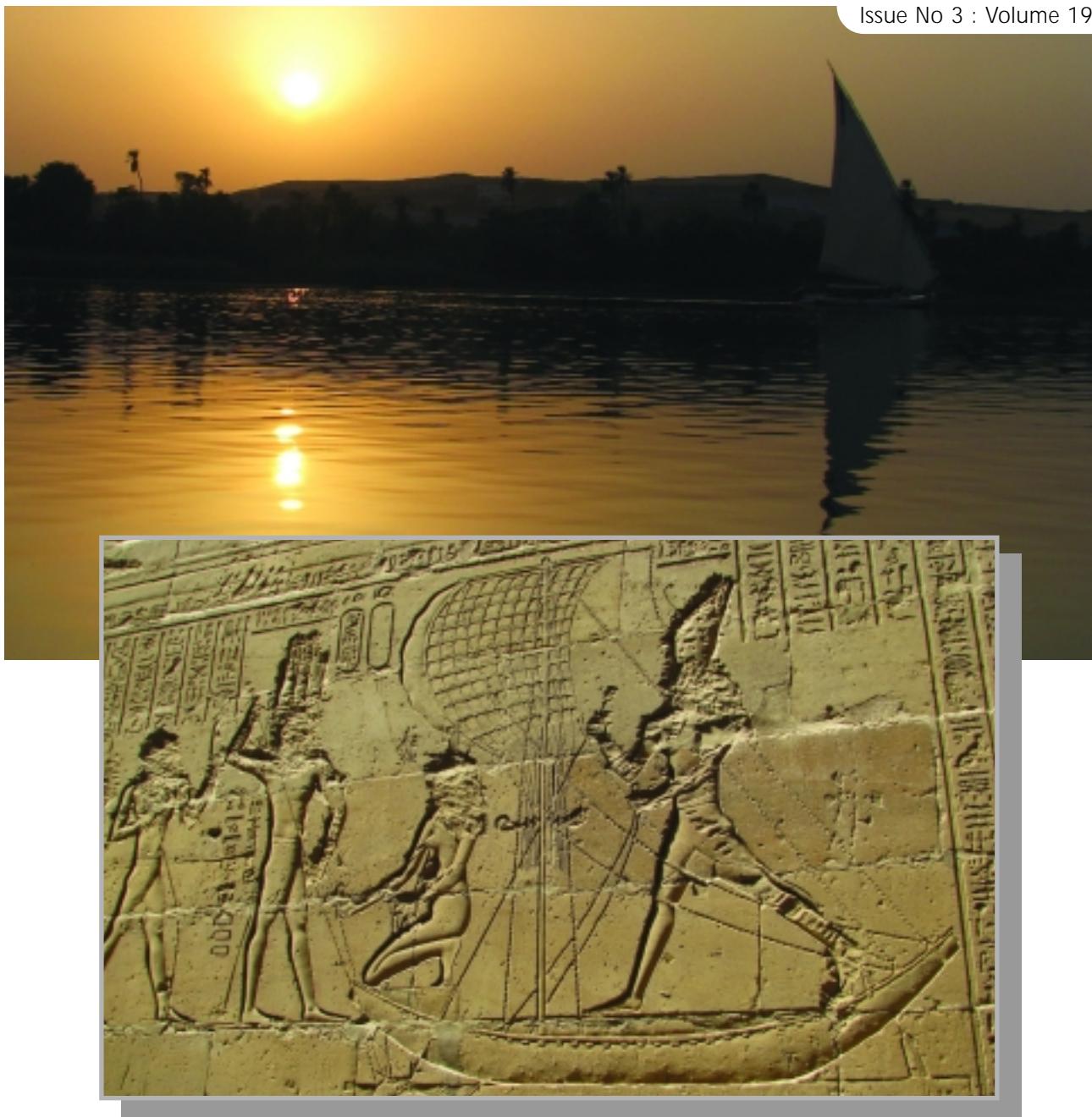


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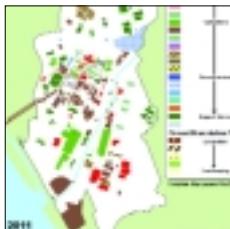


Surveying for geographical and spatial information in the 21st century

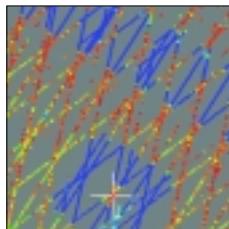
Indoor mobile mapping system arrives.



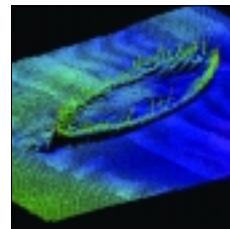
Sellafield: choreographing a nuclear site with GIS.



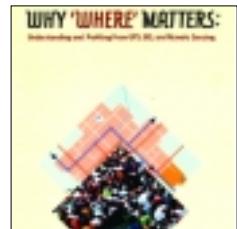
Mobile scanning delivers 3mm accuracy.



Applications for high-resolution seabed mapping.



Wisdom and hard words for some in this book.



# **Steven Ramsey, HDS UK Technical Manager**

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**Editor:** Stephen Booth

**Technical Editor:** Richard Groom

**News Editor:** Hayley Tear

**Advertising:** Sharon Robson

**Subscriptions:** Barbara Molloy

#### Editorial Board

Pat Collins, Professor Michael Cooper, Richard Groom, Alan Haugh, James Kavanagh, Professor Jon Mills, Dr Stuart Robson, Dr Martin Smith, David A Wallis

#### Overseas Sources

Roy Dale – New Zealand

Nick Day – USA

#### Editorial and advertising:

e-mail: editor@pvpubs.demon.co.uk

Web: www.pvpubs.com

T: +44 (0) 1438 352617

F: +44 (0) 1438 351989

**Mailing:** PV Publications Ltd

2B North Road

Stevenage, Hertfordshire SG1 4AT

United Kingdom

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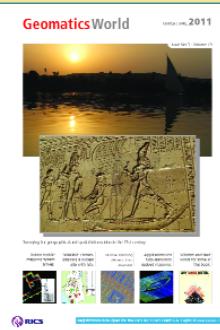
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**PV Publications Ltd**  
2B North Road,  
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#### COVER STORY

A timeless felucca sails into another Nile sunset. Mathematics was already advanced in Egypt when these hieroglyphs from Kom Ombo were carved. Today, the country is awakening again. Our thanks to Nick Day for these photos from his Egyptian trip. To read more turn to page 30.

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A new technology from Trimble can capture interior geospatial data without the cost and labour problems of conventional methods.

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DGI means business, reports Richard Groom from a colourful conference attended by well over 600 delegates from around the world.

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The next issue of GW will be that for May / June 2011.

Copy dates are: Editorial: **04 April** Advertising: **15 April**

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We need new sensors to help us navigate. Can the natural world help?

## We know what but we cannot say when

**P**art of our editorial plan this issue had been to bring you an article by Roy Dale, our New Zealand correspondent, on the Canterbury earthquake that happened last September. Roy's article was going to focus on the challenges for the cadastre when land shifts. We had several interesting radar images from GNS Science (*Te Pū Ao*), New Zealand's Earth, geoscience and isotope research and consultancy services ([www.gns.cri.nz](http://www.gns.cri.nz)), which showed the Canterbury earthquake's energy dissipation. Since then of course New Zealand has experienced its worst quake of modern times with much loss of life. The problems for the cadastre pale into insignificance. Our condolences to all colleagues and friends in New Zealand.

It seems that for all our sensors, computers and human ingenuity, whilst we can apparently tell the story of what's happened below the surface, we cannot tell *when* it's going to happen. Maybe we are relying too much on our big brains. A story on the BBC's Science website ([www.bbc.co.uk/news/science-environment-12559705](http://www.bbc.co.uk/news/science-environment-12559705)) reports on how researchers from the University of North Carolina believe they have worked out how hammerhead turtles navigate for thousands of miles underwater. The creatures apparently take cues for their latitude and longitude from the Earth's magnetic field. Along their migratory route, according to researcher Nathan Putman, nearly all regions are marked by unique combinations of intensity (field strength) and inclination angle (the angle that field lines intersect the surface of the Earth). In short, the turtles have evolved their own rudimentary X-Y coordinate navigation system. This is an extraordinary discovery and could have potential implications for terrestrial as well as subsea navigation systems. That's the theory. Now we need to get as clever as the turtles in developing the sensors.

Staying with the Earth's magnetic field, the News section reports on one of those wild web stories about how changes in the magnetic field are causing "superstorms" and other extreme weather phenomena. We ran the story past one of our IESSG boffins. His comments make interesting reading including for those who still believe human activities are having no impact on the planet's weather.

### GIS opportunity

I am delighted to bring you a slightly larger than usual issue of *Geomatics World*. One of the reasons we're doing this is to alert readers to the high quality articles they might be missing by not subscribing to our sister title *GIS Professional*. I know that many Geomatics members play key roles in setting up,

developing and maintaining geographical information systems. Mike Cottrill's account, therefore, of the Sellafield GIS (page 14) will, I am sure, be well received. It is exceptionally well written and informative and won him and his team a prize at the AGI's annual Awards Dinner last November.

I will try and find space for more GIS related editorial but in the meantime subscriptions to *GiSPro* are extremely modest for RICS members. Just £27.95 for six issues per annum. More at [www.gisprofessional.co.uk](http://www.gisprofessional.co.uk)

This issue of *GW* brings details of yet another ingenious system integration. Developed by Trimble company Applanix, the TIMMS indoor mapping system merges laser scanning and inertial positioning into a system capable of capturing accurate 3D data inside buildings. Although likely to be expensive, the system should find interested customers in the UK and Europe where there is a massive legacy of buildings without even 2D drawings. It will be interesting to see how costs compare with traditional measured building surveys.

Enjoy the issue and I look forward to meeting as many readers as possible at our annual GEO Event, GEO-11 6 & 7 April at the Holiday Inn, Elstree (more at <http://www.pvpubs.com/events.php>).

Stephen Booth, *Editor*

### 10 YEARS AGO: from *GW* March/April 2001

Like today, although for rather different reasons, a decade ago education was a hot potato. *GW* explored this through articles by Dr Mathias Lemmens of Delft University and Professor Alan Dodson and Dr Martin Smith of University of Nottingham's IESSG. Both articles would pay re-study and can be viewed via *GW*'s website at [www.pvpubs.com](http://www.pvpubs.com).

The issue also recorded that the Ikonos imaging satellite had managed to detect the Maha Kumbh Mela in India, a gathering of 100 million people; the Land Registry had just announced that digitisation of the Index map was to begin. On a sadder note the issue recorded the death by accident of the Director of the AGI, Shaun Leslie and we also noted the passing of Jack Weightman. Jack had led a full life and our obituary recorded a man remembered with "affection as an independently minded spirited surveyor who brought wit, wisdom and irritation, often in equal measure".

Racal Surveys had just been bought by Thales and *GW* explained how to pronounce it: "ta'les". Professor Jonathan Raper of City University was explaining all about the new science of "geoinformatics" which he saw as having a strong focus on mobile information services and Taizob Yoshino told us all about Japan's Key Stone project to monitor crustal deformations by GPS and other devices to try to detect impending earthquakes and volcanic eruptions.

The editor welcomes your comments and editorial contributions by e-mail: [editor@pvpubs.demon.co.uk](mailto:editor@pvpubs.demon.co.uk) or by post:  
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## Exhibition celebrates OS mapping



**Over 160 years of history between Ordnance Survey and the city of Southampton** is celebrated in an exhibition at the Southampton Maritime Museum. Open to visitors until 5 June, **Ordnance Survey In Southampton: Mapping Great Britain Since 1791** showcases a timeline of history as well as artefacts illustrating past surveying and cartographic techniques. For details of opening times and ticket prices, visit [www.southampton.gov.uk/s-leisure/artsheritage/museums-galleries/maritimemuseum.aspx](http://www.southampton.gov.uk/s-leisure/artsheritage/museums-galleries/maritimemuseum.aspx)

*Note: this pic was captioned Surveyors at work in the early 20th century. Strange practices indeed!*

### Digital imagery guidance

RICS Geomatics has produced the 5th edition of its guidance note on vertical aerial photography and digital imagery. The international guidance note recognises the shift in demand from panchromatic film and photographic products to the use of digital cameras and sensors to capture vertical images. It aims to help anyone involved in commissioning, buying or producing surveys and maps by outlining best practice and preventing duplication of effort. The guidance, as well as the geo client guide series, are available from WikiGeo at <https://communities.rics.org/connect.ti/Wikigeo/groupHome>

### Newcastle date for IGSM

For the first time in ten years, the 24th International Geodetic Student Meeting (IGSM) will be held in the UK. Dates to note are 14th and 19th April 2011 and the meeting is to be hosted by the School of Civil Engineering and Geosciences, Newcastle University, Newcastle upon Tyne. The IGSM promotes collaboration and networking between geodesy and geomatics students from around the world. Each year, the conference is held in a different country and current IGSO membership includes 80 universities from 28 different countries. More at <http://www.igsm2011.org.uk/>

particles coming from the Sun is the Aurora Borealis (or Northern Lights, which indicate the same phenomenon in both the Northern and Southern hemispheres), where energetic charged particles (e.g., protons and electrons) can cause chemical reactions having as an additional result the emission of a greenish (sometimes even reddish) light.

On the other hand, the effect of the Sun on the Earth's climate is the result of a complicated coupling of many factors (for instance, the Sun contributed to past ice ages on Earth). Nevertheless, nowadays it is also evident that the effect of human activity on climate change is occurring on a much shorter time scale than those "naturally" occurring. This is ultimately the most important factor behind more frequent extreme weather events.

