Geomatics World

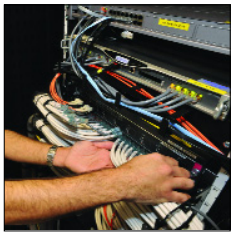
JANUARY | FEBRUARY 2012

Issue No 2 : Volume 20

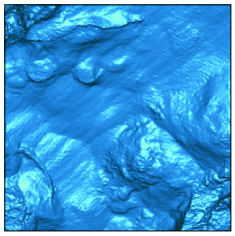
Surveying for geographical and spatial information in the 21st century

Can mobile phones help solve land tenure problems?

Mapper's project keeps the disks whirring



Stonehenge: high-resolution scans reveal secrets



Tossing the ball around; amongst friends!

Scanning for 13-year olds, at Keystage 3

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Contents

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COVER STORY
No, it's not a special tractor for gathering up the deckchairs on Brighton Beach! This vehicle is looking for some very special pebbles amongst the millions scattered across the beach, each one fitted with a tiny widget. For the full story turn to page 18.

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Measuring beach movement is not a precise or static science. One solution involves installing 2400 tiny RFIDs in pebbles.

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p.23 **Crowdsourcing for land administration**
By using mobile phones the developing world could close the 'security of tenure' gap, argues Robin McClaren.

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It's not all doom and gloom by a long way for Geomatics education. GW spoke to three academics from very disparate institutions.

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Would you like to receive the electronic version of GW?

Many RICS members overseas already receive an electronic version of *GW*. To receive the printed edition too overseas members must opt in. If you haven't already advised us please go to:

http://www.pvpubs.com/OverseasRICS

and register your requirements.

Meanwhile, UK and Irish readers and subscribers can also receive the electronic version, which is sent at least a week ahead of the printed copy, by emailing a request to **barbara@pvpubs.demon.co.uk**

Note: the electronic version can now be downloaded as a PDF and printed.

Next issue

The next issue of *GW* will be that for March / April 2012.

Copy dates are: Editorial: **17 February** Advertising: **22 February**

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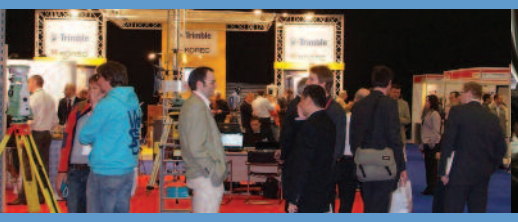

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Weathering the storm: can you help?

High-resolution scanning, tracking RFIDs, crowd sourcing. . . it's all Geomatics, especially for the Chinese.

Welcome to the first issue of GW for 2012; I hope you find the breadth of editorial coverage as wide as ever.

In the second part of Surveying Stonehenge, **Paul Bryan** discusses the imaging and results achieved from the high-resolution scanning of the ancient monument; while we report on a visit to Britain's mapping agency to find out more about their re-engineering of their topo database and map production facilities. Next, **Robin McClaren** examines how crowdsourcing can assist land registration in developing nations where many informal occupiers have no security of tenure.

Someone told me recently that the Chinese currently have over 30,000 students undergoing geomatics education. In the UK we struggle to reach three figures and the prospects remain worrying for this key sector of the economy, which must surely be critical in the years ahead as we go ever further into the location and positioning age. A short feature on prospects for geomatics education in the UK looks at courses in this sector.

Beaches are odd things. They can come and go, wither and grow again. Building jetties, causeways, breakwaters and piers can all affect the shape and extent of a beach, as well as storms. Working out cause and effect can be tricky. One solution, where the beach is shingle, is being tried in the Solent area using 2400 pebbles tagged with tiny RFID transmitters. Detection is key. If the pebbles can't be found and geo-located you can't measure what is happening to the beach. **Clive Moon** and **Ted Read** explain how they did it in a ground-breaking (or should we say beach-breaking?) article on page 18.

Land (including the seabed) is the bedrock upon which virtually all of geomatics rests. It is therefore vital that all land has clear unappealable ownership, whether it belongs to the state, a private individual (or individuals) or corporation. Without clarity of ownership it is almost impossible to undertake any development let alone use title as a security for a loan. The publication therefore by RICS of the third edition of *Land Markets & the Modern Economy* is of great significance. When only approximately a quarter of the world's estimated 6 billion land parcels are registered it is not difficult to see the reasons why buying and selling rights in land are important in a modern economy. The latest edition of this research work suggests ways in which the efficiency and effectiveness of land markets can be improved. The text is fully updated to reflect the changed dynamics of the world economy due in part to the financial crisis and the emergence of new global powers like India, China and Brazil. It presents key issues, which nations that need effective land markets must think about. There are new case studies and the work is due to be presented at forthcoming World Bank and UN land orientated events. The companion study, *Crowdsourcing Support of Land Administration*, offers cost-effective ways in which unregistered land in developing nations can be registered.

Challenging times for publishers too

These are challenging times not only for surveyors but publishers too. Like nearly all journals in the business and professional sector *GW* has fewer pages than three years ago. That is because there are fewer advertisers and fewer subscribers. *GW* is subsidised by the RICS but by itself is not enough to sustain the publication. As a reader you can help in three ways. Firstly by encouraging colleagues and business associates who are not RICS members to subscribe. Secondly by using GW's classified section for your business' or organisation's recruitment. Lastly by encouraging relevant businesses to advertise their products and services. With your help, *GW* can weather the economic storm clouds that continue to threaten the world economy.

Stephen Booth, Editor

The editor welcomes your comments and editorial contributions by e-mail: *editor@pvpubs.demon.co.uk* or by post:
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TEN YEARS AGO: from GW Jan/Feb 2002

Writing in the issue **Rob Mahoney** praised the diversity of specialisms and the geographic spread of membership but lamented the low number (7%) of women in Geomatics (since then progress has seen new membership at around 15%). Perhaps more worrying was that 16% of members were over 65.

Undercurrents marked the 50th anniversary of the death of **Heinrich Wild**, the designer of the iconic T2 theodolite. Wild was a big man in every meaning of that word and the profile photo of him peering through an instrument revealed a form that might have benefitted from a curvature correction.

Meanwhile, the onward march of technology reported a GPS-enabled Palmtop from Positioning Resources and the latest version of Cyrax's laser-scanning software provided plug-ins to AutoCAD and MicroStation.

Old aerial photos help win land use case and save nursery

Aerial photography dating back to the 1990s has helped secure the long-term future of a business in Essex, England. Thurrock Council claimed unauthorised uses on the greenbelt site. But using historic aerial photography from Bluesky's archive and the service of a professional air photo interpreter, Greenwise Nurseries were able to prove the long term use of the majority of the site. An expert witness report and supporting aerial photographs were presented to Thurrock Council who promptly withdrew the case and settled the matter in Greenwise's favour.

Bluesky's OldAerialPhotos archive came with certificates of authentification providing factual and unbiased evidence for further investigation by Air Photo Services who specialise in interpretation of aerial imagery, consultancy and expert witness services. Director Chris Cox adds, "Acting as an Expert Witness and working on behalf of my client, I was able to establish, using the historic images, that the majority of the site had, in fact, been used for nursery purposes over the last 13 years."

RICS Geomatics Evening Lectures 2012

RICS Geomatics lectures are CPD relevant and count towards your CPD/LLL quota as specified within RICS regulations. All lectures are free and open to all (especially students) unless otherwise specified. All lectures take place at RICS Great George Street lecture hall and are timed at 17.30 for 1800 unless otherwise stated.

Thursday 26 January
Geo UK Forum annual lecture: Mike Parker (author of the besteller *Map Addict).*

Thursday 1 March
Field Mapping Experiences: Naomi Morris, Field Mapping Coordinator, MapAction.

Thursday 17th May
UK GNSS RTK research phase II - the results!, Dr Stuart Edwards MRICS & Matt King

AddressBase: available in three flavours

Three new addressing products are available from GeoPlace, the JV between Ordnance Survey Great Britain and the Local Government Group. All three products are maintained from local authority data which is brought together with that from OS and Royal Mail by GeoPlace. It combines the best parts of local government's National Land and Property Gazetteer (NLPG), Ordnance Survey's OS MasterMap Address Layer 2 and the Royal Mail Postcode Address File (PAF). The three products provide increasing level of detail.

AddressBase contains PAF addresses (25.2 million for England & Wales), both commercial and residential, matched to the local authority Unique Property Reference Number (UPRN) and structured in a flat file model, allowing users to link other data about a property to a single address including X-Y coordinates.

AddressBase Plus contains current properties and addresses sourced from local authorities, OS and Royal Mail matched to the UPRN with more records including Objects without a postal address (OWPAs), such as subdivided properties, places of worship and community centres. It also enables users to locate an address or property on a map, by cross referencing the information with OS MasterMap products via the OS MasterMap Topography and Integrated Transport Network Layers' TOID references.

AddressBase Premium provides the most detailed view of an address and its lifecycle. It has more records than AddressBase Plus and provides information relating to an address or property from creation to retirement. It contains local authority, OS and Royal Mail addresses structured in a relational database model based around the current UPRN (approved) addresses, and alternatives for current addresses, reflecting the changes in addresses), provisional addresses (proposed planning developments) and historic information for addresses (including historic alternatives) where available. OWPAs and cross references to the OS MasterMap topographic identifiers (TOIDs) are also included.

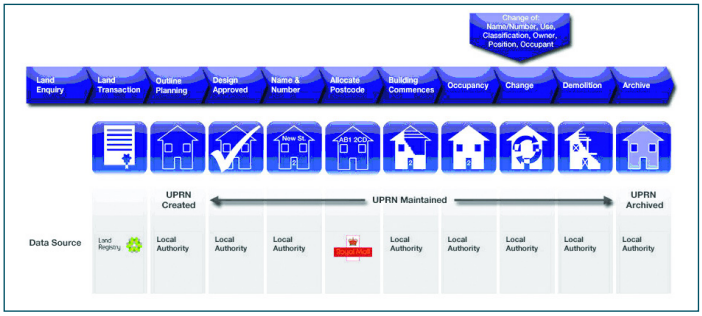
Current OS AddressLayer2 users will continue to be supported for a period. OS says that they will work with users to migrate to AddressBase.

The products are available free of charge to the public sector through the Public Sector Mapping Agreement (PSMA) and through commercial licences to other users. For more information, including manuals and sample data, visit **www.geoplace.co.uk**

Asking the crowd

A groundbreaking RICS research report investigates the possibility of using crowd-sourcing to improve land tenure security in poor communities worldwide. Author **Robin McLaren**, MRICS recently presented to a UN 'Spider' crowd-sourcing event in Geneva to an audience of over 60 UN and World Bank officials, scientists, and other sectoral NGOs like Ushahdidi, Oxfam and OpenStreetMap.

The collaborative research project from RICS and consultants Know Edge explores a potential solution to the security of tenure gap: establishing a partnership between land professionals and



The lifecycle of a UPRN. Courtesy of Ordnance Survey.

citizens through crowd-sourcing; it would encourage and support citizens to directly capture and maintain information about their land rights. The research presents a vision of how this might be implemented and investigates how the risks associated with this collaborative approach could be managed. The research includes case studies from Haiti, Kenya, South Sudan and Canada. For more information turn to page 23.

Geology collection online

Publisher Elsevier and the Geological Society of London (GSL) have teamed up to make the contents of the Society's Lyell Collection accessible via Elsevier's Geofacets. The move could offer significant advantage to companies focused on upstream oil & gas exploration. The partnership allows users of Geofacets, a research tool for geoscientists, to find, search and analyse georeferenced maps from the collection as well as Elsevier's own sources. The collaboration brings together over 165,000 geological maps (approximately 75% georeferenced) for seamless integration into geoscientists' workflows.

"What we do as geologists has little value unless we make it as widely accessible as possible" said Edmund Nickless of GSL. "As the oldest national geological society in the world, our challenge has always been how best to share our knowledge and understanding of the Earth." Created in 2007 to mark the GSL's 200th anniversary, the Lyell Collection is one of the largest integrated collections of online Earth science literature in the world.

Community 3D mapping

It is known that even though indigenous peoples may never have flown, when shown an aerial image they instantly recognise their territory and its features. This has been helping a little known ethnic group from Kenya, the Ogiek, to create a three-dimensional map of their ancestral land. Researcher Giacomo Rambaldi has been helping the Ogiek create a participatory map. 'Legend is key to any map' says Rambaldi. But in this mapping 'the community chose the key'. In the past the Ogiek were regarded as second class citizens. Today, their story has gained international recognition. The Kenyan government is increasingly listening to their voice and including them in a dialogue over the future of their community and of the Mau Forest. For more on this project go to: **http://www.iapad.org/applications/ich/mauforest.htm**

Contracts & Projects

50cm from Pléiades

Astrium has announced that Pléiades 1, the first of two identical satellites, will image the Earth for more than ten years, delivering 50-cm imagery and paving the way for finer mapping, more detailed photo-interpretation, enhanced services and a new range of high-resolution 3D products. The launch, on a Soyouz rocket, took place from Kourou spaceport in French Guiana on 16 December. With the addition of Pléiades 2 next year, the two satellites will be operated on a phased orbit, enabling a daily revisit capacity anywhere on Earth.

Unis win with Intergraph

Intergraph has awarded University College London (UCL) and Aberdeen University, Registered Research Laboratory (RRL) grants. The move provides access to an extensive suite of desktop and web-based geospatial software (including version upgrades and a helpdesk package) at no cost. The software will support research and teaching activities with students benefitting from free personal education licences for Intergraph's desktop GIS package, GeoMedia Professional.

Blom's Romanian subsidiary has been awarded two new contracts with Valcea County Council and Iasi City Town to provide technical assistance for infrastructure projects. Expected value is c. 1.5m euros. Blom will provide technical assistance and supervision relating to the rehabilitation of urban heating systems. The venture is expected to last for over 20 months and working alongside Blom as part of the winning consortium are Ramboll Romania, Rutin Consulting and BDO Audit.

RapidEye has signed a contract with China's Ministry of Land and Resources (MLR) to cover almost five million square kilometres of China over the next few months. With five satellites, "the RapidEye system performs extremely well" comments Mr Bing Sun, CEO of Beijing Eastdawn Information Technology Co. Ltd.(EDIT). "The competition is getting more severe, but EDIT represented us well," adds John Ahlrichs, vice president of international sales for RapidEye.

Construction taster for students

Leica's Paul Burrows demonstrates a laser scanner to a group of 13-year old students from Burnley as part of the Class of Your Own (COYO) initiative. COYO aims to raise the profile of architecture, engineering and professional construction careers in UK schools by inspiring young people into the industry. COYO provides a hands-on and focused Edexcel accredited Key Stage 3 project-based curriculum to challenge learners to design, engineer and construct in the built environment.

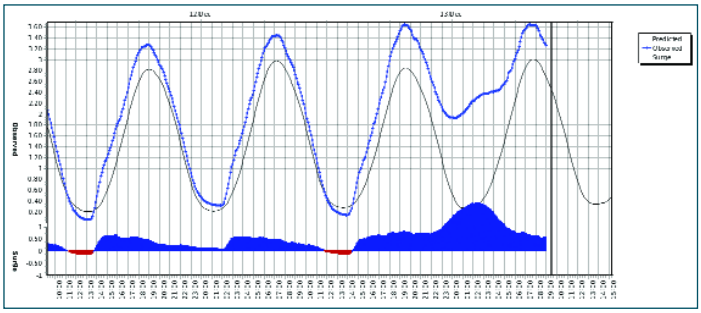
Through practical workshops students plan, manage and complete their own sustainable building project, learning about new technology such as 3D laser scanning and BIM (Building Information Modelling), sustainability techniques and environmental issues, gaining an appreciation of the range of career opportunities from architect and surveyor to structural engineer and construction manager.

Leica Geosystems MD David Price adds "Class of Your Own is a unique programme offering young people a chance to experience the excitement, the buzz and the pride of working in our industry. In addition to providing access to our technology, we're also funding a COYO curriculum locally in Milton Keynes." The course, which is exam-free, can be completed in 60 guided learning hours over one or two years. Students can continue the course to a Level 3 Extended Project (one GCSE).

