ISAP NEWS

The newsletter of the International Society for Archaeological Prospection

Issue 19, April 2009

Contents

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Editor's Note

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Welcome to the 19th issue of ISAP News. I am grateful to all those who have submitted content, but it would be great to hear from more of you more often! If you would like to contribute to the next newsletter, please send me articles or announcements by 17th July 2009.

A lot of research projects are carried out by amateur groups and local societies, so, for the next issue in particular, I would like to encourage those of you who get involved, either as someone who undertakes geophysical surveys in their spare time or as a professional providing resources, support and knowledge to local groups to share your experiences with the rest of the society.

Using laser-levels for efficient positioning of GPR measurements in buildings

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Accurate positing of the GPR antenna is crucial for the quality of the resulting time- and depth-slice images and the mapping of subsurface structures. In order to guide the GPR operator in outdoor settings frequently parallel survey lines of, for example, 50 m length are spaced at constant intervals and the measurements are conducted with even in-line and cross-line sample spacing by traversing the survey area along the lines in zigzag mode.

Using a 500 MHz antenna system a spacing of one meter between parallel lines permits an efficient survey with 25 cm cross-line profile spacing following the scheme: measurement on line A in forward direction, beside line A in backward direction, between lines A and B in forward direction, beside line B in backward direction, on line B in forward direction, and so forth. In that manner the survey of an area of 2500 square metres (50m×50m) with 25 cm cross-line profile spacing can be conducted in approximately six hours by two persons in the field using a cart based GPR system.

When conducting GPR surveys in buildings the use of a cart with a relatively wide frame and wheelbase is mostly not useful since it can be important to be able to survey close up to walls, columns or other obstacles. Under these circumstances GPR systems with a tow- or push-bar are better suited (fig. 1).

Figure 1: Hand-tow GPR system with 500 MHz antenna and attached small odometer wheel for in-line positioning. An adjustable handle bar with rigid mounting permits good control over antenna movement.

In these systems the antenna usually is directly placed on the ground, which in case of flat surfaces does not present a problem. However, the use of marking lines for orientation would obstruct the antenna movement when pulling or pushing the antenna on the line.

Recently, when faced with the task to survey in a cathedral in search for unknown cavities or graves under the floor an alternative position guidance system was tested making use of two laser levels. Simple laser levels available in DIY stores at a unit price of approximately 25€ (22£ or 33 US$) emit lines of red laser light over distances of well above 10 m (fig. 2, 3, 5).

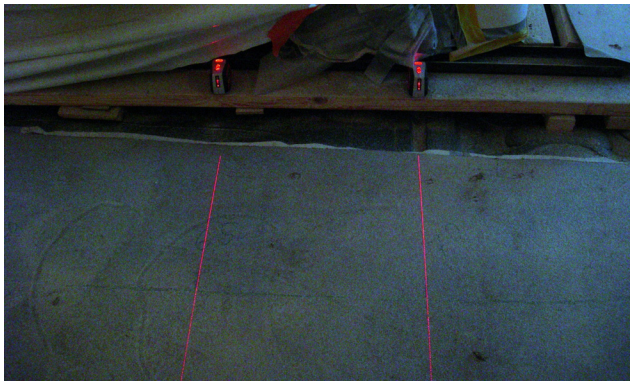


Figure 2: Two laser levels spaced at 50 cm distance emitting parallel lines of light clearly visible on the floor.

The visibility of the laser lines depends on the lighting conditions, which can be improved by blanking out internal and external light sources (e.g. night-time surveys).

Since uneven surfaces can cause shadow zones in the path of light it is advisable to place the laser levels some distance above the surface (~15-30 cm). At the far end of the survey line markers in form of for example small metallic angle brackets can be placed along a tape measure in order to quickly aim and adjust the orientation of the laser levels.