The simple polarity reversal in the geomagnetic field will occur over geological time scales (hundreds to millions of years) as it is a result of the redistribution of currents circulating in the interior of the Earth. The only effect we may foresee at the moment is the appearance of Northern Lights in different places from where they occur today (i.e. auroral latitudes, high latitudes somehow close to the North and South Poles). So whenever the polarity reversal occurs, should we still be here to tell the story, we will enjoy Northern Lights from the English countryside or the beautiful beaches of Rio de Janeiro.

Clearly, given the influence of the ionosphere, and especially perturbations such as the Auroras on transionospheric signals such as the ones from GNSS satellites, degrading effects on related applications (as we know them today) are, in principle, expected to shift from the high and low latitudes to different regions of the Earth (whatever this may mean over geologic time)."

Amongst references quoted by *Salem News* is an account of geomagnetic research activity on the British Geological Society

website. For more see: [www.bgs.ac.uk/research/highlights/southAtlantic2010.html](http://www.bgs.ac.uk/research/highlights/southAtlantic2010.html)

### OFT clears new JV

The Office of Fair Trading (OFT) has decided not to refer the proposed joint venture between Ordnance Survey and the Local Government Improvement and Development Agency (LGID) to the Competition Commission. When considering the venture to create a combined national addressing database, the OFT found that "the parties provide the only two accurate georeferenced addressing databases, and do not face competition from less frequently updated and geographically accurate databases, such as those used by satnavs. Consequently it found that the joint venture would create a monopoly in this market".

### CONTRACTS & PROJECTS

#### Trimble's GLA deal

Zeework Ltd, Trimble marine dealer for UK and Ireland, has been awarded a contract to supply GNSS receivers to the General Lighthouse Authorities of the UK and Ireland (GLAs). The receivers will be used for monitoring the GLA's network of differential GPS stations, which enable mariners to enhance their positional accuracy and to have integrity in their position. The GLAs operate fourteen DGPS radio beacons and these are routinely monitored.

The Research and Radio Navigation Directorate of the GLAs are in the process of developing a monitoring system to replace a manual verification process and to provide real-time statistics of DGPS performance. The process includes developing software for the automatic monitoring of the remotely broadcast correction signals. When complete, the system will comprise a network of remotely located GNSS receivers, monitored from the R&RNV central offices in Harwich.

#### Greece gets smart

A SmartNet Greece partnership agreement between Leica Geosystems and its distribution partner, Metrika, has been signed

## Scanning caves in Nottingham



*Image credits: Trent & Peak Archaeology / The University of Nottingham*

A project led by Trent and Peak Archaeology aims to survey almost 450 caves below the city of Nottingham. A team from the University of Nottingham are using 3D Leica laser scanners to capture the caves and Pointools point cloud software to create photo-realistic 3D models to produce films ([www.youtube.com/user/NottinghamCaves?feature=mhum](http://www.youtube.com/user/NottinghamCaves?feature=mhum)), which have been viewed over 100,000 times on YouTube.

The team aims to raise the profile of the city's heritage and 3D laser scanning at large. 'Using Pointools software to convert, process, and reuse the point cloud model, we can move from raw scan data to finished website with high-definition movies in about four working days,' says Dr David Walker, project officer for Trent and Peak Archaeology. The survey project is the first part of the Caves of Nottingham Regeneration Project (CoNoRP) designed to assess the archaeological importance of the caves.

in Athens. The latter will operate the network infrastructure locally, using its existing sites, while Leica will provide GNSS network software at its European web farm. Locally, the network will maintain the name MetricaNet, as part of SmartNet Europe.

### StreetMapper for Africa

Global Geomatics, based in South Africa, has purchased a StreetMapper mobile laser mapping system from 3D Laser Mapping to compliment its capabilities in aerial mapping, underground detection and 3D laser imaging and to gain an advantage within the African survey market.

### China again

RapidEye has delivered its second coverage of China for the Ministry of Land and Resources (MLR). The imagery campaign ran from August 2010 through 11 January 2011 and was intended to cover almost 5.8 million square kilometres – 60% of the country.

RapidEye has also signed a one-year framework contract with the institutions and bodies of the European Union through the Joint Research Centre (JRC) for satellite remote sensing data products and services. The contract replaces one which expired in December 2010.

### Positioning

Veripos has been awarded a five-year contract by POSH Semco of Singapore to provide positioning services, including its precise point positioning (PPP) facility for decimetre-level accuracies. Also, the company has secured an extension to its contract with Gardline Geosurvey, supplying positioning services to a fleet of eleven multi-role survey vessels.

### IGN opts for Intermap

In a USD \$804,518 contract with the national mapping agency of France, the Institut Géographique National (IGN), Intermap Technologies will

## Events Calendar 2011

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[editor@pvpubs.demon.co.uk](mailto:editor@pvpubs.demon.co.uk)

#### SPAR International 2011

**21-24 March**, The Woodlands Waterway Marriott Hotel and Conference Center, Houston, Texas, USA.

Contact:

[www.sparconference.com](http://www.sparconference.com)

#### The British Cartographic Society Annual Symposium:

**The Power of the Image**

**8-10 June**, Shrigley Hall, Nr. Macclesfield, Cheshire, UK.

Contact:

[www.cartography.org.uk/](http://www.cartography.org.uk/)

#### GEO-11: World of Geomatics and GIS Innovations

**6-7 April**, Holiday Inn, London-Eustree, UK.

Contact: Email Sharon Robson, [sharon@pvpubs.demon.co.uk](mailto:sharon@pvpubs.demon.co.uk) or Tel, +44 (0)1438 352617 or [www.pvpubs.com/events.php](http://www.pvpubs.com/events.php)

#### 11th South East Asian Survey Congress (SEASC 2011) and the 13th International Surveyors' Congress (ISC 2011)

**22-24 June**, Kuala Lumpur, Malaysia.

Contact: [www.seasc2011.org/](http://www.seasc2011.org/)

#### The 1st International Workshop on The Quality of Geodetic Observation and Monitoring Systems (QuGOMS)

**13-15 April**, Garching/Munich, Germany.

Contact: [www.gih.uni-hannover.de/qugoms2011](http://www.gih.uni-hannover.de/qugoms2011)

#### The Survey Summit

**7-12 July**, San Diego, California, USA.

Contact: [www.surveysummit.com](http://www.surveysummit.com)

#### Esri International User Conference 2011

**11-15 July**, San Diego

Convention Center, CA, USA.

Contact: [www.esri.com/events/user-conference/index.html](http://www.esri.com/events/user-conference/index.html)

#### 11th International Conference on GeoComputation

**20-22 July**, University College London, UK.

Contact: <http://standard.cege.ucl.ac.uk/workshops/Geocomputation/index.html>

#### The Remote Sensing and Photogrammetry Society Annual Conference 2011

**13-15 September**,

Bournemouth, UK.

Contact: Email, Dr Ross Hill, [rhill@bournemouth.ac.uk](mailto:rhill@bournemouth.ac.uk) or [www.rspsoc.org](http://www.rspsoc.org)

#### Second Innovative Lidar Solutions Conference (ILSC)

**31 May - 3 June**, Toronto, Canada.

Contact:

[www.optech.ca/ilsc2011/](http://www.optech.ca/ilsc2011/)

#### Intergeo 2011

**27-29 September**,

Nuremberg, Germany.

Contact: [www.intergeo.de](http://www.intergeo.de)

For more events, visit our online calendar at

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## SCCS places massive order with Leica

*From L to R: Jon Scott Business Development Manager ITMSOIL, Chris Rasmussen R&D Director ITMSOIL, Mark Kirkbride CEO ITMSOIL and Paul MacArthur Group managing director SCCS*



SCCS has placed the single largest order globally for Leica TM30 sensors on behalf of its customer ITMSOIL. The order follows the award of the highly prestigious C701 Crossrail contract to ITMSOIL, considered to be the largest single contract for geotechnical instrumentation and monitoring ever undertaken in the U.K. ITMSOIL's Jon Scott comments: 'We are really looking forward to being involved in one of the most exciting and technically demanding civil engineering projects happening anywhere in the world today.'

SCCS, which has technical expertise in rail, tunnelling, monitoring and scanning, has a proven track record in supplying and supporting some of the largest infrastructure projects in the UK over the past 20 years. Paul MacArthur, Group Managing Director of SCCS, is delighted: 'We are proud to be associated with the ITMSOIL and the C701 contract. With our logistical and technical ability we are looking forward to helping ITMSOIL deliver this important Crossrail project'.

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supply IGN with digital terrain models for portions of south-eastern France and the island of Corsica to improve its altimetric database in these regions.

Intermap Technologies has also received a USD \$12.4m contract to provide 3D digital elevation models and orthorectified radar images as part of a national spatial data infrastructure programme to update the client's current 1:50,000-scale base map. The geospatial data will be used for topographic map production to manage sustainable forestry projects and to support other local infrastructure needs.

### Three robotics

Survey Solutions has added three Leica Viva robotic total stations to its fleet. 'My surveyors need an instrument that allows them to capture many different types of data accurately and as quickly as possible,' says Dave Bredin, director at the company's Ipswich office.

### BRIEFS

**Malcolm Hughes Land Surveyors** has acquired Becker Geomatics, a surveying company based in Scotland and now operating as Becker Surveys Malcolm Hughes.

Archway Systems, a provider of CAD software, consulting and technical services for Bentley and Rhino software users, has joined the Pointools partner programme for North America.

The widely used least squares adjustment package STAR\*NET has been acquired by Canadian company MicroSurvey. Developed back in the late 1980s by Ron Sawyer, the package quickly became a favourite amongst "computerate" surveyors. Improvements planned include better operation under Windows 7, improved DWG/DXF support, graphics, larger network adjustment capabilities, and research into a 64-bit version.

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Geo-related policy has undergone a bit of a thaw as spring blooms into life. Issues on GNSS positioning in the EU, land tenure in the developing world and the new Public Data Corporation in the UK have all raised geo-policy from the doldrums of a bleak winter period. Geo members with a political interest can keep up to date with all RICS policy and external affairs developments @ [www.rics.org/policyandinfluencing](http://www.rics.org/policyandinfluencing) explains **James Kavanagh**.

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](http://www.rics.org/geomatics) and [www.rics.org/land](http://www.rics.org/land)

# RICS Policy Watch Spring 2011

By James Kavanagh, Director of RICS Land Group

The European Commission has launched its midterm review on the development of Europe's satellite navigation programmes Galileo and EGNOS (and by extension EDAS). Recent progress, including the signing of four major contracts and the testing of the first four operational satellites, means that Galileo is on track to start delivering services in 2014. Elsewhere in the world, China's Compass, Russia's Glonass and the US block 2r GPS underline how the global political aspirations of the major powers are so often linked to having one's 'own' GNSS system. Galileo offers European independence in a sector that is important for its economy, security and for its citizens. The full report on Galileo can be downloaded @ <http://www.gsa.europa.eu/go/news/commission-presents-mid-term-review-of-galileo-and-egnos>

There has also been considerable progress with the EGNOS programme which increases the accuracy of signals from satellite navigation systems. RICS is helping feed member comments into an EU-wide EGNOS questionnaire @ <http://www.esurveyspro.com/Survey.aspx?id=c2bc53c1-8690-419c-a70a-b2f5302313fd> through our relationship with the European Surveyors organisation CLGE [www.clge.eu](http://www.clge.eu)

The global market for GNSS is expected to be worth €240 billion by 2020 and has been growing at a rate of 30% in the past few years. It is estimated that currently 6-7% of GDP of developed countries (€800 billion in Europe) depend on satellite navigation. The EU budget will finance Galileo and EGNOS with €3.4 billion over the 2007–2013 period. It is estimated that €1.9 billion will be necessary for the 2014–2020 period to complete the Galileo infrastructure. The operational costs of Galileo and EGNOS together are estimated at an annual €800 million. RICS has recently released its industry best practice guidance 'the use of GNSS in surveying and mapping GN 2nd Ed 2010' [www.rics.org/geomatics](http://www.rics.org/geomatics)

Indeed, SBAS (satellite-based augmentation system of which EGNOS is just one) is referenced within the latest GNSS guidance note and is becoming increasingly important within marine, navigation, location based services and medium/large scale mapping applications to name but a few.

## WikiGeo and the cloud

Cloud technologies are just one of the ICT cutting-edge developments that RICS has been keeping an eye on. The latest release is a briefing paper on "the role of cloud

computing in commercial property". This is being launched in the spring and acts as a good introduction to those unfamiliar with this rapidly developing technology platform. The briefing paper highlights how technology (think Building Information Modelling - BIM - and building surveying) is not the exclusive preserve of any one area of practice. Cloud could potentially change the economics of survey practice and level the playing field when it comes to small practices competing with larger ones.

This will certainly impact on measured building survey and the need to think of added value in the form of integration into BIM datasets and energy performance criteria. 'Capture once, use many times' is finally starting to get traction within other areas of survey practice.

RICS members can access all professional information and guidance from [www.rics.org/geomatics](http://www.rics.org/geomatics)

## Public Data Corporation

The UK government recently announced the concept and thought processes behind the Public Data Corporation (PDC), which will seek to make enormous amounts of local authority and government agency information freely available (including LA, LR, OS and VOA datasets amongst others) to the public.

