AARGnews 20

CONTENTS

Editorial 3
Chairman’s Piece by Davy Strachan 6
AARG working groups 6
Honorary Secretary’s Report by Toby Driver 7
AARG Annual Meeting, Bournemouth, September 1999: summaries 8
Aerial reconnaissance in England: some thoughts for the future
by Damian M. Grady 15
The Stour Valley Project, England: a cropmark landscape in
three dimensions. Part 1: methodology by D. Strachan. 27
Vertical and oblique photographs by Michael Doneus 33
New homepages by V. Arious 40
Aerial Archaeology Workshop Leszno 1998 – the view from behind
by Agnieszka Dolatowska, Jolanta Goliasz and Lidka τ uk 41
Mobile GIS with in-flight-GPS-Support:
‘Customizing Proposal for AA by Eckhard Heller 43
The Colosseum of Rome from 681 kilometres by Martin J.F. Fowler 47
Italy from the ground. Remote Sensing in Archaeology, Summer School,
Universita Degli Studi di Siena, December 1999
by Toby Driver and Chris Musson 51
A bibliography of Polish aerial archaeology by P.M. Barford 55
Exhibition: ‘From the air - pictures of our common past in Europe’
by Ivan Kuzma 57
Forthcoming events, etc 59
CIRA and AARG 2000 60

Image power? Review article and comment by Kevin Jones 61
Books of interest? 63

J.W.E.Fassbinder and W. Irlinger (eds). Archaeological
Prospection: Third International Conference on archaeological
prospection, Munich, 9-11 September 1999 63
R. Featherstone et 16 als. Aerial reconnaissance over England in
Summer 1996. Archaeological Prospection 6

RCAHMS. Catalogue of Aerial Photographs 1994 65
Marilyn Bridges. Egypt antiquities from above. 65
Mark Bowden (ed). Unravelling the Landscape: an inquisitive
approach to archaeology 65
Lynda J Murray. A Zest for Life: the story of Alexander Keiller. 65
Branko Kerman. Settlement structures in Prekmurje from the air.
Arheoloki vestnik 50 65
Esse Ericsson, et al. Flygspaning efter Historia.
Actes du colloque international d’archeologie aerienne AMIENS,
Octobre 1992. Revue Archeologique de picardie No special 17

List of Contributors 69
Hints, tips and memorable dates for contributors inside back cover
At a recent ceremony Otto Braasch was awarded a Doktor honoris causa by Freie Universität Berlin.

The degree was officially given through the department, Fachbereich Geschichts- und Kulturwissenschaften (Historical and Cultural sciences) on behalf of the patrons, Institut für Prähistorische Archäologie (ehemaliges Seminar für Ur- und Frühgeschichte).

The ceremony opened with (live) music, and a short speech by the Dekanin of the Institut, Prof. Dr. Claudia Ulrich. After that Prof. Dr. Bernhard Hänzel gave the laudation about Otto Braasch, about his pioneer work in aerial photography, the amount of work he had done, his international contacts, especially those in the former Eastern countries (he mentioned especially his work done Poland and Hungary). Another pinot had been Braasch’s longstanding teaching of students, and his efforts to show other people the abilities of aerial photography. After that the document was given to him by the Dekanin, and it was read by her in Latin. Then Otto Braasch gave an overview about his work, closing with his recent interests in Brandenburg and Western Poland and the co-operation with our Institute in our recent excavation in Mokodonia, Kroatia.

There followed a social event with wine and an (excellent) cold buffet.

The award was attended by approximately 80-100 people.

Information from Sabine Reinhold, Artwork by Palmer and Raczkowski
Those of you who avoided AARG99 missed one of our best meetings to date, if not the best. I’m not saying that because I was conned into talking so much, but because for the first time I became really aware of the tremendous breadth that use of aerial photographs now spans in archaeological work. My own games with interpretation and mapping now seem a tiny part of a much greater whole. There has been an illustrated summary of AARG99 on our homepage since October, but for the rest of you we include the text in this issue. This is largely the work of Davy Strachan who asked if we also wanted back-summaries from AARG-Abergavenny onwards! We hope to make Summaries an annual inclusion in AARGnews – so if speakers want their own versions included they will need to provide them at AARG. September 1999 was obviously a lean time for AARG. Not only a thin AARGnews, but also a sparsely attended AARG. Why, wondered Cathy and I, did more members not attend? For once this is not an idle question, because the committee need to know if we are providing members with what they want – or with events that they want to attend.

Keele and other WW2 photographs
Andrzej Prinke stayed with me for a couple of days after AARG99-EAA between searches for RAF cover of Egypt-Sudan that he was making for his Poznan boss. I took the opportunity to invite Chris Going round for ‘a’ drink and learned of the current campaign, mainly under the auspices of NAPLIB, to ensure the safety and good management of as many of the collections of wartime photographs as are known about. To help with the campaign it seems essential to increase use of the collections or, at least, to make people aware of their potential uses. As archaeologists and users of air photos we know the value of repeated photography and are used to making daily use of the 50-year span available in Britain. Archaeology, however, is a small user compared with the more powerful environmental groups and it is they who need perhaps a poke in the right place to get them aware of potential uses of this comparative material on (at least) a Euro-wide basis. Andrzej’s research provides a good example of this potential as one aim is to compare old and recent photos to show how the rapid expansion of Cairo and the preparation of tourist amenities already have destroyed large areas of Egyptian heritage (mostly peasant remains, of course, they look after those of the nobility!). Air photos are ideal for this work and perhaps can present a stronger case than maps as (to borrow from Rczkowski, AARGnews 19) the viewer can decide for itself.

As an ‘retired’ archaeologist, Chris Going still notices interesting features when making his lost-bomb searches and told us that there is, for example, masses of stuff in Italy (much more than published by Bradford and Hunt) and good potential elsewhere. A fair amount of the Luftwaffe cover of annexed territories is at scales larger than 1:10000 and so has good potential for the photo interpreter – maybe even allowing clusters of pits to be identified. Those of us who are mainly ground-based have said many times that all old material needs to be examined as well as, or in parallel with, new flights. In the Keele, and other, collections we have that old stuff, but before it can be used efficiently it requires cataloguing, curation, and the linking with technology that will enable rapid and simple access.

Neolithic causewayed enclosures
Before its blend with EH, RCHME together with the Prehistoric Society organised a one-day conference to be held in October 1999 on CE’s in Europe. Although it was not said quite as bluntly, it is fair to say that increased numbers of these sites since the 1970s is almost entirely a product of aerial reconnaissance. In Britain we had jumped from the 15 (or so) earthwork survivors to about 40 possible sites by the mid 70s. Now there are 73 or 74 definite sites. In the whole of Europe in the mid-70s only three or four sites had been recognised (or published) as variants of causewayed enclosures, and now there are many (no speaker offered a total for
their patch). We could say that AARG was represented by Otto Braasch who showed a sample of sites that were behind the former Iron Curtain and which he had discovered and recorded from the air since 1991. Otto also showed a submerged possible enclosure – in a location from which field-swimming had produced neolithic finds that may offer wonderful potential for waterlogged evidence. In west central France there is an increasing number of CEs of which some have been investigated on the ground. If we need a demonstration of the effectiveness of continued observation, the changing record of this type of enclosure would serve well.

What became apparent over the course of the day was the similarity of design of these sites – not just the use of the ‘string of sausage’ construction, but in many of the examples shown, the overall plan of the sites was often roundish with many of the multiple ditched sites having close-spaced ditch circuits. The conference raised many questions ranging from ‘why enclose?’, to the relationship of many of the low-lying sites to water, but for me the big question was how (or why) this style of enclosure retained such similar form over such a huge area (from Hungary to Wales) in a period when we imagine communication and travel between communities to be slow.

**Verticals and GIS**

In November I was working in the offices of Bicester District Council and had the opportunity to see, and play with, their seamless layer of digitally joined vertical photographs. These had been taken in May 1999 as a gesture to millennium spending and the digital material was to be given to all local schools. Anything that gets aerial photos into the earlier learning stages is good, although I wonder how many schools may have the necessary oomph in their computers to use it…? I can guess at some uses that may be made of this material on the illustrative level and as the digital coffee-table stuff for the management to show off, but to me the concept seems to throw away the very advantages that we expect from vertical cover. Not only is there no stereo ability but you can’t rotate the images to get the shadows falling correctly. The girl who was demonstrating the stuff to me was quite confused by this request even more so when I suggested inverting the monitor. As usual in such cases of confusion, I appeal to any AARG members who may have used seamless vertical cover for enlightenment as to its virtues. Fortunately I didn’t have to use this material and instead worked on the previous year’s photos, all neatly stored in individual pockets in ring binders. Grrrrrrr.

**Changes in Norfolk**

Many of you in the UK will be aware that Norfolk Museums Service decided that they could do without the input that Derek Edwards has provided for them as Aerial Photography Officer since 1974. Derek sent me a heap of press cuttings in which the pros and cons of this decision were publicly aired, but the fact remains that he was the only full-time aerial photographer employed outside central government in the UK. Since 1974 he has accumulated an impressive collection of aerial photographs, which has provided illustrations for many publications – including, ironically, several books commissioned by the body who have just ‘retired’ him!

Derek is one of the few aerial photographers who is able to talk the aircraft into the correct position to record memorably artistic views and, at other times, ensure that sites are surrounded by control points. Without an airborne Derek, Norfolk, and the fringes of those counties which abut it, are bound to suffer from the lack of local knowledge and frequent observation. This future loss is likely to be compounded by Norfolk Museums Service whose director, Vanessa Trevelyan, shows an ignorance of the needs of archaeological survey in her quote: ‘There is a complete survey of the county and if there areas [sic] where there needs to be a new photograph then that would be commissioned as a separate project.’ *(Eastern Daily Press 20 November 1999).* Even allowing for journalistic error this does not inspire much confidence for the future efficacy of aerial survey in Norfolk.
Derek is bouncing back into action with plans which include the resurrection of *Aerial Archaeology.* A further batch of his photographs are to be published in *Norfolk Country Houses from the Air* (with Tom Williamson) a book which, Derek told me, was originally to be published by Norfolk Museums Service until they thought that it would not sell well. Sutton Publishing have taken that risk and it will be interesting to see who was right. AARG members can help sway the balance by buying (or not) at the extremely generous pre-publication price (see leaflet with this issue).

**Genuine memoirs wanted**

Wlodek Raczkowski stayed with me for a couple of days after completing a punishing lecture schedule at Durham University. One of the things we talked about was the need to try and collect honest comment from people who have been involved in aerial survey – of the need for, as I put it, ‘old people to talk openly about the past’. This point came up after I had told him of one of my last conversations with St Joseph when I was asking if he would let me record a series of conversations or at least put a number of questions to him about his early days at CUCAP. He seemed flattered to be asked but replied that he would rather do such things after he was dead as he was worried that past ‘misappropriations’ of aircraft might result in him being sent fuel bills by the RAF. Perhaps the comments of others would need a time lock on them (as did the letter that Childe left with ?Grimes), but they may provide future investigators of aerial activities with a contrasting, or explanatory, view to the official or self-promoting stuff that is usually churned out. Much may substantiate or refute the famed half-truths that are already embedded in our oral history and add life and character to the usual academic and respectful stories. I would like to think that AARG would act as a ‘bank’ for any time-locked memoirs and that a future editor of *AARGnews* would have the same irreverent will to publish such tales as I would should I be sent *The Secret Diary of OGSC.*

**AARGnews and the mail**

*I make no apologies for the delayed delivery of the September *AARGnews*. Those of you at Bournemouth were given your copy, the rest were slightly delayed. At a subsequent Committee meeting it was agreed that your relatively efficient Editor can post them himself – so you ought to receive your future copies during the month on the cover (although it may take a bit longer to get to Kevin).*

**AARG homepage news**

Since the announcement on Britarch early in December 1999, Michael Doneus reports considerably more interest in the AARG homepage. Pleasingly, this is not just single inquisitive visits, but includes a number of return trips. I hope members also will visit the page a few times each year as there are frequent but irregular updates and additions of new material, including air photos, as well as an increasing number of links to other related sites. The address, as you know, is on the inside front cover of *AARGnews*.  

**A message for few of you…**

The printers have got yet another new machine which now enables them to print directly from digital originals. This issue has been produced in that way and ought to allow high quality pics to be included in this and future issues. It also means that you can send copy by email and/or disc/CD which gives me an easier time with editing and compiling. *Notes for Contributors* will be found inside the back cover of *AARGnews*, but if in doubt ask, and I or my digital masterbrain in Austria, will provide answers.

**And finally, some good news**

David Wilson has revised his invaluable *Air Photo Interpretation for Archaeologists* for publication by Tempus later this year. With cunning timing they may manage to get the second edition out in time for AARG00. *APIA*² is a revision, not just a reprint – with updates, changes and a new 16-page colour section – which means that we are all going to need to buy a new copy.
Chairman’s Piece

D. Strachan

I would like to begin by thanking our retiring Chairman, Cathy Stoertz, for her work over the last three years. I am glad that she will remain as Vice Chairman on the committee, and as such am sure that she will continue to make a valuable contribution to the work of the group. Congratulations are also due to all those involved in the organisation of AARG99 at Bournemouth. The presentations at the conference indicate the diversity of current developments in aerial archaeology, with increasing contributions about how aerial photography is used by different organisations in a variety of ways. These included the study of the survival of WWII sites, the integrated use of air photos in industrial and urban environments, and applications of air survey for management purposes at Exmoor National Park and the Avebury World Heritage Site. The technical sessions, including papers on image rectification and GIS, are increasingly relevant as computer technology continues to rapidly develop and become more widely available. The impact on aerial archaeology, as with all walks of life, is sure to be immense, and it is important that as a group, we continue to explore and share the potential benefits, and problems, which are bound to arise from these developments.

The forthcoming Institute of Field Archaeologists conference at Brighton (4th-6th April 2000) is to include a session entitled “European Landscapes from the Air – A Guide for Users”. It will include papers from EH, RCAHMS, RCAHMW, County Councils and our “continental correspondent” Otto Braasch. The session is geared towards those in the profession, who may be less familiar with the applications of aerial photography and how they could benefit. It will also explore the need for a consistent approach, at European level, and will be illustrated by exhibitions, showing current work, from the UK, Germany, France, Belgium, Poland, the Baltic States, Hungary, Italy and the Czech Republic.

The production of the AARG leaflet is well under way, and it will allow us to promote the activities of the group to universities and organisations across the UK and Europe. In addition, the AARG website continues to expand, and also offers an opportunity for others to find out about the group and learn a bit about aerial archaeology. The site now includes a bibliography section, book reviews and illustrated abstracts of the Bournemouth papers. Further contributions are always welcome, however, and I urge members to submit short articles on their work so that the site can fully represent the activities of the group.

‘Obliques or Vertical?’ AARG working group: fifth note

Slow progress. Anthony Crawshaw is in the process of fitting a 70mm vertical camera in his aircraft. Rog Palmer is wondering whether a grant can be found to enable us to include an assessment of the IKONOS imagery written about by Martin Fowler in this issue.
Honorary Secretary’s Report

Toby Driver

AARG membership leaflet
The AARG committee is in the final stages of producing a new leaflet explaining the activities of AARG and how to join. It was thought this was a necessary step to enable us to contact individuals and institutions in Britain, Europe and across the World, who may be interested in aerial archaeology and remote sensing. The leaflet includes English, French and German text. It is hoped primarily that AARG members who belong to universities or other institutions can help to distribute leaflets on their own premises. Anybody willing should email the secretary on toby.driver@rcahmw.org.uk.

Published list of members’ addresses
We hope to publish a list of current AARG members in the September AARGnews.

Because all current membership details on the AARG database are covered by the provisions of the Data Protection Act, I would ask for any member who does NOT want to have their details published to contact me by post or email. If you have any preferences on what information is published, such as an institutional rather than a home address, or indeed only selective information such as name, institution/town and/or email, then please contact me.

Honorary Secretary’s Photograph

Re-use of the industrial landscape: Penallta, south Wales (ST 1395).
On the site of the former Penallta Colliery, near Nelson in the Rhymney Valley, old spoil tips are being re-shaped into a Millennium Commission-funded Community Park. The centerpiece is this vigorous horse which dwarfs the diggers working on the car park at the bottom of the photograph.

Crown Copyright RCAHMW. (Neg Ref. 995108-47, 13th October 1999).
AERIAL ARCHAEOLOGY RESEARCH GROUP
Annual Meeting, Bournemouth University, 13-15 September 1999.

The following notes summarise papers presented in four formal, and one informal, sessions.

“Recent Projects”: Pete Horne (EH) chair.

West Yorkshire Landscapes: recent multidisciplinary investigations in the east of the county.
Alison Deegan, Independent air photographic consultant.
9 Manygates Lane, Wakefield, West Yorkshire, WF1 5NT.
Tel: 01924 259379, E-Mail: alison.deegan@virgin.net (see also www.alisondeegan.co.uk).

An account of recent multidisciplinary investigations in West Yorkshire, England, including the role which aerial photography played in mapping archaeological features over a large area impacted upon by a major road construction. The M1-A1 Link Road project (with an £800,000 excavation, and £300,000 post-excavation budget) was carried out by Archaeological Services WYAS and Babtie Group archaeologists, with aerial photographic mapping being carried out as part of the post-excavation stage. This mapping provided context for the features identified during observe and record, trial trenching and excavation, and was itself enhanced by results from the field. The project looked at the importance of soils and land-use to the cropmark distribution, and AutoCad MAP was used to combine excavation data, geophysical data and aerial photographic data. The cropmark plots allowed the features excavated along the narrow road corridor, to be put into some larger landscape context.