During the survey the GPR antenna should not obstruct the line of laser light. Efficient, dense measurements with for example 12.5 cm cross-line profile spacing are possible by using two laser levels separated by 50 cm and measuring towards

the laser light source with the beam focused on the centre of the antenna (x = 0 cm), then measuring just besides the line of laser light away from the light source (x = 12.5 cm, again towards the light source between the two lines of light (x = 25 cm), away from the light source just besides the second line of light (x = 37.5 cm) and again towards the light source with the second line of light focused on the centre of the antenna (x = 50 cm). Figure 3 illustrates this approach.

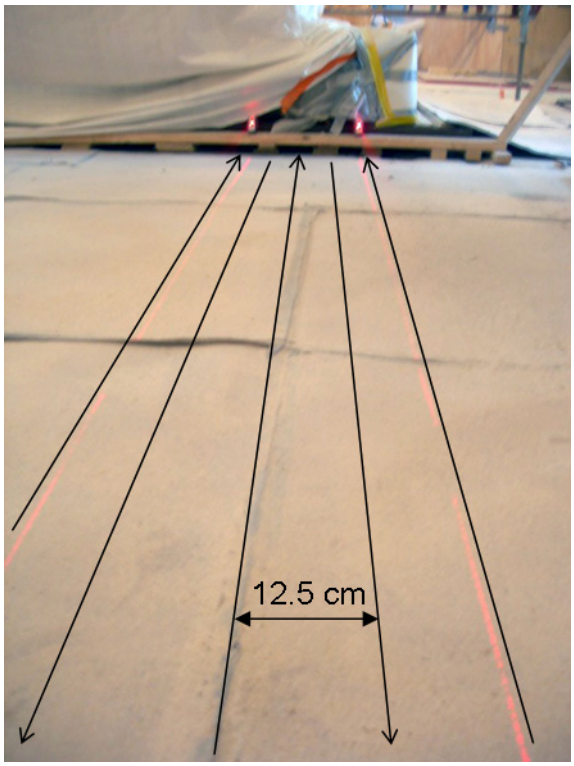


Figure 3: Illustration of the survey scheme using a spacing of 50 cm between the two laser levels and a cross-line GPR profile spacing of 12.5 cm.

A narrow marking of the centre of the GPR antenna (e.g. a strip of red tape) helps to keep the antenna 'on track' when moving on the marking line towards the light source (Fig. 4).

Similar laser levels emitting highly visible green light beams are available with alleged ranges of 30 m. Red light laser levels can be used with red laser glasses which considerably increase the visibility of the beam. The batteries of the laser levels (2×AAA each) where not exhausted after 6 hours of continuous use.

In the described case the GPR antenna positioning using laser levels presented itself as a very efficient way to conduct a high-definition indoor survey by a single operator.

Figure 4: Laser beam focused on the centre of the GPR antenna while pulling the system towards the laser level.

Handling survey ropes on the ground would have been more inefficient since the placement of the lines requires their fixation at either end, which in itself would have required tedious handling of the data logger and battery harness.

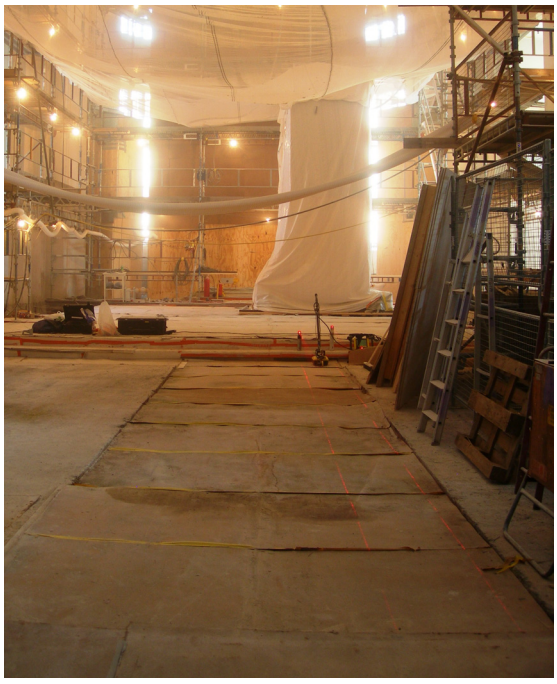


Figure 5: Relatively good laser beam visibility in daylight with additional artificial lighting

The use of laser levels for outdoor surveys on even surfaces (paved or covered with tarmac) should best be tested during one of those long Swedish winter nights!

