, it is possible that any or all of the three curvilinear enclosures identified and mapped from air photos as part of this project (876850, 1443567 and 1442639) may have Bronze Age origins. Of these, the latter two sites are entirely new discoveries, while 876850 (Low Copeland 1 and 2), near Newton Aycliffe, is of particular interest due to its close association with a square enclosure. Earlier investigators noted that the curvilinear enclosure appeared to overlie the square enclosure (Clack and Haselgrove 1982), but this relationship could not be confirmed. Given the lack of proven Bronze Age settlement, a programme of excavation targeted at these curvilinear enclosure sites

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1 Numbers in brackets are National Monuments Record Unique Identifiers (Field "Monarch")
would be an important step forward, particularly if a direct relationship between curvilinear and rectilinear enclosures could be established and securely dated.

Though many of the sites within the project study area had been previously recorded, aerial survey was often able to enhance them considerably. Binchester Roman fort (24258) is an example of a site that has benefited from this (Figure 5). Unusually within the project area, there were a large number of specialist oblique photographs available for the fort. The volume and quality of these photographs allowed us to identify and interpret the earthworks, exposed brickwork and parchmarks, adding additional information to the previously identified communal bathhouse and Dere Street (1031137), as well as identifying a variety of fragmentary ditches believed to represent part of the Vicus.

Figure 5: Monument 24291: Binchester Roman Fort and Vicus
Air survey work was also able to identify the cropmark remains of a ditched enclosure interpreted as a Roman camp (923013). The enclosure was situated close to the fort on the west bank of the river Wear close to Dere Street, and has the typical ‘playing card’ shape associated with Roman camps (Welfare and Swan 1995, 12), and a possible entrance on the western side.

Later Medieval settlements are well-represented in County Durham, on the Magnesian Limestone escarpment in particular. Many earthwork and cropmark remains of open field systems were mapped, and were seen in some cases to be associated with lynchets, plough headlands, stock enclosures and field boundaries. Ridge and furrow is also associated with Later Medieval settlements of the area, such as Preston-Le-Skerne (25846), Sheraton (27151), Great Stainton (25861) and Little Stainton (25856), amongst others. Along the Magnesian Limestone escarpment there is a relatively high density of settlement sites of this period. Preston-Le-Skerne is an excellent example of a Later Medieval settlement, now visible as earthworks forming tofts, crofts, platforms and enclosures on either side of a modern road which has traces of a hollow way on either side (Figure 6). The earthwork remains of ornamental gardens situated to the south of the Great Isle (25781) are also of great interest. From aerial photographs it is possible to discern the original course of the River Skerne and how it would have fed three fishponds, and a series of trapezoidal enclosures that are possible garden water features.

Figure 6: Monument 25846: Preston-Le-Skerne, banks (earthworks) shown in black, ditches shown in grey
Aggregate extraction and coal mining are highly visible on air photographs, particularly in the region from the north-east to the south-west of the project area (following the Magnesian Limestone and coal measures). The smaller extractive coal workings and bell pits of post medieval date (e.g. 1441851 and 1441872) are the earliest industrial activities visible. These in turn make way for the large collieries of the 19th and 20th centuries (e.g. Thrislington Colliery 1447997), with their extensive transport links including railways and tramways (1444085) which can be recognised from the air. Ordnance Survey vertical photography shows many collieries had been levelled in the latter part of the 20th century (e.g. East Hetton Colliery 1448280).

The available military photography showed a variety of Military sites, as well as the usual military buildings, trenches and pillboxes and a number of more unusual military sites were identified. A World War II Royal Ordnance filling factory was recorded at Aycliffe (1075763). The factory was responsible for the assembly of explosives and documentary evidence suggests production began in 1941, the latest 1989 Ordnance Survey photography shows that the site has been redeveloped as an industrial estate with some buildings surviving. Further military features include two bombing range markers (1443311 and 1443217). These related features comprise a directional arrow pointing in a north-east direction and the associated target (Figure 7). These markers, like so many other military features, are not visible on any photography after 1945.

Figure 7: Monument 1443217 Bombing Marker (a) and target (b), near Preston-Le-Skerne

A small number of sites were identified that due to either their poor preservation, lack of aerial photographic coverage, or simply that the features were not characteristic of any one particular period or function, could not be accurately dated. Two of the most interesting sites of uncertain date were two cropmarks of what appear to be timber structures near to the village of Great Stainton and the town of Chilton (1443506 and 1448057). These sites were both visible as cropmarks on aerial photographs. On the basis of their similar form and
dimensions, they are probably both examples of the same type of site, perhaps either Neolithic or Early Medieval rectangular buildings.

Towards a research agenda for County Durham
At the present time, the first phase of aerial photographic transcription has been completed, and a provisional assessment document with historic environment conservation guidance, together with an accompanying GIS dataset has been completed. Once the second phase of aerial survey work is finished, the assessment text can be revised for final submission in early 2008. An essential part of this final stage of work will be the preparation of a research agenda highlighting the areas of research that require the most urgent attention, as the county continues to be developed putting a risk remains of significant cultural value. At this stage of the work, further aerial reconnaissance in the county is a key research priority. The paucity of archive photographs for lowland County Durham relative to other areas has already been highlighted, and for this reason, the county cannot yet claim to have undertaken aerial survey to a level comparable to either North Yorkshire or Northumberland. Whatever the problems of interpretation and chronology, a thorough understanding of the pattern of ancient settlement in County Durham remains elusive, and in the words of Still et al. (1989, 9) “First the surveys must be undertaken”. The air photo interpretation work carried out as part of this project demonstrates the great potential for intensive aerial survey to shed light on one of England’s most neglected regions.

