Issue 28: August 2011

ISAP NEWS

The newsletter of the International Society for Archaeological Prospection

Contents

The views expressed in all articles are of the author, and by publishing the article in ISAP News, the ISAP management committee does not endorse them either positively or negatively. Members are encouraged to contact authors directly or to use the discussion list to air their views, should they have any comments about any particular article.

Editor's Note

R.J.Fry@bradford.ac.uk

Welcome to the 28th issue of ISAP News! I would like to thank all those who have found the time to contribute to the newsletter, and I hope you will find it an enjoyable read.

As the conference season approaches, included in the latter part of the issue is a reminder of the themes of discussion and details of each event. I hope to see a lot of members at the ISAP conference in Izmir next month.

*Please send any contributions or queries for the next newsletter (ISAP News 29) to the address above by the **31st October 2011**. All entries are gratefully received; I will always try to respond to emails in the same day if possible.*

Important Notices

Archaeological Prospection Journal
Take advantage of the great deal offered to ISAP members by Wiley-Blackwell for this journal
http://www.bradford.ac.uk/archsci/archprospection/menu.php?2

Airborne and Ground-Based Survey on Salisbury Plain Army Training Estate, Wiltshire

Rebecca Bennett, Kate Welham, Ross A. Hill, Andrew Ford
Bournemouth University R.Bennett@bournemouth.ac.uk

In 2009 a project was established at Bournemouth University to research the archaeological application of airborne remote sensed (ARS) data, specifically airborne laser scanning (ALS, also commonly referred to as lidar) and digital spectral imagery (commonly known as multi- or hyper-spectral imagery). The broad aim was to asses the full information content of these data with respect to identifying archaeological remains in non-arable environments and to evaluate how best this information could be extracted and utilised. One of the key objectives of the project was an evaluation of the relationship and complementarity of airborne data and ground based geophysical techniques.

The use of airborne sensors, in particular ALS has increased significantly over the last few years but research in the UK to date has mostly focussed on alluvial valleys under a heavy agricultural regime. Work undertaken in the Trent Valley and Vale of Pickering (Challis and Howard 2006; Challis et al. 2011; Powlesland et al. 2006) illustrates the potential for identification of topographical and vegetation change associated with surface and subsurface archaeological features from ALS and spectral sensors. Landscapes where arable crops do not form the dominant land cover are typified by hardy vegetation, (grasses, scrub and heath) that is less prone to the stress that induces crop mark features. This makes the observation of archaeological features from standard aerial photography significantly more challenging, particularly when coupled with land management practises that allow encroachment of scrub. The challenge for the current research was to provide proof of concept for the identification of archaeological features in ARS data in non-arable environments and to develop methods to exploit the full potential of the ALS and spectral data in these environments.

The current research began with an assessment of archive ALS and multispectral data for a study area of 4km^2 in the East Range of Salisbury Plain (Bennett et al. 2011). This study showed the potential for the identification of archaeological features in ALS and provided information regarding the best processing techniques and most sensitive regions of the spectrum recorded by the sensors. However the use of archive data meant that no contemporary observations of the ground and feature conditions were available, thus limiting the level to which interpretations could be drawn. It was decided that non-intrusive geophysical techniques combined with soil moisture measurements were the best way to help quantify the ground conditions at the time of the survey. Consequently an application was made to the NERC Airborne Research and Survey Facility for acquisition of tailored ALS and digital spectral data to enable the simultaneous collection of geophysical survey data.

One of the major challenges for the comparison of airborne data and geophysical techniques is the logistics of undertaking simultaneous survey. For the purposes of this research being able to conduct simultaneous earth resistance and ground penetrating radar survey was key to the integrity of the analysis as soil moisture levels change rapidly due to the shallow soil and porous nature of the chalk bedrock on Salisbury Plain. Simultaneous ground deployment meant that additional data could be gathered such as with soil samples for laboratory analysis and spectral taken with a hand held spectrometer.

Two sites were selected for ground observations. Site one comprises a pair of Iron Age enclosures; site two is an area of potential platforms identified in low light levels by Roy Canham (former Wiltshire County Archaeologist) but never mapped from aerial imagery. Results of the fluxgate gradiometer survey for site one are shown in figure 1. Both sites had been subject to plough damage but were now under permanent pasture, providing a challenge for airborne techniques as their associated earthworks are almost levelled and