Archaeological Geophysics: From Field to Archive.
An Institute for Archaeologists (IfA) Workplace Learning Bursary

Tom Sparrow, Chris Gaffney and Armin Schmidt, University of Bradford, UK T.Sparrow1@Bradford.ac.uk

Most archaeological geophysical surveys result in a report, but what happens with the data afterwards? In some instances they are the only record of our archaeological heritage before it is destroyed by development, in other cases these data form part of a repository to aid future evaluation. Archiving these data is hence important. But what exactly does 'archiving' mean? "Burning onto a CD" - it will fade eventually, or the surface scratched when stored in a drawer. "Storing on a terabyte disk" – what do all the folder- and file-names mean? This Workplace Bursary at the University of Bradford explores these issues beyond the ADS Guide to Good Practice (Schmidt 2002) and aims to provide advice and guidance to the community.

As the number of large-scale geophysical surveys increases, data collected using differing techniques mean that documenting and archiving this resource is increasingly challenging. With technological advances in geophysical instrumentation, especially the integration of GPS and multisensor platforms, landscape surveys are being undertaken that produce large amounts of varied data. Whilst a few years ago only one dataset would have been collected at a site, multiple datasets can now be collected in one 'sweep' using cart and sledge-based platforms and, as data collection moves from traditional gridded data to grid-less, keeping track of all processing steps becomes more challenging.

One of the drivers for this Workplace Learning Bursary was the recent donation to the University of Bradford of the Time Team Geophysical Archive (TTGA) by GSB Prospection Ltd. The TTGA has great value for academic research and has the potential to promote archaeological geophysics to the interested public. The TTGA consists of all the geophysical data that have been collected by GSB Prospection for Time Team. This annual British television series, aired initially on Channel 4 and now sold worldwide, has been running since 1994. One aim of the Bursary is to prepare these data for long-term archiving and increase access to them. An advantage of using this archive is that it is not commercially focused, but nevertheless highlights many issues that commercial groups would recognise, not just in the UK but throughout the world.

The process of archiving high-quality data and reports is an increasingly important, but as yet rarely formally taught, aspect of modern geophysical survey. There are few specialists in this area; some academic departments provide basic training whilst few commercial practitioners have time to accumulate information on best practice for long term archiving. The IfA Workplace Learning Bursary seeks to redress this balance by looking at the 'what's and why's' of current practices by geophysical contractors, the Archaeology Data Service (ADS) and national heritage groups.

This will enable documentation and archiving for archaeological geophysics to become a streamlined practice. This in turn will lead to more transparent and accessible data that will enable better integration with future geophysical and archaeological research. By developing archival databases and GIS repositories for the TTGA and other University of Bradford geophysical datasets, efficient, effective and useable strategies for archiving are being formulated. However, over the years many different formats have been produced; these may have the same file extension but vary considerably in their structure. We are good at 'keeping' the files that come out of the processing packages but the detailed description of survey procedures and data processing (metadata) can easily become detached or may have been only a paper archive in the first place. Simply keeping our legacy data on the latest storage media does not mean that we are able to read or understand the data they contain in future. Are you still able to read all your *.DATs , *.XYZs, and *.GRDs and know how they relate and fit together? The use of identical file extensions by different software packages also increases the potential for inadvertent data mix-ups.

With the data comes a need for appropriate documentation on how they were collected, and what has happened to them since the initial downloading. These issues are discussed in the ADS Guide to Good Practice for Geophysical Data in Archaeology (Schmidt 2002), which is currently being revised for a second edition. Output from this IFA supported project will also contribute to this revision.

To allow access to data for users with different software packages and avoid complications of data migration for subsequent software versions, data are often archived in a very simple and non-proprietary format like 'xyz ASCII'. However, in this process previously accumulated metadata are lost, which creates problems for later data improvements (e.g. information on grid size, line sequence, uni- or bi-directional). It may hence be necessary to use a well-documented rich archiving format that retains metadata while simultaneously providing simple access to raw or processed measurements.