The Cabinet Office has launched an online questionnaire to garner the views of industry @<http://pdcengagement.cabinetoffice.gov.uk/pdc/> and started a number of 'engagement' events. RICS has been invited to attend on the back of our policy responses to a number of "geo data" related consultations in the past year and from our involvement with the Location users group.

Needless to say, the drivers behind this are policy heavy and are at the core of a number of high profile initiatives such as "localism" and the "big society". Indeed, the "community right to buy" local authority assets and the need for LAs to publish data on what assets are available will be enabled by the PDC going live.

Geo members who are still unsure of how politics and policy effect everything they do should access <http://data.gov.uk/> and look at how multiple data applications have a major geo-data component and with a 2011 UK census costing £100's of millions about to go live even more are in the offing. An emphasis on "measurement" always has to be tempered by knowledge of the "greyer" areas of professional subjective advice.



A strong lecture programme coupled with potentially far-reaching changes in our relationship with other geomatics bodies heralds a busy year ahead explains **Stuart Edwards**, Chair, Geomatics Global Professional Group Board.

*Professor Martin Pratt shows off his Michael Barrett Award medal. On the right, his wife Sharon and on left, Ruth Adams.*



## Strong lecture programme kick-starts year

**A**s I sit down to write this column my notes indicate that it's been a busy quarter 1 for Professional Group Board (PGB) business. Following the unfortunate cancellation of the evening lecture programmed for 9th December 2010, the lecture series was given a welcome boost with two in January. The first of these was the rescheduled Michael Barrett award lecture presented on 10th January 2011, by the 2010 award winner, Professor **Martin Pratt**, Director of Research at Durham University's International Boundaries Research Unit (IBRU). In his lecture titled *Still the Razor's Edge? Boundary-making challenges in the 21st century*, Professor Pratt explored some of the key challenges faced in defining and managing state boundaries, highlighting ways in which geographers, surveyors and other practitioners can contribute to effective and peaceful boundary-making.

Professor Pratt has worked on some of the most intractable boundaries issues in the world, and in making the award the panel felt sure that Michael Barrett, who was no stranger to international experience, would highly approve of the 2010 winner and IBRU itself. Following the lecture a familiar face, **Ruth Adams** (Previous PGB Chair) presented the award.

The second January lecture was the UK Geo Forum Lecture, presented by Professor **David Lambert** on January 27th. Professor Lambert is the Chair of Geography Education at the Institute of Education and chief executive of the Geographical Association. In his lecture *How can Geography contribute to Education for Survival*, Professor Lambert focused on the potential policy implications for the philosophy of geography teaching in the adoption of the Baccalaureate qualification in England and Wales.

Both lectures were well attended and given in the newly refurbished main hall at RICS, Great George Street. The strong 2010-11 lecture series continues on the 3rd March 2011, with **Neil Ackroyd** (FRICS), Ordnance Survey director of data collection and management presenting on *OS net, the UK RTK network and the future of GNSS*. Again, the lecture will be given at Great George Street. All RICS evening lectures are free and open to all but delegates should register their interest with [cmallett@rics.org](mailto:cmallett@rics.org)

### Surveying education for civil engineering students

In December last year I and a number of other geomatics professionals and academics were

invited by **Jim Chandler**, Professor of Geomatics at Loughborough University, to comment on the revision of an important document outlining the minimum survey training required by students studying for accredited civil engineering degrees in the UK. Accreditation is governed by the Joint Board of Moderators (JBM) which itself comprises the Institution of Structural Engineers, the Institute of Highway Incorporated Engineers, the Institution of Highways and Transportation and the Institution of Civil Engineers. The JBM assesses and makes recommendations on the accreditation of relevant educational programmes, which it will accept as meeting the requirement to register as a professional engineer with the Engineering Council - the body responsible for regulating the engineering profession within the UK. The brief we received was to ensure that this important document was up to date and not overly prescriptive. Areas to be examined included: knowledge and understanding, intellectual abilities, practical skills and methods of teaching, learning and assessment. Signing off on the revised document in early January 2011 it was very pleasing to note the level of agreement between the geomatics professional representatives and academics as to what our civil engineering graduates should know about geomatics for civil engineering.

### Joined up thinking

In February my experience of joined-up thinking continued. What you may not know is that one of the fundamental drivers for me in taking on the role of PGB Chair was my strong desire to see the various geomatics professional bodies working more closely and striving for one voice. I truly believe this to be key to the longevity of our profession and am delighted to report that a very significant step has been made. Whilst it is still too early to report on the detail, suffice to say that a joint ICES/RICS working group has been established to provide a framework setting out how both organisations can co-operate in bringing to market a single Chartered Designation 'Chartered Civil Engineering Surveyor'. For me personally this represents a new phase of maturity in the RICS/ICES relationship where principles are placed before personalities, and collaboration ahead of competition.

In closing I would like to express my thanks on behalf of the PGB to those of you who have applied to join the Board and wish to 'join in and get involved'. I hope to be able to communicate the outcome of the application process in my next issue.

As ever I welcome your comments and thoughts so please email on the following address ([geochair.rics@gmail.com](mailto:geochair.rics@gmail.com)).



## No work but plenty of warmth!

By *Malcolm Draper*

No work but the RGS steps up to provide warmth and comfort from an English winter.

Well, the New Year has kicked off with... a dearth of work! Times must be very tough out there for many survey companies. I am told that one is looking, via its website, for "casual hour survey assistants". No experience of surveying is necessary as training will be given. I can't help thinking that this is going to be minimum wage work and can only contribute to the further de-skilling of surveying.

Thank goodness therefore for the RGS's Monday evening lectures, where you can find warmth and comfort from the miserable winter weather. The "spring" programme has even surpassed the RGS's normal high standard. I won't tell you about all of them I've been to, but two stand out.

Many of you will have been watching the BBC's *Human Planet* series. **Dale Templar** is the producer and she told us about the making of the series including the extraordinary lengths they go to in capturing shots. The cameramen, armed with special cameras, are winched up trees, wired and winched across raging rivers or speeding across fast cracking ice with dog teams and Inuit handlers. Days were often spent just waiting for that perfect shot. Teams had to suddenly evacuate as a volcano went nuclear. But perhaps the most extraordinary filming, which was done by helicopter, was of a cattle round-up in the Australian outback where not one but four helicopters are used simultaneously to "keep them doggies rollin'", as fans of *Rawhide* will recall. High risk filming and nerve-tingling for the chopper pilots.

The second lecture of note came from TV presenter **Kate Humble** on spice. This is another not-to-miss series that traces the origins and history of the spice trade and the competition between the Dutch and the

British to secure supplies from which fortunes were won or lost depending on whether their ships made port or not. The story is also brought up to date with vanilla, most of which today comes from Madagascar, originated in Mexico where growers are once again trying to recapture the lost market. In the early

*Getting on with the job but pray there's no big wind.*



days it often came to violence with the Dutch but differences were sometimes settled by trading islands and routes. The lecture chimed with the book I'm reading, *Nathaniel's Nutmeg*, which complements Humble's programme. Interestingly, we struck one deal with the Dutch that gave them the free reign of the Indonesian island of Run, the source of nutmeg, while they gave us New Amsterdam, the island that became New York. Alas, we lost that in 1776!

### **Getting on with the job**

It's always a pleasure to see enthusiasm by those who want to get on with the job. But sometimes it can get the better of them. The following letter and accompanying photo recently came into our possession. It recalls a job the editor tells me he was on where, after the contractor had been on site for three weeks, the agent wrote a letter to the architect saying they had some idea what the building was supposed to look like but some construction drawings would be really helpful. This guy has carried things a stage further.

*Dear Sir,*

*Steel roof and framework already constructed. I am saying to you, please kindly be sending foundation design & drawings A.S.A.P before big wind comes!*

*Regards*

*Name withheld but qualifications: BSc B.Eng Site Supervisor and senior structural engineer Ministry of Public Works.*

### **Gerry Monk**

Undercurrents was saddened to learn of the death of **Gerry Monk**, a former long-serving employee of Plowman Craven. Gerry joined the firm in 1968 although **Ron Craven** had already worked with Gerry at Huntings where they'd both gone to Ethiopia in 1958. Ron served as best man at Gerry's wedding. Gerry was chief draughtsman and later head of reprographics at PCA where he was a key man in ensuring the quality of the finished product. His eye for detail and meticulous approach to work was a major contribution to firm. Gerry is survived by his wife Pam, three daughters and four granddaughters.

### **Jasbeens**

While several former employees of land

surveyors JA Story & Partners have emailed to express interest in another gathering, we have not been able to track down a database with many names on it including those at the last gathering in 1998 at the Brighton FIG Congress. If anyone knows who has it or is sitting on it, please get in touch.

### Winter Puzzle

Last issue's puzzle brought several swift responses and one or two belated ones. One reader was so irritated by it he said 'it spoilt my lunch!' The challenge if you recall was to tell us what the following numbers have in common: 3, 7, 10, 17, 11, 12, 73 and 77.

**Roger Lott** was fastest on the draw with the right answer. They are of course numbers, which when written in English, only contain the vowel 'E'. **Fred Brazier** cracked it three days after Roger and **Jon Bylo** a fortnight later. Meanwhile, apologies for spoiling **Conor Cahalane**'s lunch.

Staying with numbers, this year is throwing some real mathematical oddities amongst dates. 1/1/11 and 11/1/11 have come and gone. We await 1/11/11 and 11/11/11.

Now for another mathematical curiosity. Take the last two digits of the year you were born in and add it to the age you will be this year. It will come to 111 whatever year you were born in. According to those who know these things such a strange conjunction of numbers will not happen again in your lifetime. Our thanks to **Roy Kinnear** in New Zealand.

Continuing with odd conjunctions, I am told that this year will be the only one for another 800 or so which has five Fridays, Saturdays and Sundays in July. Make the most of them!

*My band, The Hangovers, were recently invited to play at a classy birthday celebration, but that's another story. This young lady was so parched after her exertions on the dance floor she grabbed the first drink she could find. Luckily it was not my pint!*



### Miscellany

I am rather fond of a good pun. **Alan Murray** has sent us a quite a long list, which readers may enjoy. Here's a selection:

*Dijon vu – the same mustard as before*

*Practice safe eating – always use condiments*

*Shotgun wedding - a case of wife or death*

*When two egoists meet, it's and I for an I*

*What's the definition of a will? It's a dead giveaway*

*Time flies like an arrow. Fruit flies like a banana*

*He had a photographic memory that was never developed*

*Once you've seen one shopping centre you've seen a mall*

### Got a tale to tell?

Please send letters for publication by e-mail to the Editor: [editor@pvpubs.demon.co.uk](mailto: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](mailto:rentamalc@aol.com)

# Letters

The Editor welcomes letters from readers on relevant topics. Please endeavour to keep them brief and to the point. We reserve the right to edit for clarity and brevity. email: [editor@pvpubs.demon.co.uk](mailto:editor@pvpubs.demon.co.uk)

**Jonathan Walton** was interested to hear our comments in the last issue of GW about the recent RGS lecture about polar explorer Captain Scott. He corrects us and provides further insight on three great polar explorers.

There seems to have been an "anti Scott" movement over the last 30 years. I remember while working at the Scott Polar Institute in the 70's there was a writer researching there at the same time, one Roland Huntford. His subsequent book, "Scott and Amundsen" was no surprise to any of my colleagues at SPRI - he had made it clear that he was going to debunk the Scott myth once and for all. Which he did - but the book was so one sided that it lost much of its credibility. I would correct your comments in your recent page. The 1901-04 Scott expedition was really the first to winter deep in the Antarctic. Indeed, it was only in 1898 that the first human even set foot on the continent. The scientific results of that expedition cover several volumes and those undoubtedly make that part of the expedition "a success". However, Scott's attempt on the Pole was not successful - they only reached the Beardmore Glacier at the Southern end of the Ross Ice shelf. And don't forget that that group included Shackleton.

Shackleton in 1908/09 had a much lighter scientific programme – his main aim was always to reach the South Pole. He failed, by an

agonizingly small 93 nautical miles. They returned – but you only have to read the expedition reports to realise it was touch and go. Scott's last expedition was technically a success - they reached the South Pole. But at a terrible cost.

There is no doubt that Captain Scott had a number of faults. In some ways he was encumbered by the traditions of the Royal Geographical Society, the Navy and indeed British Society in general. Amundsen had no such encumbrances – his avowed, and only goal was to be first at the South Pole. Which of course he succeeded in. And he returned to tell the tale.

Of course, Shackleton was a remarkable person. Ironically, he never actually "succeeded" in any of his polar exploits. But it is clear he was a great leader in every respect.

The best summing up of those 3 great figures of Antarctic exploration was by Raymond (later Sir Raymond) Priestley. He worked with both Scott and Shackleton in the Antarctic so his words are worth listening to. I can't remember the exact words but they are something like this. "For a meticulous leader of a large and wide-ranging scientific expedition, Scott's your man. For a swift and efficient Polar traveller, choose Amundsen. But if everything has gone wrong and there seems no possible way of avoiding disaster, then get down on your knees and pray for Shackleton!"



A prize-winning GIS is at the heart of a 110-year plan to manage Britain's leading nuclear facility, explains **Mike Cottrill** (above).

- This article first appeared in the February 2011 issue of *GIS Professional* magazine. RICS members can subscribe to *GISPro* at preferential rates. Go to: [www.gisprofessional.co.uk](http://www.gisprofessional.co.uk)*

# The choreography of Sellafield

by *Mike Cottrill*

**T**he restoration work being conducted on the Sellafield nuclear site in west Cumbria is part of a work programme spanning the next 110 years – the Lifetime Plan. Although the site occupies only a small geographical area (about one square mile) it is home to one of the most complex nuclear licensed sites in the world.