BRIEFS

Equipment thefts continue in the UK. Steve Hawkins of Laser Surveys Ltd reports that high security locks did not prevent someone ripping open the rear doors of his van and stealing a Leica CS15 TPS/GNSS Field controller with internal TPS radio model, serial number 1591639, plus the red box and a 360° prism, ruining the van door. The theft occurred around the area of Hatfield Peverel, Essex. Anyone with information

Oxford server provides data down under



Data on a storm surge affecting the English Channel on the 12-13 December was recorded by a Valeport tide gauge on the Dart Estuary, Devon. The gauge provided telemetered data which was disseminated by Port-Log.net (*see image*). The storm surge increased high waters levels by up to 0.8m and low water levels by a massive 1.8m. The surge and combined rainfall caused the Environment Agency to issue flood warnings for the area.

The UK based marine data management, publishing and GIS company OceanWise and Valeport, have also implemented a tide, wave and weather monitoring system at an Australian marine complex. The system, commissioned by Perth based engineering company, ONA Marine Pty Ltd, combines Valeport and Gill Instruments sensors and equipment, with the output telemetered to the Port-Log.net virtual server in Oxford, UK. Incoming data streams are decoded and stored in Ocean Database on the server. Web services then act on the database to display current and historic conditions, as required by the user. A typical web display showing wind speed and direction is presented, but the system is equally capable of handling all common parameter types including ADP and wave data.

should contact london@lasersurveys.com or call 01708 438408.

The British Cartographic Society is inviting papers for its annual symposium, 13-15 June, under the theme "Mapping The Global Village". Potential speakers are invited to submit papers on Olympic Mapping; Transport Mapping; Visualisation; The 'Art' in Cartography; Keeping up with the times; Mapping Political Change; and Open Data. Abstracts of not more than 300 word are required by 13 January. More at **http://www.cartography.org.uk**

The 12d Model International User Conference 2012 will be held at the Brisbane Convention & Exhibition Centre (BCEC) 29-31 July. The conference will cover all aspects of civil design and surveying with user presentations, a wishing booth, hints and tips and the very popular "birds of a feather" sessions.

The 6th international conference on high resolution surveys in shallow water is set for 20-24 February in Wellington New Zealand. A technical programme of 13 sessions includes one exclusively devoted to the common dataset. A full programme of workshop backed by six companies is also planned. More at **http://www.conference.co.nz/shallowsurvey**

3D Laser Mapping has announced an Australian office based in Perth. 3D Laser Mapping International Pty Ltd will be headed by Iain Bramwell to provide support for the whole of the Asia Pacific region.

If you were wondering what has happened to the massive Aerofilms archive of photography you will be relieved to learn that much of it will shortly be available through English Heritage's "Britain from Above" project, which is digitising, cleaning and stabilising the negatives. Over 7,500 negatives have been scanned so far and the number is growing daily. GW hopes to bring you more on this in due course.

The European Association of Remote Sensing Laboratories (EARSeL) symposium "Advances in Geosciences" will be on Mykonos Island, Greece, 21-24 May 2012. More at http://www.earsel.org/symposia/2012-symposium-Mykonos/

Software company Aveva and 3D laser scanner supplier Faro have announced an interoperability agreement that will see the two companies co-operating closely to provide an efficient integration between Faro's laser-scan hardware and Aveva's portfolio of laser engineering and design software. Faro's **Bernd Becker** adds, "This agreement will ensure that our joint customers can benefit from a complete solution, which leverages the Faro 3D capture technology and Aveva's suite of laser engineering and design solutions". The move follows the recent acquisition by Aveva of the LFM software division of Z+F UK.

Events Calendar 2012

• SEMINARS • CONFERENCES • EXHIBITIONS • COURSES

We welcome advance details of events likely to be of interest to the Geomatics community. Please send details to: editor@pvpubs.demon.co.uk

International LiDAR Mapping Forum 2012
23-25 January, Denver, USA.
Contact: www.lidarmap.org/ILMF.aspx

Defence Geospatial Intelligence (DGI) 2012
23-26 January, QEII Conference Centre, Westminster, London, UK.
Contact: www.wbresearch.com/dgieurope/

Geodesy, Mine Survey and Aerial Photography – At the turn of the centuries
16-17 February, Moscow, Russia.
Contact: www.con-fig.ru

Shallow Survey 2012
20-24 February, Wellington, New Zealand.
Contact: www.shallowsurvey2012.org

SPAR International 2012
15-18 April, The Woodlands Waterway Marriott Hotel & Convention Center, Houston, Texas.
Contact: www.SPARPointGroup.com/International

SPAR Japan
5-6 June, Kawasaki Industry Promotion Hall, Kawasaki, Japan.
Contact: www.SPARPointGroup.com/Japan

12d Model International User Conference 2012
29-31 July, Brisbane Convention & Exhibition Centre, QLD, Australia.
Contact: www.12d.com

GEO-12: The GEO Event
World of Geomatics & GIS Innovations
21-22 March 2012 at the Holiday Inn, London-Elstree, UK.
For more information, contact: Sharon Robson
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Visitor registration opens 1 January 2012 at www.pvpubs.com/events.php

For more events, visit our online calendar at www.pvpubs.com

PEOPLE

Jim to stand down

Loy Surveys MD **Jim Loy** is planning to stand down by June this year. Founded in 1985 Loy Surveys was acquired by the Ogilvie Group in 2006. "The successful integration of the business has ensured that our many clients and dedicated staff can be confident about the future success of the business" adds Loy. Ogilvie Group CEO **Duncan Ogilvie**, who earlier this year was granted fellow member status by RICS in Scotland in recognition of his services to property, stated "Loy Surveys has proven to be an excellent addition to the Ogilvie Group. I respect Jim's personal decision and I am confident we will continue to work with Jim to ensure a smooth transition period. I am keen to maintain the benefits of Loy's identity in the market for delivering innovative surveying services".

Gregory joins KOREC

Dominic Gregrory has been appointed survey sales consultant for Lincolnshire, Yorkshire and the North East by KOREC. He has over 11 years of site-based experience in surveying and project management roles and has gained extensive hands-on experience of both GPS and optical instruments in his previous positions for Halcrow, Jacobs and Tata. He will be responsible for sales and hire of the Trimble range of survey instruments. Dominic holds a degree in surveying & mapping science and is a chartered surveyor.

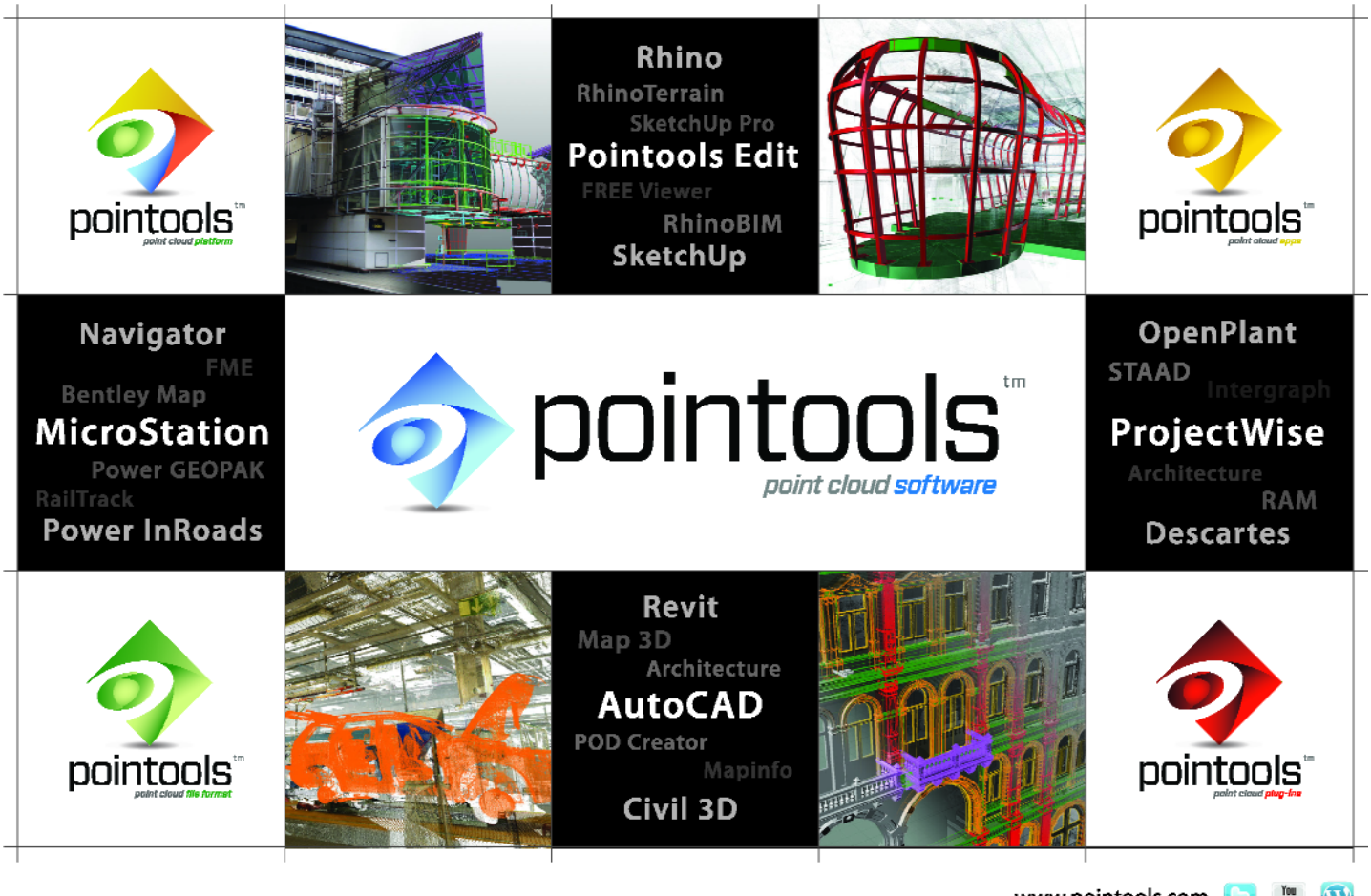
Dominic will be replacing **Matthew Lock** who has taken up a new specialist role as KOREC's rail sales consultant. Matthew's move reflects the company's increasing commitment to approach markets from the customer's perspective to better serve the railway industry.

Goodbye Jim, hello Peter

The September issue of Survey Review is the last to be produced under the editorship of Jim Smith. "Not everyone appreciates how much work the editor has to get through in the course of production." Writes Dr Arthur Allan, "I for one do know, having edited the Review myself some time back. Jim has brought the whole process of peer review editing into being, so that the journal now features as part of the Scientific Information Index, so essential for the accreditation of quality. To achieve this Jim had to secure the assistance of a great many reviewers, in excess of fifty I believe, and nurse, cajole and browbeat them to respond in reasonable time. In this duty Jim has shown incredible perseverance and sustainability over more than ten years, for which the survey profession should be grateful." Jim is succeeded by Peter Collier with a new management team headed by David Powell, who replaces Mike Cooper as chairman.

BIM specialist appointed

Plowman Craven has appointmented a BIM technical specialist **Andy McKay.** He has worked within architecture and the BIM environment for the past eight years as both a supplier and a client. His role will focus on maximising the companys' ability to deliver and manage projects using platforms such as Revit.



RICS Policy Watch Winter 2011/12

Land Tenure - open data - Belgium opens cadastral info

By James Kavanagh, Director of RICS Land Group

The lecture programme is in full swing and two new research studies are being received to critical acclaim. Meanwhile, RICS has been busy commenting on plans for the Public Data Corporation and Europe's moves towards open data. Read on for **James Kavanagh**'s full report.

It's been an extremely busy and productive winter so far for RICS Geomatics with the traditional 'geo' evening lecture series going from strength to strength. In a new development and to help members unable to attend the London based lectures, we have started to upload the evening lecture series to YouTube **http://www.youtube.com/ricsmediacentre**

The Christmas 2011 lecture and launch event for the Land Markets 3rd edn and sister publication, 'Crowdsourcing Support for Land Administration' was filmed for this purpose. We are increasingly using social media channels to communicate with our global membership and RICS now has over 10,000 followers on its Twitter account **@RICSnews**

I'm sure that many of you are signed into the myriad geo and surveying related LinkedIn groups and have seen RICS increase its profile there over recent months. The Land Group blog is another way of keeping in touch with developments in our rapidly changing professional and technical environment.

Open data has been garnering most of the geo-policy headlines (as the LightSquared GNSS issue continues in the background) with substantive strategies being developed and released by the UK and EU, more on these below. Geo members with a political interest can keep up to date with all RICS policy and external affairs developments @ **www.rics.org/policyandinfluencing**

Members can, as always, keep up to date on RICS related news with the Land e-brief, Land Journal and through the website **www.rics.org/geomatics** and **www.rics.org/land**

The 3rd edn of Land Markets will be presented at a World Bank conference in Washington in April.

Land Markets: new edn and crowdsourcing

Over 80 industry experts, senior RICS members and related professionals attended the launch of the new 3rd edition Land Markets research and Crowdsourcing outputs. The 3rd edition of *Land Markets* focuses on the markets that exist when and wherever it is possible to exchange rights in land for agreed amounts of money or services rendered. Without an integrated and formalised real property system, a modern economy is not viable since the ability to create national wealth is severely restricted. An efficient land market underpins the capacity of banks and other financial organisations to lend money and for landowners to invest. The Land Markets and Crowdsourcing outputs are inextricably linked, with the former focused on the institutional, economic, legal and social justice elements of real estate ownership and the latter on the brave new world of open data access, technology and public engagement. Indeed, the EU has very recently announced a new policy consultation on 'open data' access much in line with the recent UK open data strategy.

At the core of both outputs is a focus on 'security of tenure' and the now internationally accepted concept of a land/property rights continuum. Crowdsourcing is a real and very viable option to help developing countries engage in creating functioning land markets and for developed countries to bring real depth to their property ownership and cadastral databases.

Social media and industry press take up of both outputs has been excellent and RICS has been invited to present to a global gathering of national mapping and cadastral agencies at Nottingham University in Jan 2012. Both research studies will be presented at the World Bank 'Land & Poverty' conference in Washington April 2012 and are a prime example of RICS bringing strong thought leadership to audiences far beyond our own membership.

Crowdsourcing and land administration

A groundbreaking RICS research report investigates the possibility of using crowdsourcing to improve land tenure security in poor communities worldwide.

Only 1.5 billion of the estimated 6 billion land parcels worldwide have land rights formally registered in land administration systems. Many of the 1.1 billion slum dwellers and further billions living under social tenure systems wake up every morning to the threat of eviction. These people are excluded from any form of security of tenure: they are trapped in poverty. Increasing global population and urbanisation is only going to turn this gap into a chasm.

A collaborative research project from RICS and Know Edge explores one potential solution to the security of tenure gap: establishing a partnership between land professionals and citizens through crowdsourcing. This would encourage and

support citizens to directly capture and maintain information about their land rights. The research presents a vision of how this might be implemented and investigates how the risks associated with this collaborative approach could be managed.

The Crowdsourcing report has already been taken up by international agencies and has been disseminated heavily through social media channels. The open access strategy behind this output has led to it being downloaded over 1000 times in a couple of weeks and it has helped to raise the RICS profile amongst a wide non-surveying and mapping audience. You can read an abridged version of the report from page 23 of this issue of *GW*.

UK adopts Open Data and Transparency

The UK chancellor **George Osborne** in a departure for announcing depressingly bleak financial and budgetary forecast recently announced the adoption of wide ranging open data and transparency policies. This is the latest step in the administration's ambition to make the UK the most transparent and pro-open data government in the world. HM Gov hope that the new measures will support investment in medical research and in digital technology in the UK - with a particular emphasis on promoting opportunity for innovative small and medium sized enterprises. The latest announcements follow the UK consultation on Open Data and the Public Data Corporation (Oct 2011), the full RICS response to this consulation can be sourced at **www.rics.org/geomatics**

With a focus on surveying related issues, the measures announced include:

House Price Data: From March 2012 Land Registry will make available "Price Paid information" showing all residential property sales in England and Wales at address level. This will be downloadable for re-use, in a re-useable format under the Open Government Licence, and updated monthly.