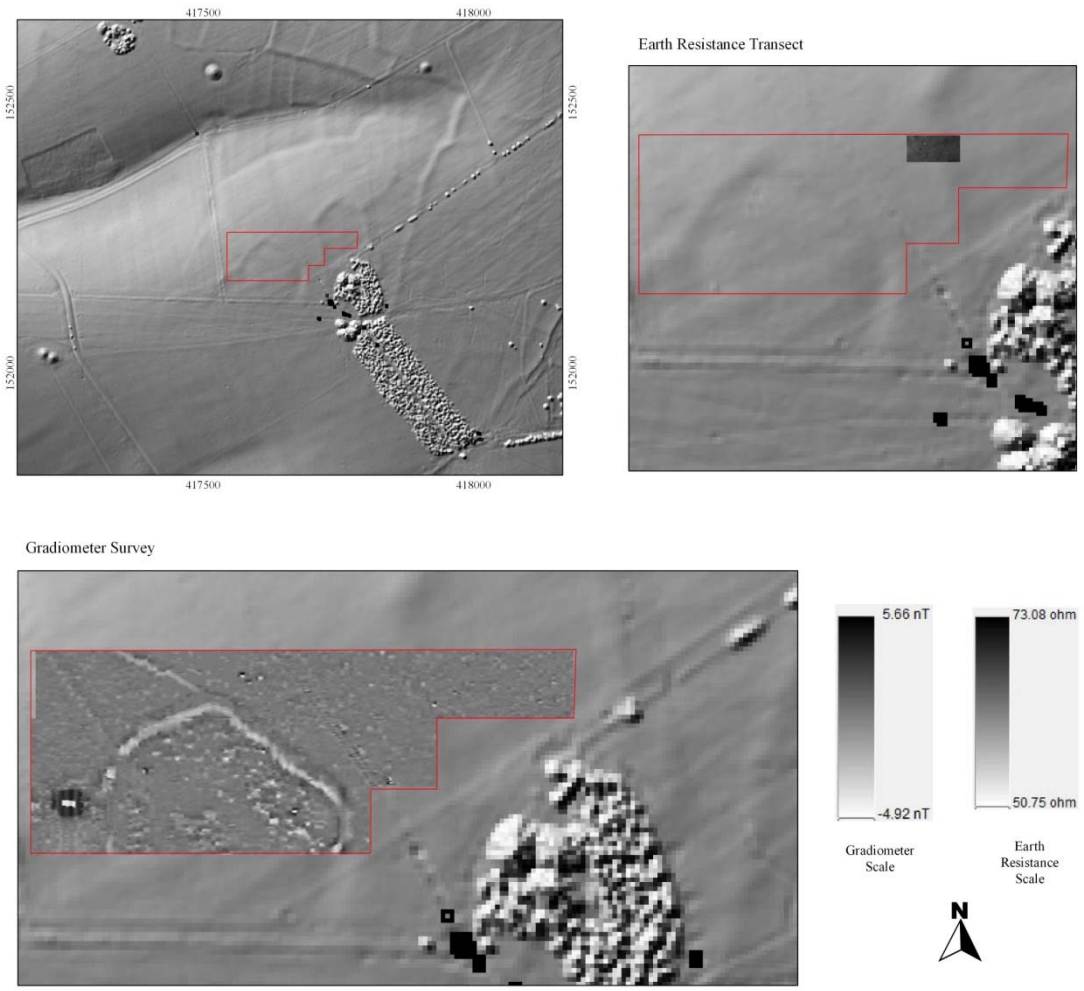


Figure 1: Location of gradiometer survey and earth resistance transect at Site 1 (overlain on the ALS shaded relief model)

the chance of observing stress induced type vegetation change in the hardy chalk grassland is very small. Both sites were surveyed with a fluxgate gradiometer (Bartington Grad 601-2) with a traverse interval of 1m and a sampling interval of 0.125m to provide an accurate location and broader site context for the features selected prior to the acquisition of airborne data.

The acquisition of ALS and hyperspectral data was undertaken in clear conditions in March 2010. The fieldwork team was rapidly deployed to site and was able to collect two 15 x 30m transects of earth resistance survey at site one along with a 15 x 30m transect of GPR data across the enclosure bank. The earth resistance survey was undertaken using a multiplexer with 0.25m and 0.5m probe separation at 0.5m resolution to survey the shallow near surface features that were likely to be represented in the airborne data. The GPR data were collected using an 800mhz antennae and a line spacing of 0.5m sampling at 5cm intervals. At site two we were able to collect a further 15m x 30m transect of a platform feature the following day. This survey was also undertaken using a multiplexer with 0.25m and 0.5m probe separation at 0.5m resolution.

The airborne data were initially calibrated by the ARSF and delivered in December 2010. Work in the interim has involved applying atmospheric and geo-correction to the digital spectral data along with strip adjustment and visualisation of the ALS elevation and intensity data. With this completed, it will be possible to analyse the geophysical data collected with respect to the airborne data using a variety of geo-statistical techniques to assess the existence and strength of any correlation over known features at site one. At first look the results from the data seem promising and we look forward to presenting the conclusions of the study later in the year.

Acknowledgements

Airborne data acquisition for the project was supported by the NERC Airborne Research and Survey Facility (GB10-07), Field Spectroscopy Facility and Geophysical Survey Facility (920) . The Bournemouth University team would like to thank the Ministry of Defence and Defence Estates for facilitating access and especially Richard Osgood and Martin Brown, Senior Historic Environment Advisors. Access to the archaeological archive was facilitated by the staff of the Wiltshire Sites and Monuments Record and we are especially grateful for the expertise and encouragement of Roy Canham, former Wiltshire County Archaeologist. The research is supported by a Bournemouth University Doctoral Research Bursary.

References

Bennett, R., Welham, K., Hill, R.A., and Ford, A. 2011. Making the most of airborne remote sensing techniques for archaeological survey and interpretation. In D. Cowley (ed.) *Remote Sensing for Archaeological Heritage Management*.EAC Occasional Paper, 99-107. Hungary: Archaeolingua

Challis, K., and Howard, A.J. 2006. A review of trends within archaeological remote sensing in alluvial environments. *Archaeological Prospection* 13(4): 231-240.

Challis, K., Carey, C., Kincey, M., and Howard, A.J. 2011. Airborne lidar intensity and geoarchaeological prospection in river valley floors. *Archaeological Prospection* 18(1): 1-13.

Powlesland, D., Lyall, J., Hopkinson, G., Donoghue, D., Beck, M., Harte, A., and Stott. 2006. Beneath the sand: remote sensing, archaeology, aggregates and sustainability: a case study from Heslerton, the Vale of Pickering, North Yorkshire, UK. *Archaeological Prospection* 13(4): 291-299

An Algorithm for the Fast and Accurate Three Dimentional DC Resistivity Inversion Applicatiion on Imaging Buried Archaeological Objects

M. Emin Candansayar[1,2] and Nikos G. Papadapoulos[2]
[1] Ankara University, Department of Geophysical Engineering
[2]Laboratory of Geophysical-Satellite Remote Sensing & Archaeo-environment nikos@ims.forth.gr

Direct Current Resistivity (DCR) method is one of the most useful geophysical methods in archaeological prospection. During the last decade DCR data acquisition systems have been greatly improved and currently thousands of data can be measured relatively fast (e.g. less than an hour) using multi-channel and multi-electrode measurement systems. Furthermore, the development of three-dimensional (3-D) DCR inversion algorithms for processing the apparent resistivity data has rendered the 3-D electrical resistivity tomography (ERT) very popular among geoscientists.