A sample of recent developer-funded work in England.
Rog Palmer and Chris Cox, Air Photo Services.
E-Mail: rog.palmer@dial.pipex.com (see also www.airphotoservices.co.uk)

An account of developer-funded, pre-excavation assessment work. The aim of which is to use all (easily) available aerial photographs to provide the excavator with information about the features which they will encounter when the topsoil is stripped (including geological and “modern”). Typically housing and extraction developers realise late in the process that they have to take archaeology into consideration and this can often result in only short time-scales being available for the pre-excavation work. AirPhoto and AutoCad Map are used for mapping from oblique and vertical sources and prove an efficient and rapid tool when mapping to dead-lines. While the most usable end-result is an accurate plot, in good time, to the developer, they also want multiple copies of the results in nicely presented packages (i.e. from digitised input via AERIAL 4). It is suggested that wherever possible feedback should be sought from the excavator about what was found in the excavation, in order enhance interpretation skills.
Using aerial photography in the management of the historic environment of Exmoor National Park.
Verlyn Heal, Exmoor National Park Authority.
Tel: 01398 323665 Fax: 01398 323150.

The area has received relatively little archaeological attention in the past. An archaeologist post was appointed in 1991, however, and an SMR was developed for the park, which is an upland environment consisting of heather and grass moorland and low wooded valleys. The Nation Park, a “consumer” in aerial photographic terms, have contracted false colour vertical coverage since 1977. These are taken at high summer for vegetation studies and as result are of little or no use for viewing archaeological earthwork features which are covered by the bracken at that time. One run, from 1996 is quite useful, however. MARS high-lighted the National Parks as an important source of preserved earthwork landscapes, and both oblique and vertical NMR sources are consulted to both put sites in their wider context and to monitor erosion and threats to sites. These include both human and natural sources, with increased visitor access and agricultural activities being the most destructive. Aerial photography also plays an important role in the presentation of sites to the public and landowners, the overview enabling an understanding of individual monuments that are difficult to appreciate on a ground visit.

“Technical and practical sessions”: Davy Strachan (ECC) chair.

Interpretation and mapping of vertical and oblique photographs using digital photogrammetry and GIS.
Dr. Michael Doneus, Institut fuer Ur- und Fruehgeschichte, Franz-Kleingasse 1, A-1190 Wien, Austria.
E-mail: michael.doneus@univie.ac.at (see also www.univie.ac.at/Luftbildarchiv/)

A demonstration of an advanced rectification system which is currently being used for aerial archaeology. From a vertical stereopair, a digital terrain model is measured, and then oblique and vertical aerial photographs are rectified and georeferenced using digital photogrammetry. Using the method of bundle-adjustment, even photographs with a bad distributed ground control can be involved in the process. This can be achieved using so called tie-points, which are object points, that can be measured in more than one photograph. The resulting digital photomosaic can then be enhanced using digital image processing techniques and interpreted on screen in a GIS environment. This was demonstrated at the Roman town of Teurnia, Austria, where the interpretation drawing was combined and counterchecked with plans from excavations. Air photo interpretation enabled preparation of an accurate and detailed map of an extensive area in a fraction of the time that it took to excavate other parts of the town.

Men in black come down from the sky: air photography from a Robinson R22 helicopter.
Chris Musson, Aber Photo Services.

A humorous outline of the advantages and disadvantages of summer and winter aerial reconnaissance in a light helicopter, as opposed to the traditional Cessna platform. The cost, in many instances, can be as economical as Cessna hire and in every other way it appears to offer better suitability (lack of circling is far more economical and hovering also saves on time-consuming turning). The conclusion is that they are an ideal platform for oblique aerial photography. One notable disadvantage being that the “bowl” windscreen appears to create far more reflection from people and objects inside the aircraft – leading to the suggestion that black attire can help reduce the problem (hence the title).
Irwin Scollar’s AirPhoto program.
Rog Palmer, Air Photo Services, Cambridge.
E-Mail: rog.palmer@dial.pipex.com

An introduction was given to this inexpensive Windows-based program which transforms scanned images to match maps via a choice of flat-plane of DTM algorithms. Details of the software, which can be downloaded for a free trial period, can be found at http://super3.arcl.ed.ac.ul/ baspmirror/ (and in AARGnews 16)

African Legacy: Rapid large-area survey in Africa.
Patrick Darling, African Legacy.

The paper began with a description of the huge scale (both in extent and physical size) of earthwork systems in pre-European Nigeria. A description of the current state of heritage records in West Africa (basically non-existent) and landscapes containing thousands of miles of large-earthworks which divide large tribal areas. Much of these are under heavy vegetation and only a very small percentage of them have been recorded in any way (most “Western” map-makers ignored monuments of African culture). After outlining the many problems facing a photo interpreter working in Africa, the speaker asked for guidance on suitable methods, including use of high-resolution satellite imagery, that may allow extensive and rapid transcription of features on a country-wide scale. While much vertical photography exists at Greenwich (in the form of unlocated verticals); prohibitive costs of access currently make study of these sources unfeasible. In addition, there is often little (or no) control and very poor quality mapping. It was suggested that satellite imagery could be used to locate these verticals. Available 20m resolution is not good enough to allow mapping from EarlyBird etc., however, it may be that when the NASA make available the 5m resolution imagery which their satellites currently collect, then there will suddenly be enough material available to allow mapping of entire landscapes for the first time. The presentation continued as a practical demonstration of methods so far used by the speaker.

“Recent developments in European aerial survey.” Anthony Crawshaw chair.

A motorway from the air: Archaeological air reconnaissance over the planned A2 motorway in Mid-Western Poland.
Andrzej Prinke and Wlodek Raczowski, Institute of Prehistory, Adam Mickiewicz University, Poznan.

Perhaps the largest development which Poland has ever seen. While aerial photography began to develop well from the 1930s in Poland (witness the astounding balloon aerials taken in the late-1930s of the huge water-logged site of Biskupin) the war, and subsequent political regime had completely halted the use of the technique. In recent years, however, Otto Brasch and Martin Gjoda have carried out a number of flights to assess the potential of the various landscape zones. The AARG-led Leszno training workshop has trained a small group of interpreters and flyers and this is leading to new relationships being formed between University archaeologists and Planners. Around 300 sites were affected by the road scheme. A Soviet MI-2 helicopter was used for reconnaissance, and the line of the development was flown twice west-to-east and twice east-west. GPS was used as a method of locating photography, but in general mapped features were common enough to allow easy identification of position. There remains greatly discussion between archaeologists, however, about the value of air photography, as many archaeologists think that the work must be very expensive and does not produce results. This problem evolves from the lack of systematic survey at the best times of the year.
Augszeme (Latvian) hillforts from air and land.
Juris Urtans, Inspection for Heritage Protection of Latvia.

The speaker illustrated some of the problems of aerial survey in an extensively wooded country (currently around 470 such sites are recorded). These generally appear as large, tree-covered, mounds constructed in strategic positions. Aerial photography had been banned until the collapse of the Soviet regime in the 1990s. A number of flights were carried out by a Swedish aerial archaeologist in 1995, and in May 1999, four flights were carried out, funded by the Latvian Government, using a Cessna 152, which photographed each hillfort. Other sites were also recorded, although Soviet drainage schemes, had destroyed many areas and also left a number of confusing landscape marks. GPS was used. Many hillforts are under heavy woodland, although these can often still be seen as a raised area of trees in a woodland area. The survey could not reach many of the sites on the Latvian/Belazus border as pilots refused to fly the area as a balloon had been shot down the previous year! The results represent the beginning of modern aerial work in Latvia and show that, despite those problems, there is good potential for this method of survey and recording.

Jerash and the Wadi Zarqa: Jordan the next step.
Bob Bewley, English Heritage Aerial Survey.
National Monuments Record Centre, Kemble Drive, Swindon SN2 2GZ
Tel: 01793 414700 E-Mail: bob.bewley@rchme.co.uk

Some results from the second season of reconnaissance primarily aimed at recording Roman landscapes and sites in Jordan, while recording some prehistoric sites en route. Eight hours of flying were carried out. Around 50 international projects (mainly excavation) are carried out each year in the country, contacts were made with some of these. JADIS (Jordanian Archaeological Data Information System) has the majority of the main sites, although the number, and quality, of new sites being discovered is still impressive. These included a detailed record of Jerash, which may assist the French ground survey of the Roman town, and many other new, or newly photographed, sites in the north-eastern part of the country. The urgency comes from agricultural improvement, involving large-scale drainage schemes, which could be destroying sites which are not yet recognised.

Aerial survey in England: some thoughts for the future.
Damian Grady, English Heritage Aerial Survey.
National Monuments Record Centre, Kemble Drive, Swindon SN2 2GZ
Tel: 01793 414703 E-Mail: damian.grady@rchme.co.uk

This paper outlined both the official (English Heritage) and personal views on how the practice of aerial survey in England may evolve in the near future. Themes discussed included the need to develop skills and continue to train the next generation of flyers and interpreters; and how to address weaknesses (both thematic and geographical) in the National Monuments Record (such as “the coast”; buildings; urban landscapes; in addition to areas which have received little survey work in the past). A piece based on the paper will appear in the forthcoming AARGnews.
“Heritage Management and ‘new’ heritage topics”. Cathy Stoertz (EH) chair

The ups and the Downs: the Avebury World Heritage Site management project.
Melanie Pomeroy, Avebury World Heritage Site Officer.
Kennet District Council, Browfort, Bath Road, Devizes, Wilts SN10 2AT
Tel: 01380 724911 Ext.830 E-Mail: melanie.pomeroy@kennet.gov.uk

Stonehenge and Avebury World Heritage Site (WHS) was designated in 1996. WHS is an internationally recognised status of international importance, which requires a) a management plan and b) legislation to preserve and protect the site. The management plan has a difficult task in that “travellers”, residents, archaeologists and “spiritual groups” all have conflicting interests about how the site should be presented and managed. This summer, for example, some of the standing stones on the sanctuary were painted red (rather oddly) as a protest against GM foods. Aerial photographs have been interpreted to produce a map of the Avebury WHS and its close environs, and are also used as a method of monitoring erosion and damage. They also continue to reveal new sites and enhance our interpretation of known features, as with the discovery in 1996 of a number of parchmark circles inside the main henge at Avebury. Recent excavations have shown the spread and complexity of neolithic sites within the WHS but many of these, as well as the greater proportion of the 22.5 sq km area, are currently in arable fields and therefore under threat. A management project, combining field work and air photo interpretation, will provide a baseline view of the present situation and so allow monitoring of future change.

Industrial landscapes in Cumbria.
Mark Bowden, Archaeological Survey, English Heritage.
NMRC, Great Western Village, Swindon SN2 2GZ.
Tel: 01793 414766, E-Mail: mark.bowden@rchme.co.uk

Industrial monuments and landscapes often involve a number of factors which make them complicated to map and interpret. They usually contain a combination of buildings, earthworks and buried remains, often linked by transport systems which cover extensive linear areas. Many have power systems, associated housing and complex social processes to be considered. In addition to this, they are also usually very dynamic in terms of their usage, often resulting in continuing change on the same site. For many industries in the UK there is no MPP Step 1 report and as a result no national context within which to define regional or local studies. All of these factors are additionally complicated when occurring in a mountainous landscape such as Cumbria. Both vertical and oblique sources are used to produce plots which can then be annotated in the field. Interaction between photographers, mappers and field staff is important, preferably on site, to discuss matters such as control. Examples were given of how mapping from aerial photographs could provide a valuable guide for the field surveyor, and also helped show industrial sites, often formerly thought of as unrelated and scattered machinery, in their full context.
Concrete Evidence from Aerial Photographs: the analysis, interpretation and preservation of 20th Century military remains in England.
Mike Anderton, English Heritage Aerial Survey.
National Monuments Record Centre, Kemble Drive, Swindon SN2 2GZ
Tel: 01793 414855 E-Mail: mike.anderton@rchme.co.uk

The project providing a rapid assessment of certain type-sites of military remains in England through the use of both vertical and oblique photographs from the National Monuments Record Centre archive. Funded by the Monuments Protection Programme this survey is looking at Heavy and Light Anti-aircraft sites, Anti-V-weapon sites, Bombing Decoys, Coastal Batteries and Radar installations (pillboxes, air-raid shelters, etc. are covered by the Heritage Lottery Fund (HLF) funded Defence of Britain Database and Archive based at Duxford Airfield). Establishing the location of the sites from Dr Colin Dobinson’s CBA published volumes (originally gained from documentary sources in the Public Record Office) the current survival-state of the site-types was noted. Based on a classification system that ranged from 1-5 (completely survives to totally destroyed) figures for the survival-rates of certain site-types have now been produced (as set out below). Other sites are still to be examined, but the overall impression is that within a short time-span (i.e. 50-55 years) a great deal of this irreplaceable archaeological material has already been lost to any further study.

<table>
<thead>
<tr>
<th>Site Type</th>
<th>No of sites</th>
<th>Worthy of further study by % (i.e. class 1-2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heavy Anti-aircraft batteries</td>
<td>965</td>
<td>5.6</td>
</tr>
<tr>
<td>Light Anti-aircraft batteries</td>
<td>897 (excludes airfield defences)</td>
<td>0.3</td>
</tr>
<tr>
<td>Diver sites</td>
<td>1,257</td>
<td>0.71</td>
</tr>
<tr>
<td>Decoy sites (uncompleted)</td>
<td>?</td>
<td>Estimated around 5</td>
</tr>
</tbody>
</table>

The selected types of site were described and used to show how fifty years of post-war landuse has left very few examples in good preservation.

Behind the Frontage – Aerial Archaeology and Urban Conservation.
Kate Clark, English Heritage.

This paper followed two themes to demonstrate how oblique aerial photographs, often specifically taken, can enhance the recording of standing buildings. In one case they can show the densely concentrated workshop areas that still exist in some towns, in the other they help provide context to single buildings or small parcels of earlier development. The speaker warned of the necessity to preserve ‘context’ as well as ‘site’.

Power of image: some ideas on post-processual aerial archaeology.
Włodek Raczkowski, Institute of Prehistory, Adam Mickiewicz University, Poznan.

In AARG’s first theoretical paper we were given a very different view on aspects of past practice and given explanations as to how aerial archaeology has been able to maintain a balance with academic archaeology by creating the need for specialists. The paper also included comment on how suitably presented publications can influence the acceptance of aerial archaeology by the public. The paper can also be found in AARGnews 19, 1999.
Informal evening papers.

Agnieszka Dolatowska, Jolanta Goliasz and Lidka Zuk: Aerial Archaeology Workshop Leszno (Poland) 1999 – the view from behind. Cataloguing photographs taken by students during the Leszno Workshop has led to a number of suggestions that may help to improve such future events. The need for good and accurate flying notes was stressed and it was seen to be important for students to work on their own photographs so that any problems may be dealt with in later flights.

Ioana Oltean: Some results from the 1999 aerial survey of the Mures Valley, Romania. Wet weather earlier in the year had evened out crop growth, and aerial survey concentrated on recording earthwork features, including discovery of an unexpected hill fort.

Jacek Nowakowski: Winter and summer reconnaissance in the Poznan area of Poland. Comparison of photographs of the same sites under different conditions showed the advantages of slightly flooded conditions for recording slight topographical changes that were crucial to the location of stronghold sites.

Chris Musson: Recent reconnaissance in Herefordshire, England. New work in this county was discussed by way of the maps used for flying and the speaker’s policy to take a set of oblique photographs that will show the context of a site as well as its details.

Field Trip to Hambledon Hill, using a variety of vertical photographs, and Down farm and the Dorset cursus.