Open Data Institute: The Government is committed to the establishment of a world-leading Open Data Institute (ODI) in East London to innovate, exploit and research open data opportunities. In view of the commercial and social priority of open data, the Government is to commit up to £10m over five years with match funding from industry and academic centres to support the Open Data Institute through the Technology Strategy Board.

The establishment of a Public Data Corporation, the creation of a Data Strategy Board (DSB) and a Public Data Group (PDG) was also announced. DSB and PDG will work together to maximise the value of data from the Met Office, Ordnance Survey, Land Registry and Companies House. This announcement signals a significant step towards making additional core reference data available and free at the point of use. All of the above was welcomed by RICS. For more information, please visit the Cabinet Office's website: **http://www.cabinetoffice.gov.uk/news/open-data-measures-autumn-statement**

EU launches new Open Data strategy

The EU Commission has launched an Open Data Strategy for Europe in which Europe's public administrations will open their data for re-use. The EU Commission will lead by example and open its information to the public through a new data portal. Euros 100 million will be granted in 2011-2013 to fund research into improving data-handling technologies. It is argued that the EU could gain anything up to euros 40 billion from open data re-use strategies. The Commission proposes to update the 2003 Directive on the re-use of public sector information. A small but significant step in this direction has seen the Belgian cadastral system go online with access to all datasets opened to property professionals. More EU cadastral systems will follow.

AssocRICS land-engineering and hydrographic survey routes. More information can be found on Land & Engineering Surveying AssocRICS @ **http://associate.rics.org/uk-home11/how-to-qualify/landengineering-surveying-pathway/**

Hydrographic surveying **http://associate.rics.org/uk-home11/how-to-qualify/hydrographic-surveying-pathway/**

Eye on Earth – a global geo data sharing initiative goes live

A new global web service allowing users to create maps and visualise data on environmental issues was recently launched by ex-US president **Bill Clinton**. The new Eye on Earth global public information service brings together vast amounts of data about the environment in a powerful, visual format and is line with the modern geodata zeitgeist of global data sharing. **http://www.eyeonearth.eu/**

With all of the above some of you may have noticed the complete omission of any mention of the Inspire initiative. I'm sure it will resurface in 2012.

And to finish, Glonass is now fully operational with a full compliment of 24 satellites for the first time since the fall of the Soviet Union…

Have a wonderful start to 2012.

• *Members can keep up to date on RICS related news with the Land e-brief, Land Journal and through the website* **www.rics.org/geomatics** and **www.rics.org/land**

jkavanagh@rics.org

Crowdsourcing could offer a way forward for countries with citizens without land tenure security.

"…the new measures will support investment in medical research and in digital technology in the UK - with a particular emphasis on promoting opportunity for innovative small and medium sized enterprises."

You took a gravy boat where?

By Malcolm Draper

We need a system reboot sometimes and so do the banks, following our reasearch. The only ray of sunshine remains the RGS.

The survey business remains very sluggish. Almost everyone I speak to says the same: business is slow and getting paid is even slower. In the words of one senior partner, 'It's all gone dead since September.' Let's hope the Olympic Year will bring better times, but don't put your shirt on it. Meanwhile, if you're working flatout and wondering why you feel sleepy by 2 or 3 in the afternoon, here's the reason given by a reader of *The Guardian*.

"It's a system reboot. During the morning, ageing equipment increasingly struggles to process masses of new information. Various applications now refuse to close properly when tasks are completed, instigating memory leaks that clog up the performance of newly launched programs, resulting in an increased sluggishness that impedes performance. Once this approaches a critical level, System Admin waits until you're sitting down and not moving before instigating an emergency shutdown and restart. Usually, the first inkling of this is jerking up with a start and then a bemused "What just happened?", which signifies successfully logging back on." So now you know.

Where our money went

In the absence of a heavy workload, *Undercurrents* has been busy researching the cause of the banks' collapse, the recession and other woes visited upon us during the last four years. Here's how it all began.

Helen is the proprietor of a bar in Detroit. All her customers are unemployed alcoholics and can no longer afford to patronize her bar. To solve this problem, she comes up with a marketing plan that allows her customers to drink now, but pay later. She keeps track of the drinks consumed on a ledger (thereby granting loans to the customers). Word gets around about the "drink now, pay later" marketing strategy and increasing numbers flood into her bar. Soon it has the best sales of any bar in Detroit.

By providing her customers freedom from immediate payment demands, Helen gets no resistance when, at regular intervals, she substantially increases her prices for wine and beer, the most consumed beverages. Her gross sales increase massively. A young and dynamic vice-president at her bank recognizes that these customer debts constitute valuable future assets and increases Helen's borrowing limit. He sees no reason for any undue concern, since he has the debts of the unemployed alcoholics as collateral. . .

Meanwhile, at the bank's corporate headquarters, expert traders figure a way to make huge commissions and transform these customer loans into Drink Bonds. These "securities" are bundled and traded on the international securities markets. Naive investors don't really understand that the securities being sold to them as "AAA Secured Bonds" are really debts of unemployed alcoholics. The bond prices continue to climb and the securities become the hottest-selling products.

One day, even though the bond prices are still climbing, a risk manager at the original local bank decides that the time has come to demand payment on the debts incurred by the drinkers at Helen's bar. She then demands payment from her alcoholic patrons, but being unemployed alcoholics they cannot pay back their drinking debts. Since Helen cannot repay the loan she is forced into bankruptcy. The bar closes and Helen's 11 employees lose their jobs. Overnight, Drink Bond prices drop by 90%. The collapsed bond asset value destroys the bank's liquidity and prevents it from issuing new loans, thus freezing credit and economic activity in the community. The suppliers of Helen's bar had granted her generous payment extensions and had invested their firms' pension funds in Drink Bond securities. They find they are now faced with having to write off her bad debt and lose over 90% of the presumed value of the bonds. Her wine supplier also claims bankruptcy, closing the doors on a family business that had endured for three generations, her beer supplier is taken over by a competitor, who immediately closes the local plant and lays off 150 workers.

Fortunately though, the bank, the brokerage houses and their respective executives are saved

As you can see, I dined recently with the former All Blacks captain Sean Fitzpatrick. But surveyor Bill Rees managed to go one better by training with England's Martin Johnson and the England team!

and bailed out by a multibillion dollar no-strings attached cash infusion from the government. The funds required for this bailout are obtained by new taxes levied on employed, middle-class, non-drinkers who have never been in Helen's bar. Now do you understand?

A bright star amidst the gloom

With business not very busy it's been fortunate that the Royal Geographical Society has excelled itself this autumn with some brilliant lectures and a seminar on Everest which covered the inter war years including the ill-fated Mallory and Irvine expedition led by **Brigadier General Bruce**. We were shown some remarkable artefacts and photographs, including a naked shot of Mallory (from the rear I hasten to add) hiking up the lower slopes of the Himalaya. Also on show were clothing, oxygen kit and an invoice from Messrs Fortnum & Mason who supplied a great long list of crockery, cutlery and other (presumably camping) equipment including two gravy boats and butter dishes. Well, would you seriously attempt to climb Mt Everest without a gravy boat let alone a butter dish?

The question of whether Mallory and Irvine could have reached the summit remains. But experts believe fitness levels were just not up to it back then, what with 50lbs of tobacco being amongst the supplies inventory. Still, that missing role of film from Mallory's Kodak camera could still one day surprise us.

The evening lectures have included former Python star **Terry Jones** talking about how Columbus came to be so revered by Americans (all down to a 19th century historian whose textbook was used in every school); **Mark Kalch** who walked across Iran recently from the Caspian Sea to the Persian Gulf; **Colin Thubron** and the most outstanding, **Alastair Fothergill** producer of the BBC's series *Frozen Planet*.

Narrator of the series **David Attenborough** really is a star. He is almost certainly the oldest man (at 84) to have visited both poles. More importantly, he has been voted the most trustworthy person in Britain! It took 18 months to film and so far six million people have watched this gobsmacking series that included some of the most extraordinary footage of animal behaviour ever recorded, like a pack of 25 wolves pursuing bison, or penguins building nests of stones with one rogue bird stealing stones from his neighbours' nest to avoid the search and long walk to the beach!

Watching penguins for six months clearly gets to you. We saw a great clip of one of the team stuck on South Georgia with only thousands of penguins to watch taking their daily trip to the sea and back. He described how they followed the American system of walking down on the right and back on the left. But was then convinced that the day before they'd followed the British system, down on the left and back on the right!

Building a bridge

My old friend **Ron Craven** has emailed me some fantastic sepia pics of the iconic Tower Bridge under construction in 1892. They show the great steel frame before it was clad in stone, numerous cranes and a river with many sailing boats. Apparently the haul of 50 pics were found in a skip five years ago by a caretaker who rescued them.

Miscellany

A recent press release from the Chartered Institution of Water and Environmental Management alerts us to an event Undercurrents has previously not celebrated. World Toilet Day was the 19th of November (they missed my birthday by one day, *Ed*). Accompanied by an alarming catalogue of statistics involving viruses, bacteria, parasite cysts and eggs, it some how reminded me of a story about a senior surveyor whose company had rather muddled his hotel booking. 'Don't worry' he told the apologetic young lady, 'I'm a surveyor. I am just happy I don't have to dig my own toilet!'

I heard a good comment the other day from an academic on the difficulties in developing artificial intelligence. "My science colleagues are interested in artificial intelligence. I'm much more interested in natural stupidity!" He added a second great quote about former US Defense Secretary **Donald Rumsfeld** and his extraordinary verbal ramble on knowns and unknowns. "Rumsfeld's known unknowns are what determines the direction of future research – and that is what makes ignorance so exciting!"

Extracts from church bulletins.

Ladies, don't forget the rummage sale. It's a chance to get rid of those things not worth keeping around the house. Bring your husbands.

Miss Charlene Mason sang "I will not pass this way again", giving obvious pleasure to the congregation.

At the evening service tonight, the sermon topic will be "What Is Hell?" Come early and listen to our choir practice.

Potluck supper Sunday at 5 pm - prayer and medication to follow.

The ladies of the Church have cast off clothing of every kind. They may be seen in the basement on Friday afternoon.

Low Self Esteem Support Group will meet Thursday at 7 pm. Please use the back door.

Weight Watchers will meet at 7 pm at the First Presbyterian Church. Please use large double door at the side entrance.

Got a tale to tell?

Please send letters for publication by e-mail to the Editor: editor@pvpubs.demon.co.uk or contact Undercurrents, in strictest confidence if you wish (we promise to change names, places, etc to protect the guilty!), via e-mail: rentamalc@aol.com

Ordnance Survey: a visit to… the tardis!

By Richard Groom & Stephen Booth

Anyone who has visited the main London museums will know that an afternoon is not enough to do them justice. The same is true of a visit to the Ordnance Survey's new headquarters in Southampton, as **Stephen Booth** and **Richard Groom** discovered one windy afternoon in November.

In fact the Ordnance Survey has more in common with Doctor Who's Tardis than a London museum. The purpose of our visit was to find out more about the Phoenix Programme: the ambitious restructuring of Ordnance Survey's topographic database that has seen a single database replace the numerous databases that existed previously. It also included the re-engineering of OS's maintenance and production systems. This was not just a tweaking of systems, but a brand new data model. July 14th 2011 was switchover date but the old systems had to be ramped down in the preceding months, whilst in the months following the switchover, OS staff have been getting used to the ways of the new data management system.

Bob Goodrich is director of information systems at OS. He explained that the Phoenix Programme was just the continuation of the process of modernisation which began back in the 1970s with Ordnance Survey's large scale map digitisation programme. Digitisation was eventually completed in the mid 1990s following sponsorship and encouragement from the National Joint Utilities Group (NJUG) in its latter years. But OS realised that significant though the achievement was, the data was unstructured "spaghetti data" with many minor defects – unclosed polygons, overshoots etc. To put this right, a new data structure – TOPO96 was developed and delivered in 2000, which formed the basis for the large scale seamless OSMasterMap™ product. This was, and of course remains, intelligent mapping suitable for many GIS applications, but behind the modern façade were back office systems that needed attention. The Phoenix Programme has delivered a new database structure called GeoBase04 and new technology platforms that address these back office issues.

Designed to derive all products

With the new data model has come the Geospatial Data Management System (GDMS). Using the 'measure once – use many' principle, GDMS is designed to derive all products, including for example the road network and address data, from the one database. Furthermore, in GDMS the same editor is used whatever the source of data, whether it is photogrammetry or land surveying. Although OS has no strategic plans to get surveyors to do photogrammetric work, **Neil Ackroyd**, director of data collection and management, realises that this harmonisation brings with it the potential for flexibility. The value of this ability to combine photogrammetry and ground survey data has been proved at the Olympics site, where work has had to be turned round quickly for Ordnance Survey's customers.

Although the objective is automation throughout the product chain, there has always been significant cartographical input to the derived mapping scales. The Phoenix Programme and supporting investments has further reduced this input but the OS is keen to retain the character of its small scale mapping and feels that it is important to retain the highest quality of cartography even if this means manual intervention.

OS field surveyors are being re-equipped with Leica GNSS "on-the-pole" receivers and new panasonic Toughbook PCs.

Delivery cycles

Are there plans to introduce more frequent revision cycles? Ackroyd explained that most customers are happy with six-weekly OS MasterMap data delivery cycles and the daily field based surveying of continuous revision. Indeed most would find it a nuisance and an unnecessary overhead to have to update their data holdings more frequently. There is however one customer, Land Registry, that demands up-to-date data more frequently. "Every change today is

delivered by 4pm tomorrow", explains Goodrich. For OSOpenData products – those datasets that are now available for free – the update cycle remains the same as when they were paid-for mapping products.

It is easy to forget that "large scale" for the OS effectively means 1:1,250 scale mapping in urban areas. To achieve this, their surveyors effectively collect generalised data. The level of generalisation at data collection stage is governed by rules. For example a building overhang has to be offset more than a metre from the plinth line to be included in the dataset. Less than this figure and it is not surveyed. A glossary of feature names, properties and rules is available to the surveyors on-line so that the surveyor can easily look up queries. The new data model stores richer data than its predecessors, but the OS cannot make this available to customers for the whole country straight away because most of the data in the database is legacy data. In fact, some features in the database can trace their lineage back to the earliest days of the OS, explains Goodrich. 'Although they will have been checked during the digitisation programme if there was no change then they remain exactly as surveyed in the 19th century.'

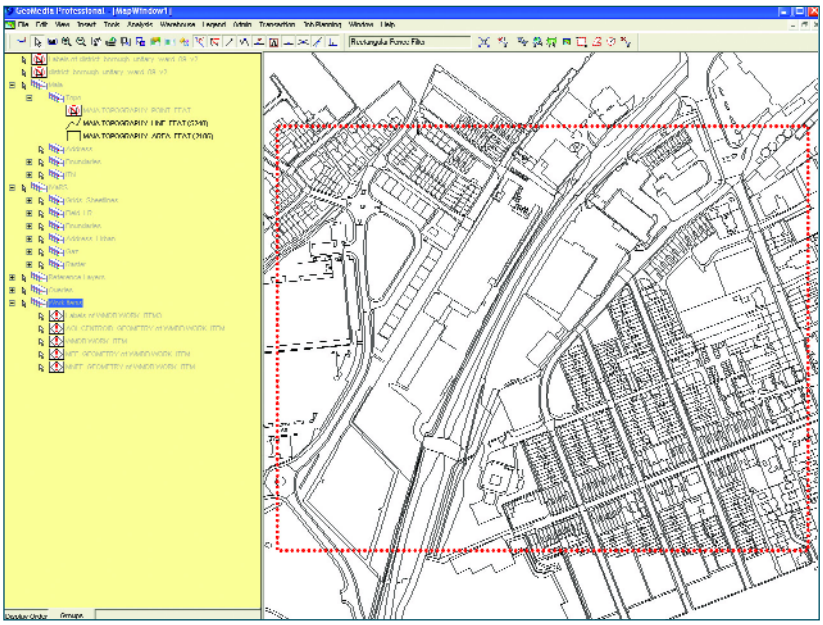
Old receivers do not die

Each OS field surveyor is issued with an RTK "on-the-pole" GNSS set, a total station and a Panasonic Toughbook PC. Surveyors are about to take delivery of the latest Leica GNSS receivers as well as an upgrade for their Panasonic Toughbooks. The latter take data directly from the survey instruments via the Ordnance Survey's Object Editor software, which is customised ArcMap. What happens to the old equipment? Ackroyd is justifiably proud that the GPS receivers will be used to provide permanent control stations for the AFREF network in Africa (see *GW* September/October 2011) and he has gone to some trouble to ensure that they will go to the right places.