In recent years there has been considerable interest in metadata from the geospatial community as a whole, leading to a large number of ISO standards and metadata guidelines. These include guidelines from:

- IGGI (Intra-Governmental Group on Geographical Information)

- AGI (Association for Geographic Information)

- UK GEMINI (Geo-spatial Metadata Interoperability Initiative)

- INSPIRE (Infrastructure for Spatial Information in the European Community)

Using new and existing methods and practise and the adoption of recent metadata standards, it is hoped that a practical `archaeological geophysics data infrastructure' can be formulated and tested.

The building blocks of a practical archaeological geophysics data infrastructure are:

- Developing effective methods for file and data management.

- Designing archival databases and GIS repositories, which use standardised wordlists and terminologies. For example those set out in FISH (Forum on Information Standards in Heritage).

- Documentation of the file formats that are used (and have been used) to store and document data. These include standard proprietary formats as well as in-house formats developed by individual organisations.

- Creation of a metadata schema, which effectively documents and defines the data for archiving and reuse. This will be in-line with current standards to enable greater data portability and transparency.

The archaeological geophysics data infrastructure will be applied and tested on the TTGA. Based on these finding, a 'toolkit' will be developed to aid the archiving of archaeological geophysical data. In its final form it is hoped it will consist of a set of practical procedures, templates, and software for the documentation, conversion and management of data for extended preservation and use.

Ideally, a 'universal converter' could enable data and metadata to be combined, resulting in fewer files that need to be archived, and converting back into a proprietary format for re-evaluation or reprocessing at a later date. By consolidating the number of different files, it is less likely that a 'piece of the puzzle' will be lost.

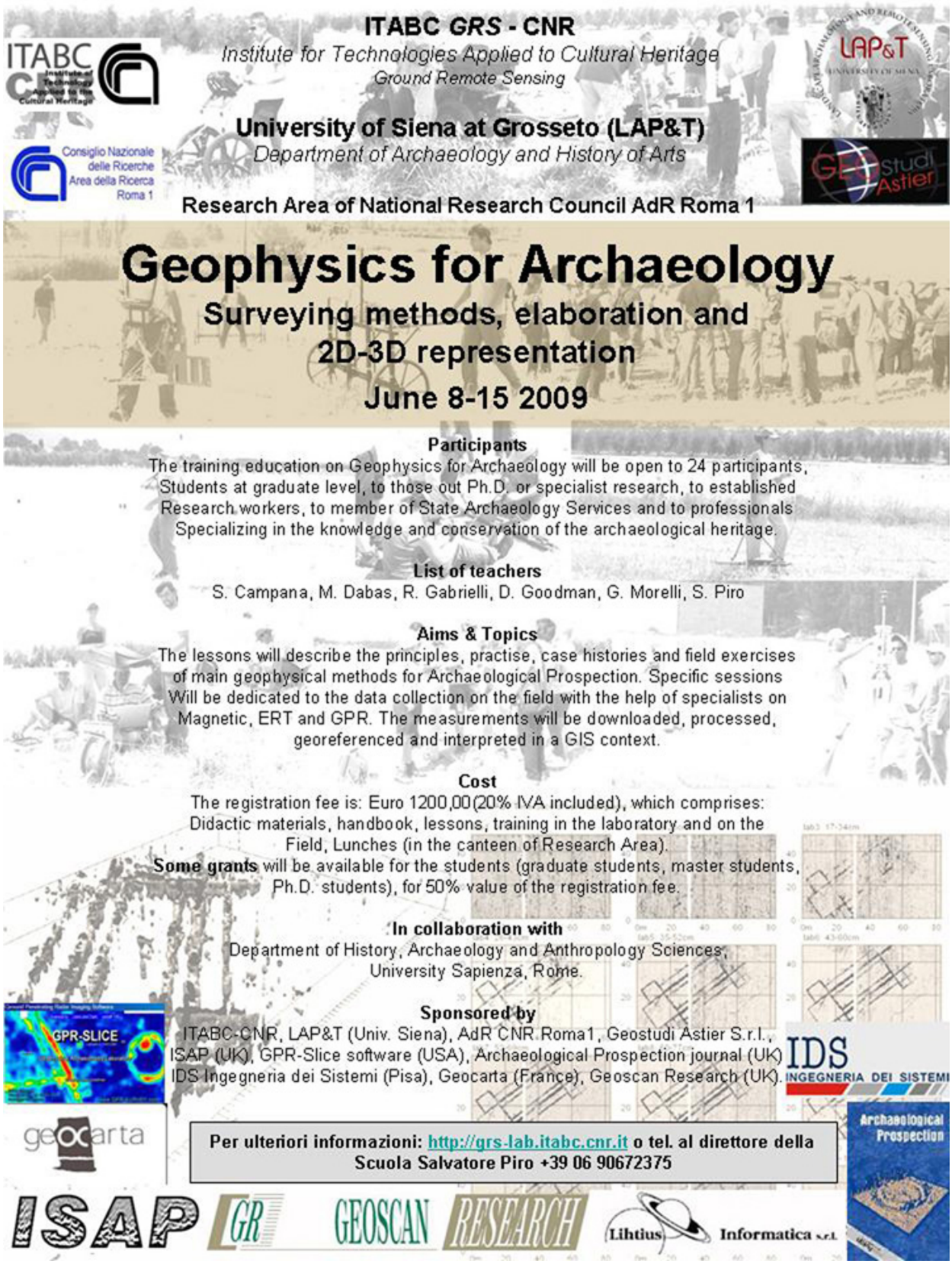
If you would like to comment, provide information, sample data, or insights into your own methods of file management, documentation or file types etc. please contact Thomas Sparrow via email: T.Sparrow1@Bradford.ac.uk.