Nowadays in archaeological areas, DCR data are mostly collected along dense parallel lines and are interpreted by using 3-D inversion algorithms. The main issues that are of major concern in DCR method include: a) the choice of the optimum array to effectively investigate buried archaeological remains and b) data processing time when using the 3-D inversion algorithms.

In this study, we suggested two new improvements in 3-D inversion of DCR data set. The first is the calculation of the compressed sensitivity matrix (Papadopoulos et al. 2008) in initial iteration and the subsequent updating of this matrix with Broyden' s method during the latter iterations. The second is the collection of data by using left- and right-sided pole-dipole and dipole-dipole arrays and the jointly inversion of these data sets (Candansayar, 2008) to get more accurate result than any individual use of these arrays

We showed these improvements with a synthetic data inversion. The synthetic data sets were calculated by using 441 electrodes (21 by 21 in x- and y-direction) for the model shown in Figure 1. The model consisted of two layers. The surface layer resistivity is 75 ohm-m and the basement resistivity is 50 ohm-m. There is also a tumulus like structure having 500 ohm-m resistivity that is buried in the basement. Dipole-Dipole, left- and right-sided pole-dipole arrays data sets were calculated along x-direction that yielded 11088 apparent resistivity data.

Inversion with full sensitivity matrix inversion obtained after 96 minutes CPU time is shown in Figure 2. Inversion result with sparse sensitivity calculation in initial iteration and Broyden's update for the following iterations is obtained after 18 minutes CPU time and shown in Figure 3. Although both inversion results are of comparable accuracy and similar to the original model, our suggestion converges to an inversion model in shorter time compared to conventional inversion approach. We also compared individual inversion of each array data sets with each other and with the joint inversion of all the data sets calculated for the model explained above. We showed that (not presented here) joint inversion of left- and right-side pole-dipole and dipole-dipole arrays data sets gives more accurate results than individual inversion of any of these data sets.

ACKNOWLEDGEMENTS

This work was supported by the european project **"ArchaeoLandscapes - ARCLAND" Europe**. (2010-2015) European multiannual project (2010-2015) - European Commission - Directorate General Education and Culture, Programme « Culture » (2007-2013).

REFERENCES

Candansayar,M.E.,2008. Two-dimensional individual and joint inversion of three- and four-electrode array dc resistivity data. J. Geophys. Eng.,5,290-300.

Papadopoulos, N.G., Tsourlos P., Papazachos C., Tsokas G.N., Sarris A. and Kim J.H., 2011. An algorithm for fast 3D inversion of surface electrical resistivity tomography data: application on imaging buried antiquities. Geophysical Prospecting, 59, 557-575.

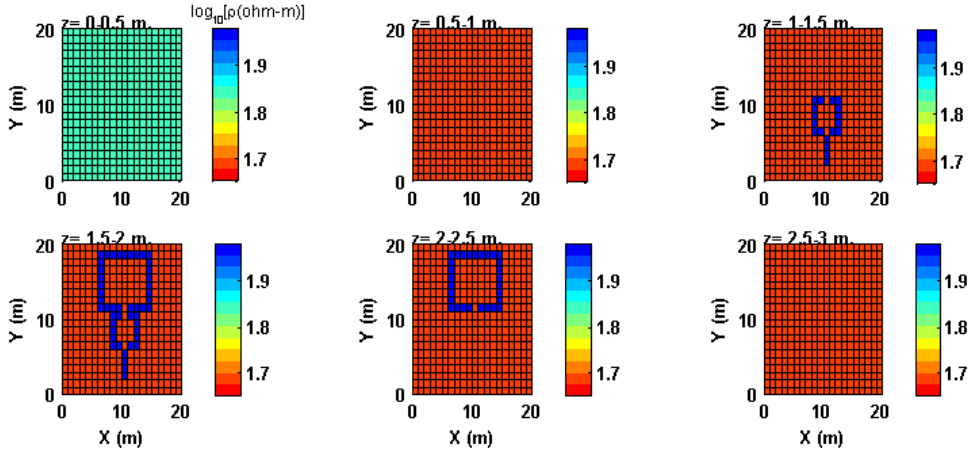


Figure 1. *XY-slices of the 3D resistivity model for each depth range.*

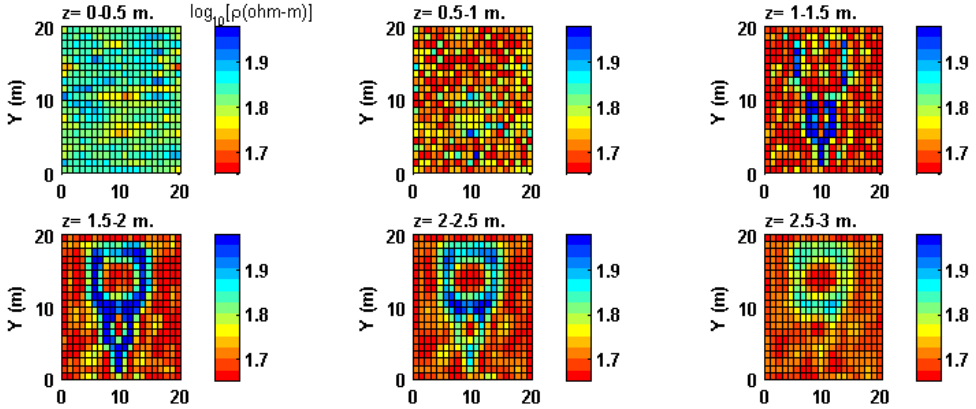


Figure 2. *Inversion result as xy-slices for each depth range with full sensitivity calculations in each iteration.*