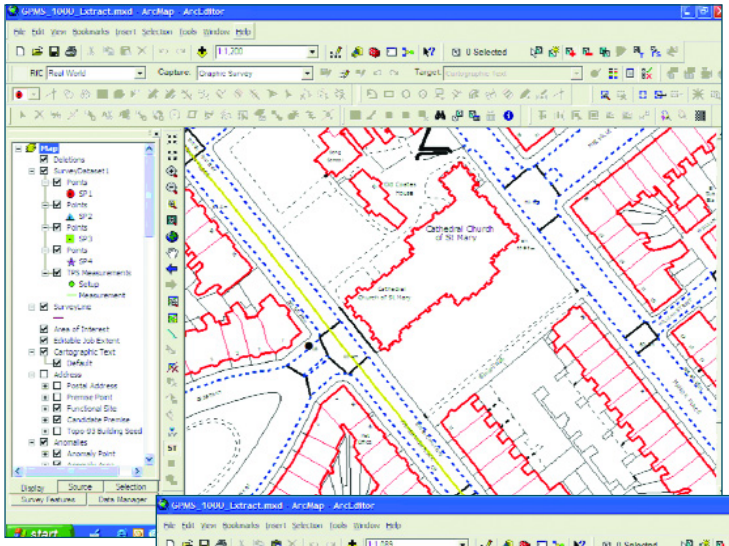
Despite having tested the new system extensively before switchover date, there were inevitable teething troubles. In the first few weeks the Object Editor, used in the field was causing the surveyors some operational issues. However, one advantage of having developed the editor system in-house was that OS had more control over the software and were able to sort out bugs quickly. Two software revisions later and the systems are running more smoothly for the surveyors.

Linking the real to the virtual

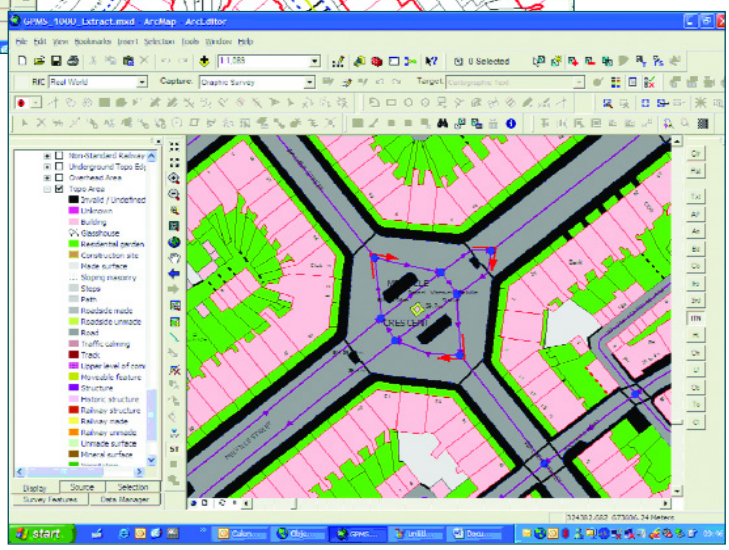
The field side of the implementation is run by **Bob Beavis**, senior manager data collection and management, who arranged demonstrations of the Job Planning Client, which is used to manage surveys and Object Editor which is the platform for field survey data collection. Beavis' colleague, **Derek Howland**, describes himself as the link between the real world (the surveyors) and the virtual world (the software developers)! The Job Planning Client is a particularly impressive aspect of the new system. This takes areas where change is



The Job Planning Client is used to manage surveys, showing where change has taken place and estimates time and resources needed to survey.



***Left:** the default Object Editor screen.*



***Right:** Object Editor with routing and topo area colours*

Above: *Rows of black cabinets with rack-mounted servers and hard disks run in an air-conditioned environment.*

known to have taken place and schedules the work needed to update the database. Using information about the changes, Howland demonstrated how the system automatically estimates the time and resources needed for survey. It then monitors progress of the work and there is even a feedback loop that updates its estimating functions based upon actual progress. The surveyors are then given batches of work to do on a monthly basis and, except for priority changes such as those required by the Land Registry, have some freedom to optimise their schedule to minimise travel time.

There are now roughly 250 field surveyors of whom 80% work from home. This has saved the OS £1.8 million in accommodation costs and been good for the organisation's carbon footprint. However, home working brings with it issues arising from isolated working, of which the OS is very conscious. To help overcome these, they organise regular field conferences and production meetings and are also looking at social media as a means of retaining strong links with and between the workforce.

Recruitment and accreditation

Ordnance Survey regularly recruits new surveyors, and next year will be no exception. Each new recruit goes through an eighteen-month training period before proceeding to fully unsupervised production work. It is critical to OS that quality is controlled and assured. The organisation does this by accrediting all surveyors who provide them with data, whether they are full time employees or employees of contractors working on OS projects. The accreditation process has been so successful that OS has taken a leading role in writing a new candidate ISO standard 19158 – Collaborative Supply Chain Management. The final touches are being made to the standard, which will be available soon. The success of accreditation has come in the form of reduced costs through reduced re-work and because less supervision is required. It also enhances the value of the surveyors' skills. The OS management system is so comprehensive that they can actually put figures on the savings that have been made.

Below: *data centre manager Simon Hughes expertly adjusts cables, keeping track of the route of each one.*

The hum and hiss of data

One of the highlights of our visit to Ordnance Survey's new Adanac Park headquarters was a tour of the Data Centre. Approached only through high security controls, one enters an air-conditioned room humming and hissing with technology. Rows of matt black cabinets hold rack-mounted processors, drives and other complex kit that flashes and whirrs away and it's all connected by kilometres of cabling. OS even has its own picocell to boost mobile phone access.

Simon Hughes, data centre manager and **Dave Rothwell**, infrastructure architect, gave us a tour around their fiefdom. For all his youth, Hughes's enthusiasm and pride in his work is infectious and it is hard to imagine a more competent or safer pair of hands. The room is meticulously laid out and mirrored exactly by the data centre in Gloucester. In fact it is the Gloucester centre that holds the working software and the data centre at OSHQ that is the back up and used for development work. Clearly there is no point in producing high quality survey data if it is not stored securely, so IT is not an area on which OS skimps. The opening of the Gloucester data centre was even timed to coincide with the office move from Romsey Road to Adanac Park so as to provide resilience for Ordnance Survey's data holdings.

So what does the future hold for the database? Clearly, demand will grow for a full 3D product. The quality of height data is already improving aided by lidar, stereo image matching and the new RTK GNSS data collectors which allow accuracy to a hitherto unavailable level. '3D will be driven by customer demand' says Ackroyd, acknowledging that 'technology and infrastructure make no concession to mapping'.

So why was the programme given the name of Phoenix? It rather conjures up the vision of a bonfire of old survey notes in the car park! The truth, it turns out, is itself part of the OS mythology, was it a re-birth of the new production system or was it that the name was borrowed from the TV series *Phoenix Nights* which was on at the time the project began?

From man-made stars and sensors to boundaries and land registration

The Geomatics Global Professional Group Board has been busy with meetings and lectures. A visit to colleagues in the Society of Chartered Surveyors Ireland (see above, SCS Chair **Ben King** and **Stuart Edwards**). There are also developing cross collaborations with photogrammetry and remote sensing colleagues.

Welcome to the first Chair's column of 2012. I hope that you were able to relax and enjoy the Christmas festivities with family and friends and are now refreshed and keen to embrace the challenges of the year ahead.

The close of 2011 was as busy as ever for PG Board business. On the 4th November I was able to combine two significant aspects of my life: my research into Network RTK performance and my role as Chair of the PG Board. These two elements came together in Dublin at a half-day symposium organised by the Society of Chartered Surveyors Ireland (SCS) addressing the current performance of Network RTK in Ireland. Over 30 geomatics professionals attended to hear the findings of research undertaken by Dr **Audrey Martin** FSCS and Dr **Eugene McGovern** (FSCS), both of Dublin Institute of Technology (DIT). Their work investigated the current performance of all three service providers – Leica, Trimble and Topcon – from the perspective of typical accuracies and precisions a user might expect. Further presentations from the service providers and Ordnance Survey Ireland combined to generate many questions and excellent discussion. Forums such as this where end users, equipment manufacturers and academia come together and engage in open discussion must surely be good for all.

Following the morning session I attended a working lunch with the SCS committee where the topic of collaboration continued. SCS and RICS have a long history of partnership and discussion topics including: new pathways to membership (AssocRICS) and joint publication of information and guidance. It was also excellent to visit the Department of Spatial Information Sciences at DIT. Led by **Frank Prendergast**, a group of around 11 staff, including the PG Board's very own **Helen Murray**, graduate over 30 new geomatics professionals each year. Like my own department in Newcastle and those of sister departments, the palpable staff enthusiasm for the discipline seems to capture the imagination of students inspiring them to achieve at the highest levels. This is as it should be for the graduates we produce today provide the leaders in the Geomatics industry tomorrow.

The evening lecture series began with a very well attended Michael Barrett award lecture given by this year's award recipient, Earl **John Lytton** FRICS. Earl Lytton is a most worthy recipient of the award for the outstanding leadership and vision he has shown as Chair of the RICS Boundaries and Party Walls Panel since his appointment in 2006. His lecture, entitled 'Boundaries, neighbour disputes and the future', drew upon his many years of experience in dealing with the legal aspects of boundaries as a basis for the consideration of the drivers behind legislation evolution, professional engagement, new markets and opportunities. The lecture was significant as it was delivered completely without any form of slideshow and I was able to present the award in person to John and his wife Uschi. The lecture was also videoed for further dissemination. Whilst video capture of our lectures is not new to the Geomatics PG Board, the method of dissemination via 'YouTube' is yet another first for any RICS PG.

The lecture series continued in December with a very well attended presentation given by Prof. **Peter Dale** OBE FRICS and **Robin McLaren** FRICS (complete with Hat!) speaking about their 3rd edition of *Land Markets and the Modern Economy*, which was launched at the event.

A chance encounter at RICS HQ revealed further developing cross collaborations between a diverse range of land surveyors, photo-grammetrists and remote sensers working on our behalf. The Remote Sensing and Photogrammetry Society (RSPSoc) ISPRS Committee met in December to coordinate activities for the ISPRS Congress, to be held in Melbourne in August 2012. Although a sub committee of RSPSoc, it is jointly sponsored by the RICS and CICES. Its purpose is to support the organisation and funding of formal activity by the UK in relation to ISPRS (International Society of Photogrammetry and Remote Sensing). Recent years have been particularly active for UK colleagues working in photogrammetry, with the on-going work associated with hosting Commission V of ISPRS. In addition to the successful symposium held in Newcastle in June 2010 (*GW* Sept/Oct 2010), the six Working Group chairs are coordinating efforts in close range photogrammetry, including: new and integrated imaging sensor technologies; the processing and modelling of two and three dimensional image data; and, analysis of derived information for a broad range of disciplines, including: industrial metrology, the preservation of cultural heritage, and morphological measurement in the earth sciences. Further details of all of these initiatives can be found: **http://research.ncl.ac.uk/pls/isprs_tcv/wg.html** This hard work is helping to put the UK at the forefront of close range photogrammetry and requires our continued support and gratitude. Recent initiatives like Autodesk's 123-D catch is at last opening the world's eyes to the potential of "casual photogrammetry" for us all, and the UK is now well placed to take advantage.

Footnote
My thanks to Prof. Jim Chandler MRICS for his contribution on the work of the RSPSoc ISPRS Committee and to Prof Jon Mills.

Stuart Edwards
welcomes your comments and thoughts so please email on the following address
geochair.rics@gmail.com

Pebble Tracking using RFID

By Clive Moon and Ted Read

Measuring beach movement is not a precise or static measurement problem. One solution involves installing 2400 tiny radio frequency identifiers in pebbles and tracking them over time.

The Havant, Portsmouth & Gosport Coastal Partnership is a partnership of local maritime authorities responsible for managing coast and flood erosion risk along 136 kilometres of the East Solent coastline in southern England. The partnership is undertaking a long-term study to track the movement of shingle along their coastline. The study, currently covering the open coast on Hayling and Portsea Islands, features the long-term tracking of shingle pebbles that have had a small radio frequency ID (RFID) tag embedded within them. The ultimate purpose of the study is to improve understanding of the movement of beach material along the coastline, which will in turn help to optimise future coastal erosion and flood protection schemes. Of special interest is the performance of the ongoing beach nourishment operations at Eastoke, Hayling Island. SCOPAC, the Standing Conference on Problems Associated with the Coastline, has also contributed financially to the project, recognising the wider benefits of developing a new technique for tracking gravel sized material in the littoral zone.

Pebble Tagging

To accurately simulate the natural beach material, individual pebbles are drilled using high pressure water jets and a small RFID tag is placed in the hole which is then filled with a plastic resin. Where possible the hole is orientated along the short axis of the pebble so that in its natural repose position the majority of tags will be pointing upwards, this being the optimum orientation for RFID detection.

The RFID tags used are passive, meaning that they have no internal power source. The power used by the pebble's microchip tag is supplied by inductive electromagnetic radiation emitted from the RFID reader device. The Texas Instruments tags utilise half duplex (HDX) transmission technology, and operate at a low-frequency of 134.2 kHz. Ultra-high frequency (UHF) tags are not suitable due to the fact that if they are near a conducting material such as metal (or in this case wet salty ground) the range is greatly reduced.

There are three different sizes of RFID tags being used (32 and 23mm glass transponders, and a 12mm plastic wedge transponder). The 32mm tags have the greatest optimum detection range at 1.0m, decreasing to 0.2m for the 12mm tags. Only limited numbers of the 12mm wedge tags will be used initially to test the performance of resin-based artificial pebbles in simulating the movement of smaller sized shingle particles.

RFID equipment

The RFID detection equipment consists of three major components, an RFID control unit, an antenna load tuning box and an external antenna. These components were assembled by Ohmex into two trial units, a portable hand-held unit and a towable large antenna configuration. During August 2010 a field test was organised with Clive Moon (Coastal Engineer, Havant Borough Council) on Hayling Island to trial the two assembled devices. The hand-held antenna has an area of 0.2 × 0.2m, and recorded an optimum read range of 0.4m for a 32mm transponder. The larger antenna was 1.0 × 2.0m and designed to sit in a wooden tray and be towed behind an all-terrain vehicle (ATV). The maximum read range for a 32mm transponder was only 0.2m for this larger antenna.

The optimum read ranges during the initial trial were lower than anticipated and prompted modifications to the design of the equipment. The hand-held antenna was re-wound using heavier gauge wire. During subsequent testing this increased the read range of a 32mm tag to 0.8m, close to the optimum range of 1.0m suggested by the manufacturer.

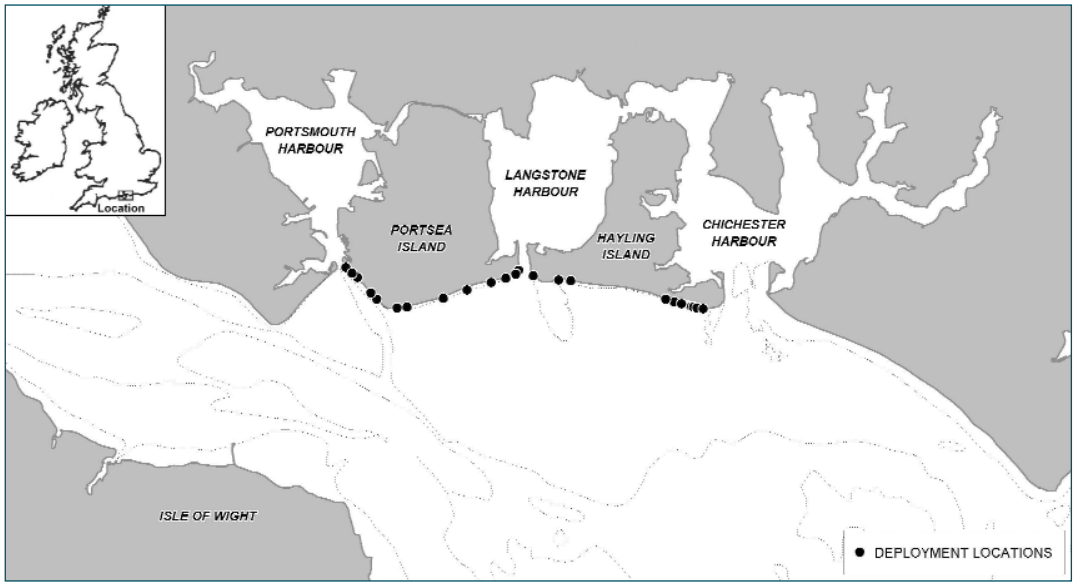


Figure 1: The study area, Hayling and Portsea Island on the South Coast of UK

Figure 2: Tagged pebbles

Figure 3: ATV mounted RFID antenna.