Bibliography

Schmidt, A. 2002. Geophysical Data in Archaeology: A Guide to Good Practice. ADS series of Guides to Good Practice. Oxford: Oxbow Books. (see also http://ads.ahds.ac.uk/project/goodguides/geophys/)

Conference, Seminar and Course Announcements

Geophysics for Archaeology: surveying methods, elaboration and 2D and 3D representation
Rome, Italy, 8-15 June 2009



AARG 2009

University of Siena, Italy, 25-27 September 2009

The following sessions have been proposed for the presentations and discussions on 25 and 26 September. Offers, posters and additional session titles of papers are welcome:

Aerial Archaeology in Italy and the central Mediterranean
New Projects
Postgraduate Research
Interpretation, Interpretation, Interpretation….. in the 21st century
The Death of Cropmarks?
Engaging with Aerial Photography
Conflict and Military Archaeology
Beyond-Visible Archaeological Reconnaissance

27 September Conference Day 3: Field Trip

Note: session titles are provisional and all papers and session proposals are welcome.
Oral papers should usually be 20 minutes duration. Equal value is given to poster presentations.
Closing date for abstracts is **31st May 2009**.

Conference Organising Committee:
Professor Dr hab. Wlodek Rączkowski (AARG, University of Poznań)
Dr Stefano Campana (AARG, University of Siena), Dave Cowley (AARG, RCAHMS)
Robin Standring (AARG, Cambridge), Lidka Żuk (AARG, University of Poznań)

Address for all conference correspondence:
Dave Cowley, RCAHMS, 16 Bernard Terrace, Edinburgh, EH8 9NX, Scotland
Email dave.cowley@rcahms.gov.uk

STUDENT/YOUNG RESEARCHERS BURSARIES FOR AARG 2009
These are to support bona fide students and young researchers who are interested in aerial archaeology and wish to attend the conference. Applications to Dave Cowley at the above address, by letter or email. There is no formal application form but please provide the following information:
Your interests in archaeology and aerial archaeology; place of study; the name and contact details of a supervisor or employer who can provide a reference; an estimate of travel costs to attend.
Closing date for applications is **31st May 2009**.