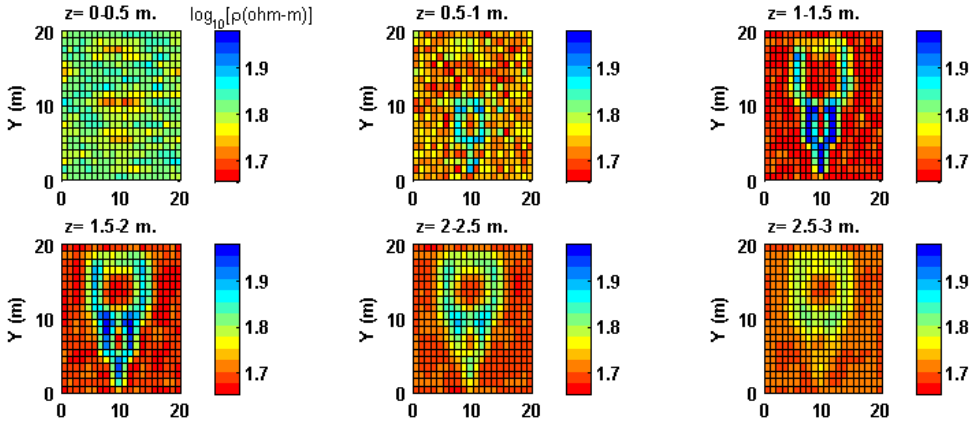


Figure 3. *Inversion result as xy-slices for each depth range with sparse sensitivity calculations in initial iteration and Broydan update for the following iterations.*

New Archaeological Surveys at Wolvesey Palace, the Cathedral and Winchester College, Winchester, Hampshire

Kristian Strutt[1,2] and James Miles[2]
[1] Archaeological Prospection Services of Southampton (APSS)
[2]The University of Southampton
K.D.Strutt@soton.ac.uk

Over the past 3 years Archaeology staff and students at the University of Southampton have been carrying out new geophysical survey work at Winchester in Hampshire. The work is being conducted as part of research into the buried archaeological deposits relating to the Roman and medieval deposits in the city, and has focused on the zone of the cathedral and close, within the city walls, and on some areas further to the south of the city. The study has also provided an ideal location for the training of undergraduate and postgraduate students at the university in different techniques of archaeological prospecting, and the theory and methods which surround a non-intrusive approach to archaeological research.

Figures 1-3: 2009 survey undertaken at Wolvesey Palace with 1: Earth Resistance, 2: Magnetometry 3: GPR

In 2009 survey concentrated on the area of Wolvesey Palace, located at the south eastern corner of the city walls. Students, supervised by Dominic Barker, Timothy Sly, James Cole and the authors, conducted survey using resistivity, magnetometry and Ground Penetrating Radar (GPR) within the playing fields of Pilgrim's School, and within the curtilage of the English Heritage site of Wolvesey Palace (see figures 1-3; photos taken by Dominic Barker). Resistivity and magnetometry were utilised across the playing fields, with GPR being used to survey within the rooms of the ruins of the Palace to locate Roman structures below the medieval floor level. The survey was complemented by topographic survey and some building survey, creating a new plan of the Palace and the city walls. The resistivity above all located the remains of structures between the Palace and the Cathedral Close, buried remains located adjacent to the city walls and the remains of the south and west wings of the later Bishop's Palace (see figure 4).

In 2010 the focus of work shifted to the areas immediately to the west and north of the Norman cathedral at Winchester. A GPR survey was conducted by postgraduate students Eleanora Gandolfi and Richard Milwain together with the authors, as part of the postgraduate module in Archaeological Geophysics at the University. Some of the areas in question had already been excavated in the 1960s and 1970s by Martin Biddle. The aim was to produce a plan of archaeological deposits for the zone, comprising the excavated areas and the unexcavated areas further to the west and north. Results indicated a number of features associated with those found by Biddle. The line of the Paradise Wall to the north of the cathedral was also clearly defined in the results, and possible traces of the earlier Roman street plan.

Most recently in June 2011 the authors conducted a survey outside of the city walls, close to the Winchester College buildings, some 300m to the south of Wolvesey Palace. The survey was conducted on behalf of the Winchester Archaeological Research Group (WARG) prior to commencement of an archaeological excavation (for more information on the group please check their website at www.warg.org.uk). The area was supposedly that of the church of St Stephen, and a resistivity survey was conducted with the aim of locating any structures associated with the remains of the church. Results of the survey indicate the