The towed antenna was redesigned to incorporate a multiplexer that can drive up to four antennas, each 1.2 × 0.6m in area, again using heavier gauge wire. The optimum read range for a 32mm tag again increased to 0.8m during subsequent testing. The new array can cover a 3m wide strip of beach, increasing the survey efficiency by 50% compared to the original design.

Further testing is currently underway in which antennas are suspended from the back of an ATV rather than being dragged along the beach surface. If successful this will increase the potential surveying speeds, whilst also reducing wear and tear on the various antenna components. Data from the antenna array is logged and time-stamped using a datalogger. Position data is simultaneously logged using a Trimble R8 GNSS receiver with TSC2 datalogger, using corrections supplied from a Trimble NetR5 base operated as part of the Southeast Strategic Regional Coastal Monitoring Programme. The data is post-processed to combine RFID tag numbers and locations for each of the four antennas.

Initial Results

As part of the ongoing study 2,400 tracers have been deployed around the Hayling and Portsea Island open coast. Sixteen kilometres of beach is being scanned every three months over a 12-month period to build up a picture of the rate and direction of sediment transport. After 12 months, as many tracers as possible will be recovered and re-measured to quantify the rate of attrition of the beach material. This will help the partnership improve the accuracy of long-term volumetric predictions for the fate of beach nourishment material placed along the coastline.

A two-week study of 300 tracers deployed at Eastoke, Hayling Island, in September 2010 yielded good initial results. The average detection rate over the two weeks was 72%, with more than 95% of all the tags detected at least once. After five months deployment the tracers had dispersed along three kilometres of beach, with the mean direction of drift westwards – as anticipated, based on the current understanding of sediment transport in this area. The detection rate had dropped to 17% after five months – a significant drop, but one of the key outputs from the project will be a clearer understanding of the detection rates achievable over longer time periods.

"After five months deployment the tracers had dispersed along three kilometres of beach. . ."

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The day of the RFIDs has arrived

Radio-frequency identification (RFID) is a technology that uses radio waves to transfer data from an electronic tag or label. Attached to objects, the RFID tag enables a reader to identify and track the object. Some RFID tags can be read from several metres away and beyond the line of sight of the reader. Basically there are two types of RFID tag: fixed and mobile. The latter are increasingly used to track vehicles for toll charges while the static have wide application in logistics and stock control as well identifying buried utility services.

The tag's information is stored electronically. The RFID tag includes a small RF transmitter and receiver. An RFID reader transmits an encoded radio signal to interrogate the tag. The tag receives the message and responds with its identification information. Many RFID tags do not use a battery. Instead, the tag uses the radio energy transmitted by the reader as its energy source. The RFID system design includes a method of discriminating several tags that might be within the range of the RFID reader.

Surveying Stonehenge Part 2

– high resolution survey captures surface data down to 0.5mm

The first part of this article, published in the Nov/Dec issue of GW, covered data collection and processing. In the second part **Paul Bryan**, Head of Geospatial Imaging, English Heritage discusses and reviews the results of the survey.

Following post-processing of the captured site data, all the outputs highlighted in the specification were delivered to English Heritage by surveyors Greenhatch. These included:

- Raw and registered scan data provided in both proprietary ZFS and non-proprietary XYZ (ASCII) formats
- Scan data formatted for viewing in TruView, Leica Geosystems' web-enabled point cloud viewer that lets users view, measure and mark-up laser scan data
- Meshed 3D models provided in OBJ format in both textured and untextured forms for:
  - the Triangle landscape at 100mm resolution
  - the bank and ditch landscape at 20mm resolution
  - the standing and fallen stones at 1mm resolution
  - individual faces of standing and fallen stones at 0.5mm resolution

Data density issues

The availability of such a high resolution dataset undoubtedly provides a very powerful tool for numerous other applications concerned with Stonehenge. However, it also currently brings difficulties in viewing such densities of data on standard computers without resorting to decimation and lowering the number of triangles displayed within each meshed surface. By selecting a suitable level of decimation it is possible to minimise the effects on the underlying geometry, detail and colour of the surface. But the higher the decimation, the less accurate and flatter the data will be, which inevitably impacts on its usefulness for detailed archaeological analysis and interpretation.

Even with this current limitation, this new survey has resulted in an exceptionally high-quality dataset which may be used to inform interpretation and education within the new visitor centre; verify the knowledge already gained for the monument through previous investigations; assist condition monitoring for both stone surfaces and lichen coverings; measure erosion rates for the stones and surrounding earthworks and identify previously unseen features on the surfaces of the stones.

Archaeological assessment

An initial archaeological assessment of the meshed 3D models was undertaken by Caroline Hardie from Archaeo-Environment Ltd. Using Meshlab, a free, open-source viewer for unstructured 3D triangular meshes, she was able to import, view and analyse each 3D model using a variety of different colourings, finishes and 'virtual' lighting conditions. Although a more detailed assessment of the data is currently being developed by English Heritage, this initial summary has already contributed to increasing our knowledge on the working of the stones and that the 'grooves' resulting from stone dressing on some surfaces appear to be divided into sections, suggesting that different teams of Neolithic builders worked on separate areas of each stone.

The significant size and detail contained within each laser scan has demonstrated the current limitations of viewing and the need to decimate the data to facilitate loading on a standard computer. However, by scanning every surface of the monument at such a high resolution, the lichens, Bronze Age carvings, erosion patterns and Victorian graffiti are all revealed with utmost clarity.

Filtering out vegetation

Many areas of the site are covered by vegetation, be it upon the surrounding landscape or on the

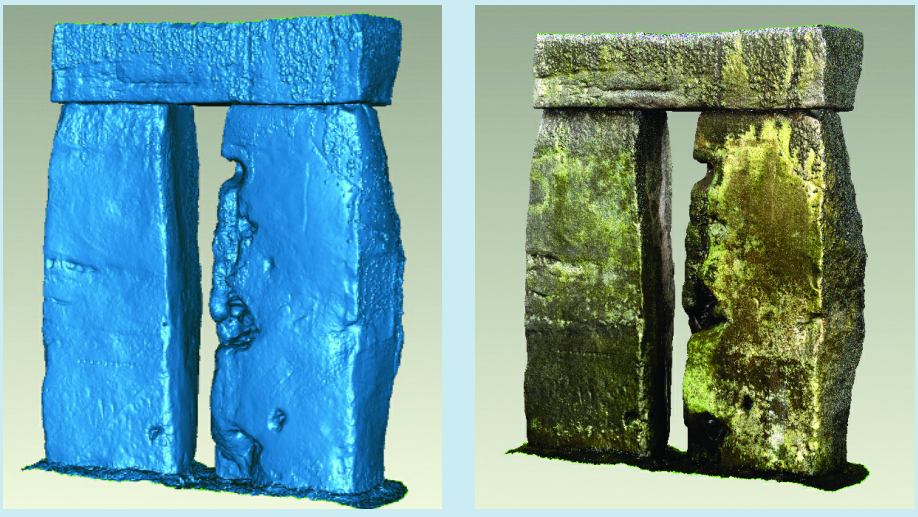

Figure 5 – Example 3D model for trilithon at Stonehenge (Image © English Heritage).

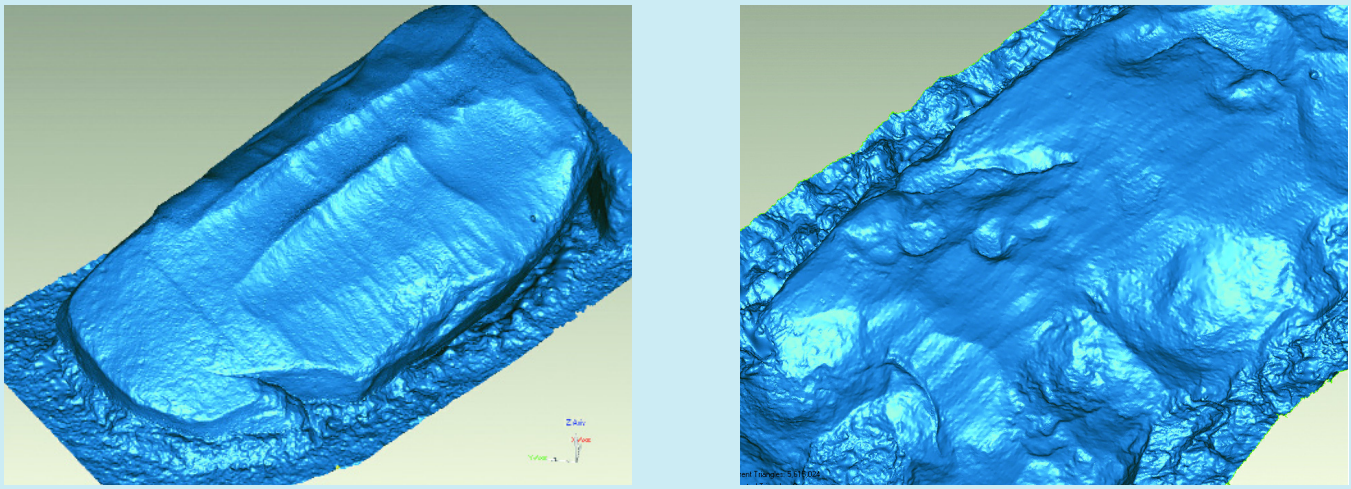

Figure 6 – Examples of tool marking and surface smoothing visible within some of the 3D models (Image © English Heritage).

stones themselves. Even with very dense resolutions of data, such coverings still act as barriers to most terrestrial laser scanners thus limiting the effectiveness of data capture and later attempts at interpreting any surface features that may still exist below. The lichen growth on the stones creates similar problems; but given their national importance, laser scanning still provides a detailed and measureable record of the lichen's current extent, which can assist in long-term monitoring and management. However, as more information may still be revealed on both the landscape and stone surfaces, English Heritage will be looking to the manufacturing, academic and survey communities for assistance in determining what filtering algorithms for terrestrially scanned data already exist or may need to be developed.

Archiving

With over 800Gb of data so far generated, it will be important to ensure both the long-term safety and accessibility to all products generated by this survey. Current guidance on archiving laser scanned data suggests that ASCII text is seen as the most stable format for data preservation, whilst open binary formats suit the dissemination of 'Big Data', such as laser scanning, because of a dramatic reduction in file size (Austin et al, 2007). The development of the LAS format as a public file format for the interchange of lidar data between vendors and customers has led to its widespread adoption by both suppliers and end-users.

However, up until now no such format has existed for terrestrial scan data so since the Stonehenge survey commenced in February 2011, it is pleasing to see the release of the newly approved ASTM International E57 data exchange standard for 3D imaging systems. Some laser scanner manufacturers and processing software developers have already adopted the format and will be introducing tools for both the import and export of E57 data within their respective products. Although this will mean future work for English Heritage, in converting the Stonehenge scan data to E57, this does mean that a non-proprietary alternative to ASCII does now exist and which will hopefully satisfy both the generators, end-users and archivers of laser scanned data.

Disseminating the data

Finally this new dataset will undoubtedly provide a very powerful tool for both monitoring the physical condition of the monument and for expanding our understanding and knowledge of it. Therefore English Heritage is currently developing a data dissemination strategy to help guide and manage its current and future usage. This important document is looking at all the specified outputs resulting from this survey. As well as considering how each may be suitably managed, various dissemination mechanisms are also being considered for making the products available both within English Heritage and externally. These currently include the 'raw', registered and other supplementary versions of the scan data, such as that formatted for viewing in TruView, meshed 3D models and pre-rendered animations, some of which have recently been unveiled on the English Heritage website (**www.english-heritage.org.uk/about/news/3d-stonehenge-model-unveiled/**).

Although a pre-determined route has been used, these animated views still provide a feel for the detailed level of data that has been collected and a flavour of what might be achievable in the future.

Summary

As highlighted recently on both the English Heritage website and the Discovery Channel

"By selecting a suitable level of decimation it is possible to minimise the effects on the underlying geometry, detail and colour of the surface."

Figure 7 – An extract from one of the 3D animations for Stonehenge (Image © English Heritage).

> *". . . scan data, . . . will undoubtedly prove a very important resource for many years to come and provide the basis for both detailed condition monitoring and further research and analysis across the site."*

(Canada), a new and (very) high resolution 3D model of Stonehenge now exists. This is already assisting within a number of English Heritage's own initiatives, such as the development of both static and virtual content for the proposed new visitor centre. The scan data, and all derived outputs so far developed, will undoubtedly prove a very important resource for many years to come and provide the basis for both detailed condition monitoring and further research and analysis across the site. Although not the first time that 3D survey data has been collected at Stonehenge, the capture of every nook and cranny of all the stones' surfaces to a sub-millimetre resolution, combined with the survey of the surrounding landscape to centimetre levels, has resulted in the most comprehensive and accurate digital model ever produced for this world famous monument.

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About the author

Paul G Bryan BSc is the Head of Geospatial Imaging within the IGS (Imaging, Graphics & Survey) team of English Heritage. Based in York, he heads up the Photogrammetry team alongside taking the corporate lead on the application of modern metric survey technology to cultural heritage. Paul has extensive knowledge of image-based survey approaches, including photogrammetry and laser scanning, and is co-author of the 'Metric Survey Specifications for Cultural Heritage' which sets the standard for metric surveys across the heritage sector. He is currently UK representative for CIPA (The International Scientific Committee for Documentation of Cultural Heritage) and chair of the 'Cultural heritage data acquisition and processing' WGV/2 working group within ISPRS (International Society for Photogrammetry and Remote Sensing) Technical Commission V concerned with the development and application of close range image measurement techniques.

Crowdsourcing for Land Administration

By Robin McLaren

The closing of the 'security of tenure gap' experienced by the poor and vulnerable in the developing world is of critical importance to future global economic progress. **Robin McLaren** explains how crowdsourcing could help to solve the problem.

• *This article is an abridged version of the RICS Reasearch paper Crowdsourcing Support of Land Administration produced by Know Edge Ltd.*

Only 1.5bn of the estimated 6bn land parcels worldwide have land rights formally registered in land administration systems. Many of the 1.1bn slum dwellers and further billions living under social tenure systems wake up every morning to the threat of eviction. These people are the poor and most vulnerable and are excluded any form of security of tenure; they are trapped in poverty. Increasing global population and the rush to urbanisation is only going to turn this gap into a chasm.

This groundbreaking collaborative research project from RICS and Know Edge Ltd, an independent ICT and Land Policy consultancy, explores one possible solution to the tenure gap: establishing partnerships between land professionals and citizens that encourage and support citizens to capture directly and maintain information about their land rights. The research presents a vision of how this might be implemented and investigates how the risks associated with this collaborative approach could be managed.

Land administration systems

Land administration systems (LAS) provide the formal governance structures within a nation that define and protect rights in land, including non-formal or customary institutions. Their benefits range from guarantee of ownership and security of tenure, through support for environmental monitoring, to improved urban planning, infrastructure development and property tax collection. Successful land markets depend on them.

The security of tenure gap cannot be quickly filled using the current model for registering properties through land professionals. There are simply not enough land professionals worldwide, even with access to new technologies. To quickly reduce this inequality, we need new, innovative and scalable approaches to the problem. This is one of our fundamental global challenges.