References


AERIAL ARCHAEOLOGY, COMPUTER VISUALISATION AND PAST LANDSCAPES: AN INTERNATIONAL WORKSHOP

Organised by the Aerial Archaeology Research Group and the SimVis Research Group, University of Hull

at The HIVE, Department of Computer Science, University of Hull, UK

12 December 2007, 10.30 - 16.30

Aerial archaeology continues to play a leading role in the understanding of the landscapes of the past. Advances in computer hardware and software are making the acquisition of large datasets and their manipulation much more accessible. The results of aerial survey can be combined with other methods of remote sensing to facilitate interactive exploration and analysis of large areas of past landscape in new ways. This workshop will bring together workers active in these fields from Britain and beyond in the Hull Immersive Visualization Environment (HIVE), a purpose-built facility in the University of Hull dedicated to the research and presentation of 3D stereoscopic and other methods of visualising data for a range of users including industry, medicine and the Heritage sector.

Provisional programme:

10.00 – 10.30 Registration and Coffee
10.30 – 11.00 Introduction to the HIVE and computer visualisation of landscapes: - Paul Chapman (Leader, Simulation and Visualization Research Group) & Peter Halkon (Lecturer in Archaeology, Dept. of History University of Hull)
11.00 – 11.05 What's new in aerial archaeology: - Dave Cowley (AARG)
11.05 – 11.30 Archaeological site detection: - Anthony Beck
11.30 – 12.45 Lidar and its implications for aerial archaeology and understanding past landscapes: - Michael Doneus (Institut fur Ur- und Fruehgeschichte, Austria)
- Keith Challis (University of Birmingham)
12.45 – 13.45 Lunch
13.45 – 15.00 Total landscape survey and the potential of computer visualisation as a tool for analysis and presentation – Part I : -
- Kevin Macleod & James Hepher (RCAHMS)
- Louise Barker & Sue Fielding (RCAHMW)
- Alison Deegan (Northamptonshire)
- Anthony Corns & Robert Shaw (Discovery Programme)
15.00 – 15.30 Tea/Coffee
15.30 – 16.30 Total landscape survey and the potential of computer visualisation as a tool for analysis and presentation – Part II : -
- Stefano Campana (University of Siena, Italy)
- Discussant: Professor Dominic Powlesland (Landscape Research Centre)

Registration forms are also available from the AARG website: http://aarg.univie.ac.at/
Why don’t you write something about the last Summer School in Foggia?

Gianluca Cantoro

Here I am. I accepted the invitation Darja gave me to tell other people how our photo interpretation experience was.
Pay attention, please: this is not a surviving manual like “10 rules not to be sick during the flight… or AFTER!!… or BEFORE??!”
In fact there are more than 10 rules, do you want some?

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<td>1A) Do not eat a lot and do not drink too much the night before flight.</td>
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<td>1B) Do eat as much as you can, because your stomach must be a “solid” (not moving) thing.</td>
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<td>2A) Do not take coffee; you must be calm during the flight.</td>
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<td>2B) Coffee can help you during the flight to stay conscious and reactive.</td>
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<td>4A) Taking photos could be hard for your stomach</td>
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<td>4B) The hardest thing to do is to take note of what photographer sees: this can make you sick.</td>
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The only rule I really learned was: DO NOT BELIEVE ANY OF THOSE RULES! Do it yourself and enjoy the flight. If you do this, you can start to see cropmarks, soilmarks, stoneworks, etc. and they are not because of your stomach or because of your “tilting” brain (if any). Believe me: I am the winner (and Giovina with me) of the “sickness award”: 3 times in 5 flights… also with the travel-gum!! (and I am still waiting for the certificate for this award!!).
In any case, there are some “serious” things I would like to say about this Summer School: it was really a nice and useful experience for the improving of skills of all of us.
“Sim- fatt’ ‘na squadr-’” – as my partner Giovina says – : the pronunciation is something like “seem faat na squad” and the translation –from DAUNIA dialect to English– is “we made a team”. And this is true: the flying (base) group and the ground (advanced) group with different but complementary missions. Photo interpretation is something like a game (or a pathological condition of mind!!): whenever you see a photo you start to search for plants or grass, to understand the season; shadow, to understand where is the sun and what time is it; rivers, to understand the slope of the landscape; agricultural or geological features, to understand what is what… and at the end you say: “Where are cropmarks? …Oops, I was looking at the photo of my fourth birthday and this is the cake!”
Or, in another case, you start to say:
“I can see a neolithic settlement with the typical compound”
and Cathy: “No, sorry. Those crops marks are made by rabbits!”.
“This is a roman road… I am quite sure it is the Via Traiana”
and Dave: “No, this is a pipeline for irrigation”.

So, now I can say that there are very few SURE things: Otto and Klaus are the best pilots for aerial archaeology (thanks for help they give us), but when they ask you twice “Is everything...
“ok?” and you say “Yes”, pay attention, they will start to take orthophotos (!!!) with Cessna and to put the plane upside down! This is for scientific purpose, I’m sure, but your stomach may disagree.

I said “pathological condition of mind” and this is true. For example, I was searching for the address of a friend of mine, and at a certain point, I realised that I was mapping whatever I can see around Foggia in LiveSearch (also using www.flashearth.com to compare GoogleMaps with LiveSearch and YahooMaps): more than 20 features per hour (and I still don’t know where my friend lives!), and I’m sure I can do better and this is not my best. And this is great and I hope to contaminate other persons with this pathology! Thank you AARG.
The first aerial archaeology workshop in Jordan, April 14-16, 2007

Bob Bewley, David Kennedy and Francesca Radcliffe

The combination of a decade of aerial archaeology workshops in Europe, and a decade of aerial reconnaissance in Jordan meant the time was right, if not overdue, to organise an aerial archaeology workshop for Jordanians, in Jordan. By comparison with events elsewhere, especially in Europe, the pace of work in aerial survey has been much slower in Jordan and the impact of aerial survey has still to be fully realised (see Kennedy and Bewley 2004). However the current Director-General of Antiquities, Dr Fawwaz Al’Kraysheh, with the support of the Council for British Research in the Levant (CBRL), has been very keen for us to arrange a workshop on aerial archaeology for archaeologists from the region.