The cost of delivering the Lifetime Plan is estimated at £42bn and will involve many physical changes to the site landscape including large-scale building and decommissioning works being carried out alongside current and new operating facilities. The spatial and temporal planning of these activities is critical in order for efficient, effective and safe delivery of the work programme.

To meet the challenge of planning this work Sellafield Ltd, the organisation responsible for decommissioning the site, is using a GIS to visualize the 'choreography' of the site over the 110-year period. The solution provides visualisation of the complex interaction of all aspects of the programme, including spatial animation of programme timelines, which enable efficient and effective site planning and asset management, producing expected multi-million pound savings.

The use of GIS in this context relies on the basic principle of being able to join spatial information or 'geo-data' depicting the location of current and future assets on the site, with temporal information relating to the associated project timescales (Fig. 1).

Sellafield's Lifetime Plan GIS has been created using ESRI's ArcGIS software, together with

the Tracking Analyst extension, to bring both visualisation and time-awareness to the solution. For the first time, the spatial evolution of the Sellafield site can be visualised and explored on an interactive map.

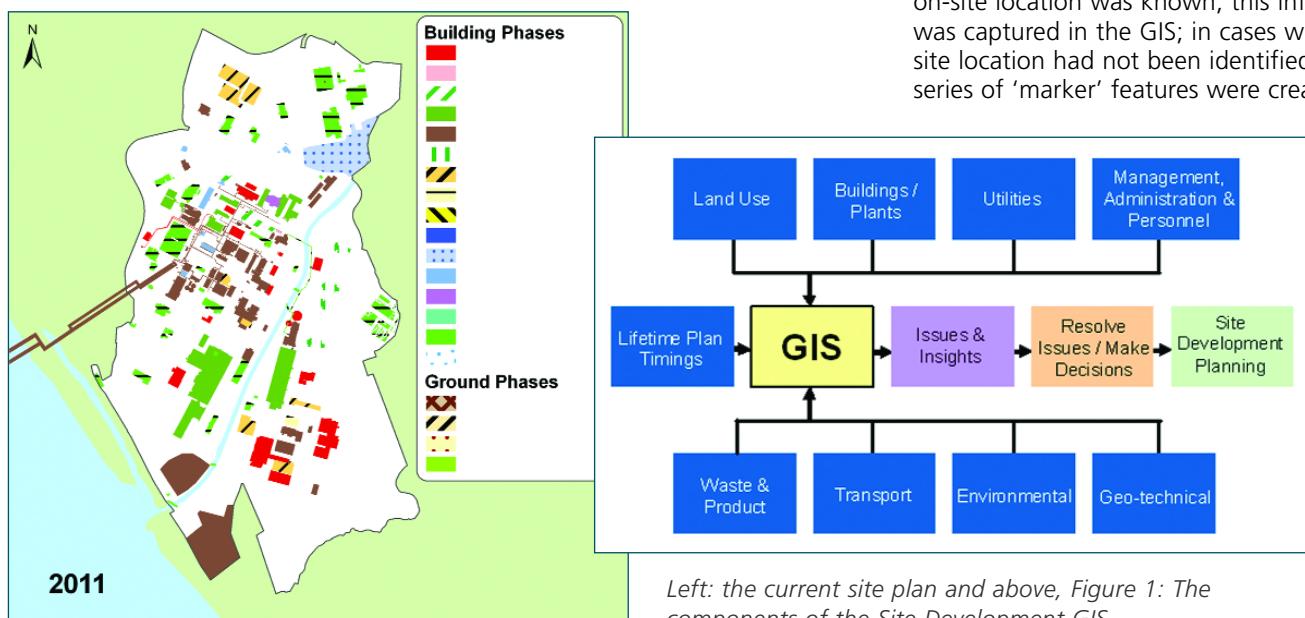
By far the biggest challenge for the GIS team in creating and developing the system has, and continues to be, the acquisition, organisation and refinement of data.

## Acquiring the geo-data

Much of the data relating to current features on the site resides within as-built design drawings held in CAD format. Some information still resides on paper drawings, however, much of these are now accessible electronically but only in a scanned-in image format. The compatibility associated with the data held in CAD format wasn't too difficult to deal with; for example, the information depicting the current buildings, roads and rail on the site was well captured in the CAD system and, therefore, easy to import into the GIS.

The information relating to future building and decommissioning projects, however, was a little more difficult to obtain. Although the various projects were listed in the Lifetime Plan, the information was high-level and without any real detail or information regarding location on the Sellafield site. So a small team within the Strategy & Programs directorate was tasked with collating detailed information regarding these future projects by contacting the 70+ operating units within the business.

The end-product was a spatial dataset containing information on new-build projects spanning the Lifetime Plan. In cases where the on-site location was known, this information was captured in the GIS; in cases where the on-site location had not been identified yet, a series of 'marker' features were created in the



GIS and located in a 'holding area' outside the Sellafield site. As these projects evolve and the sites are determined, the features are then given a correct on-site location and ultimately shape/topology, thus building up the accuracy of the map.

### Acquiring the temporal data

For the temporal information, a separate non-spatial database system called the Sellafield Site Remediation Model (SSRM) was the source of data for timings associated with each of the strategic buildings (future and current) on the site. This system had been set up by a separate department within the business where location-enablement was not a requirement. A simple export from this system was required to obtain the data.

Further work was also carried out to determine the various transport requirements of the Lifetime Plan; in this case geo-data for roads and rail is joined with temporal information relating to the year-on-year fluctuations in traffic volumes on these transport routes.

### Joining, Visualisation and Animation

After a degree of data manipulation, to allow the joining of the temporal data to the geo-data, it is possible to map out and visualise the evolution of buildings, year-on-year, throughout the Lifetime Plan. In the case of transport moves it is possible to depict the volume of traffic expected on the site's road and rail network year-on-year. Figure 2 shows examples from the system depicting the building layout in 2010, 2050 and 2100. This type of interactive map allows the business to visualise the location and timing of projects in the Lifetime Plan. The benefits associated with this are now being realised.

### Benefits

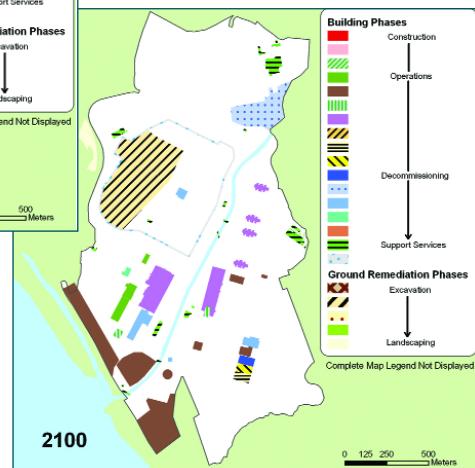
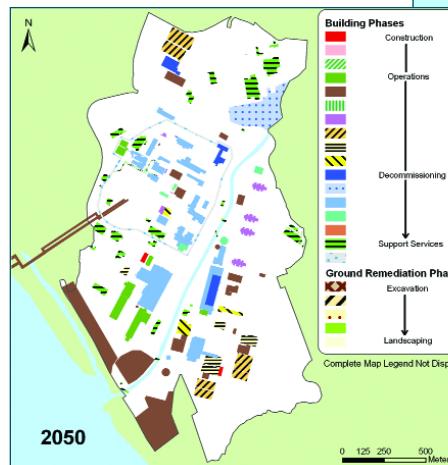
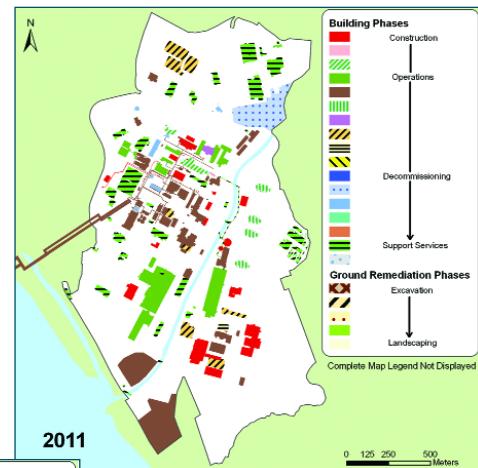
The system has provided the ability to quickly and effectively visualise temporal data spanning the entire Lifetime Plan, e.g. when and where buildings are being constructed and decommissioned, and when and where transport routes across the site are being most heavily used. In simple terms, it provides a more effective and interactive way of communicating the complex work programme.

In the area of strategic or long-term planning of the site the system has made it much easier to reveal any development conflicts between the many different projects that are underway and scheduled for the future. It is now possible for the strategy team to develop a fully considered site plan taking time to analyse the best location for a given project. The benefit in this case is improved efficiency during the siting phase of all construction projects.

For near-term and current project work the system acts as a communication tool allowing any project team to quickly understand where

*Figure 2: Three maps taken from the Lifetime Plan GIS. The maps depict the layout of buildings in 2010, 2050 and 2100; the different colours representing the different phases of a nuclear facility.*

*Please note, in order to meet security restrictions the full map legends and annotations used in conjunction with these maps cannot be displayed.*



and when other work on the site is taking place. It provides projects with a mechanism to understand what their 'neighbour' is going to be doing and plan-ahead. The benefit in this case is the avoidance of any clashes such as availability of space or demand on the road/rail network. Furthermore, efficiencies associated with sharing of common resources across multiple projects are possible.

In the area of Stakeholder and Regulator communications, the system has provided an improved means for demonstrating site development. To this end, it has been used effectively to help resolve planning issues with local authorities; assist with regulator communications and presentations; support the Nuclear Decommissioning Authority in the planning of new nuclear sites within the county; and provide assistance during the Cumbrian floods of last year.

In addition to direct benefits, the system has also led to a number of unexpected spin-offs for the wider organisation. Off the back of the Lifetime Plan work a central GIS repository has been developed; this is now being made available to all directorates in the business. For example, the information is being used to a greater/lesser extent by the following teams: Engineering, Environmental Health Safety and Quality (EHS&Q), Land Quality, Operations Support, Emergency

*"The system has provided the ability to quickly and effectively visualise temporal data spanning the entire Lifetime Plan..."*

Figure 3: The Sellafield Ltd GIS team receive 'highly commended' in the category of Innovation & Best Practice (Private Sector) at the AGI Awards 2010. From left to right (Mike Cottrill, Karen Pegler, Ray Buckingham, John Robison).



**“...the government are spending billions of pounds delivering the restoration programme.”**

### Response/Planning and Finance.

In some areas this extended use of the system has led to an improvement in the quantity and quality of the data held. As the uptake for GIS has grown the need for appropriate controls and procedures to manage the data, hardware and software have been put in place and GIS is fast becoming corporate/enterprise (for want of a better definition!) in scope.

### Summary / Future

Although the geographical footprint of Sellafield is relatively small in area, the site is considered to be one of the world's most complex and hazardous industrial sites. The safe management and decommissioning of the site is therefore paramount, which is why the government are spending billions of pounds delivering the restoration programme. Combine this with the changing political landscape surrounding nuclear development, including the immediate adjacency of a

proposed nuclear reactor site at Braystones (north of Sellafield), it is fair to say the area will continue to be one of remarkable change for many years into the future.

To allow these physical changes in the landscape to take place in a safe and sustainable manner the need for innovative solutions that provide benefit to the work will be in demand. The opportunity to use geographic information and associated technology to aid the planning process and subsequent work delivery is inevitable, which is why Sellafield Ltd has chosen to formalise the development of its GIS capability.

The Lifetime Plan GIS work described in this article won 'highly commended' at the 2010 AGI Awards (Fig. 3), 1st prize at the ESRI UK Conference and gained 'Excellent' at Sellafield's internal Business Excellence Awards. Looking to the future, the challenge for the team now is to grow the GIS capability in new areas in a way that will bring further benefits to the business.

### About the Author

Mike Cottrill (BSc, MA) has occupied the role of senior technical advisor on GIS at Sellafield Ltd for three years. Previous experience in the GI space includes postings with MWH, working on water utilities projects; GDC, working on local government projects; and Natural England, working on the 'Open Access' mapping project. He also sits on the committee for AGI Northern Group ([www.agi.org.uk/north](http://www.agi.org.uk/north)). Contact: [mike.cottrill@sellafieldsites.com](mailto:mike.cottrill@sellafieldsites.com)

## The Sellafield nuclear site in west Cumbria



Established in the 1940s, Sellafield spans the entire history of the UK's civil nuclear industry. The site started life as a Second World War Royal Ordnance factory but shortly after the war in 1947 the construction of nuclear facilities began; firstly to produce materials for nuclear weapons and later to provide commercial energy to the grid. The Calder Hall plant at Sellafield was the world's first civil nuclear power station capable of delivering electricity in commercial quantities. Powered by four Magnox reactors,

Calder Hall began operations in 1956 and remained in operation 47 years. During this time many more nuclear facilities were constructed on the site, the emphasis being not only on the production of nuclear energy but also the reprocessing and storage of nuclear material associated with Sellafield's own activities and other national and international nuclear contracts.

Current site operations include Mixed Oxide (MOX) fuel manufacturing; reprocessing of fuels produced by nuclear power stations; storage of nuclear material and radioactive wastes; and decommissioning of the earlier legacy plants. All these activities are managed by specialist operating units and assisted by a vast number of support services.