This research paper explores 'crowdsourcing' as a means of extending registers of property rights. Crowdsourcing uses the internet and online tools to obtain information from citizen volunteers. It is currently used to support scientific evidence-gathering and to record events in disaster management, as witnessed in the recent Haiti and Libya crises, for example.

A key challenge of this innovative approach is how to ensure authenticity of the crowdsourced land rights information. The research paper explores applicability of the approaches adopted by wikis, e-commerce and other mobile information services and recommends the use, initially, of trusted intermediaries within communities, who have been trained and have worked with local land professionals.

Limitations of existing LAS

Despite the clear link between effective LAS and efficient land markets, a number of factors limit the scope for implementation:

- Costs are significant and national solutions can take from five to more than 20 years to implement.
- Overly complex procedures lead to high service-delivery costs and end-user charges, which exclude the poor and the vulnerable.
- Lack of a supporting land policy framework ensures that the LAS do not deliver against the main drivers of land tenure: land markets and socially desirable land use.
- Insufficient support for social and customary tenure systems excludes large sections of the population.
- Lack of transparency encourages corruption in the land sector and discourages participation.
- Communication channels to customers are either office or internet-based and lead to geographic discrimination or exclusion through the 'digital divide'.
- A mortgage requires a bank account and a credit rating, both out of reach of the poor and those remote from financial services.
- Cadastral surveys using professional surveyors are normally mandatory and subject to high fees.

It is estimated that there are around 6bn land parcels or ownership units worldwide, but only 1.5bn are formally registered and have security of tenure. Within many of the 4.5bn unregistered parcels, 1.1bn people live in the squalor of slums. With urbanisation predicted to increase from the current 50% to 60% in 2030 and a further 1bn likely to be added to the world's population over the same period, the security of tenure gap will become a chasm. This will be impossible to address in the foreseeable future within the available land administration capacity.

The lack of effective, affordable and scalable LAS solutions conspires to limit access to land administration services by large sections of society, especially the most vulnerable, leaving them trapped in poverty. There is a pressing need to radically rethink LAS: simplify procedures, reduce the cost of transactions and open new channels for participation. Crowdsourcing through mobile phones, for example, offers the opportunity for land professionals to form a partnership

> *"There are simply not enough land professionals worldwide, even with access to new technologies."*

Benefits of modern land administration systems.

with citizens to create a far-reaching new collaborative model and generate a set of LAS services that will reach the world's poor.

The increasingly pervasive mobile phone

Although citizens can provide their crowdsourced data through a number of traditional channels, including paper, mobile phones are proving to be the device of choice. Mobile phones have made a bigger difference to the lives of more people, more quickly, than any previous communications technology. They have spread faster and proved easier and cheaper to adopt. In the 10 years before 2009, mobile phone penetration rose from 12% of the global population to nearly 76%. It is estimated that around 5bn people have mobile phones already and 6bn will have them in 2013.[1]

Recently, the fastest growth has been in developing countries, which had 73% of the world's mobile phones in 2010, according to estimates from the International Telecommunications Union (**www.itu.int/ITU-D/ict/statistics/**). In 1998, there were fewer than 4m mobiles on the African continent. Today, there are more than 500m. In Uganda alone, 10m people, or about 30 percent of the population, own a mobile phone, and that number is growing rapidly every year. For Ugandans, these ubiquitous devices are more than just a handy way of communicating; they are a way of life (Fox, 2011). Not all phones in the developing world are in individual use; some are a communal asset of the household or village.

Due to their high ownership levels and widespread geographic coverage, especially in developing countries, mobile phones are an excellent channel for obtaining crowdsourced land administration information. But are they affordable and do they have the necessary functionality?

"The mobile phone will allow citizens to record the boundaries of their land rights."

The rise of smart phones and tablets

Telecommunications has developed exponentially. Phones have changed and there is a big shift from holding a phone to your ear to holding it in your hand. Smartphones are able to browse the web, send and receive emails, and run applications, as well as storing contacts and calendars, sending text messages and (occasionally) making phone calls. Although smart phones may cost around US$600 (£379) today, the volume of sales and frugal innovation will drive the cost down to an estimated US$75 in 2015. A US$100 smartphone has already arrived on the streets of Nairobi. Before the end of the decade, every phone sold will be what we'd now call a smartphone and cost US$25.

The emergence of tablets is also providing an opportunity for supporting crowdsourced information, especially graphical information. This technology will play a significant role in the future of crowdsourcing.

Vision of a crowdsourced LAS

This increase in mobile phone functionality, its migration to lower-cost devices through frugal innovation and the phenomenal market penetration of mobile technology in developing countries have opened up the prospect of it being used to deliver more effective and accessible land administration services. The possibilities are explored below.

1. Accessing customer information services. Already, a whole new generation of innovative information services, in fields such as agriculture and health, are being provided to users of mobile phones in developing countries.

2. Recording land rights. The mobile phone will allow citizens to record the boundaries of their land rights. This can be achieved in several ways:

- marked-up paper maps photographed digitally by phone
- a textual description of the boundaries recorded on the phone
- a verbal description recorded on the phone
- geotagged digital photographs of the land parcel recorded on the phone
- a video and commentary recorded on the phone
- the positions of the boundary points identified and recorded on imagery-using products – for example Google Maps and Bing
- the co-ordinates of the boundary points recorded directly using the GNSS capability of the phone.

In all cases, the authenticity of the captured information would be enhanced by passive recording of the network timestamp at the time of capture. This information is not something that most (99.999%) of users can tamper with.

The results of this crowdsourced or self-service information could then be submitted electronically to either the land registration and cadastral authority or an open data initiative for registration. Although there will be limitations in terms of the quality and authenticity of the ownership rights information provided, it could form the starting point in the continuum of rights being proposed by UN-HABITAT. This recognises that rights to land and resources can have many

1. http://www.itu.int/ITU-D/ict/statistics/

different forms and levels.

When the captured land rights are submitted to the property register (or shadow register), a variety of quality checks can be applied to the submitted information, including random checks in the field, comparisons with other applications submitted from the same area, checks on ownership of the mobile phone, checks on the location of its owner through the log showing that the phone is frequently used within that location, network time-stamping of captured information, and contacts with clients and their neighbours by mobile phone to ask for clarification.

3. Obtaining title. Fees for submission of applications for registration of title could be paid through mobile banking and encrypted forms of land title could be incorporated into clients' mobile phones with biometrics to provide proof of ownership.

4. Accessing land information. The next development stage is to make LAS outward-facing and accessible by customers, either by extranet or internet on mobile phones.

5. Paying mortgage instalments. Secure payment of land administration fees could be done through mobile banking, and a simplified process would create the potential for wider property ownership.

Implications of the new citizen collaboration model

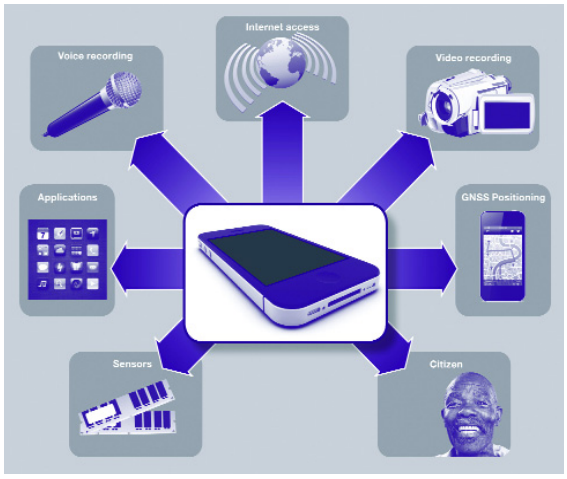
The introduction of this new LAS model might be perceived as radical by most land professionals working in the land administration sector and as a serious threat by some. The attitude of land professionals to this new model will determine how land administration is shaped in the future. Here are two possible scenarios:

A 'shadow' property register. In countries where land professionals reject citizen collaboration, but there is little citizen trust in poorly performing or corrupt land administration services provided by the government, an alternative property register could be created through crowdsourcing; similar to the OpenStreetMap crowdsourced model. Ultimately, it might either replace the government land administration service, reinforcing the informal land market, or be adopted by government once it has reached a critical mass and quality.

A *supplement to the formal property register.* In other countries, the new model might be embraced as a new opportunity to accelerate the number of properties being registered across the country and to support a much more inclusive solution to land administration. This would involve a change in the role of land professionals, working with citizens rather than for citizens.

Managing the risks

As with all radical changes to long-standing systems, there are some risks.



Smart mobile phone cyborg functionality

Can crowdsourced information be authenticated? One of the most contentious issues surrounding crowdsourced information is the authenticity or validity of the information provided. So what techniques can be used to quality-assure the authenticity of the information to a level that would be acceptable for inclusion in a property register?

Community knowledge workers as intermediaries. This approach would avoid open, direct crowdsourcing, initially, and accept information only from trusted intermediaries within communities who had worked with local land professionals. Over time, quality assurance sampling would significantly decrease and the intermediaries could help establish a network of 'experts' across communities.

Community-based quality assurance. Quality assurance could be provided by community members who would take direct responsibility for authenticity. The crowdsourced land right claims could be posted for communities to review and comment on. Some form of local or regional land tribunal could be established to arbitrate on conflicting claims. The local public display of the results combined with the witness function of the local land committee and the citizens will provide societal evidence of land rights.

Wiki and e-commerce solutions. A centralised user reputation system similar to buyers rating sellers on eBay could be used to assess the credibility of contributors and the reliability of their contributions.

Crowdsourcing quality assurance. Some elements of the quality assurance process do not require local knowledge of the land rights claim and could be crowdsourced to a network of informed consumers and worldwide professionals, or could even be automated.

Passive crowdsourcing quality assurance. Mobile phones can passively collect evidence that supports validation of user-entered information - e.g. the continual logging of

continued on page 29

"... an alternative property register could be created through crowdsourcing; similar to the OpenStreetMap crowdsourced model."

Geomatics Education

At first sight the future of geomatics education might appear bleak. For British undergraduates, the introduction of higher tuition fees means that convocation day will see them graduate with a valued qualification but also with the burden of debts dragging on into middle age. Elsewhere prospects look a little better.

There is currently raging a worldwide debate on the pages of **Linkedin** about 'a suitable name for the profession'. In one corner we have the land surveyors and in the other, geomatics.

Several commentators have observed that it is often an age split. As one greying chartered surveyor told us, "We live with fast evolving technology that has reduced what I took several weeks or even months to measure as a land surveyor to a matter of minutes for anyone who can press buttons and read a display." He conceded however that "the fact that many of us might have had difficulty in explaining our work at a dinner party until Google Earth came along is a small price to have paid for a varied career in what the Chinese curse calls interesting times."

So is this debate of any importance or is it trying to count angels on the head of a pin while Rome burns? An academic we turned to cut to the chase. He says that cutting-edge research in geomatics is increasingly indistinguishable from computing science where academic departments and researchers are much more numerous. Search on key words, he says, such as sensor networks, navigation, bundle adjustment, data mining or 3D visualisation and the majority of recent work is computing science generated. Geomatics influence is prevalent in research into Geodesy, Engineering Surveying and Remote Sensing. However, UK research funding strategy, peer review and interdisciplinary faculties blur discipline distinctions still further. This is a good thing for Geomatics, he argues, as it opens out both scientific and applications research into a much broader community.

The future of a handful of specialist geomatics / surveying degree courses is of greater concern to the professional institutions. Will they survive? We turned to a leading academic researcher. "These courses survive where engineering student intake can be leveraged and key staff skills sustained as part of a wider departmental strategy" he says. "Fee increases will inevitably play a growing part in educational choice such that a clear and cohesive message from industry and its professional bodies is essential to convince prospective students and their parents that a career in geomatics will be of real value." he argues, adding: "The only way I can see this happening is if the CICES, RICS, TSA and others such as FIG, ISPRS and RSPSoc work in partnership with industry and the education sector so that maximum effort can be directed".

We turned next to Dr **Brian Whiting** from University of East London who gave a detailed and thoughtful response to our questions. He explains the new system of government funding from the beginning of the next academic year, what his university is doing to enhance this, whether Geomatics is sustainable as a discrete subject in the long term and the effects on research. He stresses that the views expressed are his and not necessarily those of UEL.

BW: The new fee structures that are coming into place for new home students make for an interesting time, writes Brian Whiting. We are told that whilst government funding of certain groups of university courses will be removed altogether, courses in science, technology and engineering areas, which normally includes geomatics, will continue to receive a small amount of funding. Universities therefore have to make up the difference from the new fees and it is expected that this will enable them to improve the overall provision for students.

Whilst the fee for full-time undergraduate UK and EU students will rise from £3375 per year up to a maximum of £9000, students are not expected to pay this upfront as they will be covered by a tuition fee loan. To go along with this we are offering students starting in September 2012 a package which includes free textbooks, a bursary for progression on their programmes alongside additional financial support for those from lower income families. Maintenance loans will also be available to full-time home (UK) students to help pay for living costs.

For the first time, from September 2012 part-time students from England will not have to pay their tuition fees upfront themselves or have them paid for by an employer. Those studying for their first degree or other higher education course can receive a government tuition fee loan. Previously this type of loan was not available for part-time study.

Students will not have to pay this loan back until they have finished their programme of study and are earning over £21,000. They only then have to pay back 9% of the amount earned over £21,000 so that the monthly repayment is based on income and is the same regardless of the amount borrowed. So students starting in 2012 will not have to repay anything until after they graduate in 2015 when hopefully the economy will be in recovery.

Undoubtedly the outlook for Higher and Further education is different, but it is not bleak. As a professionally based vocational subject Geomatics is well placed to take advantage of some of the changes.

GW: *In the longer term, are educational institutions re-thinking courses for this new landscape? Perhaps geomatics should no longer be a degree course on its own but offered as a module(s) attached to other courses. Should the focus be on further education rather than higher education?*

BW: Educational institutions are continually assessing their provision to meet the current needs of both education and industry. Our Industrial advisory board meets regularly to help and assist us in this process. Modular programmes were introduced to provide a structure which is both efficient and adaptable allowing for a variety of study patterns.

For further education or higher education, it depends on needs. Further education as provided in technical and sixth form colleges is more about technical competence whilst higher education aims more for professional judgement. There is clearly a need in the short term for technical abilities such as instrument handling and routine processing of data but in the longer term perhaps it is more important to be able to cope with differing situations and problems which require some thought to come up with an unusual or perhaps unorthodox solution that is still rigorous.

GW: *What will be the effect of the recession on postgraduate study and research? Is funding holding up in these straightened times and are the universities attracting the calibre of students that they need?*

BW: Often in times of recession, education sees a rise in applications as individuals seek to improve their qualifications in order to give them a better chance in life. Postgraduate courses do not receive funding from Government and so have not been affected by the recent changes. However, the ability of students to pay is likely to be more difficult and here there is a requirement to pay upfront. It is possible for individuals to receive career development loans but these are on commercial terms. Traditionally, many of those studying at post-graduate level are from overseas and changes to visa regulations have resulted in fewer applications.

In recent years, student numbers have been capped by Government and Universities have generally raised their entry requirements. Therefore, the entry qualification and calibre of students is generally higher now than in the past.

View from the North

From Dr Jane Drummond's perspective at University of Glasgow things look a bit different. Scottish domiciled undergraduate students pay no fees. 'University financing drives things - rather than the needs of the Geomatics sector, society at large, young people or their tax-paying parents', she says. 'Five years ago, and even before the recession, our Geomatics BSc had become too expensive for our faculty, compared to the apparently perennially popular Geography programme. So, with industry support, we launched a "conversion" MSc - attracting Geography, Physics, Engineering and IT graduates, from across the UK and abroad. All graduates of this programme find relevant work; how the Geomatics sector compares these graduates with our former BSc graduates is yet to be ascertained.

But things move on. Reduced teacher employment makes Geography less popular. The lack of technician level Geomatics training has to be addressed. And now universities are being asked to consider offering shorter more directed courses. Studying and teaching Geomatics remains attractive and essential. But one (MSc) size may not fit all.'

CURRENT COURSES

Below are the current Geomatics university courses, both graduate and post graduate currently available in the UK. In addition, the Survey School in Worcester has been a success in providing trained surveyors for TSA and other survey companies.