A day was spent visiting Hambledon Hill, Dorset which has earthwork examples of neolithic causewayed enclosures, long barrows and, arguably, the most beautiful iron age hill fort in southern Britain. The trip later went to Down Farm – situated mid-way along the Dorset cursus – where Martin Green showed us his museum and some of his recent excavations.

~~~~~~~~~~~~~~~~~~~~~~

AARG 2000.

Aberdeen University: 5-7th September.

Offers of presentations, demonstrations or exhibitions and posters, contact Davy Strachan (Chairman) on 01245 437681 (e-mail: david.strachan@essexcc.gov.uk).

For further details about the conference, please contact Fiona Small (Meetings Secretary) on 01793 414701 or fiona.small@rchme.co.uk.
Aerial reconnaissance in England: some thoughts for the future

Damian M. Grady

INTRODUCTION

The following paper is based on a lecture given at the AARG conference held in Bournemouth in September 1999. This occasion was as an opportunity to introduce myself to many of the AARG members as the person who took over Roger Featherstone’s responsibility for English Heritage’s southern reconnaissance programme and local flyer liaison. Before June 1998 I had spent eight years as an air photo interpreter, working mainly on National Mapping Projects (NMP) in the York office. The impetus for the lecture came from Cathy Stoertz who thought it would be a good idea for me to offer some opinions on the challenges I have faced since taking over from Roger. Having heard the talk, Rog Palmer thought it would be a good idea to publish it in AARGnews along with responses to some of the issues raised. I have found it difficult to re-create, in a published form, the relatively informal atmosphere of an AARG conference, but I have attempted to do so mainly to encourage respondents to share their experience with someone who has just started taking aerial photographs. There are questions embedded in the paper that will hopefully stimulate debate.

The paper consists of two parts. The first part will be with my English Heritage hat on, outlining how Aerial Survey has been affected by merger so far. The second part consists of comments and observations on some of the problems that I have faced in the last fifteen months in my new job. The views expressed in this second part are my own and are not necessarily the views of English Heritage.

PART 1

Local Flyers

This is not the place to go into the structure of the new merged organisation, but I will describe how merger has impacted on aerial reconnaissance so far. As most AARG members are aware, the last few years of the English Royal Commission saw cuts in budgets such that we were unable to adequately fund the local flyers. Over the last few months (April-September 1999) we have been in negotiations with the Archaeology Commissions section of EH to secure funding for local flyers. They have agreed to this in principle and we have managed to release some money for the summer of 1999. In the first year of merger while we have been pleasantly surprised at being allowed access to the Archaeology Commissions’ budget, there has been a steep learning curve for former RCHME staff in getting used to EH administration, which has led to a few delays. These delays have resulted in us not getting as much money to local flyers as we would have liked. So over the autumn and winter we hope to have ironed out the administration problems and before April 2000 we aim to issue guidelines to the local flyers on how to apply for funding.

Reconnaissance Strategy

The role of local flyers plays an important part of the English Heritage Aerial Reconnaissance Strategy. Even before merger Bob Bewley had begun to pull together a Strategy document in order to provide a corporate statement on the aims and objectives of the aerial reconnaissance
programme. The document is still in a draft form, but we hope it can be made public soon. It is quite a dry, high level document, but it will allow you and others to see what the reconnaissance programme hopes to achieve.

I will outline some of the important points in this document. To begin with the overall strategic aim is “to identify and record, using aerial photography, the remains, existence and current condition of archaeological and architectural sites and landscapes throughout England, and thus increase our understanding of the historic environment”.

Within this aim there are a number of objectives, the important ones I think are the following:

a) To form part of the EH national archaeological survey to discover and record new sites.
b) To co-ordinate a national programme of specialist aerial reconnaissance (including the local flyers).
c) To photograph those architectural targets and urban landscapes which have a high priority for thematic projects or because they are under threat from demolition.
d) To monitor protected sites.
e) To identify weaknesses in the current AP cover in conjunction with the NMR and other EH staff and initiate projects to overcome them.
f) To deposit the photographs in the NMR, with an accompanying record (where appropriate) and to provide access for the dissemination of the information contained on the photographs.
g) To promote the highest standards on recording from the air and to monitor and evaluate technological innovations.

Some of the priorities we have already identified, at a very broad level are medieval, industrial and urban landscapes and the remains of military activity, especially those of the twentieth century. Priority geographical areas include the coast, the Pennines, the Northwest, Staffordshire, Suffolk and parts of Northumberland.

The next stage is to put this strategy into action and begin to define specific targets and areas in parts of the country not covered by a local flyer. This is one of my current tasks with a view to producing a lower level tactical document. Regardless of merger, this is something I would have needed to do anyway to help me in my new job. I still have much to do before this exercise is complete. I need to take into account English Heritage’s Implementation Plan for Exploring Our Past, the main points of developing Research Frameworks, the weaknesses in the NMR collection, and the needs of SMRs as well as internal EH projects. This will involve consulting many people internally and externally which may mean it will never be completed as such, but it will be a process that is evolving all the time.

I think an important point to stress is the potential volume and variety of work there is to do from the air, especially with the increasing demands for aerial photographs from our architectural colleagues. I mention this because I get a feeling that there are some archaeologists who believe that after seventy years of aerial reconnaissance there is little left to photograph from the air. We have reached a mature stage in the history of aerial photography and I would accept that in certain cropmark areas we have to do less primary reconnaissance and should concentrate more on targeted problem-orientated flying. But this
opinion assumes that aerial archaeologists are only concerned with finding cropmarks. The variety of uses aerial photographs are put to, as illustrated by the variety of lectures at the 1999 conference, means there is much to do, all year round, not just in the short cropmark season.

Training
Assuming that funds for local flyers remain available and at an appropriate level there may be a need to train more people in the art of aerial photography. We in English Heritage need to find some money from somewhere to implement a training course for aspiring aerial archaeologists.

PART 2
Now I will move on to the second part of my paper, the part in which the views expressed are my own and are not necessarily those of English Heritage. These views are those of someone whose experience of aerial photography is based on eight years as an AP interpreter and fifteen months as a flyer. I will leave it up to you to draw your own conclusions as to whether the issues I raise are relevant to aerial photography in general or just to the world I have inhabited for the last nine years.

Flight Maps
When I first started on my own I was allowed the freedom to fly where I wanted to in order to feel comfortable in the air, learn how to use the camera equipment and get used to the variety of archaeological landscapes in the south of England. Then, having almost mastered taking stereo pairs with lots of control points from a near vertical position without throwing up, I came across my first major frustration. The lack of reliable up to date flight maps. Except for those areas that had been covered by NMP, my flight maps had not been systematically updated since the early 1980's, due to lack of resources. So on several occasions I thought I had found amazing new sites only to be disappointed when I looked in the collection. This would not have been a problem for Roger who had an amazing memory for sites. However, even if I had Roger’s experience, I could not rely on my memory to overcome the lack of mapped information. Maybe it is because I come from a mapping background, but I cannot see how I could go flying without up to date mapped information. This highlights for me the need for NMP to be funded to completion soon so that, along with its other benefits, it can aid future reconnaissance.

Once an area has been mapped by NMP, there are some archaeologists who assume nothing else will be found from the air, but we know that this is not true. For recently mapped areas I want to be able to fly over them systematically, photographing new sites that can then be mapped and information transferred to flight maps. If you add to this systematic reconnaissance the ability to target specific areas and sites suggested by field workers, AP interpreters or any other archaeologists involved in research and you have the ideal mechanism for problem-orientated reconnaissance; an efficient continuous process of discovery and research.
Known Sites

While the recording of new sites will be helped by mapped information, I have so far been unable to take a consistent approach to the re-photographing of known sites. I have found this to be a particular problem on the chalk areas of Wiltshire and Hampshire. Last year I felt overwhelmed by the sheer volume of potential archaeology to photograph and the knowledge that aerial archaeology was pioneered in these counties over 70 years ago. When considering cropmark sites already recorded I was aware of conflicting pressures. The aerial photography textbooks say it is necessary to photograph a site in as many different conditions as possible. On the other hand senior managers say, “save money” and ask, “how many new sites have you found?” When flying my response has not always been consistent or scientific. In busy areas I have ignored known sites and concentrated on the new ones. On other days I have ignored known barrows and field systems and re-photographed enclosures and settlements. Sometimes I have photographed everything in certain areas knowing that the sites have not been photographed for over a decade or more. I would be interested to know what approaches other people take to photographing known sites. Do you think we should always photograph them or only on a regular basis, say once a decade? Do we only photograph known sites when it is part of a research requirement? Given the resources we have, should we change AP lore to say that it is better to look for new sites rather than photographing known sites over and over again? We still need to fly over these sites and monitor them, but do we need to photograph them?

Clay Soils

Most archaeologists know that the national distribution of aerial photographs reflects two things, the distribution of soils conducive to the formation of cropmarks and the habit of aerial archaeologists in looking for cropmarks in favourable areas. This distribution has been a major influence on archaeological theories. As Chris Taylor pointed out in the first CBA report on aerial archaeology (Taylor 1975, 136-7), before the war, the early pioneers of aerial survey built upon and fed the deterministic views that prehistoric man only settled on light, easily worked soils. River valleys were only considered to be trade routes. Eventually aerial photography on the gravels showed how extensively the river valleys were settled, but the theory that prehistoric settlement was determined by the presence of light soils seemed to be confirmed. While we now know more about settlement beyond the well-drained soils loved by aerial archaeologists, the distribution of cropmarks still has an important influence on archaeological practice.

Along with many other criticisms of aerial archaeology, Chris Taylor argued that this bias in the archaeological record created, and probably still perpetuated, by aerial archaeologists, was not helpful to research and not enough was done to redress the balance. Since Taylor made this criticism over twenty years ago we have found thousands of new sites and filled in large blank areas, especially in the north, but the dominance of the well drained soils remains. I know a number of sites have been found on clay soils since then, but I assume that most flyers do not systematically survey clay areas on a regular basis. It is something I would like to do more of, but in a poor cropmark year senior managers may have to review performance indicators that concentrate on the number of new sites found. However, in 1983 Derrick Riley commented on how in the Thames Valley the rate of discovery was most marked soon after the war when land use changed from pasture to arable. With the current crisis in farming and the subsequent switch from pasture to arable in some areas, is there a possibility that we
may now have an opportunity to discover more new sites on clay than we have been able too for a long time? Again I would be interested to hear other people’s views and experience of flying over clay and observations on changes in modern farming practice that may affect cropmark development.

**Medieval Archaeology**

The last session of the 1999 AARG conference was on new heritage topics, which highlights a recent trend of APs being used for more than cropmark research. This is an encouraging trend and we are all very keen to become interested in subjects like military and coastal archaeology, but I would make a plea for us not to forget the medieval period. I sometimes think aerial archaeologists view the medieval period as being somewhat problematic; mainly because ridge and furrow masks prehistoric and Roman sites and in many areas it is a complete landscape that we cannot understand without documentary evidence. The thought of tackling the complexities of the medieval landscape may sometimes put off aerial archaeologists from trying to understand it and we stick to only photographing and mapping the earthworks. Medieval settlement studies have moved away from just studying deserted and shrunken villages towards looking at nucleated and dispersed settlement in all their forms (not just earthworks). Landscape context (woods, forests, hedges, ridge and furrow, etc) is also important to the understanding of the origins of medieval settlement and while I do not advocate mapping all these extra features, we do need to be more aware of their presence to help with interpretation. When flying we should not just record settlement earthworks, but also photograph their context, be it associated buildings, ridge and furrow, assarting, etc. Even where there are no settlement earthworks, the ability to read the existing landscape may lead us to areas where we could anticipate recording settlement remains, given the right conditions. Archaeologists interested in settlement studies will require us to photograph existing hamlets and villages as well as earthworks. There is no way we can photograph all existing settlement, but if we engage much more with medieval archaeologists and work within defined research priorities, I am sure aerial archaeologists can make a valuable contribution to the understanding of settlement origins and development.

**Buildings**

Having come from a mapping background I understood the requirements needed to photograph cropmarks and earthworks, but as an archaeologist I did not fully understand the requirements of photographing buildings. Roger had taught me how to photograph large buildings, such as cathedrals and country houses, for illustrative purposes. But, I soon learned that architects are not just interested in illustrative material. For certain building types and urban landscapes they needed the aerial photographs to help with interpretation.

I have worked on five major architectural projects over the last year. Prisons, Shops, Southwest Textile Mills, Cold War and the Birmingham Jewellery Quarter. The aerial photographic requirements of the first two projects were mainly illustrative. But aerial photographs for the other projects were used to help the architectural surveyors with their interpretations. This is probably best summed up by the Birmingham Jewellery Quarter Project.

The jewellery quarter is situated to the west of City centre and is one of the finest surviving examples of a concentration of buildings related to a single dominant industry. It is
increasingly coming under threat as companies in the city centre start looking for opportunities to build new offices and car parks. The JQ developed in the early nineteenth century and what we see now is mainly the mid and late nineteenth century expansion of the specialised processes of the jewellery trade over farmland and pasture. The whole area is characterised by narrow plots of land with ordinary houses on the street front. Entrepreneurs bought these houses, used them for offices and warehousing and built workshops in the gardens. The workshops required light and ventilation so they built long narrow buildings around a courtyard with the glazing on the courtyard side.

At the beginning of the project the ground surveyors were asked to record 1000 buildings over a 10-month period. This was quite a challenge given the nature of the landscape. Maps of the area were of limited value because not all the rear buildings were marked and they gave no indication of how many storeys the buildings had. At the beginning of the project I was asked to provide blanket aerial photographic cover, which proved to be of great benefit in helping the architects find their way around on the ground. As the fieldwork was drawing to a close, I was then asked to carry out a second flight to take more detailed shots of buildings they had been unable to get access to. As well as sites where they were refused access there were some that were just physically impossible to get to, because of the density of development, the properties backed on to railway cuttings or they were just too dangerous to survey. Without the air photo element many buildings would have been difficult to interpret just from the street frontages.

CONCLUSION

I hope those reading this paper can offer me some advice on some of the issues that I have raised. Some of the issues raised are not new and many readers may know what all the answers are, or may think the issues raised are irrelevant. But as I still have a lot to learn, I reserve the right to change my mind about anything I have written about in this paper.

RESPONSES

Not many respondents commented on every aspect of the original paper. Many concentrated on issues that interested them, and some only responded when they objected to something I had written. However, overall everyone who responded was very constructive, I just hope that by summarising so many opinions I can do justice to everyone’s point of view.

PART 1

Local Flyers

Respondents’ summary

Since presenting my paper at AARG in September it would appear that I used the term regional flyer incorrectly. I should have used the term ‘local flyer’. This has been reinforced by the terminology used by two respondents. It would appear that I should use the term ‘local flyer’ for those who fly in a single county and ‘regional flyer’ for those who fly in more than one county covering a much larger geographically diverse area. Using the term ‘regional flyer’ might cause confusion within EH’s new regional structure.
The two respondents (both from outside EH) who commented on this section were encouraged that funds were to be made available for locally-based flyers. Both emphasised the need to encourage locally-based flyers, especially where there was a real commitment to aerial work.

Damian’s response

By making more money available for local flying I hope that we can go some way towards re-building bridges between the former RCHME and local flyers. By the time this paper goes to print EH will have issued guidelines on how local flyers can apply for reconnaissance funds. The main message to communicate is that EH considers the role and future of a locally-based network of fliers to be important.

Although EH is a national body, the way in which it organises its reconnaissance with bases at Oxford and York is in some ways a regional structure, with both national and regional priorities.

A criticism implicit in one response to EH reconnaissance is that it appears to fly with little reference to local priorities. In some ways this is a valid criticism, certainly in the south. I know I must do much more and talk to local archaeologists about their needs and must use my influence within EH to make records from APs more accessible.

In the long term I hope we can get to the stage where EH resources, both our own flying time and grants, can be co-ordinated with that of local flyers to provide national coverage. This may be wishful thinking especially in view of the need for more resources for mapping and having to compete with the rest of the archaeological community for funds from the Archaeology Commissions’ budget. However, this long-term aim is one I will be trying to achieve.

**Reconnaissance Strategy**

Respondents’ Summary

A general lack of response on this section would seem to suggest that people find these types of documents rather dull. Indeed on balance those who did respond found it hard to see the need for such documents. However, there was one that tried to give a balanced response, pointing out the need to state the obvious uses of aerial photographs especially to those in high positions within a government department that may know little about the uses of aerial photographs for archaeological purposes.

The strategy document is something I have read many times, but from one response there is a problem with what has been presented. The respondent was not clear whether the EH flying programme was primarily for monitoring known sites for heritage protection purposes or to help with interpreting and understanding past societies. This was then followed by another respondent querying the strategic aim ‘To identify and record, using aerial photography, the remains existence and current condition of archaeological and architectural sites and landscapes throughout England, and thus increase our understanding of the historic environment’. The criticism being that just taking aerial photographs does not increase understanding.
Damian’s response

Whether we like it or not these documents do become important not only when arguing for resources, but for being open about what we hope to achieve with the resources we are given. However, from the criticism of the main strategic aim, we have not put across what we do as clearly as possible. I agree that the creation of an aerial photograph does not provide understanding. There has to be a further process of interpretation that has to be presented in graphical or text form and only then can we begin to work towards understanding the past. Often that understanding cannot be achieved without further landscape analysis or evidence from other archaeological techniques, but at least we should present the interpretations in a way that can be analysed when new information comes to light or when new questions are asked.

As for the original query about whether we photograph for heritage protection purposes or to help with understanding the past. We do both. Protection can only follow on from an understanding of a site’s theoretical importance and only after analysis of similar sites, its landscape setting and condition. EH may prefer to see more reconnaissance resources go towards monitoring protected sites, but the former RCHME ethos of working towards understanding the archaeology will continue. We see merger as a potential benefit for Aerial Survey.

Although I have alluded to the need for these strategy documents to state the obvious to senior civil servants, recent conversations inside and outside EH about the uses of aerial photographs suggest the same needs to done for other archaeologists. There are some that cannot see the difference between taking a photograph and interpreting it and there are others who think we should avoid interpreting sites that do not fit the criteria of a monument class description. All this on top of a comment in my original paper about some archaeologists believing that in certain areas there is nothing left to photograph. Depressingly, we still need to educate many archaeologists about what can be done with aerial photographs.

Before I go on to the next section I need to point out that in my last paragraph in the strategy section I used two phrases, ‘primary reconnaissance’ and ‘problem-orientated flying’. One respondent was not clear about what I meant by these terms and suggested an additional term, which on reflection I agree with. So how about these definitions: -

**Primary reconnaissance** - flying over areas where little has flying has been done in the past and where there is potential to discover new information.

**Selective reconnaissance** - flying over areas which have revealed many archaeological landscapes in the past, but now require efforts to be directed towards filling in the gaps and mainly recording new sites and selectively photographing known ones.

**Problem-orientated reconnaissance** - directing reconnaissance towards testing theories about the archaeological landscape, such as looking for ‘missing’ Roman forts along a Roman road.
Training

Respondents’ summary

Many respondents agreed with the need for training, but expressed three main concerns about who would be selected to go on a course. Firstly, any candidates for training would need to be made fully aware of the conditions in which they would be working and the stamina needed to be effective. Secondly, a trainee would need to demonstrate some commitment to aerial photography before a course. Finally, there would be a need for EH support after training and if such support was forthcoming, there would need to be an agreed commitment from the trainee that they would be prepared to get in the air whenever necessary.

Damian’s response

These concerns are valid and ones I share, especially the first one. Your first flight in a light aircraft is always memorable, mainly because of the fear of throwing up, the noise, the claustrophobic feelings and all this before you take any photographs. While we do not want to put anyone off, if there is to be investment in a course and a trainee never gets over the initial shock of being in a plane, then the training is wasted. I know at least one of my colleagues has not got over the shock of their first flight and goes white as a sheet when an offer to go flying is presented.