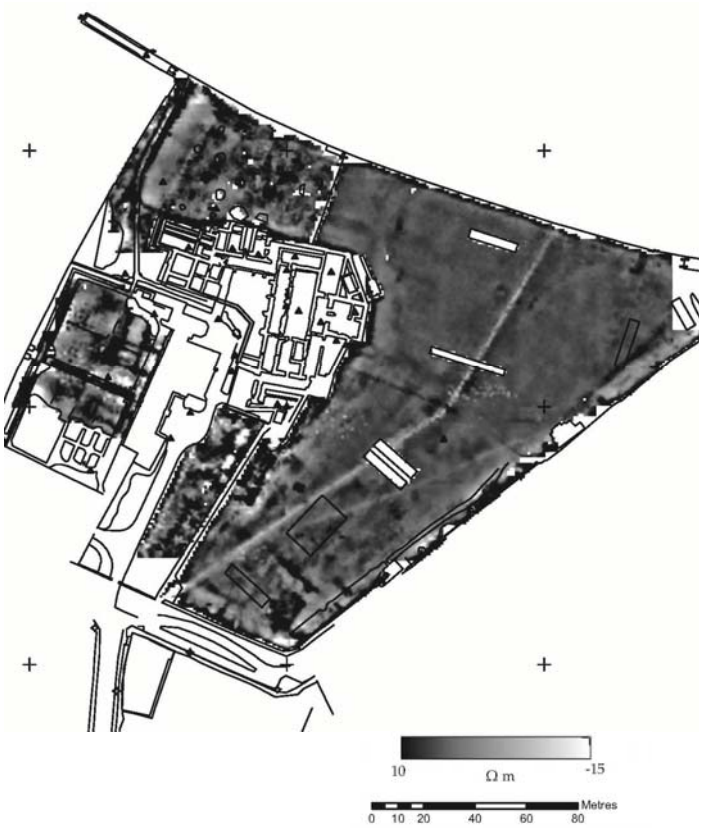


Figure 4: Resistance dataset over the playing fields of Pilgrim's School

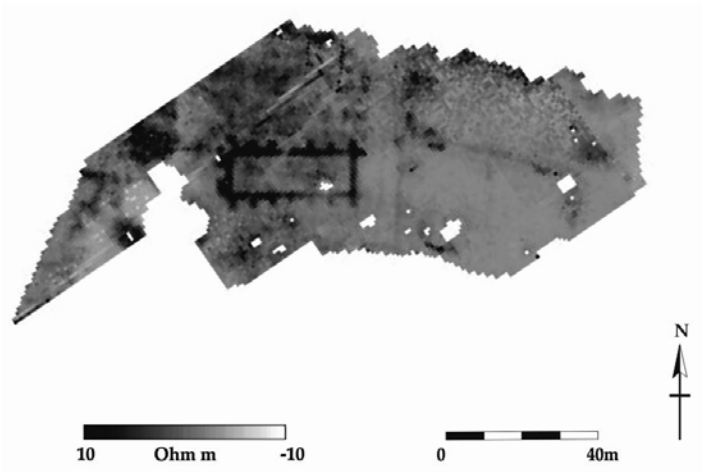


Figure 5: Resistance dataset over the potential Church of St. Stephen

presence of a substantial building, measuring some 40m by 15m, and supported by buttresses (see figure 5). Evidence for a track-way or road running from north to south is visible in the results.

The team plan to continue geophysical survey in Winchester, and in the area of St Stephen's in the future. WARG are due to start excavation at the site this summer.

The ArchaeoLandscapes Europe Project

Dr. Axel G. Posluschny[1] & Christopher R. Musson[2]
[1]ArchaeoLandscapes Europe
[2]Aerial Archaeology Research Group
Posluschny@rgk.dainst.de

The *ArchaeoLandscapes Europe* project – EU-funded within the framework of the Culture 2007-2013 programme – aims to address existing imbalances in the use of modern surveying and remote sensing techniques and to create conditions for the regular use of these strikingly successful techniques across the Continent as a whole. It aims to create a self-sustaining network to support the use throughout Europe of aerial survey and 'remote sensing' to promote understanding, conservation and public enjoyment of the shared landscape and archaeological heritage of the countries of the European Union.

The project represents the culmination of a growing European cooperation from the mid-1990s onwards. Now federating 42 prestigious institutions in the field of archaeology and heritage protection from 26 countries, it will bring that process to a sustainable and self-supporting future as the long-term legacy of this and earlier EU-assisted initiatives.

The central theme of concerted action and cooperation will be stressed through annual meetings of the whole of the membership, to agree policy, review progress and plan new initiatives. Much of the project's work, however, will be undertaken through specialist 'focus-groups' and carefully structured 'work-packs' setting out operational programmes and timetables for each of the project's eight key objectives or 'Actions':

1. Creating an ultimately self-supporting *ArchaeoLandscapes Network*, with a small central secretariat, to provide leadership, coordination and advice on the use for heritage purposes of aerial photography, remote sensing and landscape studies.

2. Using traditional and innovative methods to publicize the value of aerial survey, remote sensing and landscape studies amongst the general public, students, teachers and all those who explore, enjoy or care for cultural landscapes and heritage sites across Europe.

3. Promoting the pan-European exchange of people, skills and understanding through meetings, workshops, exchange visits, placements and opportunities for specialist training and employment.

4. Enhancing the teaching of remote sensing and landscape studies through courses for students and teachers, and in the longer term through a European Masters degree in remote sensing and heritage management.

5. Securing the better exploitation of existing air-photo archives across Europe by researching, assessing and publicizing their potential for heritage interpretation and landscape conservation.

6. Providing support for aerial survey, remote sensing and landscape exploration in countries relatively new to their use, especially in northern, eastern and southern Europe.

7. Further exploring the uses of laser, satellite and other forms of remote sensing and web-based geographical information systems (GIS) in archaeological and landscape research, conservation and public education.

8. Providing technical guidance and advice on best practice in aerial survey, remote sensing and landscape studies, with a particular emphasis on conservation and heritage management.

Dialogue with target groups in the scientific community and the general public will focus on multilingual and interactive web-based presentation (http://www.archaeolandscapes.eu), which will be updated with new content as a result of the work of the *ArcLand* project in the coming weeks and months. Use will also be made of leaflets, booklets and more substantial publications to engage both with ordinary citizens and with specialists in various aspects of heritage exploration, management and presentation.

The project's long-term legacy will be better appreciation of the landscape and archaeological heritage of Europe, closer contact between heritage professionals and the general public, more effective conservation of the shared cultural heritage, the international sharing of skills and employment opportunities, better public and professional education, the wider use of archive resources and modern survey techniques, and higher professional standards in landscape exploration and conservation.

For further information, comments and suggestions please contact Dr. Axel G. Posluschny

Call for Papers

The 1st International Conference on Best Practices in World Heritage: Archaeology

Dokuz Eylül University in Izmir, Turkey. 19th-24th September 2011

CALL FOR PAPERS

1st INTERNATIONAL CONFERENCE ON BEST PRACTICES IN WORLD HERITAGE: ARCHAELOGY

April 9-13th, 2012 at Menorca, Balearic Islands, (Spain)
http://www.congresopatrimoniomundialmenorca.cime.es/

The Universidad Complutense de Madrid, together with the Consell Insular de Menorca are organizing this international conference to generate a meeting point on Archaeology management and treatment of World Heritage Sites.