University of East London (UEL)

The University of East London has over 60 years experience in teaching Geomatics. BSc(Hons) programmes in Surveying and Mapping Sciences and in Civil Engineering Surveying, alongside Foundation Degree courses, meet the needs of students with a range of entry qualifications and experience. These courses give the opportunity to develop knowledge and understanding, skills and professionalism and have a significant practical content. All programmes are professionally accredited and are available for both full-time and part-time study with direct entry available to those with previous experience or education. For more information, contact applicant enquiries by emailing **study@uel.ac.uk** or call +44 8223 3333. **www.uel.ac.uk/**

School of Architecture, Computing and Engineering
University of East London
Docklands Campus
University Way, London E16 2RD

University of Newcastle

Newcastle University is the only provider of undergraduate geomatics degrees in the UK that are accredited by both the RICS and CICES. Two degree courses are offered: BSc Surveying and Mapping Science; and BSc Geographic Information Science. Students have access to a large pool of industry standard field equipment and software. Scientific and practical studies are complemented by modules focussed on industrial applications, professional practice, and field courses. The courses enjoy exceptional employment rates (100%) and exceptional student satisfaction levels. Recently, students have won the inaugural TSA student bursaries and attracted sponsorship and placements from a wide range of geomatics organisations.

School of Civil Engineering and Geosciences, Cassie Building
Newcastle University
Newcastle upon Tyne NE1 7RU
t: +44 (0) 191 222 6350
www.ncl.ac.uk/

University of Glasgow

The University of Glasgow offers the postgraduate degree programme, Masters in Geomatics & Management, which is aimed at graduates in geomatics. It aims to enhance students' career progression in the field of geomatics and provide them with the necessary skills to succeed in managerial positions. Students have access to the latest surveying equipment. The programme uses the combined resources and expertise of the staff from the School of Geographical & Earth Sciences and the Business School, plus input from industry experts. Programme overview: MSc, 12 months full-time or 24 months part-time; PgDip, 9 months full-time.

University of Glasgow
School of Geographical and Earth Sciences G12 8QQ
www.gla.ac.uk/

University of Nottingham (IESSG)

The Institute of Engineering Surveying and Space Geodesy (IESSG) has earned global renown for its research, spanning engineering surveying to unmanned aerial vehicles. The institute runs masters (MSc) courses in: Global Navigation Satellite Systems Technology (GNSST); Engineering Surveying and Geodesy (ESG); Environmental Management and Earth Observation (EMEO); and Positioning & Navigation Technology (PNT). They benefit from the research undertaken at the institute and from expertise brought in from industry, the armed forces and other academic departments.

IESSG, University of Nottingham, Triumph Road
Nottingham NG7 2TU
www.nottingham.ac.uk/

University College London (UCL)

The Department of Civil, Environmental & Geomatic Engineering offers courses on civil engineering that encompass structures to earthquakes to transport while also providing a sound understanding of civil engineering principles. The department offers six undergraduate degrees in civil engineering and environmental engineering. At postgraduate level, an MSc in civil engineering, along with an accredited three-year (BEng) degree, will satisfy the requirements of the professional institutions. There are a further ten masters (MSc) degree programmes in a range of subjects including surveying, hydrographic surveying and civil engineering.

Department of Civil, Environmental and Geomatic Engineering, UCL, Gower Street, London WC1E 6BT
www.ucl.ac.uk/

Survey School (Worcester)

The Survey School provides land survey and setting out training and is the UK's only commercial training centre that provides training to the survey industry which is accredited by both the Chartered Institution of Civil Engineering Surveyors (CICES) and the Royal Institution of Chartered Surveyors (RICS). The Survey Association has its own course at the school – Introduction to Surveying Course – which was created for the development of new entrants into the geomatics industry or those with experience but no formal training. It is intended to broaden the student's practical experience and to supplement theoretical experience gained from their employer. The school also offers courses in topographical surveying, underground utilities and setting out.

The Survey School, Waterworks Road, Worcester WR1 3EZ
www.surveyschool.co.uk/en/index.html

University of Plymouth

The Geomatics group is based within the Faculty of Science at University of Plymouth. The group develops new areas of collaborative research and links with commercial organisations in areas like coastal zone management, hydrography and geodesy. A wide range of opportunities exist for research into many aspects of geomatics. The group teaches a masters degree by research (MRes) geomatics course as well as courses in marine studies and hydrography.

Faculty of Science
University of Plymouth
Drake Circus, Plymouth PL4 8AA
www.plymouth.ac.uk/

Holidays all at sea and pensions doubtful

By Carl Calvert

Well, that's the holiday season over, or is it? writes our legal correspondent. Better study your conditions of employment as there are many land and hydrographic surveyors (especially the latter) for whom recent Supreme Court judgements are applicable.

This column considers the effect of the Supreme Court ruling in the matter of *Russell & others v Transocean International Resources Ltd* [2011]UKSC 57 on appeal from [2010]CSIH 82: the judgement was also reported in *The Times* of 8 December 2011.

The Appellants (Russell and colleagues) are all oil and gas rig workers employed by the Respondents in the North Sea. The tour of duty was two weeks on and two weeks off, the two weeks off being the 'field break'. The question arose: 'Could the workers take leave during the field break period?'

Lord Hope said that this question was important to other workers such as teachers who were required to take their leave during non-term time and delivered the judgement with which the other Justices agreed, that the Appellants were not entitled to take their annual leave during the time that they were scheduled to be on the rig. This decision upheld the decision of the Inner Court of Session (2011 SC175) which allowed an appeal against the ruling of The Employment Appeal Tribunal ([2009]IRLR 519) whose ruling was that leave could be taken during time scheduled for work on the rig.

The Working Time Regulations (WTR) stem from the Working Time Directive (WTD) which is a European Council Directive (2003/88/EC) but there is no attempt, either in the WTD or the WTR, to identify particular patterns of working and legislate for them individually. 'It is for the judiciary, in the event of a dispute, to work out how its requirements are to be applied in particular cases'(per Lord Hope).

The question arises, which other groups of employees and employers will consider this judgement and only allow annual leave to be taken during 'rest' periods within their employees' shift or work patterns?

"...which other groups of employees and employers will consider this judgement and only allow annual leave to be taken during 'rest' periods..."

Defining pension benefits

On another matter entirely, that of pensions, the Supreme Court considered occupational pensions in the matter of *Houldsworth & Another (Respondents) v Bridge Trustees Limited and Another* (Respondents) & Secretary of State for Work and Pensions (Appellant) [2011]UKSC 42. In this case it was a matter of deciding where the dividing line lay, for regulatory purposes, between defined benefit (normally earnings-related) schemes and defined contribution (or money purchase) scheme.

The general nature of the distinction between these two types of scheme is that under a defined benefit scheme (e.g. a final salary scheme) the benefit to which a scheme member is entitled, on retirement at normal pension age, is a pension for life calculated (in a final salary scheme) by reference to the member's pensionable salary at retirement. A typical formula for calculating the pension is N/80ths, where N is years of pensionable service. The member pays contributions (typically a fraction, such as 5%, of current pensionable salary) and the employer is under a general obligation to pay the balance needed to provide all the benefits under the scheme. Final salary schemes are also referred to as balance of cost schemes. What the member pays makes an important contribution to the benefit, but the amount of the benefit is not calculated by reference to the amount of the member's contributions, and the risk of a disappointing investment return on the pension fund is assumed by the employer.

By contrast, under a defined contribution scheme the member's benefit is calculated by reference to the contributions that the member makes, and those that the employer makes in respect of that particular member (for instance the member may pay 4% of his or her current pensionable salary, with the employer matching that with an equal contribution). These contributions, and the investment return on them, are the measure of the member's benefits, and for that reason these schemes are also called money purchase schemes. The member, and not the employer, takes the risk of the investment return disappointing expectations. That is one of the main reasons why large numbers of employers have, since the last years of the 20th century, closed their final salary schemes (either completely or to new entrants) and introduced money purchase schemes. Thus in the first example the employer takes the risk whilst in the second, the employee takes the risk.

The case in mind involved a pension fund that was being wound up and the question arose:'did the current pensioners benefit or was there any duty to consider prospective pensioners, that is those who were not of pensionable age but expecting to benefit from a pension? The claim by three pensioners and 'prospective pensioners' raised a number of questions of construction, which were answered either by the deputy judge or by the Court of Appeal. The Secretary of State for

Work and Pensions was not a party to the first-instance proceedings, but regarded the decision as having serious policy implications.

The case is of great importance to any current and deferred pensioners interested under the scheme, since if the Secretary of State is right then part of the contributions paid by or in respect of members still in service or entitled to deferred pensions at the date of commencement of the winding up of the scheme will be used, under the statutory order of priority in section 73 of PA 1995, to satisfy the rights of those already entitled to receipt of pensions at that date.

The Supreme Court, by a majority, dismissed the Secretary of State's appeal holding that equilibrium of assets and liabilities is not a requirement of the statutory definition of a money purchase scheme (and similarly for money purchase benefits). In other words, neither the application of a guaranteed rate of return nor internal annuitization prevents benefits from meeting the statutory definition of money purchase benefits. In other words, a funding deficit could exist in relation to 'money purchase benefits'.

So now that annual leave and pensions have been dealt with, it's back to work.

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mobile data by the network, which confirms where phones are frequently used, inferring the location of the owner, and the automatic network timestamp.

The extent to which control is held by the contributor, by the institution, or by 'the crowd' of contributors assessing each other's contributions may be different across different implementations of crowdsourcing.

Will openness lead to more corruption?

Land administration is often perceived as one of the most corrupt sectors of government. Although individual amounts may be small, petty corruption on a wide scale can add up to large sums. In India, the total amount of bribes paid annually by users of land administration services is estimated at US$700 million, equivalent to three-quarters of India's total public spending on science, technology, and the environment. However, one of the best means of reducing corruption within a good governance framework is through transparency of information and the ability to have two-way interaction with clients.

Will land professionals form a new partnership with citizens?

This new partnership model implies that land professionals will have a different relationship with citizens – or 'pro-amateurs'. The increased collaboration with citizens opens up the opportunity for new services to train citizens and community intermediaries and quality-assure their crowdsourced information, so it should not be perceived as a threat to individual livelihoods and the profession. But will land professionals accept this new role and will sufficient citizen entrepreneurs provide land rights capture services and become trusted intermediaries? Technology will continue to challenge the relationship between 'pro-amateurs' and land professionals, but these drivers of change also present significant opportunities for all concerned.

Will crowdsourcing just reinforce the informal land market?

There is a danger that the emergence and acceptance of crowdsourced land rights information by citizens will just reinforce the informal land markets in countries where there is ineffective land governance, poorly performing land administration systems and weak formal land markets. The final outcome of the informal or formal market will depend on the land administration agencies' reaction to crowdsourcing and whether they reject or embrace it.

Who will provide the ICT infrastructure?

The implementation of crowdsourcing in land administration requires technical infrastructure to support the uploading, management and maintenance of the land rights information. The implementation could mirror the voluntary support model of OpenStreetMap, which is supported by University College London's VR Centre for the Built Environment, Imperial College London and Bytemark Hosting, with a wide range of supporters providing finance, open source tools or time to support the initiative.

Conclusions

Crowdsourcing within the emerging spatially enabled society is opening up opportunities to fundamentally rethink how professionals and citizens collaborate to solve today's global challenges. This paper has identified land administration as an area where this crowdsource-supported partnership could make a significant difference to levels of security of tenure around the world.

Mobile phone and personal positioning technologies, satellite imagery, the open data movement, web mapping and wikis are all converging to provide the 'perfect storm' of change for land professionals. The challenge for land professionals is not just to replicate elements of their current services using crowdsourcing, but to radically rethink how land administration services are managed and delivered in partnership with citizens. Land administration by the people for the people can become a distinctly 21st century phenomenon.

• ***Robin McLaren*** *is Director of Know Edge Ltd robin.mclaren@KnowEdge.com*

"... the best means of reducing corruption... is through transparency of information and the ability to have two-way interaction with clients."

You say soccer, I say football. . .
(Let's not call it a special relationship)

by Nick Day

Our mid Atlantic correspondent finds he's in a humour-free zone where hubris is befalling those who set their prices too high and there really is no special relationship. **Warning:** this column reflects the views of the writer but may contain more than a kernel of truth.

Hear, hear, old chap?

I had my hearing checked the other day, realizing that like a dam monitoring survey, I needed a baseline from which any future deterioration (or maybe improvement) could be compared. The audiology department at my local hospital had all the latest hi-tech equipment, and after a series of tests, the specialist deemed my hearing pretty good for a man my age. I didn't quite know how to take that – to be incensed or flattered! But there was a problem, she noted, in the high end of the pitch range, such as hearing young kids' voices. I begged to differ, feeling it was a blessing rather than a problem, and that maybe she could recommend a good set of earplugs to help exacerbate the problem. She then said, "well, you don't need a hearing aid… yet," to which I replied, "WHAT?" She started to repeat herself before detecting my flippancy. Ah, sometimes I think I'm in a humour-free zone!

Countries falling apart

Travel broadens the mind. It also allows one to see trouble or prosperity coming, often long before a country's peoples, or the pundits/politicians who are totally out-of-touch. Visiting Turkey in late 2006, I was impressed with the vitality, entrepreneurship, creativity, efficiency, value for money, and education of the people. I felt that within a short time their economy would boom. Five years on and Turkey is going gangbusters. A three-week visit to Ireland in summer 2008, seeing the ridiculous price of houses out in the sticks, the overbuilding, and outrageous cost of food, etc, was all I needed to see an imminent and nasty crash. Likewise Greece, a country I visited in April 2007 for the first time in 35+ years. Back then, prices were the lowest in Western Europe, the people were friendly, and tourists flocked there. By 2007, all had changed. Food and accommodation were unrealistically high-priced, higher than France and Germany, and the people, presumably spoiled by their new found wealth had become offhand in their treatment of visitors. Why, I asked, would one go to Greece when Turkey was much cheaper, had more to offer in historical sites, and treated visitors well? For me, the writing was on the wall that their lifestyle was unsustainable. Similarly, a visit to Spain, once a cheap country, showed overbuilding of unbelievable proportions and prices that were poor value. All of these countries have since paid the price, and with minimal manufacturing base, it should have come as no surprise. But, a surprise it has been, with those who should have known saying "no one could have seen this coming." Well, I beg to differ.

Contrast with France, Germany and Switzerland, which I have visited over the past two years. Travelling across the countries, by train and car, I was impressed by the powerhouses that they are. Manufacturing is evident everywhere, as is transportation of materials by barge on canals and rivers, or by goods' trains. The Rhine is a super-highway. Most cars driven in the two Eurozone countries are home produced, and it's possible to buy lots of items that aren't made in China. Compare that to the USA where even if you want to pay extra for quality, home-made items, it's tough because they virtually don't exist. Northern Europeans prefer quality over quantity, Americans vice-versa.

The (not so) Special Relationship

I had intended to submit this some time ago before the numerous Wikileaks emails saga, so embarrassing to several governments, notably the USA. In view of recent events, and to start the New Year off right with a little light-hearted banter – plenty of time for serious Geomatics-related content in future issues – I feel the time is now ripe. This may not be politically correct, it may be contentious, certainly it will be controversial – my remit when I first started this column over ten years ago.

While travelling in Europe last year, following the news outside the UK was difficult. There were few programmes on TV in English, and my French, Italian and German are not up to scratch beyond "une autre bouteille de vin rouge, s'il vous plaît monsieur." *The Guardian Weekly*, a superb compendium of articles from the paper plus *The Washington Post* and *Le Monde*, was a godsend whenever I could find it. However, I did hear about President Obama's trip to Ireland (or O'Bama in view of his newfound roots), and subsequent visit to the UK to stress the "special relationship", now

upgraded (or is that downgraded?) to the "essential relationship" existing between "our two great countries", and the "same shared values and cultures."

US presidents and UK prime ministers are consistent in their utterances, supported by "on-message" inner cabinet members. A dwindling compliant media is not far behind touting it. But, unlike most politicians and journalists who have spent little time, if any, in each other's country, let me be very clear as someone who has now spent half his life in both countries – there IS NO special relationship, or shared values, culture, and common language.