Striking the right balance between encouraging people to experience flying and providing full training support for those who have already shown a commitment will not be easy or cheap. We have come up with two ideas that might be feasible if we can get enough financial support. The first type of course would be similar to the Hungary and Poland courses. It would be four or five days in length and give trainees the opportunity to take aerial photographs using EH leased aircraft. They would also be expected to catalogue their own photographs and possibly map from them, as well as being given plenty of instruction on the ground about what they would expect to see from the air. This type of course would not necessarily be restricted to archaeologists in England. I know that there would be support for such an initiative from another part of the British Isles. The second form of training could be work shadowing one of the EH reconnaissance teams, mainly for those who have already shown some commitment to aerial work. Both types of training are fraught with potential problems, not least the weather, and I have to stress that these are still ideas at this stage. The next step is to work up these ideas in to firm proposals that can be taken forward by our training officer. If any AARG members have any other ideas about training let me know.

PART 2

Flight Maps

Respondents’ summary

Most flyers who responded used marked up flight maps in some form or other, ranging from dots on maps of known sites and potential targets, to the mapped information that we use in EH. Many implied that the importance of these maps diminishes as your experience increases. Some felt that constantly updating 1:50,000 flight maps with NMP transcriptions would be too time consuming and you would still need to fly in those areas NMP had not completed.
Damian’s response
Despite the reservations some people have about using transcription data at 1:50000 I still like to use them. Yes they are difficult to up-date, but I hope this will change once our entire mapping becomes digital. The number of dots is also increasing on my flights for those areas not yet covered by NMP as well as all the specific targets I am asked to photograph. No matter how good my memory gets or how knowledgeable I become about the areas I fly, I would not like to be without the NMP data for the Wessex chalk or the Thames gravels.

Known sites
Respondents’ summary
There seems to be no clear consensus about when to photograph known sites other than you cannot make definitive rules about this, except when monitoring scheduled monuments. Indeed in some areas with difficult soil conditions and weather, this is a minor issue. Many said that you should re-photograph a site if it is looking stunning and some suggested you should always photograph clear soilmarks as this indicates another layer of archaeology has been destroyed by deep ploughing. Finally, the implication of all the comments was that no amount of information on flight maps could make up for knowledge and experience of a given area.

Damian’s response
I was relieved to see that there were as many different opinions and approaches to this issue as there were respondents. On balance the most pragmatic approach seems to be, ‘if it looks good photograph it’ and for scheduled monuments, ‘photograph them on a regular basis regardless of how they look’. An implicit criticism of EH reconnaissance in this section and that on flight maps is that because we work for a national organisation we cannot know a local area well. For me this is probably true at the moment, as I had only lived in the south for 18 months before I got this job, but you have to start somewhere! I would not say it is true of my colleagues (Pete Horne and Dave Macleod) working in the north.

Clay Soils
Respondents’ summary
Of all the comments I made in my original paper, this section surprisingly produced some of the strongest opinions. On the one hand there are those who insist that unresponsive soils are a priority in arable areas and on the other there are those whose insist that even in drought years these soils are unproductive. One respondent was concerned that clay areas were being considered more important than the usual responsive ones. However, there may have been some agreement that clay soils should be targeted during exceptional drought years and that resources needed to be available for targeting the very short period in which cropmarks on clay reveal themselves.

Damian’s response
I would not say any one type of soil is more important than any other, but I would agree that during exceptional years we should target the clay areas. Even in an average year when
flying from one productive area to another we should transit via clay areas to keep an eye on how the crops are developing.

**Medieval Archaeology**

**Respondents’ summary**

Again the responses to this section varied. On the one side there were those who said ‘agree entirely’, one person in particular got very excited about recording medieval landscapes and has been contacting all the medieval archaeologists he knows and asking them how we can be of use to them. This person also agreed with my point that many aerial archaeologists prefer to ignore medieval archaeology in favour of prehistoric cropmark sites. On the other side there were those who suggested that vertical photography was the most efficient way of understanding the medieval landscape and that the oblique photograph should be restricted to the recording of slight earthworks and for illustration. However, even those who preferred the use of verticals seemed to support the idea of working more with medieval archaeologists.

**Damian’s response**

When Rog first suggested this exercise he told me that he hoped the feedback would be “useful rather than personal preferences and long-term whinges”. On the whole the feedback has been very useful, but I have to be honest and admit that the reason for bringing up the subject of medieval archaeology was due to my own preference and interests. Those of us who interpret and take aerial photographs have to know a lot about most periods and in recent years our knowledge base has been stretched to include ‘new’ subjects such as military and coastal archaeology. Sometimes the rush to learn new subjects means we do not keep up with developments in traditional period studies. I feel that this may be the case with medieval archaeology. For the most part I would agree that the interpretation of verticals would in many respects be the most efficient way of interpreting medieval landscapes, as demonstrated by the Northamptonshire Open Fields Project. However, I still think there is a requirement for those of us who fly to engage with the medieval specialists and carry out problem-orientated reconnaissance to test theories they have put forward. This is on top of the photography for monitoring and illustration.

**Buildings**

**Respondents’ summary**

The respondents who had photographed buildings would appear to want to do more, but not at the expense of traditional cropmark work. Again one person suggested that verticals would be better for this type of work than obliques. The views of our architectural colleagues reiterated what Kate Clark talked about at the Bournemouth conference and this may be worth repeating here.

Aerial photographs for architecture are mainly useful for large complexes or buildings. They show relationships between buildings within a complex - how buildings lie in relation to each other; which are large, which small; which are multi-storeyed, which single-storeyed. They also show the relationship of complexes to other features of the landscape - housing around a factory, stables in a country house, waterpower features in a mill, a house in a park etc.

Relationships can assist interpretation in the consideration of things such as:
2. Social/functional separation or association - service areas in a country house, proximity of church to mansion etc.
3. Changes in scale - early small to late large.

This is in addition to their use as illustrations in themselves and as a basis for the creation of isometric drawings.

Damian’s response

I know our architectural colleagues do use verticals for large sites, but they also have a requirement for obliques to see the side elevations of buildings. The last flight I carried out over Birmingham was mainly to take photographs from specific angles in order to see parts of buildings that were not visible from any other viewpoint. An important point to make in the obliques versus vertical issue is that for people who do not use aerial photographs all the time, the familiar view of the oblique is preferable. I have discovered that this familiar view is extremely useful for our new colleagues in the Gardens and Landscape section to help them with their interpretations for the Parks and Gardens register.

An important point to make about buildings photography is that it is mainly project led. Only occasionally do I take photographs of other buildings when passing and only if I have the time. Working with the architectural teams within EH has been extremely useful for me personally in making me look beyond just cropmarks and earthworks and seeing the landscape in a number of different ways. One of the respondents summed it up better by saying, “…the subject of the photographs is governed more by the imagination of the archaeologists (amongst others) rather than the limitations of the method. For example, the Birmingham Jewellery Quarter Project shows very clearly how vital it is to discuss the aspects of how to utilize aerial photography with those who are using the photographs.”

FINAL THOUGHTS

Finally I would like to thank everyone who took part in this exercise. I have learnt a lot from everyone’s replies, but I suspect I may not have done justice to what they said. A number of people seemed to have enjoyed the process of thinking about some of the basic points I have made. One person said it is “useful to have someone saying a lot of obvious things that are perhaps not so obvious to those uninvolved in survey”. Reflecting on the way we approach photographing certain types of site is sometimes a healthy exercise especially when learning how to do the job, but I hope this does not lead to a long period of navel gazing. Many archaeologists outside the aerial photography world think we are very introverted, spending too much time looking in on the methods we employ. I hope I have not perpetuated some of the problems that Taylor criticised twenty-five years ago.

BIBLIOGRAPHY


D. Strachan.

Introduction
The river Stour forms the boundary between counties of Essex and Suffolk in southeast England (Fig. 1). It flows along a band of alluvium, terraced valley gravels and glacial sands and gravels, in an area that is predominately Boulder Clay with pockets of underlying London Clay. The dense concentration of cropmark sites along the river valley was regularly flown from the 1950's on by the Cambridge University Committee for Aerial Photography (CUCAP); the Royal Commission on the Historical Monuments of England (RCHME); and the Archaeology Section of Essex County Council. The latter included survey carried out in the exceptional conditions in 1995-6, which not only discovered new sites, but also afforded important additional detail at a number of important sites (Strachan 1996 and 1997).
The area was re-mapped between 1997-8 (Strachan and Ingle 1998 and forthcoming) by the Essex Mapping Project (Ingle and Strachan 1994) as part of the National Mapping Programme (Bewley 1995 and 1998), revising the existing 1:10,560 cropmark plots maintained by the Essex and Suffolk Sites and Monuments Records (SMRs). This process illustrated the extent and diversity of cropmark sites along the flood-plain, and in particular, the prehistoric “Monument Complexes” consisting of ring-ditch cemeteries (including large dual concentric examples); elongated enclosures (interpreted as long mortuary enclosures and long barrows); and the two cursus monuments at Wormingford and Stratford St. Mary.
This current project arises from the preparation of a regional research framework for the eastern counties (Glazebrook 1997) and has been funded by English Heritage (EH) as part of the implementation of the Monuments at Risk Survey. The first stage builds on the work described above and involves the large-scale mapping of the cropmark landscape, and the use of a digital terrain model (DTM) within a GIS environment, as the basis for study and interpretation. This summary describes the methodology employed by the project, and it is hoped that results will appear in a forthcoming AARGnews.

Fig. 1: The location of the river Stour running between Essex and Suffolk, and in relation to London and the East Anglian counties. Parts of the study area lie within the Suffolk Rivers Environmentally Sensitive Area (ESA) and the Dedham Vale Area of Outstanding Natural Beauty (AONB). The area also includes two Sites of Special Scientific Interest (SSSI). Management of the cropmark landscape is one of the long-term aims of the project.
Fig. 2: An oblique image of a nucleated barrow cemetery appearing as a cropmark complex at Cavendish, Suffolk. The site includes a long mortuary enclosure and several ring-ditches, including two dual concentric examples, and is situated on a meander of the river. The photograph was taken in the June 1996 (photo: D.Strachan. Copyright Essex County Council).

Methodology

Air Photographic Sources.
Air photographic collections held by the Essex Heritage Conservation Record (EHCR) and the SMR at Suffolk County Council were the primary sources used for image rectification. These collections contain a variety of sources including selected images by CUCAP, local flyers, RCHME survey and Essex County Council (Fig. 2). In addition, the complete CUCAP specialist oblique collection was also consulted along with two black and white Aerofilms vertical runs, at a scale of 1:12,000 (dating from June 1960 and September 1990) which are held by the Essex County Council Information Resource Centre.

Image rectification, interpretation and mapping.
Selected images were scanned at a resolution of 300 dpi and imported into Aerial 5.5 software (Haigh 1996) for rectification based on OS land-line data accessed via the Essex County Council Arcview GIS. The residual error for rectification was kept below 5m, allowing future work, such as geophysics or excavation to be added to the GIS and confidently correlated with identified cropmark features. When photography for a site had insufficient control, the existing NMP plot (accurate to less than 10m) was imported into GIS and used. The resulting rectified images were then geo-referenced and imported into the GIS, to be viewed with OS land-line data and allowing mapping of identified features (Fig. 3, see note below).

Note: Arcview images are produced in colour to allow several data sets to be viewed simultaneously. Reproduction in black and white has resulted in quality loss.
The cropmark landscape consists of three main elements: circular, sub-circular and elongated enclosures (both rectilinear and curvilinear); the rectilinear landscape; and areas of local drift geology and palaeo-channels. These features were mapped on screen at a scale of 1:500, producing three polygonal vector layers (“Monument Complexes”, the “Rectilinear Landscape” and ”Geology”) which can be viewed independently or in combination. In addition to these, a number of other data sets, from a variety of sources, have been added to the GIS. These include 1:25,000 drift geology data (partly made available by Wessex Archaeology) and find-spot information from the SMRs (divided by period: Mesolithic, Neolithic, Bronze Age, and Iron Age). A total of 334 individual sites were recorded in the “Monuments Complex” class.

**Viewing sites in the landscape and view-shed analysis.**

The resulting plots and associated data sets can be viewed at a variety of scales (ranging from individual sites at e.g. 1:1,250 to distributions at around 1:200,000, Fig. 4.). A site, or group of sites, can therefore be viewed against geology and find-spots, and in relation to other sites and topography (in the form of the 5m contours). In addition, however, the 5m contour data can be used to create a Triangulated Irregular Network (TIN), or surfaced elevation model, on which the data can be draped. The 3D Analyst and Spatial Analyst extensions of Arcview allow the inter-visibility of monuments to be studied by selecting a position on, or above the DTM, and carrying out “line of sight” (LOS) or view-shed analysis. The former determines what is visible on a surface, looking in a certain direction from a single point, while the latter shows areas on a surface visible from one or more observation points. View-shed analysis is generally more useful as an aid to studying an
Fig. 4: The Cavendish complex viewed with neighbouring sites, including a complex at A, along with the 5m contours, the river, and the rectilinear landscape.

Fig. 5: As per Fig. 4 but including view-shed analysis from a position 3m above a central ring-ditch in the Cavendish complex. The black areas indicate where visibility from that point is obscured by terrain, including the complex at A. Other sites are shown to be inter-visible.
Fig. 6: The cropmark plots and river viewed in three dimensions. The viewer can select the x,y,z position and angle of the view, or select a position and rotate the landscape. The software also allows for fly-through animation.

archaeological landscapes as it reveals other sites which share visibility with the observation point. The process results in a “flood diagram” which shows areas visible from that position and areas which are obscured by terrain (Fig. 5). Cumulative view-shed analysis (CVA) can be carried out using a number of different positions, or sites, to create a model of inter-visibility. While the model does not take into account vegetation cover, it is a valuable tool for the analysis of the relationship between sites and their topographical setting. The principles and methodology for CVA have been described in a study of the inter-visibility of long barrows in the Stonehenge and Avebury areas (Wheatley 1995). The technique requires only a suitable DTM and the location of sites in the landscape, and can therefore be easily applied, and is likely to produce archaeologically significant, and often unexpected, results. Complex studies can be quickly carried out over large areas and in terrain where it would be difficult to judge inter-visibility by contour lines alone. It is also invaluable in areas where modern development may obscure visibility and remove the possibility of checking visibility on the ground.

In addition, TINs can be viewed used as the basis for 3D visualisation, and viewed in three dimensions, along with the cropmark plots and other data, in perspective from a selected static 3D position, or in rotation (Fig. 6). This feature is useful for viewing sites in their topographical setting, and the software allows for vertical exaggeration of the DTM (which can reveal topographical subtleties) and control over the sun’s azimuth and altitude. In addition, when viewed from ground level, the models display the spatial organisation of
monument complexes within their topographical setting. The potential for this technique as an aid to landscape interpretation is evident, but is more likely to be significant when combined with a morphological study of the sites mapped. The project has involved simple morphological analysis of sites within the “Monument Complexes” class, allowing distributions and cumulative view-shed analysis to be carried out on selected site-types. It is hoped to include details of this process, along with results, in a future AARGnews.

References


Haigh, J.G.B. 1996 “Another member of the AERIAL software family.” AARGnews 12, 26-33.


Vertical and Oblique Photographs

Michael Doneus

Introduction

During the last few years the issue, whether aerial reconnaissance would be better served by vertical or oblique photographs, has been debated several times. The latest discussion started in 1996, when in the Editorial of AARGnews 13, Rog Palmer questioned the way, aerial reconnaissance was done in England. “Is, for example, the 1930s method of whizzing about in a light aircraft and taking obliques still the best way to do things 60 years later?” (Palmer 1996). The answer by Anthony Crawshaw clearly showed that vertical photographs are not appreciated everywhere (Crawshaw 1997).

This discussion went on at AARG97 in Edinburgh. As a result, an AARG working group – “Obliques or Verticals?” – was founded (AARGnews 16, 1998, 8). Its aim is to compare oblique and vertical aerial photographs to assess practicalities, problems, advantages, disadvantages and costs. Plans were developed, to fly an area of land doing oblique recording and taking systematic verticals at the same time. This would provide a good basis for a comparison of both kinds of photography. Unfortunately, this idea has not yet been realised (Palmer 1998; 1999).

Although I am not member of this working group, I am using both vertical and oblique photographs in my daily working routine. This is possible, because we have a co-operation arrangement with the Austrian military air base at Langenlebarn. We get their 23 by 23 cm² vertical photographs from them, and we have even the possibility to order flights for the refund of minor expenses (see also Doneus 1997).

Oblique and vertical coverage along the river March in 1998

In 1998 we had the opportunity to get both oblique and vertical coverage of the same area at more or less the same time. At the beginning of July 1998 Toby Driver visited me in Vienna. During this time, we made a few reconnaissance flights over the eastern parts of Austria. One of these flights took us along the river March (Figure 1).

This river defines the border between Austria and its eastern neighbour Slovakia. Although we know from field archaeology that this area was densely populated throughout prehistory, the distribution of cropmarks is usually rather sparse. However, on the 1st of July 1998, the conditions were almost perfect. We were flying in a Cessna 172 and spotted site after site. We were both taking photographs using colour slides and a black and white film.

Unfortunately, we had not requested prior permission to cross the river and go into Slovakia. This made it impossible for us to go around those sites that were lying very close to the river. The other problem we had was that time was running short and we had to stop our work after one hour of flying next to the river. Two days later the Air Archaeology Training Project in Leszno, Poland, would start and I knew that I would not be able to fly in this area again under these good conditions. Therefore, I asked the staff from the military air base in Langenlebarn to do a vertical survey of the whole area as soon as possible. Fortunately, they agreed but because of bad weather they could not perform the flight until two weeks later.
The vertical cover was taken on the 13th of July at a scale of 1: 10,000 with an overlap of 60% using a black and white film. The whole area of approximately 160 square kilometers was in that way recorded on 156 photographs within 26 minutes (see also the outline of vertical cover on Figure 1).

**Evaluation**

In the course of the oblique reconnaissance we documented 30 archaeological sites along the river March within approximately one hour. The vertical photographs were examined thoroughly half a year later within two days, using a stereoscope. No reference was made to the oblique photographs of the area. During that time 133 archaeological sites were identified. I want to stress, however, that under „normal“ conditions the oblique reconnaissance of this area would have taken a few hours longer, which would have led to the detection of more sites. Therefore, it is not very realistic to compare both flights in terms of quantity of sites.

What is much more striking was that with the exception of only two sites (e.g. Figure 2a and b), every site from the oblique reconnaissance had been identified on the vertical photographs. It seems that even the two weeks of rainfall between my own flight and the vertical coverage did not have very much influence on the visibility of the archaeological sites. In Figure 2a, several cropmarked Grubenhäuser and pits of a settlement can be seen in two fields. The original

**Figure 1:** Relief map of the north eastern part of Austria. The bright line marks the borderline between Austria and Slovakia and is more or less identical with the river March. The black line shows the outline of the vertical block. The white triangles locate the sites found during the oblique reconnaissance. The black circles represent archaeological sites found on the vertical block.
colour image reveals clearly, that the colour of cropmarks and the surrounding crops is the same; there is no tonal contrast. The features are brighter because of a different reflectance, which became visible only from this certain angle. The same seems to be also true for the second site (without Figure). That is why the vertical images (Figure 2b) do not show any sign of the cropmarks at least in the larger field. The bright marks in the narrow field could, however, belong to the site. But without prior knowledge from field archaeology or the oblique photographs, I certainly would not dare to interpret them in terms of belonging to an archaeological site.

Two more sites were documented during the oblique reconnaissance but were not covered by the vertical block (compare the distribution of sites from oblique reconnaissance to the outline of the vertical block as shown in Figure 1).

In most cases, the detail of information on both sources was rather equal. In some cases, the oblique photographs provided better information because of the better choice of a suitable viewing angle. This is true in figure 3a and b, where in the oblique photograph (Figure 3a) the outline of four tumuli can be clearly identified.

The vertical photograph (Figure 3b) shows only one faint circle (I hope, that it will be still visible in the print).

In several cases, the vertical photographs do show more detail. The reason for this lies partly in the fact, that some sites were too close to the Austrian-Slovakian border. Therefore, we were not able to choose the best position and viewing angle for documentation (Figure 4a and b).
Figure 4a shows a settlement in a large field lying close to the Austrian border. The site could be photographed only from a very low angle, so that only the major features (Grubenhäuser) are visible. In this case, the vertical image on Figure 4b gives a much better impression of the site showing more than a hundred pits and several Grubenhäuser.