The aim of the workshop was to train enough practitioners and scholars so that there is locally-grown knowledge and skill for aerial reconnaissance, photo interpretation and mapping projects, and that this skill is sustained for the future.

The Jordanian Department of Antiquities arranged the accommodation, meals and lecture room at the magnificently located Umm Qeis (ancient Gadara in northern Jordan overlooking neighbouring countries). Umm Qeis was one of the Decapolis cities, founded in the 3rd century BC (for a brief summary see Kennedy and Bewley 2004: 158-9). The CBRL Director (Bill Finlayson) and his staff (in particular Nadja Qaisi) were enormously helpful in arranging the publicity and receiving applications and providing logistical support.

This first year, in 2007, was a trial event, which, if successful, might lead to subsequent workshops, hopefully to include students from neighbouring countries across the region, as well as Jordanian archaeologists. It was never an intention to include “international students” (i.e those working in the region, but not indigenous to the region) but as so many applied, and it seemed right to include them. In fact the combination of students, from a wide background, enhanced the level of discussion and interaction, and thus will be encouraged in future. However, the workshops have to be for those archaeologists who have a real connection with the region and attendance can not be a pretext to visit Jordan!

We asked for a volunteer to write a student’s view of the course for which Robin Standring was volunteered (p 39). The purpose of this note is to provide the organisers’ view of the aims and also what was achieved, as well as to explore what may follow in subsequent years.

The aim was to train archaeologists from the region to expand the expertise of this important subject, to raise awareness of the survey work which is being undertaken and highlight the archives which already exist and are being expanded and to explore the potential of the subject for the region. Ultimately we are looking for local archaeologists to undertake aerial reconnaissance, air photo interpretation and mapping, and that this is sustained for the future.

In future years the challenge will be to reach the standard of other training courses, in both the length of the courses and the content; which will need to include more tutors, and a wider rage of topics, such as aerial reconnaissance (and digital photography), more detailed air photo interpretation and mapping exercises and the basics of archiving photographs and cataloguing.
Future courses will have to include digital mapping, and the use of GIS, which will be a logistical challenge, in terms of software, hardware and teaching space.

The first, and unexpected, outcome of the workshop was a heightened awareness in Jordan of the potential use of the aerial imagery so far collected – not least because of the contacts of one student – and discussions with interested parties about the need for greater protection of the cultural heritage in Jordan.

The second and almost immediate outcome was an invitation to return next year (to Yarmuk University) for a second, longer workshop, perhaps including a flight or two.

The feedback session was constructively critical in that the students all felt the aims of the course had been met, but that the aims should, perhaps, have been expanded, especially in the areas of interpretation, mapping, especially in the use of computers, and reconnaissance. This was very positive feedback in that it proved the pattern and scope of the aerial archaeology schools, which have been developed in Europe since 1996, can be translated to the Middle East. This first, trial, workshop was only three days, considerably shorter than all the European schools.

So, where does this leave the planning for next year? All the organisers have many others commitments but we are planning for a workshop in 2008 or 2009. What we have learnt from this one is that we will need a longer lead-in time for advertising the course, for obtaining the funding, and also exploring as many ways of obtaining necessary computer hardware and software to allow for digital transcription of a number of sites from the region.

For the record, the summary of topics covered was as follows:

Aims and history of aerial archaeology; aerial archaeology in the Middle East
Introduction to aerial reconnaissance
Introduction to photography in the air
Sources: imagery, maps, records
Hands-on exercise: locating sites (photos maps and records)
Introduction to air photo interpretation (including stereo-viewing)
Hands-on exercise: air photo interpretation
Introduction to mapping: vertical/obliques, methods, results and value
Aerial archaeology and heritage management

Participants:
Fawzi Abu Danneh, Al- Hussein Bin Talal University, Jordan
Abdullah Ali Al-Rawasdeh, Department of Antiquities, Tafilah Office, Jordan.
Ziad Ghneimat, Department of Antiquities, Ajloun, Jordan.
Catreena Hamarneh, Department of Antiquities, Amman, Jordan.
Ahmad al-Momani, Department of Antiquities, Amman, Jordan.
Robin Standring, Cambridge Field Unit, UK.
Chris Tuttle, Assistant Director, ACOR, Amman, Jordan.
David Vila, Associate Professor John Brown University
Assistant Field Director, Abila Excavation, Jordan
**Tutors:** Dr Robert Bewley, Professor David Kennedy and Jane Taylor, with logistical assistance from Francesca Radcliffe.

**Acknowledgements:**
Without local support, from both the Depart of Antiquities and CBRL, especially the administrative skill of the CBRL staff, in particular Nadja Qaisi and the Director, Dr Bill Finlayson, the smooth running of the course would not have been possible. Equally the funding institutions (British Academy, Palestine Exploration Fund, Society of Antiquaries and the Seven Pillars of Wisdom Trust) the decade of aerial reconnaissance and the workshop, would not have been possible, and we are extremely grateful for their continued support.

**Reference:**
Workshop in Jordan – a view from the floor

Robin Standring

My first impressions of Jordan were not the sun and the desert of the imagination but a belting thunder and hail storm, roads turning to raging rivers, and a taxi driver who though he was Ayrton Senna. After getting a bit lost, we eventually climbed above the rain clouds to the hilltop town of Umm Qais. I was immediately impressed by the wonderful views to the Golan Heights, Israel and the Sea of Galilee below, and also his forthright request for Baksheesh (I gave him 2 quid on the condition that he never drove me again).

I can’t claim to be an expert on Jordanian archaeology, but I jumped at the chance to come and visit once I found there were places free on the seminar. It was a chance to meet new people, improve my knowledge of the local landscapes and eat a lot of chicken kebab too.