How true is the perception in the eyes of the real inhabitants of both countries compared to talking heads? False, according to my findings on both sides of the pond. If ever there was a special relationship, it ended a long time ago, the divide widening over the past few years. And this is very important for those Brits and others from English-speaking countries who come here assuming similarities and that it will be easier to do business than in, say, Brazil or Japan. They become disillusioned very quickly; they receive no special preference. It's sad that the "almighty dollar" and pursuit of outrageous profits still reign over anything else here. Even more sad, perhaps, is that too many in the UK are adopting similar and unsustainable values and business models.

I suggest much of the myth goes back to **Winston Churchill** who was half American by birth- – a fact of which he was deeply proud. In his first address to a joint session of the United States Congress, on December 26, 1941, he teased the assembled Senators and Representatives with the mischievous suggestion, "If my father had been American and my mother British, instead of the other way round, I might have got here on my own!" His mother was Jennie Jerome of Brooklyn, New York, later Lady Randolph Churchill.

Don't mention the guns

Differences are striking in many ways, and I don't just mean Brits hating anaemic-looking American birthday cake with fake cream, and Americans loathing Brit fruit cake and Christmas pudding; or, how most Brits find baseball incredibly boring (on a par with watching paint dry), and Americans not understanding cricket. And, let's not even mention their manic, paranoid need to own guns, abhorrent to most Europeans.

On occasion, as volunteer work, I teach ESL (English as a second language) to foreign students on the UC Berkeley campus. Those that learned their English in England, or from English teachers in their own countries, are totally confused in America when they try to put their new found skills to effect, only to find they are not understood, and phrasing, pronunciation, and idioms are so different. And you thought the French were awkward!

Note American overstatement vs British understatement. Radio/TV news is regularly hyped, with a high degree of hyperbole and speculation. Meaningless statistics are thrown at one ad nauseum by sports' commentators. I well remember the days of tennis commentators **Dan Maskell** and **Peter West**, true minimalists, speaking only when necessary, and never over a point. Here, it's non-stop verbal diarrhoea. Metaphors and analogies fly here and there, with comparisons to basketball, baseball and football – never tennis. If a basketball celebrity is in the stands they have to interview him, not to ask about their tennis interests, but what's going on in their personal life or in basketball, all the while talking over an important tennis point.

We have high scores in basketball, 101-103, and football, 49-37, with time-outs or ads every few minutes. A football game (soccer in the USA. . . and only here) with a final score of 0-0 is considered boring to Americans (yet they consider a "no hitter" in baseball as special). The fact there were many thrilling moments when a cleverly crafted swerve ball hit the upright or nicked the crossbar, defying the laws of physics and the incidence of reflection, failed to make the back of the net, creates ne'er a stir. Oohs and ahs of the crowd reach fever pitch before dying down in disappointment. Or, with amazing agility, foresight, and split-second reactions, the goalie appears from out of nowhere, diving fully outstretched to tip the ball around the post or over the bar with a strong hand.

Top: *time out for American Football*
Above: *the beautiful game is not "Soccer".*

Serious note

Ending on a serious note, let's not forget that over 60% of the US population favoured the wars in Iraq and Afghanistan, while over 80% in the UK were against. The list is endless. Suffice it to say it's a "give and take" relationship – the UK gives, the US takes! These views are not just mine, but of the many wonderful and concerned Canadians, Aussies, Kiwis, and other nationalities I met and chatted with on my travels. So, Great Britain, look eastward to Europe and beyond, not westward. Time to move on, take a leadership role, and forge new relationships. WWII has been over nearly 70 years now!

About the author
Nick Day, FRICS, FRGS, PLS, is retired from the California Department of Transportation (Caltrans). He can be reached at feasibility.nick@gmail.com

A gaol, a chain, a cricket pitch. . . and a wombat!

By John Brock

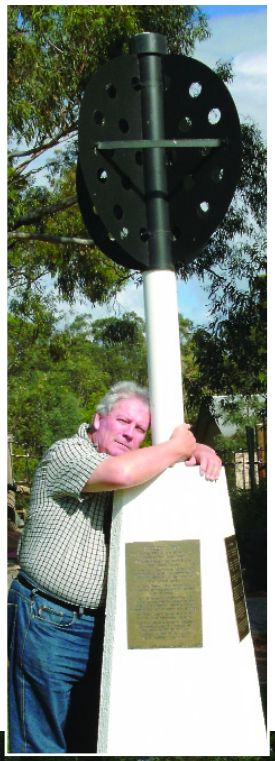
A baseline in a gaol and giant wombats plus a plug for the big FIG event in Rome are on the agenda for this issue.

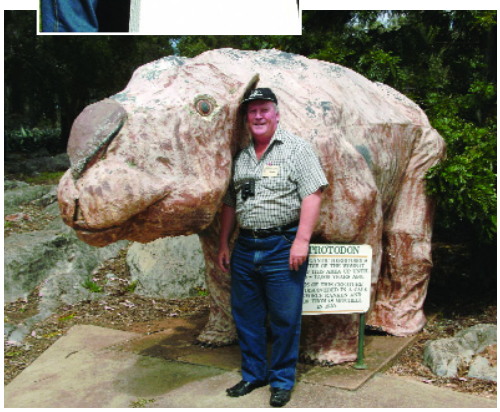
Despite a world downturn and a slowing effect in Australia, I have been flat out doing surveys since my last column. Not only that I have squeezed in a lecture (by me) on Colonel **William Light** who was first Surveyor-General of South Australia to the Kogarah Historical Society.

What a whopping wombat !

On a five-day Topp Tour of the Dubbo area (3 hours drive north west of Sydney) we visited the Wellington Caves where some of the first dinosaur fossils in Australia were discovered. Naturally the story I love the most involves our legendary NSW Surveyor-General **Thomas Mitchell**. The unverified tale goes like this: the discovery of dinosaur fossils a short time before 1830 by **George Ranken** had come to the attention of our scientifically motivated S-G who arranged a meeting with this man to inspect the site. Upon arrival the Major stopped at the mouth of the cave that now bears his name to hitch his horse to what he thought was a tree stump but when his horse pulled backwards the leg bone of a Rhinoceros Wombat was revealed! Thus the first Diprotodon fossil in Australia was unearthed for dispatch to the dinosaur guru Sir **Richard Owen** in the UK for examination and ultimate naming.

Our native wombats are rather more cuddly than their behemoth sized ancestors as you can see in the photo of me next to a full size statue of one which stands outside the caves visitor centre. From a Giant Wombat fossil to a real Rhinoceros (which was about the same proportion!) we had a quick visit to the Western Plains Zoo visitor area where we could view red-handed spider monkeys and ring-tailed lemurs being fed. However, to my great surprise there was a trig station to signify the major contribution that the Central Mapping Authority of NSW had made to the establishment of this great zoological park for all to see.





***Top:** Love is. . . finding a trig point. **Above:** Getting to know Australia's ancestral fauna.*

A major attraction in Dubbo is the old gaol built in 1871 (de-commissioned in 1966) and surprisingly located in the centre of the current town. To my delight there just happened to be a baseline in the sandstone blocks near the entry gate with broad arrows chiselled at the terminals which was used by the surveyors to check the length of their Gunter's chains (100 links = 66 feet = 20.117 metres – the length of a cricket pitch). The trip would not have been complete without a specially arranged viewing of the **Walter Liberty Vernon** designed Lands Department building (built in 1895-96) constructed with the curious combination of timber and corrugated iron.

Come to FIG Rome

If you are a history fan then going to Rome for the FIG History Workshop and Working Week is a must. I am the co-ordinator of this event to be held on Friday 4 May at the Biblioteca Casanatense (founded in 1701), which is intended to include a Saturday visit to the Vatican Gallery of Maps and Library, the repository of thousands of ancient books and maps.

The programme for the day will cover Mesopotamian surveyors (3000 BC), **Lacaille** (250 years since death), **Leonardo Da Vinci** (1452-1519), **Mercator** (1512-1594), The Struve Arc (1816-1855), the battle for Machias Seal Island between the USA and Canada, the Surveyors of Mt Rushmore, cadastral surveying in the 1600's, the Roman Survey of the World (c53-20 BC) and the four surveyors of Caesar who did that survey. Speakers are coming from the UK, Canada, USA, Belgium, South Africa, France and Australia to thrill and amaze you so put this in your diary now. Please contact me for bookings and further details on **brocksurveys@bigpond.com**

Meeting Sir James at the ANMM

My favourite place – the Australian National Maritime Museum – just turned 20 and there were two events to mark this milestone. There was the annual members' dinner at which former radio personality **Mike Carlton** made a presentation about his recent book "Cruiser – The Life and Loss of *HMAS Perth* and Her Crew" which was excellent. The other function was a cocktail party for Foundation Members (of which I am one) at which the great yachtsman and vignoron Sir **James Hardy** made a colourful appearance.

• *John Brock is a Registered Surveyor in Australia and is a stalwart of FIG and its Permanent Institution for the Art and History of Surveying.*

Making sense of the great indoors

Sensewhere Ltd (formerly SATSIS), a hyper-local positioning technology company, has launched a self-correcting indoor positioning system. The company's positioning software, sensewhere, uses crowd-sourced location data to deliver accurate location even indoors. The software automatically crowd-sources and cross-references RF (radio frequency) access point data via users' own devices, creating a proprietary global RF location database. The software uploads updated reference point information as it fixes a location. By cross-referencing this information from different sources, at different times, it improves the accuracy of indoor location over time. The company aims to allow social networks, device manufacturers and app developers to capitalise on the potential of accurate indoor location.

New GNSS server

With integrated internal and external device management, multi-user management, high-end security, modular and scalable design, Leica's new GR25 GNSS reference server is designed for permanent and semi-permanent network installations and monitoring applications. The server allows the upgrade of key hardware parts, such as tracking, memory, power and communications, and provides an IP67 housing with no additional multi-cables. A built-in display and keypad configures and performs basic setups and operations without a controller or PC. There are four configurable power sources including two external inputs, power over Ethernet (PoE) and a removable internal battery with charger that can provide up to 20 hours of data logging backup. Onboard software allows the system to be configured via the Internet, USB and Bluetooth. It supports 28 languages and all common web browsers.

Onboard update

Designed to enhance data collection and stakeout, Leica SmartWorx Viva v4.0 onboard software supports the: Viva GS25 GNSS surveying receiver, CGR10 and CGR15 radio modems and the Exchange data transfer service. With this version, points, lines and areas that have been surveyed are now overlaid onto the wide-angle camera's live video from the TS11 and TS15 imaging total stations. Other features include: improved remote viewing of the TS wide angle camera with CTR16/RH16 radios; panoramic image capture when using a TS15; the lock performance of the TS15 is improved especially when working at short distances from the total station; extensions to pop-up menus and drawing toolbar; and the ability to use the GS08 and GS12 GNSS sensors as RTK base stations.

3D scan data shared

The latest version of SCENE WebShare, a tool for safe sharing of scan data over the Internet, is available from Faro. Scan projects can be published on a web server and the software permits access and sharing of laser scans generated by Faro's Focus3D scanner within a standard web browser. Version 4.9 allows for direct measurements on the web. Scans shared using WebShare can be directly analysed on the browser: the overview map provides measure tools for distances and surfaces while the panorama view allows measurement of distances. Also, documentation objects are available in the panorama view to enhance 3D documentation, enabling the user to add information and attach documents using hyperlinks.

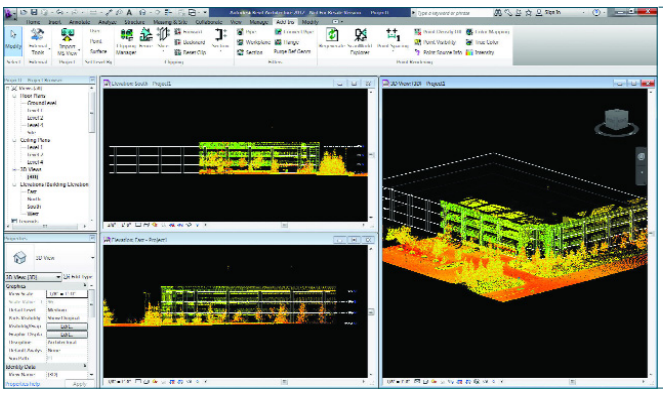
BRIEFS

South Survey has special offers to celebrate the 20th anniversary of its GstarCAD software. Buyers of GstarCAD2011 get a free upgrade to 2012. Existing users have only to pay a one-year upgrade fee to upgrade existing versions to 2012. Both offers are only applicable in the promotion period, which finishes on 28 February 2012. For further details, contact the company on 01200 429870 or email sales@southsurvey.co.uk.

BlomSTREET is a collection of georeferenced, high-resolution, 360° panoramic images photographed at street-level by cameras mounted on a specially equipped car. Delivered as a cloud service, the customer receives images and functionality via a web service. No storage of data is necessary for the client and users can take measurements directly from the imagery.

VirtuSurv, a software application for post-processing of laser scan data from kubit, imports and combines datasets, independent of hardware vendor, into complete project files. Each scan position within the file is presented in a high-quality view and points can be clicked within for extraction of coordinates and distances. The selected coordinates can be transferred to any Windows-based software using predefined and customisable macros. Surveyors benefit from "a create field book" function that enables users to perform a traditional field survey from the office, by creating coded point lists for CAD import.

Geomagic's Wrap 2012 software is designed for capturing probe data and processing 3D point cloud data to produce polygonal models, cross-section profiles and geometric features. This latest version has increased data handling performance, enhanced sketching tools and a scripting environment for advanced automation of key commands. There are also features for navigating and visualising scene-based data, as captured with 3D scanners. Other 3D imaging software releases from the company are: Studio 2012, Qualify 2012, Qualify Probe and Wrap OEM Edition.



Plug-ins and data exchange

The latest software plug-in from Leica provides a faster way for AutoCAD Revit users to create building information model (BIM) deliverables of existing buildings based on scan data. CloudWorx for Revit includes many of the features in the plug-in for AutoCAD, such as extra point cloud handling and as-built modelling capabilities. Additional Revit-specific tools include: direct access to Cyclone projects; faster loading and display of higher density point clouds and the ability to set levels (i.e floor elevations) directly from scan points or surfaces created from point clouds and to automatically create plan view slices.

GW RECRUITMENT

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Ref D995A

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Hours of Work: Full time
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You will hold a PhD (or equivalent) in a relevant area and have research interests which complement those already in the geomatics group. You should be able to demonstrate a track record in applying advanced analysis to primary data sets, and further testing or development of physical models. Research expertise across the broad spectrum of land surveying, including photogrammetry, is essential.

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For an informal discussion, please contact Professor Jon Mills: Tel: (0191) 2225393 or e-mail: jon.mills@ncl.ac.uk.

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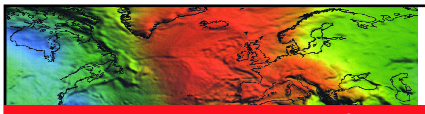

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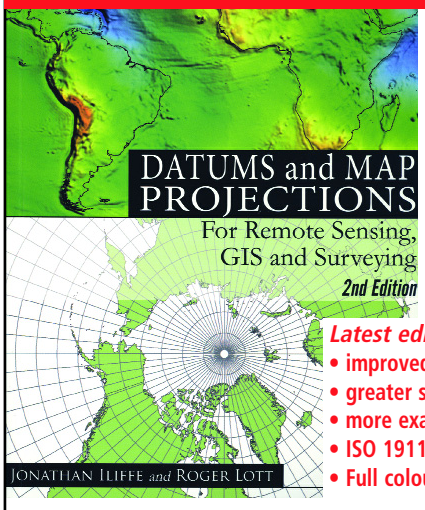

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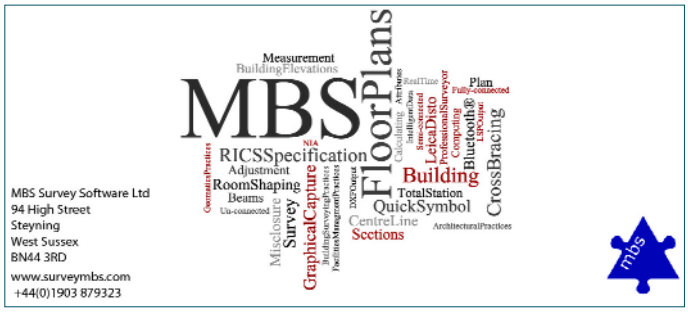

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