Additionally, the vertical photographs usually give a larger amount of information, because they provide the detail together with a better overview, where the site can be seen together with neighbouring sites in its natural surroundings. Sometimes, cropmarks could be detected in the vertical block a few fields away, which turned out to belong to the same site and which had been missed during the oblique reconnaissance.

Conclusion
In theory, every site, which was detected during the examination of the vertical block, should also be found during the oblique reconnaissance. However, I am not sure, if any aerial archaeologist would be able to find all 133 sites during just one flight as was the case with our vertical block. The total number of sites will depend largely on the time, which is spent in the area and on the experience of the aerial photographer / archaeologist. Anyway, here lies one of the advantages of a vertical coverage. If it is flown at the right moment – as was the case here – it will document plenty of archaeological sites in 3D within a very short time.
Figure 4a: Drösing – settlement features, which had to be photographed under a rather unsuitable angle of view.

Figure 4b: Drösing – in this case, the vertical photograph provides a better documentation of the site. © Fliegerhorst Langenlebnar.
On the other hand we all know that the vertical view is not always the best. When Anthony Crawshaw states that “It is my contention that a competent aerial photographer will always be able to equal, and often better, the archaeological information content of a vertical photograph of a site, when taking an oblique“ (Crawshaw 1997), I think almost every aerial archaeologist will agree with this argument. The experienced photographer will usually find the best angle for documentation, as long as he/she can move around the site without any obstacle (border...). However, when reconnaissance is at stake, it is far more important to detect sites at all than to document the faintest detail of its structures. Therefore vertical photographs should be part of every reconnaissance strategy; especially in those cases, where the time for oblique flights is limited or where obstacles (borders etc.) hinder or prohibit free movement in the air.

If a vertical block has to be ordered on the free market, it will be very expensive. Therefore aerial archaeologists will have to make contacts with other organisations that can provide them with verticals at a reasonable price. However, the idea of involving the military in aerial archaeological reconnaissance is not appreciated everywhere. In the course of a discussion with Otto Braasch a few weeks ago, he argued that as soon as a cheap source for (vertical) aerial photographs was available, the budget for oblique reconnaissance would be shortened or even cancelled. Another concern of his is connected with the fact that in several European countries the restrictions made by the military complicate or even prohibit oblique reconnaissance by civilians. In this case – as the argument goes – a co-operation could make civil flights unnecessary and in that way rather strengthens the military position.

These issues have to be taken seriously, and every aerial archaeologist has to find the best way to meet the situation in their own country. I think the Austrian way shows that co-operation is possible. Our contract, which was based on a co-operation agreement of 1973 and finally signed in 1988, is the result of more than 20 years of making and maintaining personal contacts and of persistent persuasion on a scientific and political level (Friesinger et al. 1982; Doneus 1995). Getting cheap vertical blocks has not hindered us yet to do our own additional oblique reconnaissance.

More than 20 years of experience with oblique and vertical photographs have led us to the conviction that both sources are of great value to aerial archaeology. There are pros and cons for both and if reasonably used, they will complement one another. For this reason, we should not try to play off one source against the other.

The 1998 flights show one way in which useful vertical cover was achieved. My own brief reconnaissance indicated the potential of a part of a river valley and I was able to commission immediate vertical photography of a specified block of land. Making and maintaining the personal contacts that allow such responses, be they from the military (as Crawford did so well) or from commercial companies, should be among the skills of the aerial archaeologist.

Note
All aerial photographs are released by the Austrian Ministry for Defense No.: 13.088/11.-1.4/00.
References


Palmer, R., 1999. AARG working groups. AARGnews 18, 22.

AARG 2000.
Aberdeen University: 5-7th September.

The conference will combine two days of presentations and workshops with a field trip, which is to include a visit to a recumbent stone-circle and some Pictish artwork.

Programme details and booking forms will be posted to AARG members in the usual way, and will also appear on the AARG website.

Offers of presentations, demonstrations or exhibitions and posters, contact Davy Strachan (Chairman) on 01245 437681 (e-mail: david.strachan@essexcc.gov.uk).

For further details about the conference, please contact Fiona Small (Meetings Secretary) on 01793 414701 or fiona.small@rchme.co.uk.
New homepages

There is an increasing number of homepages that may be of interest to AARG members.

Views from France

A page by Jacques Dassie and provides a reasonable, if expectedly French-biased, introduction to aerial photography and includes photos of reasonable quality showing a range of different things.
http://www.archaero.com/archeo31.html

Did you know that aerial archaeology was not invented before 1925? Have a look at the French version of history:
http://www.archaero.com/archeo32.html

Views from Britain

Two pages show uses of aerial photographs in the developer-funded world.
http://www.airphotoservices.co.uk/
and
http://www.alisondeegan.co.uk

Views from the Czech Republic

Martin Gojda has launched two new sites. Currently in Czech, but to be translated into English very soon:

One on Aerial Archaeology (with two parts: general and special - on the aerial programme in my Institute):
www.arup.cas.cz/airarch/

and the other on the big six-year project (1997 - 2002) I am heading titled Settlement Patterns In Prehistoric Bohemia:
www.arup.cas.cz/sppc/

Theoretical views

Do you know that the full text of Wlodek Raczkowski’s Power of Image is on ArchTerra? When your AARGnews version is worn away see a new copy at:
http://www.muzarp.poznan.pl/archweb/archweb_eng/archweb_e.htm

Things to try

Do you know about Sam Redfern’s software AAS? Did you ever try it? Download is at:
http://www.it.ucg.ie/~sredfern/psi/aas/aas.html
Organisers of the Workshop in Leszno had hoped that photographs taken during flights would be used by students in the ground school. So a few people were needed who would prepare photographs for them to work with. The easiest and cheapest way was to ‘employ’ students, so six lucky students were happy to be invited and work at Leszno. Our work at Leszno was not very hard or complicated. Mostly we only recorded films and collected flight notes.

The Aerial Archaeology Workshop at Leszno 1998 showed aerial archaeology as the combined process of reconnaissance and analysis of air photographs. Teaching was in two parts: ground school, which would show the processes of interpretation and mapping and prepare students to work with photographs; and air school, where students would get experience in aerial reconnaissance and taking photographs from the air.

About 3600 photos (more than 100 films) were taken at Leszno. It is a good result considering the frequent poor weather. Thirty percent of these films have been fully catalogued so far [mid-1999]. Photographs have been located on 1:25000 scale maps and indexed by co-ordinates, village, and related to known AZP sites. Because many sites were photographed many times, other films showing sites already catalogued will be faster to process, so the 30% is really the ‘difficult 30%’.

To us, progress seems slow – but when Rog visited in May 1999 he was very impressed by the amount of work that we had done on the photos from Leszno. But this work was not as easy as it ought to have been for reasons that were discovered after the course. For a lot of participants this Workshop was the first of its kind. Because aerial archaeology is not very well developed in Poland, the week at Leszno would give most students their first experience in the air. Before the first flight students were shown how to fill up flight notes on printed sheets. These contained three columns and a record for each site should be written to show: film and frame numbers, GPS number, and a short description. Although all films were processed in a few hours and prints were available next day, there was no time on the course to check the correctness or completeness of students’ flight notes. Working with films and prints from Leszno we came up against a lot of problems because of that ‘little neglect’ as only some 25% of flight notes were completed properly.

The main problems were:

**Frame Number and Description.** It had been expected that the photographer would keep track of and record the frame numbers taken of each site. These were often not very precise and sometimes we were very surprised by differences between flight notes and the actual frames on films. Fortunately most of these were correctable if we could compare films of students flying together. Sometimes descriptions of sites could have been very helpful. Our work was also much easier when students’ flight notes were legible!

**GPS.** Another problem appeared when we wanted to use GPS co-ordinates. Partly it was linked with many mistakes in the Frame Number column. However, some GPS numbers were completely absurd and we found large differences between a place that a student suggested by GPS number as the place where the plane should be, and the site photographed. Towards the end of the Workshop we were getting a lot of photographs without GPS numbers at all. The reason is that in the Wilga plane, which was hired for the last days of the Workshop, there was no GPS system. If we wanted to locate such photographs on maps, we had to compare them with photographs from films already done. Students were not issued with maps and had made no written record of where they had been on those flights!

After we had made order with flight notes we had to locate photographed sites on maps. During the Workshop we had been taught using good quality English maps with fields boundaries. Polish maps

---

**Aerial Archaeology Workshop Leszno 1998 – the view from behind**

Agnieszka Dolatowska, Jolanta Goliasz and Lidka t uk
are different! Working with photos from Leszno we use AZP sheets. In the 1970s the 1:25000 map of Poland was divided into A4 sheets as the basis of the Polish archaeological record. Using those maps now, in the 90’s, is not as easy as it might be. First of all, maps were edited in a previous political system which protected state secrets very strictly. It should not surprise anyone that some of maps were fabricated (falsified) by cutting out parts of them where there was anything of great importance. Maps are old enough to give us the possibility to find old roads, railways and canals, which existed in the recent past (70s), but sometimes they do not show similar features that are on air photographs taken in the 90s! One more thing that disturbs us very much is the quality of maps. We work with copies of copies of maps which are held at offices of former administrational districts for managing and protecting monuments. Roads, railways and canals, which were visible in original colour maps are hard to distinguish on our copies of copies. Maps have been copied as sheets, so sometimes we have got 1cm gaps between them. Rog told us that Sods Law states that many sites we have to locate will lie exactly between 2 (or 4) sheets. Our work is also made harder because there are not field boundaries on Polish maps and a lot of sites are in places where field boundaries are the only points of reference. In addition most of photographs had been taken to show crop marks the best way. Most photographers had not taken care of control points at all.

We are aware of that we are not experienced in this type of work. The archaeology inspectors in Poland are not very experienced either, and may meet the same problems in their work. After our work with the photos, and from attending the course at Leszno we suggest that changes in future courses might usefully include the following:

1. At a late stage in the air school, students should be allowed to direct the flying and also choose which sites to photograph. They should decide which features might be archaeological and which not. Their results would need to be discussed on the ground.

2. More attention must be paid to filling up flight notes, especially GPS numbers or alternative information about location of features photographed. This will soon be learned if student are made to locate their own photographs the day after flying. So...

3. Students should work with their own films and photographs at the ground school (neatly rewrite flight notes, locate sites on maps, interpret photos). Then air school will be a nice relaxation after this hard work in ground school!

Aerial Archaeology Workshop in Leszno was a very good training week for all participants. It has proved that aerial survey can be used in Poland with good results which satisfy even the most demanding archaeological inspectors. Aerial photography is one complementary method of archaeological survey and sites discovered from the air may improve our understanding of past landscapes. Personally, working in Leszno and afterwards, we have convinced ourselves that there is much work and learning in front of us.

Polish Puzzle Picture. How do we locate this site on the map?
1. Introduction

In AARGnews 16, Phil Markham briefly described a moving map GIS that may be used in future flying in Northamptonshire (Markham 1998, 19). This contribution develops that theme and suggests other ways and means by which this may be realised. The ideas come from this writer’s professional work with utilities on the ground and have been converted to become an Aerial-Archaeological-Information-System (AAIS) in which data collected on the move is done so as an integral part of a ground-based master GIS in which they are further managed.

2. AAIS - Aerial-Archaeological Information System

Graphical data and thematic information may be recorded, processed, managed and presented in a GIS. With respect to aerial archaeology, the dataset may include oblique and vertical photographs plus high-resolution satellite imagery. These could be image processed to best show archaeological information and stored in transformed and geo-corrected form. Accompanying these images would be tabulated descriptions in a clearly structured database from which a range of queried output reports could be obtained.

3. Mobile GIS - GPS-supported

The product name of the application software is GISMobil® from the German company infoGraph. It is a mobile GIS on a notebook, that originally was developed as a ‘closed’ system with Siemens Business Services GmbH and EWE AG (Oldenburg). This writer uses it as a mobile information system in the utilities section to have access on a daily actual line-system database. Changes that are made in the field can be integrated a few hours later by a fully automated update procedure. A mobile Hardware variant is the MicroPEN® from Microport with the GPS R10-CAE© of the company Dr. Ingeborg Bertges, operating system Win95/98/NT©.

This contribution was submitted as an idea for a system that may become a useful aid to navigation and recording. With the author’s agreement, it was circulated to three people with technical and airborne experience (and who I knew would respond!) who were asked to comment and to ask questions. These questions, and the author’s replies to them, are appended to the edited contribution and may provoke further discussion on how reconnaissance is best able to benefit from current technology.

Image 1. Graphical User Interface GISMobil®

Regardless of the Hardware-constraints Image 1 gives an impression of the graphical user interface of GISMobil® : views of a gas-pipe documentation in different window sizes. Image 2 shows a possible overall system-configuration.

Digital base is a vectorized cadastral map where the gas supply net is referenced to (Image 1). Beyond this large-scaled data from the utilities area one can imagine also a medium-to-small-scaled topographical map. Supplied vector-formats within this environment are SICAD-SQDs and AutoCAD-DXF, TIFF and GIF-raster types.
Through customizing, a tailored solution for another application area, it is possible to achieve an Archaeological Information system through adaptation of the data model. ‘Customizing’ in this connection means the matching of the database table structure with respect to the specific thematic features. In the following such a practical overall configuration will be described.

During aerial reconnaissance a ground feature is recognized by the observer, circled and photographed. This is part one of the data gathering. The positional fix may be achieved by overflying the discovered site and GPS-registration at the zenith, i.e. triggered through the notebook. Alternatively, the location may be considered to be the centre of the circuit. During the archaeological flight the path may be recorded continuously by a flight path line in the display of the remote notebook where it can be shown on topographic maps. When the position mark on the display moves close to the edge during the flight, it will automatically be repositioned to the centre. This information comes from the real-time GPS-position. Additional in-flight-parameters can be registered and saved in the local database: flight date, flight time among others. A second person can put in-flight descriptive data onto the remote system: object address, site description. Later on the ground additional in-field recognitions can also be entered in the ‘mobile station. All can be downloaded to the master GIS by a fully automated update procedure.

Beside GISMobil© from the company InfoGraph there is another Moving-Map-System: Observer© (Skyforce Avionics Ltd.). In principle it is the same, but Observer is based on military requirements so is more rugged and totally integrated into the instrument board panel. However, it does not offer the GIS-flexibility of GISMobil. A Route-Planning-Software builds the kernel, which is up- and downloadable through a PCMCIA-slot. A flight-logging-function records all relevant mission parameters. A user-defined database is customer-adaptable. As parameters for the archaeological site (image) only a label string, position and additional descriptive text can be registered. Two digital images can be attached to each site. Observer can be configured using a choice of vector or raster geo-referenced maps which can be displayed at different scales.

4. General Considerations to GIS-procedures
GISMobil® or mobile GIS allows digital, in-flight and in-field, recording at the moment of data capture. Use of automated updates make it more efficient to upload this information into a master record than transfer of a hand-written flight record. Information from previous flights can be used to navigate back to specific targets on different dates by following the GPS-supported flight symbols. The mobile GIS was initially born through the demands from the urban utilities. In this example the procedure has been transferred to aerial archaeology. More application areas will arise through individual needs and a following customizing through adaptation. It is efficient to make an extract from the master, working with the datasets decentral at a remote site and updating the master with the changed objects at the end of the daily process.

5. Reference

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

Appendix: questions and answers

What is the cost for hardware, maps, etc?

Hardware components in DM:
- MicroPEN  10000.00
- GPS  3800.00
- Accessories  1500.00
- Application Software: GISMobil  4900.00

What are hardware dimensions, weight, power requirements?

- MicroPEN  ca 25 x 30 x 6 cm³,  ca 2.5 Kg
- GPS  ca 15 x 10 x 5 cm³,  ca 1.0 kg
- storage battery  ca 20 x 8 x 5 cm³,  ca 1.0 kg (for 4 hours)

If the system runs off aircraft power it may be necessary to meet CAA requirements. Has this potentially large problem been investigated?

Unknown.

Can one navigate with ‘track up mode’?

Unknown.
How are additional maps added (for example of different countries), and who can do that? (This also raises the question of how much information can be practically stored and is rapidly accessible.)

The digitized maps i.e. in TIFF-G4-graphic-format have to be copied onto the internal hard disk. The map area (number of map ‘sheets’) that can be stored on the computer depends on the scale and resolution. At a scale of 1:50,000 and a resolution of 300 dpi (colour) a hard disk of about 10GB will hold ground coverage of about 250 km x 250 km. This should not only be enough for a prospection mission, also for an entire country area.

In Germany it is possible to get topographic maps on a CD (country mapping service). Where to get digital maps for other countries is unknown. Foreign data may have been surveyed using different map projections and will have to be georeferenced to the specific coordinate system [see Scollar: AARGnews 18].

How is the unit operated in the aircraft?

Operating mode is via mouse or keyboard.

It is thought probable that a notebook screen may not be easily visible in bright summer light in an aircraft cockpit (where often there is no shade). Has clarity of visibility been tested?

Nothing like this has been tested. The configuration is a proposal for AA derived from the ground-based Remote-GIS used in the pipeline documentation of urban utilities.

How rapidly does the moving map move? At what speed does the display change?

The velocity of the position mark in GISMobil depends on the chosen map scale. Supposing a flight velocity of 150 km/h several configurations are calculated:

<table>
<thead>
<tr>
<th>Scale</th>
<th>Velocity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1:10,000</td>
<td>4.5 mm / sec</td>
</tr>
<tr>
<td>1:25,000</td>
<td>1.8 mm / sec</td>
</tr>
<tr>
<td>1:50,000</td>
<td>0.9 mm / sec</td>
</tr>
</tbody>
</table>

Running towards the display boundary, the map view will be recentered when the position mark approaches 15% of the edge.
The Colosseum of Rome from 681 kilometres

Martin J. F. Fowler

Following a successful launch on 24 September 1999, the first of a new generation of commercial high-resolution remote-sensing satellites became operational at the end of last year. Operated by Space Imaging Inc., the Kodak digital camera carried on IKONOS 1 simultaneously collects 1-metre resolution panchromatic and 4-metre resolution multispectral data from an altitude of 681 kilometres above the Earth's surface. As such it provides the highest spatial resolution satellite imagery currently available, having approximately twice the spatial resolution of the previous best panchromatic imagery (KVR-1000, 1.5-2 metres resolution) and five times the resolution of the previous best multispectral imagery (SPOT XS, 20 metres resolution).

An example 1-metre resolution IKONOS 1 panchromatic image\(^1\) acquired on 9 October 1999 and covering the environs of the Colosseum in Rome is shown in Figure 1 together with a SPIN-2® KVR-1000 image\(^2\) covering the same area. A comparison of the two images clearly demonstrates the improved spatial resolution of the digital IKONOS 1 product compared with the KVR-1000 photographic product, with detail as small road markings, shadows of poplar trees and cars being readily discernable on the IKONOS image. However, whilst the IKONOS image has considerably greater clarity than the KVR-1000 image, upon closer examination the digital nature of the remotely-sensed image becomes apparent with individual pixels being evident.

Archaeological interpretation of the image, based on ground truth depicted in a tourist guide to Rome (Dorling Kindersley 1999), shows that within the Colosseum considerable structural detail can be discerned including the stone terraces and the excavated remains of the network of underground rooms in the centre of the amphitheatre where animals were kept. To the right (West) of the Colosseum, remains associated with the eastern end of the Forum and Palatino area of Roman occupation can be seen including the shadows of pillars of the colonnade surrounding the Temple of Venus and Rome (Figure 2) and the remains of rooms surrounding the courtyard of the House of the Vestal Virgins (Figure 3).

Since KVR-1000 photographic imagery has been shown to be capable of revealing crop- and soil-marked archaeological features under appropriate conditions (Fowler 1996), it is to be expected that the improved resolution IKONOS panchromatic product will be likewise capable. However, the ability of the digital camera to reveal the subtle changes in ground reflectance associated with such features, as opposed to the more well defined features of the urban area of Figure 1, is difficult to ascertain in the current absence of suitable imagery for interpretation.

Imagery from the multispectral sensor of IKONOS 1 covers the same spectral bands as the LANDSAT 4 and 5 Thematic Mapper (TM) Bands 1-4 (i.e., blue, green, red and near infra-red (NIR)) but at the higher spatial resolution of 4 metres (compared with 30 metres for

\(^1\) Downloaded from the Space Imaging web site at [http://www.spaceimaging.com/](http://www.spaceimaging.com/) where additional examples of IKONOS can be found.

\(^2\) Purchased over the Internet from the TerraServer at [http://www.terraserver.com/](http://www.terraserver.com/). It should be noted that this is not one of the better examples of the KVR-1000 products.
LANDSAT). Whilst the three visible bands can be combined to produce high-resolution true-colour images, the NIR band is of particular interest as the same spectral band from the LANDSAT TM has been found to have some potential in the detection of archaeological features through differences in the NIR reflectance of vegetation (Fowler 1995). However, the archaeological usefulness of LANDSAT imagery is constrained severely its low spatial resolution. With its higher resolution, the IKONOS 1 product represents an approximately 50-fold increase in information content of the pixel area covered by the LANDSAT product (i.e., approximately 30 by 30 metres) and hence can be expected to have a greater potential to detect archaeological features. Unfortunately, no suitable NIR images have so far been released that can be used to evaluate the sensor’s ability to detect archaeological features through differences in NIR reflectance and hence its archaeological utility remains unproven.