This northern part of Jordan is very lush in springtime and all-in-all the venue was splendid – a Roman city of the Decapolis, covered in wild flowers and at the highest point (appropriately) an Italian restaurant with one of the best views to be had this side of Jerusalem. Much of the site had been excavated but there was still enough untouched areas left to keep the combined German and Japanese teams who work there busy for another 2,000 years.

We were accommodated in old houses on the highest bit of the monument and treated to some spectacular sunsets. The houses looked to be a few hundred years old and employed much reused stone. When I commented on this, I was told by one of the Jordanian participants that we were staying in the old village of Umm Qais which had been commandeered by the Jordanian Antiquities authority in the early ‘80s and the new (ugly concrete) town nearby had been built to accommodate the evictees. A British equivalent would be English Heritage taking over the village at Avebury and forcing the population to move to Trowbridge.

It was a relaxing spot, which put me in a holiday mood. In a brief chat at the beginning of the workshop, Bob Bewley thanked me for agreeing to write a review of the workshop. It was news to me, but I tried not to let it show, and filed a mental note to have a word with Palmer some time soon!

I have followed the progress of aerial archaeology in Jordan over the years (ten now I think?) and the chief instigators David Kennedy and Bob Bewley presented most of the sessions assisted by Francesca Radcliffe and Jane Kennedy.

This work has been twofold – researching and analysing existing archival material (mostly verts) and starting a campaign of flying for obliques, the results of which were recently published in Ancient Jordan from the Air. This work thus gave a logical structure to the proceedings – a division between the practicalities of taking photos from a helicopter combined with learning about interpretation and use of imagery.

The participants were a combination of Jordanian archaeologists (Antiquities Authority and Universities), visiting scholars from the US and myself (a British Field Archaeologist who is trying to write something about the Middle East).
Jordan is more ‘open’ than many other Middle Eastern in allowing researchers access to archival imagery, but even so we mostly worked from British case-study material that had been worked-up through previous EH workshops. This gave me a bit of an advantage in the interpretation exercises and I had to keep my mouth shut when the anti-glider trenches at Sutton Hoo came up.

Much of the seminar focused on the practise of taking obliques. Jane Kennedy gave an interesting paper on her techniques for flying and taking obliques for her (very pretty) aerial books and this theme was expanded upon by Bob Bewley who also gave the participants fashion tips (see photo).

I felt that the attendees viewed themselves more as people who might use archival imagery rather than take their own and this was perhaps the only point that the workshop really needed to develop in future years. With a lack of civil aviation, it seems less likely that the participants will be taking their own photos rather than visiting state archives and consulting the material produced by Kennedy and Bewley which is stored at the British Institute in Amman (CBRL).

A field trip to look for some of the features that had been picked up by the previous flying revealed some of the classic problems of ground prospection a) where the hell are we, b) the landscape all looks the same, c) the farmer has trashed the archaeology.

The trainers were all excellent and very attentive to their audience, and the idea of ‘giving feedback’ and ‘lessons learned’ at the end of the session seemed to pleasantly surprise the attendees. It was clear that people were very pleased to have participated and made constructive suggestions for the future such as involving the universities more (I’ve heard that said in the UK too…), and putting additional emphasis on the practical skills of geolocating Jordanian imagery.

I felt that it was a successful start to an educational campaign, and the combination of location, Jordanian hospitality and the enthusiasm of the trainers made for a really great three days.
Warsztaty Archeologii Lotniczej: Poznań – 29 April to 5 May 2007

Rog Palmer & Włodek Rączkowski

The aims of the Workshop were to introduce Polish archaeology students to some of the uses of aerial photographs in archaeological research and practice. It was attended by 14 students from universities at Lublin, Poznań, Rzeszów, Szczecin, Toruń, Warsaw and Wrocław with tutors from Cambridge (Rog), Poznań (Włodek, Lidka Żuk and Wojtek Mania) and Vienna (Michael Doneus). All of the students were Polish and so this was our teaching language but for contributions by Rog and Michael.

The Workshop began with lectures on aerial photographs and formation processes, perception and air photo interpretation, applications and theoretical approaches to aerial photography and its uses, and aerial archaeology in Poland. This was followed by long sessions of photo reading and interpretation on screen with full involvement and discussion by the students. The value of stereoscopic examination of aerial photos was introduced using a series of anaglyph slides – much enjoyed by all – followed by exercises using pocket stereoscopes and the recently acquired ‘interpretscope’ that allows two people to view the same photo pair.

Practical work continued with students making interpretations on transparent overlays and making a simple network rectification. We then moved from the classroom to the computer room where students were given an interactive demonstration of AirPhoto by Lidka and then chose individual project files containing a set of photographs and maps. Each student was asked to transform and interpret photographs and, eventually, to prepare a finished map showing their interpretation. Because of the rarity of mapped control points in Poland, most of the students downloaded extracts from the freely-available orthophoto mosaic of Poland and took secondary control from those to transform their obliques.

Wojtek spent a day giving interactive introduction to MapInfo that showed the basic use of the GIS and included importing geo-located raster images above a map background, various drawing techniques, import of information from external data bases (AZP records and archaeological oblique locations) and how these could be included in a final drawing.

Students continued their projects by importing their transformed files into MapInfo and making on-screen interpretations of archaeological and other information. Their finished maps showed a variety of individual flourishes that ranged from contours and landuse to a new type of buffer, the ‘carshed’, showing what land may be visible to an archaeologist driving along the local roads. Students showed their determination to complete their projects by staying until 7.30 on two evenings (we threw them out when we really wanted a beer).

Final talks were given on limitations of aerial photographic information and how its integration with field walking, geophysics and excavation could enhance its archaeological value. To conclude, Michael Doneus showed us results of his research using airborne laser scanning and its application in his extensive landscape project south of Vienna.