To put this in context there are currently more than 1000 buildings on the site, two hundred of which are nuclear facilities. There is a large network of electric, steam, water, drainage and chemical distribution lines, many of which are interdependent. There are approximately 8000 staff who work on-site with a huge range of skills and procedures being delivered side-by-side to achieve safe, round-the-clock operations.

The challenge facing the company is to plan the restoration of Sellafield site taking into consideration contamination from its previous use in the 1940s for armament production; the site's existing congestion and complexity; adjacent facilities; radiological and chemotoxic contamination; and interdependent facilities and processes.

# Indoor mobile mapping becomes a reality

by Andrew Stott and Peter Canter

A new technology developed by Trimble can quickly capture interior geospatial data for many applications across multi-discipline professional groups such as Situational Awareness and Building Information Modelling.

**D**ocumenting the precise order and condition of indoor structures and their contents has always been a time-consuming and expensive task. For outdoor environments mobile mapping, or the creation of accurate geospatial information from a moving platform, has proven to be the most cost-effective and productive way of acquiring quality infrastructure data, but it relies heavily on receiving GPS signals. These signals typically do not penetrate building materials, so obtaining the positioning required for effective mobile mapping inside buildings has been impossible... until now.

Trimble's new indoor mobile mapping solution (TIMMS) integrates active and passive sensors and an intuitive user workflow to enable true indoor GIS capability, making mobile mapping for interior environments not only possible, but easy, quick, and cost-effective.

## Indoor mobile mapping vs. traditional survey

Mapping an indoor space has traditionally been accomplished using total stations or static laser scanning, which is time consuming and costly. A tripod, laser and camera are set up to capture measurements and images at various locations. The equipment is moved and set up again – many, many times in fact – until all perspectives of the room are captured. While this method delivers high accuracy with

relatively low capital costs, it has several significant problems: it is labour intensive, requires a lot of equipment in order to cover large areas, and produces many datasets which all need to be merged. These challenges significantly raise the complexity, cost, and time to completion. This conventional static method, when applied to surveying an existing building, takes approximately one week of field time to cover 100,000 square feet of indoor space. With the indoor mobile mapping solution now available, it takes just one day.

Operation of TIMMS is straightforward; a single walk-through, at normal walking speed, of an interior space delivers full 360-degree indoor coverage. Maps and models of thousands of square feet of indoor space are captured in minutes, entire buildings in a single day. The system is highly manoeuvrable and can be moved in and around furniture and other obstacles, making even complex, busy spaces effortless to complete. Once the walk-through is finished, software can be used for the production of accurate interior maps, spherical maps, videos, and 2D or 3D models.

"As is" maps and models, multi-purpose 2D or 3D building data and design data is quickly produced with high accuracy. Comparisons of distances measured in laser scan datasets by the indoor mobile mapping solution and those measured in real life with a tape reveal that this technology obtains relative accuracy to within plus or minus three centimetres.

## TIMMS for SA

There are a large number of instances where this type of indoor mapping capability is desirable – including instances where it is critical and life-saving. Consider for example situations where people must quickly and efficiently enter and operate in a building they are unfamiliar with, e.g. a firefighter who is required to enter a burning building to rescue a trapped family. The building's design, layout and contents are all unknown, yet getting in, finding victims, and getting out fast is paramount: in fact it could be a question of life or death. Or imagine a soldier operating in a hostile urban environment, facing adversaries one building at a time, block after block. Knowing how to enter and move within these buildings, with speed and confidence, is again a critical factor for success and survival. Both of these situations require that personnel have Situational Awareness (SA) to be effective, and SA is conditional upon having accurate and reliable indoor base map information.



Figure 1: The TIMMS Cart is equipped with a laser scanner, camera, indoor positioning, GPS, operator console, and complete workflow.

**TIMMS** is a mobile mapping system designed for capturing geospatial data in 3D inside a building. It takes between 15 and 20 minutes to set up and packs down into a ship-able unit that can be transported in a minivan or SUV.

The system consists of standard Applanix components, which are mature in the methods used for ensuring that the system is calibrated and works to specification.

*“..this technology obtains relative accuracy to within plus or minus three centimetres.”*

### Situational Awareness is potentially life-saving!

Dimensionally accurate visual 2D and 3D layouts and models dramatically assist human decision-makers faced with operating in new and unfamiliar environments by making them fully aware of an environment without ever having been in it. They allow personnel to visualise the inside, to map it, and when combined with location based services (LBS), to locate assets, hazards, and specific interiors. Personnel can determine their optimum path inside prior to having ever entered the building. The tie to indoor LBS is notable - TIMMS provides the context necessary for indoor LBS to be effective. Without an indoor base map, the effectiveness of LBS is severely limited.

Indoor base maps also aid commanders and tactical decision-makers by enabling them to accurately visualise environments where personnel need to be deployed, making it possible to rapidly and effectively deploy, re-deploy and re-direct forces. “At-risk” personnel can be prioritised and situations can be quickly and effectively responded to, thereby saving lives.

The interior maps created can be integrated into more widely acquired regional GIS databases –complementing the effectiveness and usefulness of the data and further enhancing SA. Without this SA, the first responders and military personnel described above are ill-prepared for the task before them. With it, they are fully prepared, with a plan and a path.

### Building Information Modelling

The needs of the building construction industry are radically different from those of first responders and military personnel, but the benefits building construction can realise with interior map information are just as significant. The term Building Information Modelling (BIM) is used throughout industry to describe the process of generating and managing building data during its life cycle to increase productivity in building design, construction, and maintenance. The typical BIM encompasses building geometry and plans, spatial relationships, geographic

information, and quantities and properties of building components.

Until now, professionals involved in modelling an existing building had a choice of acquiring quick but limited 2D data (floor plans) of interiors and interior structures, or acquiring more detailed but also more time-consuming 3D laser-scanned data. Indoor mobile mapping eliminates this difficult compromise; both sets of data are collected at the same time, in a single pass, at low cost, and with three to five centimetre accuracy. Conventional plans and draftsman’s drawings will remain for purposes they are best suited for, but they will now be created with more “as is” information from the indoor mobile mapping systems which may become the vehicles of choice for conveying building information to design teams, to general contractors and subcontractors, owners, managers, etc.

The benefits of 3D models are substantial in this context. They give the ability to assess alternative design and construction schemes, identify and resolve geometric conflicts in advance of construction, optimise the sequence of construction, and demonstrate the scope of work to sub bids through increased clarity.

### The Old Don Jail in Toronto

The Old Don Jail was a provincial jail for remand offenders in the city of Toronto, Ontario, Canada. The jail closed in 1977 and is now being renovated and redeveloped into administrative offices.

Having been originally constructed in the mid 1800s, the jail is a historic site and as such, very little BIM information is available. TIMMS was deployed to collect interior map data for possible use in planning the renovation and new construction. The project has demonstrated the multi-purpose aspects of TIMMS data.

The data for the 900 square metres 3rd floor was collected in 40 minutes, followed by one hour of processing time.

Ultimately, the objective for such data is to see where future mechanical and electrical interfaces can be placed. This can help to ensure the renovation is efficiently planned. In the attic of the jail (Figure 2), all ceiling beams and joists are clearly observed. The level of detail is ideal for use in routing ducts in the renovation.

The Warden’s residence within the jail was located above the attic in the upper most part of the building. This area is going to be remodelled into a multilevel space with mezzanine. The TIMMS generated point cloud (see Figure 3) is an excellent example of 3D models with cm level accuracy and detail.

### Facility management, including space optimisation

In order to maximise the financial performance of an organisation, the operation of its leased

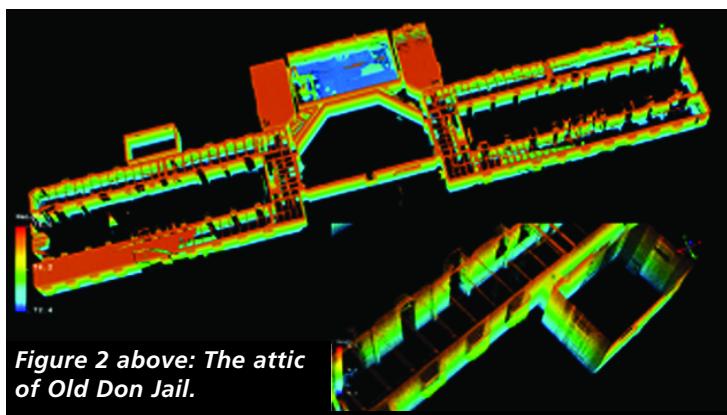
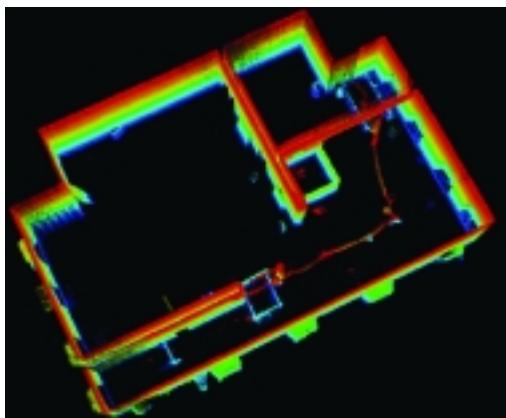


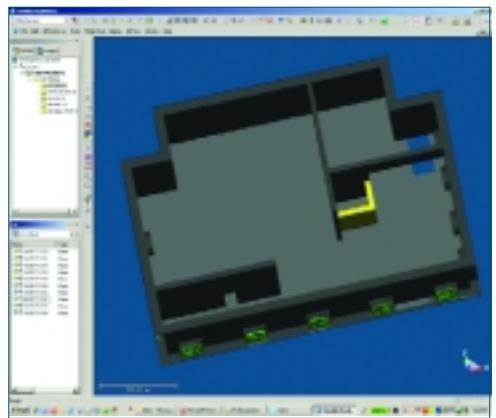
Figure 2 above: The attic of Old Don Jail.

*Figure 3: This point cloud of the Warden's Residence was collected in less than 8 minutes.*

*Traditional methods would require approximately 40 minutes.*



*Figure 4: 3D model produced from the point cloud in Figure 3.*



and/or owned facilities must be streamlined. This is at the core of "facility management" – supporting and improving the effectiveness of an existing building over the many years of its entire life, or its "operational phase". Accurate indoor map data is critical to this undertaking.

Indoor mapping provides the underlying information necessary for organisations to operate their facilities with maximum effectiveness and employee comfort – all while dramatically reducing costs – by enabling such facility management applications as renovation planning, safety and emergency procedure planning, and space optimisation. By effectively optimising space using the wide area perspectives acquired by TIMMS, businesses will have

new information to help minimise their lease and building ownership costs. They can do this by identifying facilities that can be combined, others that can be eliminated, and by enabling effective expansion within existing locations without acquiring more space.

Accurate indoor spatial data also enables building management to run "what if" scenarios so they can effectively plan for new equipment, more employees, different production processes, etc.

### Pioneering technology with enormous potential

Until now, mobile mapping has been limited to outdoor environments where satellites for positioning purposes are in view. TIMMS has overcome this hurdle and made mobile mapping a reality for indoor spaces as well, with all of the associated benefits including speed, ease, high accuracy and lower cost.

Here we have explored just a couple of important applications for this technology, but its potential is enormous, if still unknown. As a matter of history, the advent of pioneering technology ushers in changes no one could have predicted (think of the internet and map use of the general public). Indoor mobile mapping offers benefits to a vast multitude of people, yet it is possible its greatest impact has not even been imagined yet – its future is certain to be exciting.

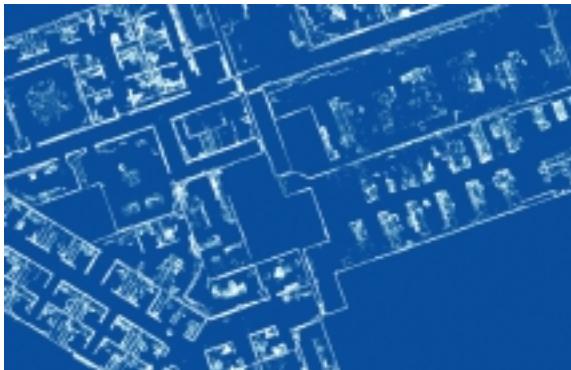
### About the authors:

**Peter Canter** is Director, Advanced Mapping and Imaging Systems at Applanix Corporation and is responsible for new business development and overall product direction for indoor mobile mapping. Peter obtained his master's degree and post-graduate degree in geography and GIS. He has over 30 years of worldwide experience in navigation, positioning and mapping.

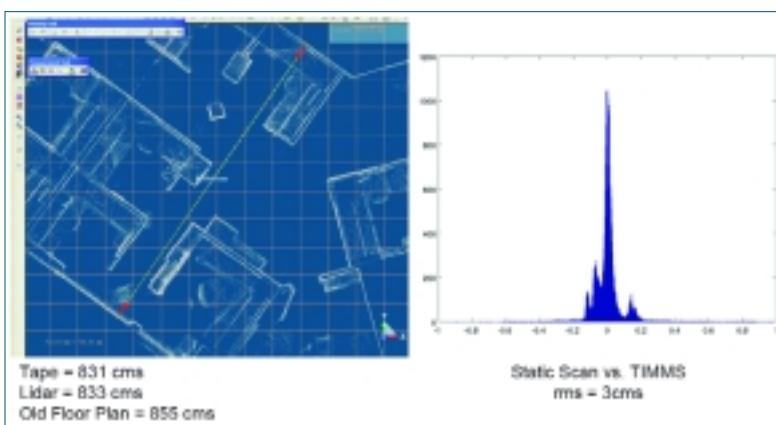
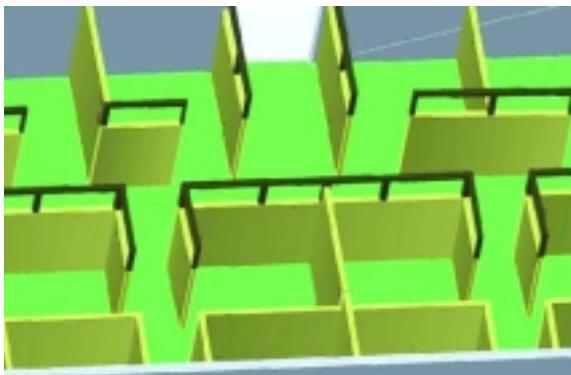
**Andrew Stott** is Technology Writer at Applanix Corporation and has been frequently published in a diverse set of industry magazines and journals.