At a cost of between $29 and $44 per square kilometre, depending on licence type, for imagery purchased outside of North America, the IKONOS product is competitively priced. However, the down side is that the minimum order is $2,000 and hence it is probably only affordable by organisations rather than individuals. In view of its improved quality, it may be a good idea for someone such as English Heritage, or one of the surviving Commissions, to order a block of cover to be acquired at a reasonable time of year for evaluation purposes. In due course, it is to be hoped that IKONOS imagery will be released in more affordable ‘bite sized’ pieces over the Internet, much as KVR-1000 imagery is now available from the TerraServer (Fowler 1999). When so available, it will represent a cost-effective source of high-resolution satellite imagery for use by both organisations and individuals in archaeological studies.

Dedicated to the memory of the late Ernest Fowler 1920-1998.

REFERENCES


The 2.53 kilometre SPIN-2® KVR-1000 image from which the extract in Figure 1 was taken was purchased for $ 7.95.
Figure 1 SPIN-2 KVR-1000 (upper image) and IKONOS 1 (lower image) satellite imagery of the environs of the Colosseum in Rome. Following Rog Palmer’s convention, North is to the bottom of each image. Places mentioned in the text are indicated on the KVR-1000 image. SPIN-2 KVR-1000 image © Aerial Images Inc and SOVINFORMSPUTNIK 1989. IKONOS 1 image © Space Imaging 1999.
Figure 2 Enlargement of the area to the west of the Colosseum showing the remains of the Temple of Venus and Rome (A) and the shadows of the pillars forming the colonnades that surround the temple (B); the ruined baths (C); the 19th century reconstruction of the Arch of Titus (D); the Baroque Church of Santa Francesca Romana (E). Cars and buses can be seen in the Via dei Fori Imperiali (F). IKONOS 1 image © Space Imaging 1999.

Figure 3 Enlargement of the eastern end of the Forum showing the remains of the House of the Vestal Virgins (A); the partly reconstructed Temple of Vesta (B); the reconstruction of the Arch of Titus (C). IKONOS 1 image © Space Imaging 1999.
Italy from the ground.

Remote Sensing in Archaeology, Summer School.
Universita Degli Studi di Siena, Certosa di Pontignano, Siena, 6-11 December 1999

Toby Driver and Chris Musson

Towards the end of the Millennium, two representatives of aerial archaeology in Wales left
the cloud and rain of the Welsh Mountains behind for a week-long ‘summer school’ in a
Chianti-producing Tuscan monastery near Siena, doubling as a self-contained conference
venue. The school had been organised by Professor Riccardo Francovich and was, for Chris, a
follow-up to a school on the Archaeology of Landscape, which he attended with Rowan
Whimster in 1991 at the same venue, to lecture on aerial archaeology.

At the time of the 1991 school, aerial archaeology appeared to be only just starting in Italy;
the audience of Soprintendenza, or state inspectors for archaeology, had little experience of
using aerial photography and no experience of flying. The general feeling was that they were
not about to start, although the attitude of Professor Francovich was quite different. Chris and
Rowan left Italy with hopes that their lecture may have sparked some interest in the
discipline.

For the present school, ‘professors’ or speakers were invited from Italy, Britain, North
America and Spain to give 4 hour workshops to an audience chiefly made up of students and
postgraduates in archaeology, with a handful of Soprintendenza and professional
archaeologists. In addition to ourselves, the list of speakers also included Danny Donoghue
and Dominic Powlesland from Britain, Richard Rothaus from St. Cloud State University in
Minnesota, representatives from satellite companies in America and Europe and some of the
leading figures in remote sensing work in Italy.

Looking for Italian aerial photography

Before we left for Italy, we both tried to find out more about how air photography was being
used by Italian archaeologists, but with little success. We refreshed our memories about John
Bradford’s classic research and fieldwork into the cropmarks of Apulia and the many other
Italian sites largely recorded from 1940s RAF vertical photography (see Bradford 1946,
1949, 1950 & 1957 and Brown 1998). The combined efforts of the late Barri Jones and
Derrick Riley, who did so much to surreptitiously research, record and investigate the
cropmark archaeology of Italy (see Riley 1992) are well known to many, but we had difficulty
in finding out about the extent and contents of their respective archives, and ran out of time to
make special visits to view the material. During the preparation of this paper, however, we
have found out that Derrick’s Italian aerial photography is held by Sheffield University but is
currently un-catalogued. The collection largely comprises colour slides, and there may be
supporting paperwork (flight plans and reports etc.) to accompany the photographs. The
contact at Sheffield University is Mark Edmonds (email: m.edmonds@sheffield.ac.uk).

Otto Braasch had flown two sorties to southern Italy in 1987, one with Derrick Riley and the
other with Klaus Leidorf and Rowan Whimster. In 1989, he made another flight with Derrick
Riley. Before leaving for Siena, we were overjoyed one morning to receive in the post a set of
glass-mounted colour slides from Otto, each image a mini-masterpiece. The major locations
of Italy, the temples of Paestum (pronounced ‘pest-um’), Siena and the Campo, and stunning cropmark sites of the Tavoliere, were all there alongside hill towns in Tuscany and upland field systems remarkably similar to those on the north-west coast of Wales. On our arrival in Siena, Chris first had to check whether it was appropriate to show these aerial photographs to the audience. After some debate, we incorporated a few key slides into our initial lectures but we finally decided that all of the material should be shown. Chris projected all the images in his final short talk about the recent AARG training schools in Hungary and Poland, showing the Italians that they did have cropmarks and other sites worthy of oblique photography. Otto’s slides caused quite a stir, and left us receiving grid references from the archaeologists with requests to search the British archives for Italian material on our return.

The structure of the ‘summer school’
The school lasted a week, with lectures from 9.00-13.00 with a break for coffee, and from 15.00-19.00 with another much-needed break. Italian students are apparently used to 2-hour lectures in their universities and sat diligently through all the very technical presentations; personally we found some of the 2- or 3-hour presentations of visible and multispectral light waves, physics, mathematics, soil resistivity, imaging and the like, hard going at times. In the main, however, it was extremely interesting, especially those on imminent developments in the quality and potential utility of satellite imagery.

In general, the standard of remote sensing and digital/GIS work being done by the Italians was very high and technically advanced. Any possible technique that was available for draping aerial photography/satellite imagery over digital terrain models, for 3D landscape visualisation and virtual ‘fly-throughs’, for digital integration of landscape, survey and excavation records and visual data within GIS, had been used and was demonstrated.

Aerial photography in Italy – how it is used
From the meeting, the following things became clear:

- Vertical aerial photography, and high-resolution satellite imagery, were both being used on a regular basis in Italian archaeology.
- Oblique archaeological aerial photography was technically not permitted, and was rare. However, oblique APs were shown at the meeting, usually gained on short ‘pleasure flights’ taken by or on behalf of archaeologists to record particular sites or excavations.
- We were told that a change in the regulations was expected, relating to aerial photography in a light aircraft, but that the timing of its implementation was still uncertain.
- The incorporation of existing vertical air photography (RAF, Greek Military and Italian vertical survey) into archaeological field projects was advanced, especially in the archaeology department of the University of Siena. The aerial workroom in the department was equipped with 6 or 7 desktop stereoscopes and other optical equipment. Photos were being used for air photo mapping, creation of detailed plans to supplement excavation results, and for 3D landscape visualisations and ‘fly-throughs’. Post-processing of panchromatic and other images in Photoshop and other software packages, was commonplace, especially for the study of land-use, geomorphology, buried soils and sediments and other features.
Aerial photography in Italy – teaching and learning.

Undaunted by what we had seen, we gave our talk on the fourth day of the meeting. We had seen the integration of vertical air photography to many projects, but there was still no flying programme in Italy (or any contingency for regular flights), and no systematic use of air photos for mapping projects like the National Mapping Programme in England. In addition, all the work we had seen to date was highly advanced, very costly and, for the multi-spectral work and 3D visualisations, time consuming. This was not cost-effective rapid survey, which was one of the main things Chris and I wanted to stress in our presentations about aerial reconnaissance and mapping. Usually you can start with the most limited of resources, but achieve useful results very quickly. Such an argument was especially relevant, given the emphasis on the use of satellite data in archaeological projects at the meeting. The costs of some imaging, with panchromatic ground resolution of between 2-10m, often ran to a few thousand pounds and was not always as useful as a few good air photographs.

The impact of our talk was at worst pleasing, at best astonishing. Despite the various high-tech applications of aerial photography we had witnessed that week in Italy, people were genuinely surprised to see the quality and the quantity of the results that aerial archaeology could yield if properly applied to regional and national survey. The air photo mapping presentation included a short demonstration of John Haigh’s Aerial 5. We thought this would be old-hat to the audience. On the contrary, it generated enormous interest. It seems many people had been stretching and fitting air photo and satellite imagery to maps using GIS ‘bolt-on’ extensions and other programmes. The results had been workable but often inaccurate. The fact that Aerial 5 TFW files could drop straight into ArcView got everyone excited. More demonstrations were given and details for Aerial 5 circulated to a lot of people. We have every hope that John Haigh will get some orders from Italy!

Dr Richard Rothaus from St. Cloud State University was also surprised to see the potential of aerial archaeology. He had not before considered it for his various remote sensing projects in Minnesota and Greece. He left the meeting promising to arrange funding to incorporate a programme of aerial photography into his landscape project on the Corinth peninsular in Greece, and we wait to see if this comes off.

Looking to the future

A surprising development was that 15 new paid-up AARG members were added to our growing international list from an audience of about 30 people. Hopefully this will provide an added boost to international communication on aerial archaeology and remote sensing matters. At the same time, the success of the Pontignano meeting led to proposals for an aerial archaeology training school for Siena in 2001. This would follow the basic structure of the previous training schools at Lake Balaton, Hungary in 1996 (Bewley et. al. 1996) and Leszno, Poland in 1998 (see AARG homepage), but would address any previous shortfalls and advance the organisation of the school accordingly. It is likely that the syllabus for the proposed school would also incorporate teaching sessions at the Archaeological Laboratory in Siena University, so that students could learn about ongoing remote sensing projects in Italy. Chris is currently taking these proposals forward on behalf of AARG and we wait to see what early summer 2001 holds.

The archaeology department at the Universita Degli Studi di Siena, has an excellent website at http://www.archeo.unisi.it/ . This includes aerial and digital images.
References:

Pontignano, Siena, December 1999. Richard Rothaus (left), Chris Musson (second from left) and other students and delegates of the summer school watching a GPS demonstration among the cloisters of the Certosa.
A bibliography of Polish aerial archaeology

P.M. Barford

Polish traditions of aerial archaeology seem to go back more than seventy years and developed in slightly different ways from the English. This article aims to present a brief introduction to the preliminary bibliography concerning the use of aerial observation for archaeological purposes in Poland. The bibliography was incorporated into the AARG homepage (address: http://rs6000.univie.ac.at/AARG/worldwide/poland/poland.html) in November 1999. It provides a list in chronological order of the available literature and offers brief comment on each entry so as to make the information a little more available to the outside reader. In this way it may aid future compilations of the history of aerial archaeology in Europe.

The impetus for the early use of aerial techniques in Poland seems to have come in part from western (particularly British) literature reaching Polish scholars in the 1920s and 1930s. Of no less importance was the work being carried out by German and Prussian archaeologists in the neighbouring provinces of Silesia and Prussia which after 1945 became part of the Polish state. The first aerial photographs taken for the use of Polish archaeologists seem to have been those taken at the request of Jozef Kostrzewski by an airforce pilot over the Neolithic coastal site at Rzucewo in 1929. For most of the period before the War, the technique of aerial photography was used mainly by Polish archaeologists from the Poznan centre for illustrative purposes. From 1935 tethered balloons were used for recording excavations (Biskupin, Klecko) the technique seems to have been based on the balloons used at Megiddo, Palestine published in Antiquity in 1932. The second use was for recording major earthwork sites such as the Early Medieval strongholds of Great Poland.

This pre-War work was not followed-up to a great degree by archaeologists in the People’s Republic of Poland. Part of the reason may well be the paranoid Cold War attitudes which made a state secret out of even basic topographic information (was this however the only cause?). There was still some useful work done. Much of this was concentrated on the recording of upstanding earthwork sites (particularly strongholds), and such views usually commissioned from military sources occur in textbooks and numerous regional surveys. Many of these however have the character of ‘decoration’ rather than being included as a source of any specific information (they are however more easily ‘readable’ than the contour-plans favoured instead of hachures by the Polish field archaeologist).

Several trends are visible in the way the use of aerial photography developed in Polish archaeology. In the beginning, the stationary bird’s eye view was used (a) primarily as a means of gaining an overview of excavated sites. In the first part of the post-War period.

---

4 The first version of this list was prepared for the Leszno school, and I would like to thank Włodek Raczkowski for his help in tracking-down some of these references. It should be noted that for the purposes of the Internet bibliography the Polish has been transcribed without the use of the several Polish letters.

5 Although this work contributed to our knowledge of the archaeology of Poland it has not been attempted here to compile a full bibliography of this pre-German work (see for example M. Helmich 1926 Luftaufnahmen und Vorgeschichtsforschung, Altschlesien 1, 252-255) which remains a topic for future exploration.
aerial photography was used (b) primarily to record the topography of and around known sites and (c) to document complexes of historic architecture (much of this work was done for the conservation services). Towards the middle of the 1960s we see (d) a shift to the use of aerial photointerpretation for aiding the understanding of the geographical environment of known sites (geomorphology, hydrography, geology of the surrounding areas), the work was frequently done by specialists in photointerpretation and not archaeologists. It is only in the 1980s that we see (e) a developing interest in aerial survey as a means of discovering new archaeological sites as both a research and heritage management tool. Despite this, we see in this period a continuation of previous trends (i.e., (b), (c), (d)).

Institutional funding has in recent years been forthcoming mainly from the Ministry of Culture through the conservation services especially through the Centre for the Documentation of Monuments (ODZ) and the Office of the Conservator-General (GKZ). So far very little aerial survey seems to have been financed by the Academy of Sciences, Committee of Scientific Investigations, or the universities. One notes with regret the initial reluctance to finance the inclusion of archaeological aerial observation and photography in the range of techniques to be applied in the Environmental Impact Surveys preceding the construction of the Polish motorways. This reluctance seems to stem from a lack of conviction about the cost-effectiveness of this technique.

Although, as we have seen, the technique was in theory well-known to the Polish archaeologist, a repeated theme which one notes is an apologetic approach of many of the post-War articles, as if the authors are trying to convince other archaeologists of the potential usefulness (and presumably cost-effectiveness) of aerial observation in their research. In part this has been due to the problems of raising adequate funds from institutional sources in Poland for the development of the technique and in part to the dissimilarities between the way cropmark/soilmark sites may appear in the Polish lowlands compared with the ‘classic’ areas of archaeological aerial observation in western Europe. The soils of most regions of Poland seem not to produce the same types of clear cropmarks as in England, Bavaria and other areas beloved by the archaeological aerial observer. Another problem is the type of features being produced in antiquity by site creation processes in Poland which consist predominantly of scattered pits of various sizes and degrees of aerial visibility but very few ditches and gullies. In some regions, the most that can be expected are somewhat amorphous discolourations of rather uncertain interpretation (although as reported in a previous issue of AARGnews, the Leszno school recorded some cropmarks of high clarity and definition). While experience allows relatively reliable interpretation of the more amorphous ‘blobs’ as archaeological sites, to those with less experience in such matters these photographs seem to remain unconvincing that the technique is applicable to Polish conditions.
Exhibition "From the air - pictures of our common past in Europe"
Ivan Kuzma

Exhibition in Bratislava

The result of the project, Treasures of our common past in Europe - history written in earth, supported by the European RAPHAEL-programme was a series of exhibitions, From the air - pictures of our common past in Europe.

Archaeological Institute of Czech Academy of Sciences (Prague), National Museum (Prague), Archaeological Institute of Slovak Academy of Sciences (Nitra), Janus Pannonius University (Pécs), AARG, and RCHME (Swindon) and of course the major initiator of the project Otto Braasch participated in the project under the leadership of Landesamt für Archäologie mit Landesmuseum für Vorgeschichte Sachsen (Dresden).

The aim of the project was to publicise the excellent results of aerial archaeology. Especially the significant growth after 1990 in countries of the former Warsaw Pact. The most important results of aerial research achieved after the fall of Iron Curtain were presented to a wide public interested in the earliest past of central-Europe.

As well as photographs, of Saxony, Bohemia, Slovakia, Hungary and Great Britain (an island off Central Europe?), others showed the history and methods of aerial archaeology, and there were some interesting photographs by Otto Braasch. The photographs were divided into single themes as: Large Circles, Places of Prayer, Advancing Romans, The Legions of Marc Aurel, Slavic Castles, Avarian Legacy, The Romans Along the Middle Danube, Castles of the Rural Nobility and others.

The exhibition was opened for the first time on 9th October 1997 in National Museum in Prague (10th October – 31st November.) together with an international conference (Doneus, AARGnews 16, 30). According to the original intention, the photographs should have been presented together with associated texts (in English, German, Czech) on 74 hanging paper strips (width of 92 cm), printed on a plotter. The original intention was changed, individual countries and history were shown on panels illuminated from the back and the strips showed methods and work by Otto Braasch. To animate the exhibition three-dimensional exhibits related to photographed sites were also shown.

For the second time, the exhibition was presented in Hungary (Pécs) from 22nd January to 5th February 1998. It was presented according to the original intention, on paper strips printed in Hungarian. The exhibition was accompanied by a workshop (Bertők, AARGnews 16, 36).

The next stop was Landesmuseum für Vorgeschichte in Dresden (25th March – 21st June 1998). There, the original version from Prague was enriched by photographs documenting the status of Dresden and other Saxon towns before
and after the war.

In Slovakia, the exhibition was scheduled to open in Bratislava in September 1998 as part of The Days of European Cultural Heritage and so link with the exhibition: Treasures of our common past in Europe. For many reasons, opening of the exhibition took place on 6th May 1999 within the annual Days of Europe, and so it remained connected with the topic. Thanks to an especially appropriate room it had a really impressive effect and I can modestly say it was probably the best of all installed exhibitions. As in Prague, three-dimensional exhibits were added.

In summer months (30th June – 26th August 1999), the exhibition was opened to public in the Jewish synagogue in the tourist centre of Liptov, in Liptovský Mikuláš (Central Slovakia).

Another installation took place on the occasion of the 60th anniversary of Institute of Archaeology of SAV in Nitra and lasted from 14th September to 10th October 1999.

The exhibition is presented in Košice in the Eastern Slovakia at the present time (8th March – 30th April 2000) and there will be probably other installations.

I have no idea how many people have seen the exhibition as a whole, but to date there have been more than 3,000 visitors in Slovakia. The project has successfully fulfilled its aim and shown that aerial archaeology, is an important non-destructive method of research. This awareness has been realised by wide classes of population in individual states. Notes in visitors’ books of different museums convincingly testify to that.
Forthcoming events, etc

AARG 2000 : Aberdeen University: 5-7th September
The conference will combine two days of presentations and workshops with a field trip, which is to include a visit to a recumbent stone-circle and some Pictish artwork.

Programme details and booking forms will be posted to AARG members in the usual way, and will also appear on the AARG website.

Offers of presentations, demonstrations or exhibitions and posters, contact Davy Strachan (Chairman) on 01245 437681 (e-mail: david.strachan@essexcc.gov.uk).

For further details about the conference, please contact Fiona Small (Meetings Secretary) on 01793 414701 or fiona.small@rchme.co.uk.

European landscapes from the air – a guide for users
This is a Bob Bewley-organised session at the IFA Conference (Brighton, 4-6 April 2000) which, he said, he has tried to make ‘about users of AP information, local and national’. The idea is that the session examines how aerially-derived information (photos, maps, records, publication) is being used every day and in every way. Feel free to send a summary for possible inclusion in the next AARGnews.

Arkeologien & Fgelperspektivet (Archaeology & a bird’s eye view)
Lunds Universitets Historiska Museum, Krafts Torg 1, Lund, Sweden
7 March to 30 August 2000
An exhibition of aerial photographs taken over Scandinavian countries. As far as I can gather, after the official opening period at Lund, the exhibition has a three-year travelling schedule. See Esse Ericsson et al. Flygspaning efter Historia in ‘Books of Interest’?

Derrick Riley Bursary for Aerial Archaeology
This annual award is offered to assist the bursary holder in the making, analysis or interpretation of aerial photographs. The bursary provides financial assistance up to the sum of £500 to help meet travel, flying expenses, film processing or similar costs necessarily incurred during the work. The panel will accept applications for smaller amounts and reserve the right to make two, smaller, awards if this is adjudged to be the most beneficial decision in any given year. In recognition of Derrick’s encouragement of young scholars preference may be given to younger applicants.

Conference grants are also available.
Application forms can be obtained from:
Professor Keith Branigan, Dept of Archaeology and Prehistory, University of Sheffield
Sheffield S10 2TN, UK (c/o D.Cruse@sheffield.ac.uk)
to whom completed forms should be returned by April 30. Successful applicants will be informed before the end of May
Many AARG members will remember Charles Léva’s attendances at earlier AARG meetings or be aware of his enormous contribution to aerial research from his CIRA (Centre Interdisciplinaire de Recherches Aeriennes) headquarters in Brussels. At AARG in September 1999, Otto Braasch told us that Charles’ health was deteriorating following a stroke. The following extracts are taken, with permission, from a note circulated (25 January 2000) by Georges Heldenbergh of the CIRA editorial staff:

“The administrative council has resolved to put an end to the activities of the association which has been animated all these years by the will and indefatigable dynamism of its president.”

“Howeover, it seems important to us to submit a symbolic gesture in publishing a final Bulletin by way of homage to the exemplary action and realization of objectives which Charles Léva allotted to himself.”

They gave no copy date, but asked for contributions (2 or 3 pages in A5 format) to be sent to:

Georges Heldenbergh, CIRA, Avenue Brugmann 291, B-1180 Bruxelles

In a later email, Georges Heldenbergh advised me that:

“The library and the aerial photos still remain the property of Charles Léva and, as long as possible, can be consulted by those who are interested in archaeology and aerial photography.”