Students then gave us presentations of the work they had completed during the workshop and commented on the value of what they had learned during a very full week and how the present aerial situation in Poland may be improved.
Culture 2000: APILS Workshop: Poznań, Poland: 6 to 11 August 2007

Rog Palmer and Włodek Rączkowski

The International Workshop on Air Photo Interpretation for Landscape Studies was, or seemed to be, the final course run under the Culture 2000 heading. Our intention with APILS was to escape from the primarily technical teaching that predominated other courses and workshops and to try and to emphasise archaeological content which, in this case, was the landscape element. Unfortunately our advertising of the course was a little late and applications were few and of very mixed focus and levels. All applicants were accepted giving us an anticipated class size of 12 students, although three failed to appear leaving us with 9 students from 8 countries. The good news was that Andrew Fleming, emeritus professor of landscape archaeology from Lampeter University, accepted our invitation to teach and so considerably broadened the scope of the Workshop. Lidka Żuk and Wojtek Mania, research students at Poznań and teachers at our earlier Workshop there, added their experience of AirPhoto and MapInfo to the “staff”.

Another aim was that we would be flexible and hoped that students could outline their research projects and then we – teachers and students – could discuss whether and how aerial photographs may be used in those projects. Our working programme has evidence of the changes and improvisation as many added scribbles. The students’ projects included landscape studies from The Netherlands, Montenegro (with a fantastic amount of upstanding walled sites and systems) and Finland, the addition of an aerial component into the excavation and field walking survey in the Bucsani area of Romania, uses of aerial survey in the investigation of Dutch settlement along Notec river valley in Poland, assessments of the usefulness of aerial survey in Estonia and Latvia together with its role in monitoring protected sites, survey using a model aircraft to photograph sites for comparison with the AZP results in an area east of Warsaw, and an assessment of the potential of aerial information in the almost absent heritage protection of sites in Armenia. We used the students’ photographs, etc, as much as possible for discussion and teaching and they were an important part of the day of photo reading. But teaching about landscape archaeology used predominantly (?) or entirely) examples were from Britain (including Andrew’s Dartmoor, Swaledale and St Kilda plus Rog’s Hambledon, Danebury and Fenland). This Brittocentric approach is now recognized as one of the weaknesses of the C2000 teaching although, without examples from elsewhere of completed projects, it is difficult to escape from using them.

One new aspect of the teaching was to spend time on ‘map reading’. The idea of this was as an extension of the photo reading, through which we hoped to show students not only the basics of every-day maps, but to encourage them to make archaeological interpretations of areas mapped from air photos and to find and discuss points of interest on the maps. APILS seemed to have a cow theme and Wojtek’s opening slide on conventional maps added to this by illustrating a rare-breed cow on which the patches were a map of the world.

It was fairly obvious to students and teachers that the wide range of interests and experience made it difficult to run the Workshop in quite the way that we had hoped. In the final day’s discussion it was clear that several of the students had come with air photos that they hoped would be examined on a one-to-one basis with tutors (this was done after the official course closed). It was also apparent that much more teaching of photo interpretation was necessary.
and that several of the students wanted more practice using AirPhoto. Because of this our original aspirations for APILS could not be achieved but it did lead to suggestions, mainly as a result of talking to our Netherlands student Willem Vletter, about directions for future workshops. We thought this was useful, as it seemed logical to conclude the C2000 programme by looking forward.

An outline of a workshop on use of air photos for landscape studies could be as follows:

Day 1: Lectures on APs and landscape
Day 2: Photo reading
Day 3-4: Use of AirPhoto during which students could be pulled from the class to have one-to-one discussions with tutors about their own air photos.
Day 5: Examples of landscape projects and map reading
Day 6: Presentation of students’ work and group discussion.

This idea will not be left to gather dust until there is a Culture 3000(?) project. It seems possible that funds may be available in Poznan to run a small number of workshops and we are both keen to use those to continue the teaching and perhaps to help consolidate the position of Poznan as one of the Centres of Excellence.
Cropmarks
(dfn: differential growth of crop that indicate variations in subsoil depth and content. May include archaeological features.)

More weather
Irwin Scollar sent me information about another free weather site that can be downloaded and can show weather at high resolution with three-hour updates anywhere in the world. There is also an optional animation sequence that forecasts the next few days:

Cameras and GPS
This may be of interest to an increasing number of aerial photographers now that the latest Canon models also allow GPS to write to Exif files.

There seem to be two ways of using GPS to write a position to the camera at the moment of exposure: a normal GPS set linked by cable to the camera, or special GPS devices made to be fixed to the camera. Michael Doneus uses the first system, with a Nikon D2X linked to a Garmin e-trex with a cable. He says that the cable so far (after a full season of flying) did not get in the way during work.

Geert Verhoeven uses a small GPS attached directly to the camera’s flash shoe. I don’t think he’s flown with that, but it looks small and neat. I bought a system made by di-GPS that bolts to the tripod mount and has the GPS unit vertically up the left side (from the users’ viewpoint) of the camera (http://www.dawntech.hk). I would not recommend this for the main reason that the GPS unit gets in the way of the camera strap fixture (on the Nikon D200) if it is screwed on to be flush with the camera side. The lid of the battery case also needs a strip of tape to ensure that it stays on. I’ve also not flown with it other than to test it for reception during commercial flights and in Wlodek’s car (on the ground). In both the signal was excellent assuring me that the unit would stay live if it was on my lap under a map in a Cessna.

Perhaps the most important consideration if you’re going to link your camera to a GPS is that the fix-to-camera devices only record points on the Exif file. There is no continuous track for which a second (normal) GPS would be required. For this reason alone the cable (which, for Nikons is ridiculously-expensive at about £100 for 50cm or so) linking a GPS to the camera seems to be the most sensible option.

Fujifilm IR digital camera
The IS Pro – the third of Fuji’s cameras to record non-visible light – utilizes Fujifilm’s Super CCD Pro and Real Photo Processor Pro technology to see light from the ultraviolet (UV), visible and near infrared (IR) portion of the spectrum (approx. 380nm – 1000nm). It also seems to have a near-opaque filter that may make it difficult to use from the air. Have any of you seen or tried one of these?

based on: http://www.fujifilmusa.com/JSP/fuji/epartners/proPhotoProductIS-Pro.jsp
Books of interest?