- Applanix Corp is a Trimble company.

*Figure 5: This indoor map clearly shows cubicle & wall thickness.*



*Figure 6: 3D model of office cubicles.*



*Figure 7: Accuracy of TIMMS*



# DGI's perfection dilemma

by Richard Groom

The boundary between surveying and GIS is blurred at the best of times but rarely more so than in the field of military mapping and intelligence. But this event is at the interface between senior military officers and their civilian suppliers, explains **Richard Groom**.

*The busy and colourful exhibition is a forum for systems rather than hardware.*

This year's DGI (Defence Geospatial Intelligence) conference in London attracted 650 delegates from around the world. In addition to a packed two days of sessions with an early start on each day, there was a larger and more colourful exhibition than in previous years.

## DGI means business

DGI is special because one really feels that it has an impact; it makes the difference. Each year the issues of the day are aired and one gets the impression that the participants listen and act, so that the following year measurable progress has been made on that batch of problems, leaving the speakers and delegates to set and get stuck in to a new agenda. The conference means business.

The daily pattern was a morning of plenary sessions, which included three panel discussions followed by specialist streams in the afternoon. The highlight of the first day however was a keynote by Air Marshall Sir **Stuart Peach**. Sir Stuart is currently Chief of Joint Operations at the UK MoD, but was Director General of Defence Intelligence between 2003 and 2006. His plea was to "keep it simple", which he demonstrated by drastically shortening the length of the title for his talk to "Geography on Operations". He has seen too many cluttered maps and urged the delegates to think of their audience. Advice that would go down well anywhere.

## Geography enables understanding

Sir Stuart's remarks reflected those of many others. "Create once, use often", the "Perfection dilemma", the "Share – Protect balance" and "Geography enables Understanding" sum up his views and concerns. By the "Perfection dilemma" he means that commanders need 80% solutions to be provided in time rather than 100% solutions late. He, and other speakers, saw this as a pragmatic solution to funding cuts.

But from the providers' side came the comment that the same commanders will criticise if they find flaws in the product. Something to work on, chaps!

The "Share – Protect balance" is in the spotlight following WikiLeaks. Several speakers picked up on this and stressed the

importance of establishing clear rules and communities of interest. However, as Sir Stuart said, there will always be a need to protect some information. He urged the conference to remember that "Geography enables Understanding".

The most colourful exhibition stand was from a company called **Fusion-io** with an impressive bank of screens displaying an array of video feeds. Their innovation is in solid-state storage technology. Moore's law has been governing the exponential improvement in the performance of processors, but storage, although increasing in capacity at a similar rate, has not experienced the same boost in performance. Fusion-io has been addressing this performance gap.

## Close Quarter Battles in 3D Cities?

The DGI exhibition is more a forum for systems rather than hardware suppliers and this year there were several purveyors of 3D city software. **Gvitech Group** is a Chinese company with 60% share in their home market's city planning sector. The company's Citymaker GIS platform features its own 3D rendering engine for fast mass 3D data processing and visualisation. Their technology was used for the 2008 Beijing Olympics and the digital Macau, Singapore, Taiwan and Stuttgart urban planning systems. Meanwhile, Croatian company **Geofoto** specialise in producing 3D physical models from virtual city models.

## Social network analysis

This year the principal sponsor was **Esri** and **Digital Globe** were associate sponsors. Esri were (subtly) behind several of the presentations and also a new development – seminars during the lunch period on both days. This year they became involved with two new companies with interesting applications – **exactEarth** and **i2**. The former has developed a system for tracking and analysing worldwide movements of shipping and the latter has been specialising in "social network analysis". Social network analysis is nothing to do with Facebook, the developers assured me, but more to do with analysing phone and email traffic to develop topological models of contacts between individuals. Last year they partnered with Esri and discovered the power of combining their product with geography.

## Insight platform

**Jill Smith**, CEO of Digital Globe is retiring this year. She spoke at the conference about satellite imagery. She, and other speakers, made some interesting comments about the



value of data that apply in civilian as well as military applications. Namely the high value of 'current' data, the drop off in value if it is delivered late and the fall-off in value as it goes out of date. But also the potential surge in value of archive data. For military and security purposes archived data is particularly important as a base from which to detect changes.

At present the industry spends 80% of its time processing data and 20% problem solving. Smith's goal this year is to invert this so that more effort can be devoted to problem solving. To do this Digital Globe are developing what they call the "Insight Platform".

### COSMO developments

e-Geos, the Italian satellite data provider were also at the exhibition. They are the distributors of COSMO-Skymed X-band SAR data and their CEO, **Marcello Maranesi**, spoke about this at the conference. The full constellation of four satellites is now in orbit. The potential revisit times are not regular but at the worst case, on the equator, there are 29 passes per week, whilst at higher latitudes such as London, there are 50 possible revisits per week. The attraction of SAR data is its reliability because it is not dependent upon clear skies or daylight. The Italian Space Agency is planning the next generation of satellites with the first launch in 2013, which will have a higher resolution and faster response time. The Italians are also in partnership with Argentina to launch two L-band SAR satellites with the first launch in 2012.

### Olympic Security

Ordnance Survey CEO Vanessa Lawrence was due to speak about the agency's work on the Olympics site, but was unwell following a foreign trip, so her Director of Data Collection and Management, **Neil Ackroyd**, stepped up to the plate. The OS has a role in mapping for national security purposes but one received the impression that it was rather ill-defined. Faced with this blank sheet of paper, OS consulted with their partners in the security and emergency services and in local government and came up with a programme to provide three tiers of mapping for the Olympics site. Tier 1 covers the site itself with a one-mile buffer, which is covered by 5cm imagery but also identifies all street furniture. Tier 2 covers the additional sites and temporary venues and Tier 3 covers the transport routes, out-of-stadium events and supporting infrastructure. OS has flown imagery for Tier 3 sites at 10 – 15 cm including a 500m buffer. Their work on the Olympics follows on from the work they did for the G20 summit at the Excel Centre in Docklands two years ago. Perhaps the most interesting aspect of this is that OS saw a gap in the market that was not covered (and probably not recognised) by others and then took the opportunity to fill it. It is enterprise like this that keeps our discipline in the places that it should occupy.

### Interoperability and Standards

Brigadier **Jim Hockenhull** from the UK MoD spoke about interoperability using an analogy that connected with the audience. He displayed a map showing the mains voltage and frequency in each country throughout the world. There is greater variation than you might perhaps expect. Then he showed a second map of the standard electrical sockets across the globe. This was even more striking.

Standardisation would clearly be desirable but changing the voltage of the national power supply would be very costly and dangerous. Changing the sockets is also quite a challenge but can be done, as it was in the UK in the 1960s. So a compromise is the answer. Most modern equipment will work off either voltage and if not, the user can buy a transformer. To solve the socket problem, the user can buy a universal adaptor at any airport. The question is, at which point to standardise to produce efficiency whilst ensuring at the same time that the standards themselves do not hinder innovation?

Attempts at co-operation between UK and US forces in Helmand produced a similar problem as described by **Jim Hill**, Acting Director of the Geospatial Intelligence Directorate, (MCIA) Marine Corps Intelligence Agency, USA. Although we speak the same language – well, nearly – there are many differences of language and culture and in the way that the two armies operate. This meant that each would only trust maps that were produced with their own nation's logo on them. Therefore the north part of Helmand was be mapped by the British and the south by the Americans – with an overlap at the join. Realising that they were missing a trick, the two allies decided in future to co-operate. They did this through face-to-face meetings resulting in a technical exchange programme, a joint UK/US geoteam in the field and co-operation in printing because MCIA does not have printing facilities.

### Opportunities in Defence

DGI is a meaty conference; it's the interface between senior military officers and their civilian suppliers. For conference delegates it is an essential means of discovering gaps in the market and establishing and maintaining useful contacts. This is a government sector that is also unlikely to suffer the level of budget cuts (certainly in geo data) that we will see in civilian government departments over the next year or so. During the conference there is plenty of time for delegates to browse the exhibition stands. However, if there is one piece of advice for prospective exhibitors, it is to avoid over-complication and demonstrate that they know, understand and address military needs. It is noticeable that most companies supplying to military customers employ ex military staff in their organisations.



*DGI is ideal for doing business and for catching up with old friends and acquaintances.*

*“...each would only trust maps that were produced with their own nation’s logo on them.”*

- For more information about DGI see: <http://www.wbresearch.com/dgieuropa/home.aspx> and the report in the February issue of GIS Professional, [www.gisprofessional.co.uk](http://www.gisprofessional.co.uk)

# Talking to Vanessa Lawrence

The Director General of Ordnance Survey has now been in post for a decade. GW recently had the opportunity of putting some questions to her about developments during that period and particularly the more recent emergence of data.gov

**“Much of the mapping being used in everyday life is in ‘disguise’”**

**You've been Director General of Ordnance Survey for over ten years. What is the single most important development to affect OS in that period?**

The realisation of the significance of GI by businesses and governments around the globe. Today, Ordnance Survey data is being used extensively across the private and public sector to drive efficiencies and underpin decision making.

At the beginning of the century the GI industry exploded with many global organisations entering the industry. This coincided with the expansion of the Internet, mobile technology and personal use of GI. For example, Google and Bing Maps catapulted the demand for maps on the web and opened up mapping to the masses. The growth in the last decade of consumer familiarity with GI has been overwhelming. Much of the mapping being used in everyday life is in ‘disguise’ with readily accessible location information becoming an indispensable part of daily life.

This growth in consumer familiarity with GI is raising the demand for even more mobile applications and services. These developments are bringing GI to new audiences resulting in many more people realising that Ordnance Survey is a trusted data provider. This shift in our brand recognition is also one of the most significant developments to affect the whole of Ordnance Survey in the last ten years.

**What do you foresee as the next major challenge for OS?**

Ordnance Survey data is increasingly being used in less traditional sectors. The next major challenge for us and the industry, is how best to foster new collaboration between ‘non-traditional’ partners to drive the geospatial innovation agenda forward, irrespective of whether the applications created are social or

commercial. At the same time we must learn from those who understand these new audiences and new markets. We anticipate that the use of data by non-traditional partners will continue to increase following the successful launch in 2010 of OS OpenData – an online platform that allows users and developers to access a range of our datasets for free.

It is vital that we, and the industry, continue to provide accurately maintained datasets, information frameworks and innovation platforms all of which are needed to effectively address local and global challenges. We will also continue to invest, innovate and remain at the forefront of developments in the GI industry. Over the last ten years we have invested over £220 million in research and development and only through continuing this level of investment can our contribution to the industry continue to grow.

**As director general your role is not just to manage the national mapping organisation, but you also advise government on matters geospatial. What are the qualities you need when dealing with a succession of ministers who probably have limited knowledge and understanding of mapping?**

At present our government has a clearer understanding of the value of GI than ever before. One of the key qualities I have to possess in ensuring everyone has an understanding of mapping and GI, is the ability to explain concepts so that they are understood easily, whilst giving clarity to queries and demonstrating the financial and efficiency benefits that GI can bring to organisations in both the public and private sector.

Through regular and improved communications with all stakeholders we have seen government and their advisors gain a greater understanding of the value of OS data over the past few years. Ministers have seen

## The Lawrence file



Vanessa Lawrence has been Director-General and Chief Executive of Ordnance Survey Great Britain since 2001. She was the first woman to hold the post. In this position she is adviser to the British Government on mapping and geographic information and was instrumental in the delivery of *Place Matters: The Location Strategy for the United Kingdom*.

Before joining OSGB she worked for publishing company Pearson and Autodesk where she held senior positions. Vanessa is the Honorary Vice-President of The Geographical Association and a member of the Council of the Royal Geographical Society, the University of Southampton and the University of Cambridge.

She is also a visiting professor at the University of Southampton and Kingston University.

She is a Companion of the Chartered Management Institute, a Chartered Geographer and a Fellow of the Royal Geographical Society, the Royal Institution of Chartered Surveyors and the Institution of Civil Engineering Surveyors. She was elected an Honorary Fellow of the Royal Academy of Engineering in 2008.

In January 2008, Vanessa was appointed as a Companion of The Most Honourable Order of the Bath (CB) in the Queen's New Year Honours List. In July 2009 she was appointed Honorary Colonel of 135 Independent Geographic Squadron, Royal Engineers.

first hand how well maintained, accurate GI can drive efficiencies and improve public services. The demand for greater access to GI was apparent in August 2010 with the signing of the Public Sector Mapping Agreement (PSMA), which will provide over 800 public sector organisations in England and Wales with free at point-of-use access to OS data. It brings together local and central government, NHS organisations, parish councils and organisations such as the RNLI and Mountain Rescue under one unified commercial agreement for the first time.