~~~~~~~~~~~~~~

AARG 2000.

Aberdeen University: 5-7th September.

The conference will combine two days of presentations and workshops with a field trip, which is to include a visit to a recumbent stone-circle and some Pictish artwork.

Programme details and booking forms will be posted to AARG members in the usual way, and will also appear on the AARG website.

Offers of presentations, demonstrations or exhibitions and posters, contact Davy Strachan (Chairman) on 01245 437681 (e-mail: david.strachan@essexcc.gov.uk).

For further details about the conference, please contact Fiona Small (Meetings Secretary) on 01793 414701 or fiona.small@rchme.co.uk.
Image power? Review article and comment

Kevin Jones


In *AARGnews* 19 (Sept 1999) Wlodek Raczkowski raised some questions about aerial photography from a post modern point of view. He is concerned that TAG theorists seem to take no account of aerial photograph as vehicles of implied meaning or meanings that have to be decoded so that underlying narratives of power and control can be deconstructed. I feel that he is not correct in suggesting that aerial photography has missed the TAG boat and even if it has, I doubt if it is a real problem. In the introduction to Tim Bayliss-Smith and Susan Owens’ (1990) *Britain’s Changing Environment from the Air*, titled ‘Aerial photography: the hidden agenda’, there is a current statement of geographers’ views of the power of image. It is persuasively illustrated by an imagined aerial projection of eighteenth-century date showing Bolsover Castle dominating a sanitised, peasant-less and tidily enclosed Derbyshire countryside.

I am reminded of this again having purchased the Arthus-Bertrand volume and felt the urge to look over some other large format aerial glossies among my books. In various ways these three large-page format books are all about the aerial photograph as propaganda. It may be true that all those post-modernists out there are correct after all. Aerial photography is about submerged narratives of autocracy, militarism and control but, actually, these books are transparent.

Arthus-Bertrand’s work has had some moral support from UNESCO, probably to assist in getting access to the resources of a number of national governments - where, one suspects, aerial photography is new if not frowned upon. Most of the photographs are very low level (as low as 15 m A.G.L.) taken from helicopter. Only occasionally do the views lapse into cliché. Many of the images are quite remarkable and novel. The view of Everest, that well known icon of New Zealand nationalist sentiment, is taken with a wide-angle lens. Everest is on the skyline some 15 kms distant and the walled valley-floor gardens (probably growing millet) of sherpas are at the bottom of the view. Any archaeologist with interest in subsistence horticulture will gain something from many of these images.

Alas, the text and essays which accompany the images are too ambitious in scope and read as fatuous environmentalist homilies. The trawlers abandoned in the saline flats of the former Aral Sea (with no sea visible on the horizon) hardly need a commentary on the woes of the Soviet economic programme. The spire of the Chrysler building, New York, demands an analysis of its role as the acme of Art Deco, rather than a diatribe against skyscrapers and
megalopolis. All that aside, this is a book for aerial photographers to look at on someone else’s coffee table and to wonder at.

Gerster’s first book is obviously funded by a farmer’s lobby group, since it consistently praises a range of soil conservation practices and the results of subsidies on farm erosion mitigation – often, it would seem unwittingly, revealing a sinister side such as nitrogen-fertiliser pollution of waterways. Again there are a few subsistence horticulture photographs such as the one of Hopi Indian plots. Overall then, a work of American triumphalism with the advantage that some farm practices which might puzzle an interpreter of aerial photographs are revealed. An example is the pattern of “lodged” (windblown) rice on p.49 or the spring season cherry trees of pp.122-123, on the Shaw photographs p.238.

*Grand Design* is much more satisfying and is if anything a lesser essay in the manner of Arthus-Bertrand. Print and film technology has moved on since 1976 (the year of first publication) so some of the images are fuzzy. However, there are many subjects here such as Stonehenge without barriers that are images of lasting value. Others where Gerster’s images are persuasive include ancient Jericho, a number of sites in Israel, the Serpent Mound (Ohio) and the Nazca lines. Of New Zealand and Pacific subjects – alas, none.

So, like Wlodek, I have a taste for the aesthetic value of aerial photographs and their capacity for instant persuasion. Unlike Wlodek, I do not see all knowledge as subjective. That way lies the cynical and ultimately nihilistic use of privileged cultural perspectives and grievance to create political mayhem. Different regional or national cultures have a right to create their own forms, provided there is a form of legitimacy (I exclude Nazism and other forms of racial superiority theories such as the ‘Black Eve’ movement) - and even to gain political advantage from it. At the same time, they also gain the benefits of universally available resources and technology.

I am content to see aerial photography as a technique, one which can be used effectively in a variety of resource management roles and if there is an element of subjectivity it will be winkled out in legal forums - alas, no longer in academe. Any other form of technology can be used in beneficial or malevolent ways – but let’s not blame the medium. We don’t have to import morality into the minds of the Luftwaffe photographers who took the photographs of Britain in the 1940s, for all that AP (and for that matter grid references and GPS) have long been a tool of the military. Aerial photographs are everyone’s medium and the only moral imperative is to make it as widely available as possible and to de-commercialise access to historical aerial photographs. To keep on side with our editor, AP interpretation can remain commercial, of course.