I have been looking forward to seeing this volume for some time, and the authors are to be congratulated for a well-researched and excellently-presented study. The idea of a theme-driven publication from the NMP work – and this is one aspect of a large project – is a really accessible way of bringing this work to a wider audience. There is also plenty of interest for the archaeologist, and it is a great reference guide for the interpretation of military remains that will find itself on the shelf alongside *20th Century Defences in Britain* [B. Lowry (ed), CBA 1995].

I had previously tried to buy the book and was told by EH that publication had been ‘delayed’ and (not by EH) this was because they ‘didn’t think it would be a big seller’. A strange criteria for archaeological publication, that! When I received the book, I realised that the accessible format probably meant that it had been tagged with the ‘popular’ books rather than dutiful (and dull) archaeological publication. This more popular series seems to be dominated by Sport (anything on football), gardening (Victorian/Edwardian) and books on London. I can only say that this is a step in the right direction. Encouraging news on the sales front is that I have already bought three copies for friends and family.

The book deals with coastal defences through the ages, skipping through prehistory and the Roman period and rapidly jumping up to Post-medieval with a great map of 17th century Landguard fort and a series of obliques of Napoleonic Martello towers. The story of World War One coastal defences and the real fear of invasion during this conflict makes for interesting reading, and it is a credit to the authors that in presenting well-researched history on earlier and later periods they do not over labour the examples from World War Two (which make up c.40% of the book).

The WW2 examples are impressive however, in large part due to the Suffolk coast being blessed with systematic verticals and obliques from as early as 1940. The range of coverage dates is what really brings the WW2 section alive – the ability to compare cover of 1940 with 1941 and the post-war survey gives a neat ‘phasing’ to the defence features, many of which were short-lived and poorly recorded. Those RAF surveys were undertaken as a means of planning invasion defences as well as checking the integrity of the finished ‘product’. This approach to interpretation and presentation is refreshing and demonstrates the value of using early photographs wherever they survive.

The format is very accessible with interpretive diagrams of the military features presented alongside the relevant photos. This is a great learning tool and absolutely necessary for the archaeologist and layman alike. The vertical images become much more ‘readable’ – a format to be remembered for the future. I gave up counting the graphics, but there are over 100 photos, most of them aerial. A peppering of colour obliques and ground shots contribute to a ‘coffee table’ feel which is essential for encouraging wider sales.

The only minor quibble with the book is the absence of German (GX) air photos, which would have added some extra texture to the story and maybe even given a good ‘strap line’
for marketing the book. These are not available in the NMR, and of the surviving Suffolk coastal sorties in the US archives, the majority were taken between April and September 1940. It seems that both the Luftwaffe and the RAF were photographing the coast at the same time, each planning their own ‘work’ on the coastal defences. History doesn’t record if the recon planes ever met half way (a pint at Southwold?). Hopefully these images will become more accessible to British researchers in the near future.

I definitely learned a thing or two from the chapter on the Cold War, and the photo of the fan-shaped Cobra Mist radar installation at Orfordness is an all-time classic to add to the Powerpoint presentation.

It is to be hoped that EH produce more books like this, although the only ‘tax’ that the air survey team may have to pay to make it more saleable is to lob in a few Luftwaffe aerial photos of old sporting events, Edwardian gardens, and a quick mention that the pilots flew on to London next.

Robin Standring


This was sent to me by the publishers because of the Armenian connection – Poidebard was there, or in the Ottoman empire (mostly in parts that are now in Turkey) in the early years of the last century. The book is in French and therefore fairly incomprehensible and appears to have been compiled to accompany the Poidebard exhibition at the musée de l’Artes in Provence in 2004. It covers the complete range of Poidebard’s activities – missionary, diplomat, aerial photographer, underwater photographer and his probings into photographic technology in a series of well-illustrated essays. So his aerial work occupies perhaps some 20% of the book – maybe some 60 pages – and ends with a series of ‘then and now’ comparisons which include a contribution by David Kennedy.

This is a beautifully-produced book and well worth the asking price (I’d guess a UK production would be uglier and twice the price) and it reminds us of Poidebard’s place among the pioneering archaeological aerial photographers. Even with its language problems, this book provides a sense of the time and the early years of experiment and discovery through its biographical scan of a bloke who seemed always to be inquisitive and never stood still. What a pity he was never an AARG member….

Rog Palmer


Despite the title and the cover image – a George Allen AP of Uffington – this is not really a book about aerial photography or archaeology, though both feature prominently throughout. Based on the author’s Oxford University D. Phil. of 2003, Hauser’s main concern is with what she calls ‘the archaeological imagination’ – the ability to recognise “the presence of the
past in a landscape despite the incursions of modernity” – and a number of artists active in the 1930s and 1940s, loosely grouped under the heading ‘Neo-Romantics’, whose work often reflected this survival of traces of antiquity at a time when the landscape already appeared to be undergoing rapid transformation.

Hauser is particularly interested in the ability of photography to record simultaneously both the historic and the modern, and as a result takes a broader than usual view of the Neo-Romantic movement to include not just artists like John Piper and Paul Nash but also photographers such as Bill Brandt. She also examines the influence of archaeological photography – including aerial photography – on their work.

I don’t propose to consider Hauser’s arguments and ideas in any detail, but a summary of the contents may be useful. Opening chapters introduce the reader to the Neo-Romantics, to archaeology, and to ‘the archaeological imagination’. In the process, some of you will no doubt be pleased to hear that archaeological methods are once more compared with those of fictional detectives (Dupin and Holmes again, not Shoestring and Cracker. Anyone fancy comparing Colt Hoare & Cunnington with Cagney & Lacey?). The lengthy chapter on photography provides the clearest indication that this book originated as a thesis – at times the emphasis seems to be more on demonstrating that everything relevant has been read and understood rather than on getting to the point. Nonetheless, there remains much of interest within.