In addition to creating greater accessibility to OS data for public sector organisations, 2010 also saw ministers realising that the data could be used to drive innovation and subsequently boost the economy. This resulted in the launch of OS OpenData in April 2010 allowing businesses, groups and individuals to access a range of Ordnance Survey datasets for free.

These two significant milestones would not have been possible without ministers having a good understanding of the value of GI to Great Britain.

**Ordnance Survey has just moved into its modern, purpose-built new offices. Given all the recent changes, is the building still what you need?**

I am delighted that we have now successfully moved in. The new office space is designed to meet the needs of modern map-making, whilst leaving us plenty of flexibility for any further changes. The new building is one of the most energy efficient office buildings in the country and has been awarded BREEAM 2006 'Excellent'\* . It uses the very latest environmentally sustainable technologies to maximise natural resources and minimise carbon emissions. These include a ground source heat pump system that will heat and cool the building. The building also has the ability to harvest and reuse up to 100,000 litres of rainwater.

Today we are a 21st century digital information business and as a result of the many changes in technology over the past 40 years, our old building no longer met the needs of the organisation.

**It's now nearly nine months since Ordnance Survey entered the brave new world of Open Data. What signs have you seen of the innovation that this was expected to generate and are the benefits greater than the cost?**

Since the launch of OS OpenData in April 2010 we have been delighted with the volume of users to the online innovation platform. In addition to the 'traditional' users of GI, OS OpenData has allowed a new generation of developers to experiment and innovate.

As a result of OS OpenData we have seen a variety of maps and applications being developed and shared across the Internet.

These innovative uses of OS OpenData include Nottinghamshire County Council using OS OpenData to show its residents which routes have been gritted and a new start-up GIS for housing associations, recently launched by GGP Systems.

The longer-term economic benefits will take time to materialise. Our challenge is to find out about the uses of OS OpenData and to encourage people to use the service. We also wish to continue to enable developers to use OS data, create innovative applications and services for commercial and public good, as well as encourage collaboration via an online network.

**OS is - at last - seen to be taking an active interest in INSPIRE. How do you see the OS technical input to INSPIRE implementation in UK developing?**

Ordnance Survey has always taken an active role in INSPIRE, with three members of staff on the Inspire drafting team since 2005. Ordnance Survey is also an active member of the Location Council and the bodies working alongside it. Our key focus is working towards making OS Inspire-compliant. This is being coordinated by a dedicated Inspire delivery manager, Clare Hadley, working with Peter ter Haar, our director of products.

Our more recent involvement with technical input reflects our leading role in the future GI economy, and is the best way we can support the Location Strategy with our specific skills. In October we successfully released the beta version of the Metadata Editor, which over 60 people have signed up to use. We are currently working on publisher tools with data.gov.uk and upgrading our view services to ensure they are fully Inspire compliant. How our future input develops is dependent upon the Location Council and how they would like Ordnance Survey to be involved.

**Since you have been OS director general what do you see as your greatest success and what is your biggest disappointment?**

It is very difficult to choose my greatest success as there are a number of achievements of which I am proud. The launch of our flagship product family, OS MasterMap, in 2001 was a wonderful achievement. OS MasterMap is a continually updated and maintained database for the whole of Great Britain. It contains a variety of different product layers consisting of topography, roads, aerial imagery and addresses. It underpins a vast number of services across the country from waste collections, to gritting routes, utilities services and many more.

More recently I have been immensely proud to see the business settling into our new head office and realising a long-held dream to work within a modern, fit-for-purpose, flexible workspace. I think my biggest disappointment is that we did not realise that dream earlier.



*The coat of many Toids. While it may not rank among her major sartorial achievements, the launch and success of MasterMap certainly is.*

**... OS OpenData has allowed a new generation of developers to experiment and innovate. ”**

\* BREEAM is the Building Research Establishment Environmental Assessment Method and is the leading and most widely used method for assessing a building's environmental performance.

# High-resolution seabed mapping – an ever widening range of applications

by Duncan Mallace

Hydrographic survey techniques are now able to deliver very high levels of accuracy, explains Duncan Mallace of NetSurvey Ltd. The consequences are that a growing number of applications and clients can benefit from the same basic bathymetric data.

In this current age of austerity, if it is possible to collect the data once and for it to be useful for multiple purposes then it obviously saves money for all involved. NetSurvey have been involved in a number of projects where seabed mapping products have been derived for a number of different agencies from the same source data.

## Multiple products

High precision, high-resolution seabed mapping has many uses and continues to develop new markets. Traditionally the product from a hydrographic survey has been either a nautical chart or a rig / platform site survey. With improvements in echo-sounders, GPS, inertial systems and computer technology the data has increased in both density and accuracy. The advantages of this are the ability to visualise the data in more intuitive ways, both to analyse and understand the processes, but also to quality control and validate the data collected. The digital terrain models formed of the seabed can be merged with the land survey derived models to form a continuous model. By updating these surveys over time, accurate studies can be performed to calculate, for instance, the rate of erosion or the effect of coastal defences.

Benthic habitat scientists use high-

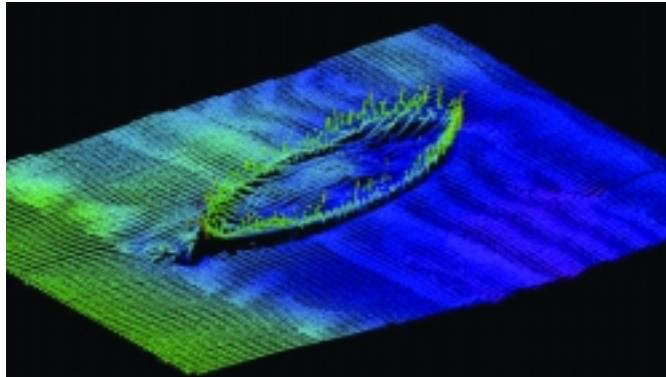
resolution seabed models to determine where different species live and they can further refine this to different ages within the same species. They also need to know the seabed type, which it is now possible to determine remotely. The applications for which the data is used are very diverse. They also cover many different government agencies and commercial companies. Rather than collecting small areas of the same seabed for different purposes, the different agencies are collating their resources to survey a larger area but then specify multiple products to cover all their different requirements. Commercial companies such as the utility and oil & gas industries now require more than one product to satisfy their construction, environmental and geo-hazard departments.

## Underwater point clouds

All of these surveys are now using Multibeam Bathymetric Echosounders (MBES) to collect bathymetric data. These systems measure a swath of data, collecting thousands of samples (soundings) per second, in a very similar manner to laser-scanning systems, except that where lasers use light the MBES systems use sound. Each of those samples contains two items, the time and angle from the transducer to the sample and the strength

of the returned or backscattered signal. The time and angle is then computed into a depth measurement for each sample by applying the position, heading and attitude of the transducer at the precise moment in time when the signal is received back at the transducer. Using the highest precision inertial systems (such as the Applanix POS MV) and the highest resolution MBES systems (such as the RESON Seabat 7125), post-processed accuracies of approximately 3cms in x, y and z can

*Below: a RESON Seabat 7125 MBES transducer.  
Below right: a wooden shipwreck on the seabed is revealed.*



be computed, approaching land survey accuracy and certainly accurate enough to measure exact seabed change or topography.

### Calibration

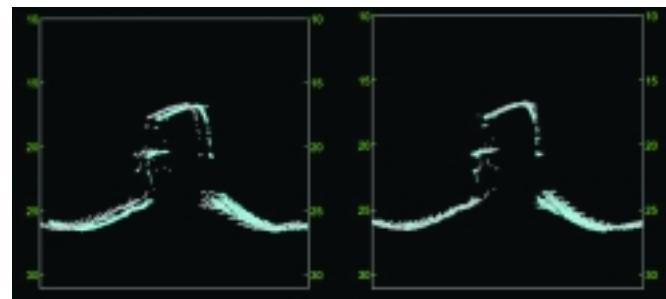
To achieve this level of accuracy the survey equipment needs to be calibrated correctly. Initially the related offsets between the inertial sensor, GPS receivers and multibeam transducers should be determined using land survey techniques. The next step is to perform what is known as a GAMS (GPS Azimuth Measurement Subsystem) calibration on the inertial sensor. GAMS uses two GPS antennas to provide accurate heading aiding for the inertial system. The GAMS calibration determines the relationship between the GPS receivers and the inertial unit. The calibration only takes a few minutes and involves taking the vessel through a series of 'figure of 8' turns in rapid succession. The real-time display shows the accuracy of the heading improving and informing the surveyor when the calibration is completed. It is also possible to perform the calibration during post processing, where the PPK GPS information can be used to further increase the accuracy of the GAMS calibration.

Once the position, heading and attitude is calibrated and seen to be performing well, the next step is to obtain the relationship/alignment between the inertial sensor and the multibeam transducer. This is known as the multibeam calibration or 'Patch Test'. The patch test determines three different offset values. The difference in alignment between the inertial sensor's and the multibeam transducer's roll axis ( athwartships), pitch axis (along-ships) and the difference in the heading of the two systems. This heading difference also needs to be applied in real-time to the data to stop any cross talk between the roll and the pitch axis.

### Analysing backscatter

Huge developments have occurred in the backscatter signal strength processing capabilities. It is now possible to discern the seabed data type from this signal strength. Knowing the type of seabed can aid fisheries habitat study, geological processes and the construction industry (wind farms, coastal engineering and oil & gas industries). Studies have shown that fish species live in different seabed habitats depending on their age. They choose their habitat based on the food supply and this depends on the seabed type. For example, adult scallops live in gravelly seabeds. Using the latest processing software the grain size, and therefore the type of seabed, can be determined from the backscatter value used in conjunction with the seabed topography. By creating maps of seabed type and relating that to habitat it will become possible to farm the sea as we farm the land. Focused fishing can preserve the juvenile species so as to avoid over fishing. It may also be possible to

*Pitch calibration ensures high levels of accuracy. Before, left. After, right.*



ascertain the 'strength' of the seabed, which is very useful information for pipeline engineers in the oil & gas industry.

Harnessing the capabilities of the equipment and technology has required phenomenal advances in the computer software and hardware used to acquire and process the data. Coastal surveys collect approximately 50 Gigabytes of data per day. Fast access to the data both via state-of-the-art hardware, multi-core processors and spatially indexed databases together allows the data to be processed in a timely fashion.

### Visualisation is key

3D visualisation (an example being the Fledermaus software suite) is key to the efficiency of the data processing, allowing the surveyor to intuitively and rapidly identify rogue points, wrecks, horizontal and vertical discrepancies and fundamentally to bring together all the different datasets to analyse, create and distribute the products. NetSurvey have also developed innovative techniques to create terrain models of quay walls and then to combine them with the seabed data to create unique and very powerful scenes for engineering analysis.

NetSurvey recently conducted a survey of the coastline around the Port of Dover. Six different organisations will analyse the data, each with their own specific requirements. The data will be used to update the nautical charts; be used as a baseline for coastal process monitoring; to monitor dredging progress; to determine quay wall condition; to identify and analyse chalk reefs and other seabed habitats; and finally for archaeological purposes.

### Above and below water

Seabed mapping has finally come of age to deliver to many new and different clients. The examples shown here were all collected from the same vessel on the same project but with differing final uses. NetSurvey has also started to use terrestrial laser scanners on the vessels, collecting this data simultaneously with the multibeam bathymetry. This is opening up even more markets as we can clearly discern the sea cliffs, survey a complete above and below water oil platform and survey rivers, their banks and their flood defences. Collecting all this data and imagery in one pass makes a hydrographic survey not only more in demand, but also much more useful.

*“...post processed accuracies of approximately 3cms in x, y and z can be computed...”*

### About the author

Duncan Mallace is the managing director of NetSurvey Ltd based in Banbury, UK. Duncan is a graduate of the University of Newcastle Upon Tyne with a BSc in Surveying Science.

NetSurvey offer advanced hydrographic survey services using multibeam and laser technology. From SOLAS charting surveys to marine habitat survey, port surveys including quay wall inspection to Offshore Energy pipeline, cable and site surveys.

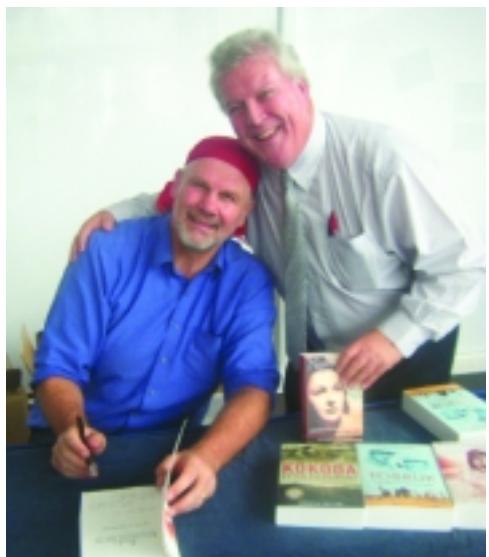
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Website: [www.netsurvey.co.uk](http://www.netsurvey.co.uk)



While the North floods, they've turned the burners up for Sydney, our correspondent reports. But the best news is a bumper crop of action-packed new year DVDs with would-be surveyors waving transits and gangsters bashing people with GPS receivers!

• 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.

**Below:** yours truly with former Wallabies star Peter Fitzsimons.



# Surveyors star in the latest DVDs

**T**alk about turn up the heat downunder! We have just had six days in a row where the temperature went higher than 30 degrees Celsius in Sydney for the first time in 150 years! One of the days went up to 41 degrees in Sydney and we cursed the day that Al Gore ever mentioned global warming.