February 2000
Books of interest?


This volume was part of the registration pack given to those attending the Archaeological Prospection conference at Munich. It includes illustrated abstracts of papers given plus an ‘appendix’ outlining some of the recent work carried out by the Munich geophysics team. As is expected, the academic quality of abstracts varies from accurate summaries to unsure ramblings about what the writer may or may not talk about at the Conference a few weeks later. They range from a two-page maximum to less than half a single column but the volume includes addresses of contributors, allowing any papers to be followed up. Despite attempts of the organisers to entice a respectable sized aerial contingent we were largely absent and the program for the meeting shows one aerial session out of six (the others being radar, resistivity and electromagnetic prospection, and magnetometry) and 47 posters of which three appear to be on aerial prospection. It seems that aerial work was poorly represented but this may well be an accurate reflection on the amount that is done and the fact that (usually) to say anything worthwhile about results from aerial survey requires a fair bit of analytical work whereas a single geophysical survey can result in a paper.

The aerial abstracts in the volume are by M Brown (South-East Scotland), Z Czajlik (Hungary), M Doneus and C Gugl (digital photogrammetry), G Indruszewski and W Karrasch (Coastal Geomorphological Processes), K Leidorf (Bavaria), G Leroux (Brittany and Pays de la Loire), B Song (China), D Donoghue and C Brooke (thermal prospection), R Zantopp (Cologne Basin). But there is also considerable interest in some of the ground prospection abstracts, especially (as we have heard at past AARG’s) in the work coming from Vienna where they are pioneering the integration of several forms of prospection to study large areas.

[Rog Palmer]


This report summarises results obtained in the air during one of the recent good summers. It seems to have been written with the intention to demonstrate that continued reconnaissance pays off. Combined flying times of 415 hours recorded 4570 targets of which about half were new and at a significant number of others new information had been added. [The report doesn’t say, of course, how many other sites were seen and not photographed, as seems to be current policy if things are thought not to be showing at their best. The ‘half were new’ is thus an accurate count of prints brought home, but not of observed reality.] I suppose this sort of publication makes a good managerial statement of cost-effectiveness but I wonder whether such statistical comments plus a selection of pretty ‘crop marks’ (although the low-contrast colour pics have not reproduced very clearly) will help demonstrate the capabilities of aerial survey to readers of *Archaeological Prospection*. This piece is very much at the level of ‘aerial photography discovers archaeological sites’ and so will make a useful reference for those who still teach the subject in this 1930s style. I suggest that to get our case across more in tune with present times we need to publish articles that show what aerial survey is good at – recording blocks of land – and that these need

6 Unless you are able to get author discount....
to be in map form (as in a single sentence on p58 and Plate 17 it referred to!) rather than a handful of photographs [see also Doneus, this issue]. In this way – and hopefully at the proposed joint AARG-Archaeological Prospection meeting in Vienna – we will be able to show how aerial and ground survey can complement one another rather than being totally different or in competition.

[Rog Palmer]


Maybe I secretly like picture books after all! I always enjoy receiving these *Catalogues* from RCAHMS because they include a lot of photographs. Both sites and the Scottish landscape are so unfamiliar to this southern flatlander that it makes a pleasant change to browse. The format of these conventionally published catalogues will be familiar to many AARG members. This latest one included a letter stating that by next year it may be possible to publish it on the internet which will be a major step forward (such as we have come to expect from RCAHMS). It will be interesting to see if the availability of photographs on the web will help spread the word that aerial survey is a good thing and help make some of the photographs more widely accessible.

[Rog Palmer]


This includes a few examples of aerial art, but nowhere near as many as I remember from her earlier *Markings* volume. I would guess that it was published because of the author’s name and reputation rather than for its contents which are somewhat disappointing. The harsh lighting and contrast – as well as those old ruined buildings – do not seem to lend themselves so well to the softer more grainy effects that, for me, made Bridges’ earlier work something different from the more conventional aerial view. All pictures are drably monochrome (remember that I usually prefer black and white) and, by their absence, indicate the potential in this part of the world for the huge range of colour that we have seen in Bob Bewley’s slide shows of his and David Kennedy’s current work over Jordan. Still, it’s not bad for a tenner and may still be available for the dedicated Aerial Egyptologist [and why can’t we have some of them?] or the avid collector of *somewhere from up there* books.

[Rog Palmer]


The bulk of this volume deals with what RCHME used to call Analytical Field Survey and was published more or less at the time when they were gobbled up by EH. AFS receives excellent treatment in this book, with discussion of methods and interpretation which are illustrated by case studies and well-captioned figures. Discussion later extends into what are called ‘special landscapes’ and the examination of buildings in their landscape. Final chapters and appendices discuss drawing, publication and archiving, levels of survey and equipment.

In among all this are three chapters that seem a bit out of place – almost as if someone had said, “Ah, hang on, RCHME also do this.” So while the AFS chapters deal in depth with method and interpretation, we have chapters on ground photography, aerial survey and ‘other survey techniques’ (geophysics and
field walking) that just discuss method. Aerial survey is, to me, particularly disappointing because, while it deals reasonably thoroughly with flying and photography the photo interpretation and mapping sections tend not to stray beyond the level of ‘this is a good idea’ and there is nothing on archaeological interpretation. Within the aerial chapter is the claim that: ‘For a 1:10000 manual transcription an accuracy of ±2m should be readily achievable with care’ (p114). This shows incredible technical skill since the published accuracy of OS 1:10000 maps is ±3.5m (Harley 1975 and OS homepage) and, to my knowledge, there is no easy or repeatable way of measuring accuracy from ‘manual transcription.’ May we look forward to full publication of such methods in a future AARGnews?


This small book crams the life and work of Keiller into its ±130 pages and reminds us that he did a lot more for archaeology than sponsor the work for Wessex from the Air. The book does not claim to be a full biography and so omits much of the boring stuff with which these often are filled. Instead it covers the subject in a series of short, almost unconnected, mini-chapters which are interspersed with ‘box features’ which provide a little more detail. Because Keiller was a ‘bad finisher’ it is easy to forget the archaeological work that he did undertake: surveys in NE Scotland [maybe something there for AARG00?]; extensive excavation at Windmill Hill using techniques that seem somehow to bridge the gap between Pitt Rivers and Wheeler (although I don’t recall this being mentioned in any of my old text books); excavation and restoration of Avebury, preservation of Windmill Hill and Avebury, and an offer (not accepted) to build a museum at Stonehenge.

Keiller comes across as a man with a wide range of interests (cars, women, booze – maybe quite a normal bloke!) with the money to indulge in them (ok, not a normal bloke). Aerial photography occupied one brief phase of his life, but it came at just the right time to lay one of the foundation blocks. This and the other sides of Keiller are sketched out in Zest.


This paper publishes results of reconnaissance since 1997 in the Prekmurje region of Slovenia. It represents the work of one of the students who attended our training week in Hungary and I am delighted that this may have led to his local flying and the recording of new archaeological features. The Prekmurje region is predominantly level country along the river Mura – which my old atlas shows to be the NE corner of Slovenia, close to Hungary. To date, flying has been restricted to summer months during which some 60 hours has produced 90 sites. It is hoped to evaluate the potential for flying in other seasons. Photos that accompany the paper show the farm land to be under a typically central European management scheme with vast fields within which there are many parallel bands of different crops. This makes a two-fold horror: firstly the strip planting hinders visibility and understanding from the air; secondly there are very few permanent control points.

7 Or £11.25 incl postage from: Morvern Books, 16 Templars Firs, Wootton Bassett, Swindon SN4 7 EN, UK.
The Prekmurje region has been recorded via an ‘archaeological topographic survey’ which provides a good basis in which to place the aerial discoveries, and previous excavations help understand some of the photographed features. These are of two basic types: circles and squares/rectangles and dimension ranges are given in the paper [some of which I would question (figs 19 and 20) unless Slovenian tramlines are spaced more than 20m apart]. Comparing the aerial results with the ‘conventional’ archaeology for the region already queries the excavated synthesis and suggests that, ‘sites seen from the air infer a different prehistoric settlement pattern’ – quite an achievement from 60 hours flying.

The paper also notes the absence of any overall scheme for aerial practice and archives in Slovenia. From his museum base at Murska Sobota, Kerman records and archives locally, but ‘… no facts are known for the other regions in Slovenia.’

[Rog Palmer]


The volume includes contributions by a five Scandinavian archaeologists who take aerial photographs and/or work with them. Its focus is the work of airforce major and archaeologist, Esse Ericsson (1921-1995), whose aerial photography took place between 1953 and 1972. Thus one chapter is a brief biography of Ericsson (by P U Hrberg) while the larger half of the book contains a selectively illustrated catalogue, topographically ordered, of his 2700 photographs (complied by L Hansen). Other chapters include a Scandinavian view of the history of ‘archaeology from the air’ (G Raising) which begins with a balloon photograph taken on 7 April 1894 and ends with a digital database; an interestingly different slant on ‘archaeology and aerial photography’ (E Ericsson) which includes climatic conditions that the rest of us may dream about and more on inter-tidal/coastal work than I’ve seen in most other similar guides. Jan Norrman (who may be remembered by some AARG members) writes about past and present work in Sweden and about problems and achievements of aerial photography in Sweden.

The book is written in Swedish but contains a selection of photographs that are unusual to the English (and young central-European) eye. An English edition is planned for publication in 2001 or 2002.

[Rog Palmer]


Ah, at last…although arriving here barely in time for inclusion in this issue of AARGnews. This is a huge and heavy volume 478 high-quality pages making a 3cm thick book of papers given at the Amiens conference but, in cases, subsequently revised (there are at least two authors with references to 1999 publications!). The delay in publication also

---

8 Copies from: IK Foundation & Company, 8 Chubb Hill Road, Whitley, North Yorkshire YO21 1JU, UK.

9 Copies from: Revue Archelogique de Picardie, 5 rue Henri Daussy, F-80 000 Amiens. Cheques payable to: Revue Archologique de Picardie. Any vagueness in what follows is due to my virtually non-existent French and attempts to understand a considerable portion of the volume based on a few words and many pictures. Any complainants may like to volunteer to prepare a future review of a foreign-language publication in less than a week!
allowed inclusion of two obituaries of St Joseph (d.1994) one of which is accompanied by a photo showing St J holding one F24 for oblique photography with another mounted for taking verticals. This picture informatively illustrates aspects of David Wilson’s ‘appreciation’ of the F24 (Wilson 1998).

The conference part of the volume is divided into four parts, beginning with Conference inaugurals which is very much a showcase for 35 years of aerial photography by Roger Agache (the conference proceedings are accompanied by a slim supplement volume of some of his most memorable obliques) and allows him to ponder on the ‘art’ or ‘science’ of l’archologie arienne.

About half of the volume contains foreign contributions which includes cover of the then-newly ‘opened’ East Germany and Hungary (O Braasch), use of recent obliques and verticals in the Italian Po Valley (M Harari) and to study Classical urban development in Sicily (G di Stefano) [so much for there being no opportunities for reconnaissance there!]. Some 300,000 or 400,000 [both figures are quoted] obliques were taken specifically to provide the basis of a historical inventory of Quebec – an area of 1,550,000 sq km (P Lahoud). Other contributions are about aerial reconnaissance in Sweden (J Norman) and there are three papers on work in Belgium (C Leva; J Bourgeois et al; G Fairon), one about use of aerial photographs to help monument management in the Netherlands (W Metz) and one on what appears to be French collaboration with the National Museum of History, Bucharest, to take verticals and obliques in parts of Romania (A S Stefan).

Another surprise is use of verticals in the valle del Ebro, Spain. The earliest were taken in 1927 and are being used to provide one level of data in archaeological and geomorphological investigations (M A Magallon and F Pellicer). There are just under 100 pages on aerial work in Britain. Unsurprisingly for a conference in the 1990s a fair chunk of this concerns RCHME’s National Mapping Programme (B Bewley; P Horne; V Fenner), plus publishable comments about coordinating regional flying in England (R Featherstone). Other UK papers comment on work in Essex, including inter-tidal recording (P Gilman), Devon (F Griffith), Leicestershire and a homage to Jim Pickering (F Hartley), development of the landscape in Scotland (M Brown), use of aerial photography to study old gardens (D R Wilson), and finally some of Gill Barrett’s Irish work which includes use of aerial photography to monitor change caused by to agricultural ‘development’.

There follows a thankfully short section containing three papers on ‘methodology’ which offer French re-inventions of the wheel with little or no reference to earlier ‘foreign’ wheels! Seekers of control points may be envious of the use of excavation grid pegs in one of the examples (S Laisne).

The final one-third of the volume holds 17 papers on regional work in France. These include use of accumulated oblique and vertical photographs for mapping projects (R Goguey), more pits in Brie than I’ve ever seen in central Europe (P Brunet), and some precision BA cemetery planning in Champagne (B Lambot). The paper by G Leroux includes credit under each drawing to the photo interpreter (himself in each case!) but sets a precedent that we may well think of continuing, not only out of courtesy but also to provide a ‘belief factor’. One of the most ‘archaeological’ contributions [use of the data rather than its collection and display] is about analysis of aerial photographs of the Yonne valley to provide archaeological and environmental information from which a model of settlement pattern has been developed (J-P Delor). There are two regional-morphological-type studies: one of features recorded on the plain of Caen (J Desloges et al), the other of north Brittany (M-Y Daire and L Langouet). Those of you
who like puzzle photos may like to consider the illustrations in the paper by Alain Bouthier. These are unusually broad and fuzzy linear ditches [I think the photos show bare-soil winter conditions] which appear to show a rectilinear system of former land division.

The final contribution to the Amiens volume is by Grard Chouquer offers what I take to be a light-hearted look back to the ‘art’ theme in Agache’s opening paper and is illustrated by some of Paul Klee’s 1920s ‘aerial’ sketches.

In summary, the papers from the 1992 Amiens conference make a reasonably comprehensive statement of the state of aerial photography at that date. [And I deliberately use the word ‘photography’ as there is not a great deal that covers the archaeological advances that had already been made by using aerial photographs. For example, compare and contrast the changing levels of knowledge, or of the states of the art, shown in the papers in the two earlier CBA volumes (Wilson 1975 and Maxwell 1983).] With this in mind it is unfortunate that the editors allowed publication to drift on for seven years and that some authors continued to update what would otherwise have made a convenient ‘time capsule’. My reading of the volume was constantly interrupted by thoughts of, “Yes, but what’s happening now?” and I would like to see updates of much of the work presented in the Amiens volume (and where better than AARGnews – or the prophesised born-again Aerial Archaeology?).

The published volume is a luxury presentation of what by most accounts was a luxury conference (see comments in AARGnews 6, 1993). It is a paperback book, but a substantial one, with good card covers and about 1mm of glue to hold the pages in place. My reviewing battering of it has led to none of the customary cracks in the spine, although the pages do stay open easier now than they did at first. Printing is good and, to judge by authors whose work I know, the quality of the photographs reflects the quality of the originals. Most papers are preceded by summaries in French, English and German and language is French or English except for one paper each in Italian and Spanish. Pictures are a universal language and, if nothing else, this volume will provide visual insights into progress in aerial survey in less-familiar parts of Europe (and Canada!).

References:

[Cog Palmer]

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

AARG 2000.

Aberdeen University: 5-7th September.

Offers of presentations, demonstrations or exhibitions and posters, contact Davy Strachan (Chairman) on 01245 437681 (e-mail: david.strachan@essexcc.gov.uk).
For further details about the conference, please contact Fiona Small (Meetings Secretary) on 01793 414701 or fiona.small@rchme.co.uk.
List of contributors

Paul Barford
Wloscianks 8 m 10
01-710 Warszawa
Poland
pbarford@pro.onet.pl

Agnieszka Dolatowska, Jolanta Goliasz and Lidka uk
Instytut Prahistorii
Sw Marcin 78
61-809 Poznan
Poland
agadola@artemida.amu.edu.pl

Michael Doneus
Institut fr Ur- und Frhgeschichte
Franz Klein Gasse 1
A-1190 Wien
Austria
Michael.Doneus@univie.ac.at

Toby Driver
Air Survey Officer
RCAHMW
Crown Buildings Plas Crug
Aberystwyth
Ceredigion SY23 1NJ
UK
toby.driver@rcahmw.org.uk

Damian Grady
English Heritage Aerial Survey,
National Monuments Record Centre,
Kemble Drive,
Swindon SN2 2GZ
UK
damian.grady@rchme.co.uk

Martin Fowler
60 Harrow Down
Badger Farm
Winchester
Hampshire SO22 4LZ
UK
mjff@compuserve.com

Dipl.-Ing. Eckhard Heller
Aplerbecker Str. 359
44287 Dortmund
Germany
fam.heller@telda.net

Kevin Jones
Department of Conservation
PO Box 10 420
Wellington
New Zealand
kjlones@doc.govt.nz

Ivan Kuzma
Archeologicky ustav SAV
Akademicka 2
SK-94921 Nitra
Slovakia
nraukuz@savba.sk

Chris Musson
Tanyffordd
Pisgah
Nr Aberystwyth
Ceredigion SY23 4NE
UK
davy.strachan@essexcc.gov.uk

Davy Strachan
Planning Department
Essex County Council
County Hall
Chelmsford CM1 1LF
UK
that’s enough…