Aerial Archaeology Research Group website: http://aarg.univie.ac.at/

Announcement

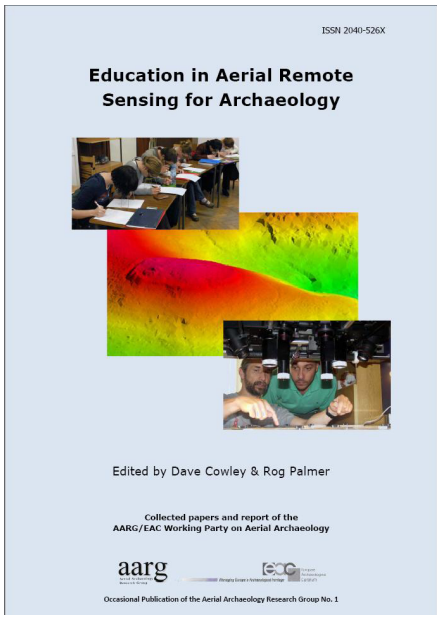
Society for Archaeological Sciences

1. The semi-official blog of the Society for Archaeological Sciences can be found at http://socarchsci.blogspot.com/. Postings are made about twice a week, usually by Rob Sternberg, General Secretary of the SAS. Suggestions and possibly additional authors are welcome.

2. The SAS also has an electronic site at http://sites.google.com/site/saswiki/, used for the posting of notices about conferences, jobs, and other announcements. Currently the postings are being made by Rob Sternberg, General Secretary of the SAS.

Publication Notification

Aerial Archaeology Research Group



This occasional publication of the Aerial Archaeology Research Group (AARG) is now available for free download (http://www.univie.ac.at/aarg/php/cms/).

Presenting the draft report of the AARG and EAC (Europae Archaeologiae Consilium) Working Party on Education in Aerial Remote Sensing for Archaeology, and a collection of 11 further papers, this publication presents a broad-based review of the current state of play and suggestions for future developments. The Working Party report is available for review and comment until the end of July 2009.

The collected papers include seven describing current practice of teaching Aerial Remote Sensing for Archaeology in Higher Education Institutions/Universities in Austria, the Czech Republic, Italy, Germany and the UK. A discussion of the issues of providing downloadable teaching aids is supplemented by an online example. The publication concludes with three papers dealing with non-specialist and general education. These cover the whole range of lifelong learning and training schools and workshops.

Journal Notification

Archaeological Prospection 16:2

The second issue of the year will be published soon and contains the following articles, book review and, sadly, an obituary of Geoff Bartington. There will be few readers who have not used either the Bartington susceptibility coil or one of his magnetometers. It is never an easy task to write an obituary, but I'm pleased that Tony Johnson has stepped up to mark Geoff's passing.

Volume 16 Issue 2

How effective is geophysical survey? A regional review. David Jordan

Multi-methodological approach to investigate chamber tombs in the Sabine Necropolis at Colle del Forno (CNR, Rome - Italy). Salvatore Piro and Roberto Gabrielli

Helikite Aerial Photography (HAP) – A Versatile Means of Unmanned, Radio Controlled Low Altitude Aerial Archaeology. Geert Julien Verhoeven, Jo Loenders, Frank Vermeulen and Roald Docter

Evaluating the multiple coil configurations of the EM38DD and DUALEM-21S sensors to detect archaeological anomalies. David Simpson, Marc Van Meirvenne, Timothy Saey, Hans Vermeersch, Jean Bourgeois, Alexander Lehouck, Liesbet Cockx and Udayakantha W.A. Vitharana

Detection of resistive features using towed slingram EMI instruments. Julien Thiesson, Michel Dabas and Sebastien Flageul

Book Review: Geophysical Survey in Archaeological Field Evaluation. Chris Gaffney

Obituary by Anthony Johnson: Geoff Bartington (7 Oct 1948 - 13 Dec 2008).

If you haven't yet signed up for the reduced subscription to the journal then please find the details on the members benefits page (http://www.bradford.ac.uk/acad/archsci/archprospection/).

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