For the readers of AARGnews, the next three chapters will probably be of most interest. The first is concerned with Crawford and Antiquity, the journal being required reading for a number of the artists Hauser is interested in. A chapter on aerial photography is then followed by one dealing with the ‘salvage photography’ undertaken by the National Buildings Record and others during the Second World War. Again, there is much of interest here, but there are problems too. Hauser is clearly not an archaeologist, so the archaeological background to Crawford, Antiquity and aerial photography is largely absent. The footnotes and bibliography indicate a rather narrower range of sources than is the case for other topics. This is particularly noticeable in the discussion of aerial photography, which relies on a small number of well-known publications, few of them of recent date. Consequently, we find Hauser repeatedly referring to cropmarks as ‘ineradicable’ (to be fair, she does quote Leo Deuel saying something similar, although it shouldn’t have been difficult to find alternative opinions), while the profusion of cropmarks photographed on the gravels apparently reflects the fact that that was where everybody lived.

The final chapter moves from still photography to moving pictures, as Hauser examines Powell and Pressburger’s 1943 film A Canterbury Tale, demonstrating that many of the ideas and themes explored by the Neo-Romantic artists are present there too. That Michael Powell tried to get APs of the Pilgrims Way from Crawford while planning the film is intriguing, though not as much as Hauser’s comparison of the finished film with The Wizard of Oz. Time to watch them both again…

As a whole, the book is a little disappointing. There is much of interest within, but there is an unevenness throughout, partly brought about, one suspects, by a lack of familiarity with the archaeological side of things. It’s a little like reading a series of individual papers of varying quality all loosely based on the same theme. For me, the weakest was the chapter dealing with
aerial photography, partly for the reasons already given, and partly because ultimately the evidence that the artists Hauser is concerned with were influenced by *archaeological* aerial photography is so limited – a single journal article and a handful of paintings. Repeated mention is made of Paul Nash’s use of an AP of Maiden Castle in his 1936 Shell Guide to Dorset, but the image he used had been widely available as a postcard for a while. You didn’t need to subscribe to *Antiquity* to see aerial views of the past in the present, and you didn’t need to be interested in archaeology to appreciate the aerial view.

Finally, this may seem like stating the obvious, but £65 is a ridiculous price for a moderately-illustrated book of 300 pages. At that price, I would expect rather better quality image reproduction than has been achieved here. Likewise, anyone shelling out that much cash might be disappointed to find that none of the paintings reproduced within are in colour.

Mattyn Barber


This profusely-illustrated and extremely-colourful book accompanies an exhibition currently being held at the Imperial War Museum, and may be of interest to anyone dealing with military aerial photography. Camouflaged sites are a not uncommon feature of the World War Two verticals of Britain taken by the RAF and the USAAF, for example, and this book provides a reasonable overview of the thinking behind the various camouflage and decoy schemes in use.

The target audience is broad, hence an emphasis on pictures rather than words, on the use of camouflage designs on fashion, and the role of artists, especially those of a Cubist persuasion – in the design of camouflage schemes. A lengthy introduction – “Visual Subterfuge in the Natural World” by Jonathon Miller – is probably the most successful of the written contributions, and it is a pity that the other chapters lack the same degree of detail and depth.

From the AP perspective, what initially caught my eye was the blurb introducing the section on the First World War – ‘Defeating the Eye in the Sky’: “the new threat of aerial reconnaissance spurred new creativity in the military arts of disguise”, a theme that recurs during the section on the Second World War. However, anyone expecting to see the effectiveness of camouflage on aerial reconnaissance will be disappointed. Of the few aerial views included, most are taken from high vantage points rather than aircraft. In fact, there are more photographs of naked women than there are APs (take note ed.). And no, they’re not stereo pairs (the APs, that is).

In any case, camouflage is dealt with throughout from the perspective of design and intention, and not effectiveness. Consequently the opinions of military AP interpreters such as Ursula Powys-Lybbe – that the Germans probably wouldn’t have bothered if they knew how easy camouflage was to spot on APs during the Second World War – are ignored. So – plenty of interesting pictures; not enough information or discussion. Can’t help but wonder what would happen today if the likes of Damien Hirst and Tracey Emin were given the job of concealing the armed forces.

Mattyn Barber
This book documents results of a landscape project about Kelmscott parish although its main focus is on Kelmscott Manor, the former home of William Morris, now owned by the Society of Antiquaries of London. Its contents range from prehistory and environmental archaeology through medieval to chapters on Kelmscott church, local vernacular architecture and the conservation policy for Kelmscott, its environs and rural England.

Kelmscott itself is a small parish in the upper Thames valley of Oxfordshire whose crop-marked features were sketched in Benson and Miles (1974, Map 3) and appear, in reworked form, in this book (see below). The three chapters following the Introduction may be of most interest to AARG members although there are snippets elsewhere that reach beyond the Manor buildings (notably Chapter 6 about the people of the parish). In reverse order, Simon Townley uses primarily documentary evidence to describe medieval and modern settlement in the parish. This seems to have its beginnings in Saxon times – although there is little evidence – and had an open field system in ‘…perhaps the 9th or 10th centuries…’ (p40).

Mark Robinson has spent a lifetime working in environmental archaeology and has contributed greatly to our understanding of the Thames valley. His work has produced results that he applies to Kelmscott by describing vegetation changes from the beginning of the Holocene through its disturbance in the Neolithic to the increasing clearance during the bronze age and later periods. Robinson’s chapter also notes hydrological changes and the effects of rising water tables in the M-LBA and MIA and of alluviation in Roman and Saxon times. These obviously would affect settlement pattern and landuse and make it curious (to me) that this chapter did not precede the one on prehistory written by Steve Baker and dealing with the crop-marked evidence. I liked the first part of Baker’s title, ‘A place for digging ditches:…’ as this plunged through the crop marks to the stuff we ought to be interested in. His maps usefully indicate ‘holes’ in the evidence due to modern settlements (fig 8) or have his ditches over a map of drift geology (figs 11, 13, 16-7) that helps explain context and is relevant to his arguments. There is no indication of the source photos used (although illustrations come from CUCAP and NMR) or of who made the interpretations and drew the maps. These offer considerably more information than Benson and Miles – but that is expected after a further 30+ years of observation and photography – but are still fairly mediocre in appearance.