The main aim of the Conference is to draw up and publish a "Guide of Best Practices in World Heritage: Archaeology". To this end, sessions about the following topics will be organized:

1) Social action and Archaeology in World Heritage
2) ICT, Archaeology and World Heritage
3) Architecture, World Heritage and Archaeology
4) Land planning, Archaeology and World Heritage
5) Preventive Archaeology and World Heritage
6) Education, diffusion, World Heritage and Archaeology

CALL FOR PAPERS IS NOW OPEN
Abstracts (300-400 words):
Deadline extension: November 10th., 2011

Send as an email attachment in WORD or PDF to:
congresopatrimonio.menorca@cime.es

The 9th International Conference on Archaeological Prospection

Dokuz Eylül University in Izmir, Turkey. 19th-24th September 2011

The 9th International Conference on Archaeological Prospection will be organised by the Center for Near Surface Geophysics and Archaeological Prospection (CNSGAP) of Dokuz Eylül University and International Society for Archaeological Prospection (ISAP).

SESSIONS

1. Archaeological prospection in the past, present and future in Anatolia
2. Site based studies
3. Integrated prospection methods
4. Processing, interpretation and visualization
5. Technical aspects and archaeological feedback
6. Remote sensing, GIS, imaging
7. Archaeological prospection in urban sites
8. Archaeological prospection in restoration and conservation studies
9. Marine studies
10. Poster session

REGISTRATION & EXHIBITION

		On the desk
Full Participant		350 €
Student		125 €
Accompanying person		125 €
Exhibitor		1000 €

Registration fees include; attendance to the sessions, volume of extended abstracts, congress kit, coffee break, cocktails on Monday and Friday. Exhibition fee includes; a table, chairs, billboards, electricity.

Oral presentations cannot be longer than 15 minutes, including questions. Please keep in mind that the accepted language of the conference is English.

Poster presentations will be presented in a separate session in the conference program (10 minutes). Poster dimensions are dictated by stand size and cannot exceed 90 cm in width and 150 cm in height.

Website: http://web.deu.edu.tr/ap2011/ **Email:** ap2011@deu.edu.tr

Conference on Archaeological Prospection in Germany 2011

The University of Mainz, Germany 9th and 10th September 2011

The Archaeological Geophysics and Prospection Research Group at the University of Mainz, Germany, invites you to an interdisciplinary conference on Archaeological Prospection. The focus will be on the application and integration of the different prospection methods in the archaeology in Germany and its international context.

The conference will take place on 9 and 10 September in the Naturwissenschaftlichen Fakultät building of the University campus. Generous funding by the Geocycles Research Centre means that there will be no charge for attending the conference but please let us know by 31 August if you intend to join us. You can contact us at the email address ap-konferenz@uni-mainz.de Further information can be found on our website http://www.geowiss.uni-mainz.de/351_DEU_HTML.php

The conference will interest all interested in archaeology in Germany, amateur and professional, to air-photographers, researchers, administrators and many others. Please note that the conference will be hold in German. We look forward to seeing you in Mainz!

Archäologische Prospektion – Potential und Perspektiven

Die Arbeitsgruppe Archäogeophysik des Instituts für Geowissenschaften der Johannes Gutenberg-Universität Mainz lädt gemeinsam mit dem Max-Planck-Institut für Chemie und dem i3mainz der Fachhochschule Mainz zu einer interdisziplinären Konferenz zur Archäologischen Prospektion nach Mainz ein.

Im Fokus des Tagungsprogramms steht die Anwendung der verschiedenen Prospektionsmethoden in Deutschland unter Berücksichtigung des internationalen Kontexts.

Die Konferenz findet vom 09. bis zum 10. September 2011 in der Naturwissenschaftlichen Fakultät (Johann-Joachim-Becher-Weg 21) auf dem Campus der Universität Mainz statt. Da das Forschungszentrum Geocycles die Konferenz großzügig fördert, wird keine Tagungsgebühr erhoben. Aus organisatorischen Gründen erbitten wir jedoch verbindliche Zusagen bis zum **31. August 2011**.

Bei Interesse können Sie uns unter der nebenstehenden e-Mailadresse kontaktieren. Weitere Informationen finden Sie auf unserer Homepage: http://www.geowiss.unimainz.de/351_DEU_HTML.php

Die Einladung richtet sich an alle, die an der Anwendung von Prospektionen in der deutschen Archäologie und der Nutzung der dabei entstehenden Daten interessiert sind.

Archaeology Special Interest Group Session – Imaging our Heritage – Cultural Heritage

13th-15th September, Bournemouth

Applications of Remote Sensing and Photogrammetry
RSPSoc Annual Conference 2011 - 13th-15th September, Bournemouth, UK

Contributions have been encouraged in the following broad areas:

- Novel technological applications for the cultural heritage sector
- Ground based remote sensing (e.g. laser scanning, geophysical survey)
- Airborne and satellite remote sensing
- Multisensor survey techniques
- UAVs for archaeological prospection

Please contact Rebecca Bennett rbennett@bournemouth.ac.uk for further information.

AARG / EARSeL 2011, Poland

The Adam Mickiewicz University of 21-24 September 2011

AMBITIONS AND REALITIES
Remote Sensing for Archaeology, Research and Conservation

A joint meeting of the Aerial Archaeology Research Group AARG)
and European Association of Remote Sensing Laboratories (EARSeL)
Poznan, Poland, 21-24 September 2011

The main - but not exclusive - theme of this conference will be exploration of objectives and challenges in the effective use of remote sensing techniques in archaeological and landscape studies, not only for research but also for the promotion of conservation and public understanding. How can our various techniques be deployed in combination with one another, and with what practical outcomes? How can we build bridges across regional or national divides? What can we learn from combining or comparing our techniques? How can we make our results useful to those involved in practical conservation and future planning? How do our national or regional realities assist or impede the use of remote sensing techniques in research, conservation and the promotion of public understanding?

The following themes have been encouraged:

- Ambitions and impediments: national and regional realities across Europe.

- Sharing understanding and experience: creating conditions for international or interdisciplinary exchange and cooperation.
- Modelling the past for the future: accessibility of LiDAR and similar data for uses in research and conservation.
- Remote sensing applications in responding to infrastructure and development projects.
- "Crossover studies": learning from comparisons and combinations of remote sensing (and other) techniques.
- Exploration + interpretation = understanding??? But whose understanding? And of what relevance to conservation and public appreciation?

1st MAC International Workshop on Archaeological Geophysics MAC-IWAG

Girona, Spain 5-11th September 2011

With presentations from some of the best known experts in archaeological geophysics, MAC-IWAG offers archaeologists and geophysicists an intensive 5-day course, within the framework of Museu d'Arqueologia de Catalunya-Ullastret (Girona) (http://www.mac.cat/eng/Branches/Ullastret).

Lectures will focus on fast and large-scale data acquisition for high-resolution mapping of big archaeological sites. State-of-the-art technology will be presented:

- Multi-channel ground-penetrating radar
- AMP – multi-sensor magnetic cart system
- ARP – multi-separation earth resistance cart system

The workshop includes theoretical topics, fieldwork activities and data processing. Lectures will be held at the Ullastret-MAC facilities (http://www.mac.cat/eng/Branches/Ullastret). The *Empuries* archaeological site (a unique site in Spain due to the presence of a large Greco-Roman settlement) is located just 30 km away (http://www.mac.cat/eng/Branches/Empuries). Other interesting places to visit when coming to Ullastret are: Cadaquès (hometown of Salvador Dalì) and many more seaside villages along the Costa Brava region.

Participants

The workshop is open to geophysicists, archaeologists, engineers, physicists and geologists who are interested in geophysical technologies for archaeological prospection.

Cost

The registration fee is 300 Euros, which does not cover accommodation and meals. Assistance will be offered with arranging accommodation close to the venue.

Contact

Information/registration: Jordi Principal (jprincipal@gencat.cat)
Further information: Gabriel de Prado (gdeprado@gencat.cat) and Alex Novo (xandrenovo@gmail.com)

Lecturers

Prof. Albert Casas (Universitat de Barcelona, Spain). Geophysics.
Dr. Michel Dabas (Geocarta, France). ARP and AMP prospection.
Dr. Dean Goodman (GAL, USA). GPR Imaging.
Mr. Gianfranco Morelli (SOING, Italy). 3D ERT.
Dr. Alexandre Novo (Geostudi Astier, Italy). High-resolution 3D GPR.
Dr. Jordi Principal (Museu d'Arqueologia de Catalunya, Spain). Iron Age archaeology.
Mr. Roger Sala (SOT Prospecció Arqueològica, Spain). Archaeogeophysics interpretation.
Dr. Armin Schmidt (GeodataWIZ/University of Bradford, UK). Magnetic prospection/visualisation.

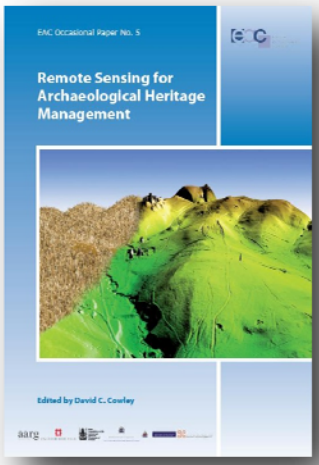
Ullastret site (Girona, Spain)

Remote Sensing for Archaeological Heritage Management
Edited by David C Cowley

Remote sensing is one of the main foundations of archaeological data, under pinning knowledge and understanding of the historic environment. The volume, arising from a symposium organised by the Europae Archaeologiae Consilium (EAC) and the Aerial Archaeology Research Group (AARG), provides up to date expert statements on the methodologies, achievements and potential of remote sensing with a particular focus on archaeological heritage management. Well-established approaches and techniques are set alongside new technologies and data-sources, with discussion covering relative merits and applicability, and the need for integrated approaches to understanding and managing the landscape.

Discussions cover aerial photography, both modern and historic, LiDAR, satellite imagery, multi- and hyper-spectral data, sonar and geophysical survey, addressing both terrestrial and maritime contexts. Case studies drawn from the contrasting landscapes of Europe illustrate best practice and innovative projects.

See http://www.univie.ac.at/aarg/php/cms/Occasional-Publications/ for contents list.



Language: English with abstracts in French and German
Distribution: Archaeolingua, Budapest
Format: 312 pp + 218 illustrations in full colour throughout, 297 × 210mm, hardback
ISBN: 978-963-9911-20-8
Price: € 40 + packing and shipping
Copies of the book can be ordered from:
Archaeolingua, H-1014 Budapest, Úri utca 49, Hungary
tel/fax: +36 1 3758939
email: kovacsr@archaeolingua.hu
web: http://www.archaeolingua.hu/books/eac.html

Journal Notification

Archaeological Prospection

Volume 18 (3) of Archaeological Prospection is currently going to press. Articles published in this issue include:

Electrical resistivity tomography investigations of multi-layered archaeological settlements: Part I-modelling by **Berge** and **Drahor**