Neither probably matter too much in a chapter that discusses past uses of, and movements across, the local landscape for which the sketchy maps seem adequate. In outline, Baker divides the landscape and its activities into three areas:

- Floodplain and lowest terrace: droveways and scattered enclosures;
- First terrace edge: nucleated activity;
- First gravel terrace: droveways and larger fields.

He then discusses how communities in this small area may have functioned and the relationships between Kelmscott and its greater environs. Conclusions look towards future work and the necessity of integrating AP evidence with other sources to reach (as he puts it) ‘…beyond drawing lines on maps, to understand more fully the act of wielding the spade,'
through which the landscape was occupied and transformed by people in the past.’ (28).
Baker’s chapter is, for me, a refreshing ‘outside’ use of aerial material to seek archaeological
explanations.

Reference
Benson, D. and Miles, D., 1974. The Upper Thames Valley: an archaeological survey of the
river gravels, Oxford.

Rog Palmer

Hadrian Cook and Tom Williamson (ed). Water Meadows: history, ecology and

Based on papers prepared for a conference in Salisbury (Wiltshire), the chapters in this book
are biased towards water meadows in the south of England. However, there is much in them
that may be of interest to anyone who wants to know about their design and management and
to those who may need to interpret aerial photos of water meadows. This is of particular
importance in the light of comments made by Chris Taylor (p 22-3) who states that a
considerable percentage of water meadows in Hampshire has been destroyed or has
deteriorated in recent times and that WM’s were not recorded by RCHME (in, for example,
their Dorset Inventories). In which case, post-war verticals may be the main source of
information on the things.

I’ve not had time to do more than dip into the book but it is well worth mentioning in
AARGnews. Topics covered include the reasons for WM’s and the crucial relationship
between WM’s and arable land (sheep shit); different types of WM’s and how they functioned,
plus chapters on the effects of WM’s on plant communities, the hydrology, soils and geology
of Wessex WM’s, on their past and present management and current agri-environment
schemes and WM conservation.

It would have been nice to have included a higher number of illustrations in the book although
it could be argued that one set of WM’s looks very much like others of the same type. But,
under good lighting, they can make rather pretty air photos.

Rog Palmer
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**Hints, tips, and the next memorable date for contributors**

Please send your contributions in digital form via email, CD or floppy disc. Preferred form for contributions is in Rich Text Format or Word for Windows files within which illustrations can be placed in appropriate places. However, it makes life easier if I can do this myself, so please send text and illustrations as separate files.

**Colour illustrations**
Should no be no problem.

**Big files**
For some reason ntl restricts me to accepting 5MB email attachments. Please forewarn me if you are sending a series of these otherwise they’ll start bouncing.

Please format Page Setup as A4-Potrait with a 3.5cm margin at the top and 2.5cm for the other three. If this is not done in your original all hell can break lose when I juggle to reformat your carefully placed pictures to the AARGnews page size.

Please adhere more or less to the style of headings, etc found in recent issues. This seems currently standardised(±) as:

- Times New Roman 12pt for single column text;
- Times New Roman 11pt for double column pages;
- Times New Roman 14pt bold for the title of your contribution;
- Arial 9 or 10pt for figure captions.

**Location Maps**
Now that AARG and AARGnews contents have spread from their Cambridge origins it has been suggested that contributors might include some kind of location map with their work – or at least mention the country they are working in!

AARGnews is published at six-monthly intervals so please adhere to the copy dates. Copy for AARGnews 36 needs to be with me by **February 15**. Editorial policy (for want of a better word) tends to be that if I am sent interesting contributions they go in up to a limit of about 50 pages. I do not wait until the copy date and wisely consider the merits of each. If an issue becomes too large I will, with permission, hold a contribution until the next issue. Definitely first come, first published!

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The Aerial Archaeology Research Group

The Aerial Archaeology Research Group (AARG) provides a forum for the exchange of ideas and information for all those actively involved in aerial photography, photo interpretation, field archaeology and landscape history. This also includes the use of aerial photography in defining preservation policies for archaeological sites and landscapes.

Since its foundation in 1980, AARG has actively encouraged such exchange through its annual conference, specialist meetings and, more recently, through the biannual publication of its newsletter, AARGnews.

Membership of AARG is open to those interested in aerial archaeology as well as its active participants. All applications for membership, subscriptions and changes of address should be sent to the Secretary:

Cinzia Bacilieri, English Heritage, 37 Tanner Row, York, YO1 6WP, UK
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* and applicants from Albania, Bulgaria, Croatia, Czech Republic, Hungary, Montenegro, Poland, Romania, Serbia, Slovakia, Slovenia, and countries of the former Soviet Union.

Subscription reminders may be sent out on January 1

Methods of payment:

- Standing Order mandate
- Cheque in Sterling payable to AARG
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Student bursaries. AARG has a limited number of student bursaries for attendance at its annual meeting. These are aimed at supporting bona fide students who are interested in aerial archaeology and who wish to attend.

Anyone wishing to apply should write to Dave Cowley, RCAHMS, 16 Bernard Terrace, Edinburgh, EH8 9NX, Scotland (Dave.Cowley@rcahms.gov.uk) with information about their interests in archaeology and aerial archaeology, as well as their place of study. Annual closing date for applications to the annual AARG conference is 31 May, other meetings for which bursaries may be available will be advertised on an ad hoc basis.