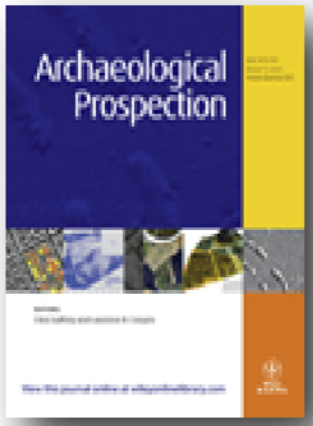
Non-destructive Electrical Resistivity Tomography Survey at the South Walls of the Acropolis of Athens by **Tsourlos** and **Tsokas**

Ground-Penetrating Radar in the Regiio III (Pompeii, Italy): archaeological evidence by **Barone *et al.***

Situating Remote Sensing in Anthropological Archaeology by **Thompson**

First field Magnetometer Investigation at the Phoenician Island of Mozia (Trapani), Northwestern Sicily: Preliminary Results by **Alfonsi *et al.***

Location of defensive military trenches in Central and Northern Greece by **Kaimaris**



MSc Archaeological Prospection

MSc. Archaeological Prospection, The University of Bradford, UK.

The course is a highly focused postgraduate degree programme which develops specialist skills in the theory and practice of archaeological prospection, in particular in near-surface geophysics.

It provides students with knowledge and experience of the principal geophysical and geochemical techniques currently available for the detection of buried archaeological features and other near-surface targets. The course provides appropriate background to materials and soil science, together with the relevant mathematical principles.

Other methods of detection such as remote sensing, topographical survey and field-walking are introduced as essential components of an integrated approach to landscape assessment. Sampling procedures and the computer treatment and display of field data from all methods are critically examined with the aid of case studies based on field experience. Skills and knowledge are developed through lectures, seminars, laboratory and fieldwork classes and a substantial individual research dissertation.

Special Features:

- In-depth specialist training, including hands-on experience in the Division's geophysics and computer laboratories and in the field
- First destination figures indicate that about 85% of postgraduates in Archaeological Sciences achieve work or further studies in the discipline or cognate areas

Course Syllabus

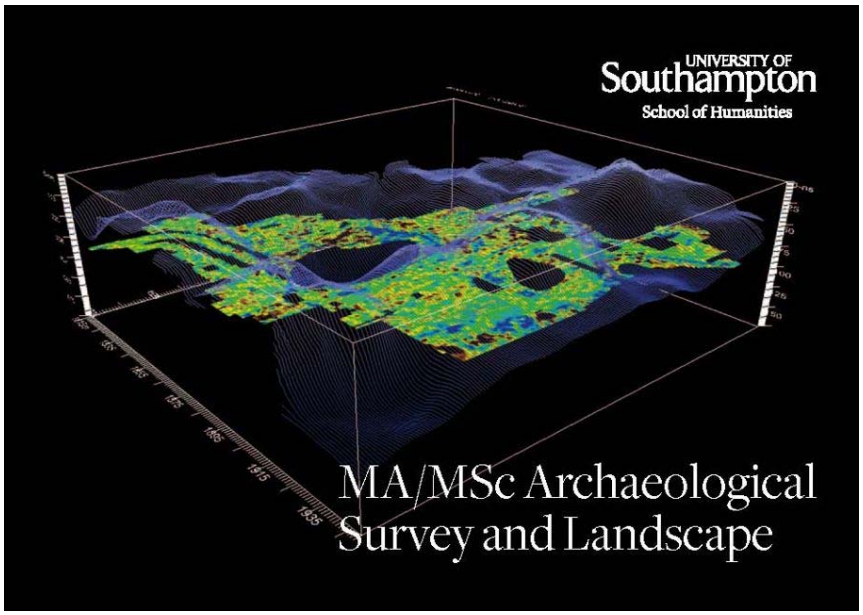
- Electrical Methods of Survey
- Magnetic and Electromagnetic Methods of Survey
- Site Evaluation Strategies
- GIS for Practitioners
- The Nature of Matter
- Treatment, Display and Interpretation of Field Data
- Soils and Chemical Prospection
- Dissertation (MSc)

For more information, visit: http://www.bradford.ac.uk/postgraduate/archaeological-prospection-shallow-geophysics/ or contact Dr Chris Gaffney (c.gaffney@bradford.ac.uk).

UNIVERSITY OF BRADFORD
MAKING KNOWLEDGE WORK

MA/MSc. Archaeological Survey and Landscape, The University of Southampton, UK.

The study of archaeological landscapes and the use of survey methods is one of the most fundamental areas of research within the discipline of Archaeology. It includes the development of scientific methods of survey and archaeological practice in the field, and the analysis and interpretation of sites and landscapes.



This is achieved through interdisciplinary skills and the application of theoretical frameworks to understand the past. An emphasis on archaeological survey and fieldwork is a longstanding strength of Archaeology at Southampton and the discipline has made many key contributions to the development of archaeological field techniques in Britain and abroad. The discipline is dedicated to teaching cutting-edge and progressive scientific techniques for the survey and analysis of archaeological sites and landscapes, including geophysical survey and GIS-based skills, backed by first class computing facilities. Our survey projects include research on the landscape of the South Downs, and the survey and excavation at Portus, Rome's ancient port, carried out in collaboration with the British School at Rome. Students on the MA/MSc are fully involved in fieldwork and data processing on these projects. Different scientific methods are taught to a high standard, preparing postgraduates for professional employment in the archaeological sector and allowing students to develop their research abilities. We actively support students with the potential for continuing within a research degree programme.

Typical Core Modules:
Research Skills
Core Computing
Archaeological Evaluation
CAD/GIS for Archaeologists

Typical Optional Modules:
Archaeological Survey and Recording
Archaeological Geophysics
Geoarchaeology
Social and Spatial Landscapes

Find out all the details of the programme and about the funding available on the Archaeology Discipline website: **www.southampton.ac.uk/archaeology** and **www.southampton.ac.uk/humanities**

Or contact Kris Strutt for further information **(K.D.Strutt@soton.ac.uk)**