## ANMM – Antarctic with Tim Bowden and Peter Fitzsimons

Ironically, before our Australia Day roasting we attended a fantastic lecture at the Australian National Maritime Museum by ABC celebrity **Tim Bowden** (whose brother Nick is a Tasmanian surveyor – well downunder!) on his many years in Antarctica, which could probably be called the chill before the warm? This desolate part of the world is still subject to loss of heritage and he highlighted the disappearance and preservation of some historically renowned sites such as Mawson's hut. Mawson was a card-carrying member of the Institution of Surveyors no less!

We also had Christmas lunch at the ANMM with **Peter Fitzsimons** (former front rower with the Wallabies) who has turned his hand to writing books, some of which have made the best-seller list. *Tobruk; Charles Kingsford Smith and Those Magnificent Men; Kokoda; Steve Waugh; Nancy Wake: A Biography of Our Greatest War Heroine;* are just samples of the many titles penned by this former Australian Rugby Union and radio star which have put him into the realms of the prolific authors of quality non-fiction works of the current era.

## Topp tour of Zig Zag railway

A Topp Tour Christmas Party would not be complete without a trip on the great Zig Zag railway at Clarence, which was the railway route over the Blue Mountains to the west of Sydney from 1869. The survey task by main Surveyor George Melrose and his team has long been heralded as a work of a measuring marvel achieved in an extreme topographic landscape of precipitousness and forestation.

## Remembering Big Mac

Governor Lachlan Macquarie's bicentennial of becoming the fifth governor of New South Wales on 1 January 1810, finally came to a close. During the last months of this epic celebration we attended fabulous lectures revealing many unknown details of his Aussie tenure. Professor Carol

Liston told us how Mr Smith resisted the might of Macquarie's acquisition policies when he held onto his thirty-acre farm right in the middle of what was destined to become the Government Domain of Parramatta. Author James Broadbent detailed the influence on the architecture of the time exerted by the wife of the Governor, Elizabeth Macquarie, while Robin Walsh highlighted the many important women who made notable contributions during the Macquarie years. All lectures were held at the Northcott Centre in Parramatta.

## Year opens with TV bonanza

This New Year has been like no other with the opening of the lid on a cornucopia of DVDs with surveyors in them not previously available for purchase. I have been able to grab episodes of the various legendary series Hogan's Heroes (1966), Green Acres (1968), Mission Impossible (1969), Death Valley Days (1950s and 60s), Married With Children (1994), Lonesome Dove – The Series, The Sopranos (2007) and Foyle's War (2010) all with truly exceptional footage of surveying in them. Colonel Hogan (aka Bob Crane), Peter Graves, Ronald Reagan and Vic Morrow all demonstrate their prowess with the surveying instrument in their respective programmes while it is scarcely believable that Danny Bonaduce from The Partridge Family plays the part of the expert in the sitcom Married With Children to comically resolve ownership of a disputed apple tree. Surveyor Renault gets shot in a gun siege in Lonesome Dove – the series is then buried by Newt with his transit atop the grave site pointing to the North while the survey team is heaved during the final episodes of Season 6 of the Mafia inspired US series The Sopranos where the foreman is bashed with the GPS receiver on its tripod! Absolute gold!

## Australia Day with Shrek!

Nothing beats going down to Parramatta Park on Australia Day to celebrate the founding of our nation even if it was 38 degrees in the shade. However nothing could prepare me for rubbing shoulders with that big green guy Shrek and his "gorgeous" girlfriend Princess Fiona, along with their intriguing off-sider Franky the Fairy! As you all know I do look forward to getting my photo taken with anything that makes my large melon appear just a wee bit smaller so the photo opportunity with the big green fellow could not be resisted.

• 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.



# GEO-11 previewed – top class venue with great facilities

## Lead Sponsors:



## Other Sponsors:



VISITORS are in for an exciting range of new products and services at this year's GEO Event. GEO-11 takes place **6 & 7 April** at the Holiday Inn London-Elstree. This is a four star hotel with first class facilities. Visitors can stay overnight for a very reasonable £88 incl VAT and breakfast. Call 0870 4431 271 and quote "GEO-11" but act now as rooms are going fast.

Lead sponsors this year include Faro, Opti-cal, Leica Geosystems, RICS, AGI and TSA. GEO-11 will also feature a full programme of seminars each day. For the latest schedule go to

<http://www.pvpubs.com/events.php> Attendance is free of charge but pre-registered visitors get fast-track entry, free refreshments and free trial subscriptions to *Geomatics World* and *GIS Professional* magazines.

There will be a Gala Dinner on the evening of 6 April sponsored by KOREC with pre-dinner drinks sponsored by Esri UK. The evening features a four-course dinner with wine and guest after-dinner speaker comedian

**Mark Dix**. Tickets are strictly limited to a maximum of 150 so act now if you're planning to come. Call 01438 352617 or go to [www.pvpubs.com/events.php](http://www.pvpubs.com/events.php) to download a booking form.

**The following companies have reserved stands at GEO-11 as we went to press but watch the website for the final list.**

### Stand 6 – 3D Laser Mapping Gold Sponsor

StreetMapper is now being offered on a fractional ownership basis providing affordable access to leading edge technology. With projected savings of more than 25% and without the upfront investment required for an outright purchase, the StreetMapper Fractional Ownership Plan is set to broaden the appeal of the world's most accurate mobile laser mapping system.

For potential customers there are significant savings compared to a commissioned survey service and reduced capital outlay and associated staff costs compared to full system purchase. Organisations can take advantage of the latest technology with expert support gaining high levels of asset utilisation at a much lower risk.

### Stand 19 – Applications in CADD

Applications in CADD Ltd (AiC) is one of the UK's leading suppliers of survey mapping, ground modelling and design software, with over 20 years of experience working in surveying, earthworks, quarrying, construction and the built environment.

AiC will be launching a standalone version of its survey and data capture software, called 4Site. Previously only available as an AutoCAD™ plug-in, 4Site uses a code table to convert your total station into a digitiser, processing data directly into DWG files for topographic surveying, setting out and checking as-built surveys.

Our n4ce software will also be on show at GEO-11, with new features – least squares network adjustment and 3D transformations for fabrication surveys.

### Stands 12 & 13 – CScope

Cscope are pleased to launch the new digital range of pipe and cable avoidance tools.

Unparalleled 'locate and identify' performance make C.SCOPE CXL, DXL and MXL locators the ideal choice for all utilities and their contractors (gas, water, electricity, telecom, drainage), local authorities, highways contractors – In fact, ANYONE who carries out any form of excavation work. With optional Bluetooth technology enabling details of ANY LOCATE to be uploaded automatically, storing time, location, and mode of operation onto a digital map for later analysis, safe work practices can be adopted, reducing cable strikes, through improved training.

### Stand 27 – Esri UK Gold Sponsor

Esri UK is the leading provider of geographic information system (GIS) technology, helping businesses become more profitable and public services more efficient through a better understanding and analysis of location-based information. Esri UK offers an extensive range of GIS technology and professional services and is the only company in the UK providing a complete and entirely integrated GIS solution.

Esri UK helps organisations to think and plan geographically in order to make better decisions, keep communities safe and create a more sustainable world. It's what we call Visionary Thinking. For more information, visit [www.esriuk.com](http://www.esriuk.com)

### Stand 8 – FARO UK Platinum Sponsor

FARO UK will show its brand new FARO Laser Scanner Focus3D. It is a revolutionary, high-performance 3D laser scanner for detailed measurement and documentation with intuitive touch-screen control that makes it as easy to operate as a digital camera. It is four times lighter and five times smaller than its predecessor and is the smallest and lightest laser scanner ever built. Thanks to its millimetre-accuracy and its 976,000 measurement points/second, the Focus3D offers the most efficient and precise method for measurement and 3D documentation of building construction, excavation volumes, façade and structural deformations, crime scenes, accident sites, product geometry, factories, process plants and more.

### Stand 20 – Higher Mapping Solutions / Routeware

Higher Mapping Solutions will be demonstrating RouteFinder, a plug-in routing application for MapInfo. The software will calculate shortest - fastest path, drive time, drive distance isochrones, drive matrices and nearest centre calculations. RouteFinder works with topological datasets such as the Ordnance Survey Integrated Transport Network (ITN) including the new urban footpath layer, Navteq and Teleatlas road data. We will also be showing an application for Special Needs Transport Management and School Bus Routing optimising software, which is based on RouteWare's FleetEngine. We also offer customised routing solutions



based on client requirements. Please come and see us for more details.

### Stand 2 – kubit /Latimer CAD Gold Sponsor

kubit and Latimer CAD return to World of Geomatics to present their solutions suite for surveying in AutoCAD and to highlight how the three main surveying methods may be combined in this platform:

**PhoToPlan:** the flexible system for capturing 2D and 3D metric information from photographs and scanned images.

**TheoLt:** the accessible software for real-time total station and distance meter surveying featuring toolsets for building survey, topographic, archaeological and control surveys.

**PointCloud:** the simplest route from laser scan to 2D or 3D AutoCAD drawings. Advanced fitting routines allow the creation of not only plans but also 3D pipework.

### Stands 14 & 15 – Leica Geosystems Platinum Sponsor

With close to 200 years of pioneering solutions to measure the world, Leica Geosystems' products and services are trusted by professionals worldwide to help them capture, analyse and present spatial information. GEO-11 show will see the launch of the brand new High Definition Surveying™ 3D Laser Scanner for high speed as-built and topographical surveying, offering exceptional speed and versatility.

*Also on stand 14 & 15 find out more about...*

**Leica Viva TPS** & GNSS Image Assisted Surveying

**Leica SmartNet** - the largest Network RTK in the UK

**myWorld** online customer portal for a wealth of information at your fingertips. We look forward to seeing you there!

### Stand 3 – MBS Survey Software Gold Sponsor

This year's GEO-11 provides MBS Survey Software with the opportunity to launch v.5.40 of our Floor plans software package. Advances in hardware available to run our software on have encouraged us to support our users who are keen to go down the tablet computer route. We have a selection of new features designed to improve workflow whilst using tablet computers. This includes 'Adding Room Names from a drop-down list', 'current hot-keys being pick buttons'. Other key features include the reduction of Ceiling Heights to Floor Levels and the ability to Add Symbols from other Symbols. Please come along to see us!

### Stand 17 – ONG-IT, CartoPac European Service Centre Gold Sponsor

CartoPac is a leading provider for advanced mobile field data collection solutions that integrate with a wide range of technologies including GPS, laser range finder, RFID, cameras and others. We increase field to office workflows efficiency by allowing field users to take a fully relational database model into the field and support them with customised forms. CartoPac manage many of the complexities found in traditional GIS and GPS applications behind the scenes to deliver faster and more productive solutions. By configuring customised forms based on the enterprise geo-database CartoPac solutions are time and cost effective resulting in a high ROI.

### Stand 1 – Opti-cal Survey Equipment Platinum Sponsor

Opti-cal Survey Equipment Ltd, an authorised Leica

Geosystems Distributor and Service Partner, sell, hire, repair, service and calibrate land survey and laser equipment, including Levels, Lasers, Pipe Lasers, Dual Grade Lasers, Total Stations, Theodolites, GPS Survey Equipment, Laser Distancemeters, Survey Accessories and Cable & Pipe Detectors.

### Stand 18 – Ormston Technology Gold Sponsor

As UK distributor for the Ashtech Professional range of GPS positioning and navigation equipment, Ormston Technology will present the newest generation of GNSS handheld mapping devices. The Mobile Mapper 100 uses the latest Windows Mobile operating system has built-in GSM/GPRS modem and Ashtech's powerful BLADE technology. We will also display the new ProMark 200, a cost-effective dual-frequency network RTK rover that includes Ashtech's rugged GNSS receiver running FAST Survey field software. Also on show on stand 18 at GEO11 we will have the field proven ProMark500, a true state of the art, future proof GNSS survey system.

### Stand 11 – Penmap.com Ltd

Penmap.com Ltd is proud to launch three new products during the GEO-11 event in April. With the STONEX S9 GNSS (Model 2011), Penmap will show the world's most intuitive GNSS system, tracking GPS+GLONASS+Galileo satellites using Trimble's latest GNSS technology. At an incredible price we can bring this technology to more users.

The new STONEX R9 Robotic Total Station will redefine robotic optical surveying and will make total station surveying more intuitive and productive. Both instruments are powered by the latest version of Penmap encore Mobile Geodata software, running on Windows Mobile PDAs and Windows 7 TabletPCs.

### Stand 21 – Pointools

Pointools will demonstrate the Pointools Suite – a high-value software bundle for working with point clouds – the billions of measurement points collected by 3D laser scanners. The Suite includes a portfolio of applications and plug-ins for streamlining the conversion, processing, and reuse of point cloud models, and eliminates the need for time-wasting translations while maintaining the visual quality and accuracy of the data. Pointools Suite includes Pointools POD Creator (to convert the broadest range of 3D laser scan formats), Pointools Edit (for selecting, editing, segmenting, and animating the largest point cloud models), and Pointools Plug-ins for Rhino, Google SketchUp, and Autodesk applications including AutoCAD, Civil 3D, Architecture, Map 3D and Land Desktop.

### Stand 26 – Positioning Resources Gold Sponsor

Positioning Resources provide field data capture solutions for many every day applications. At GEO-11 we will be demonstrating the latest products from Ashtech – the MobileMapper 100 and ProMark 100. MobileMapper 100 sets a new standard for mobile mapping accuracy, capable of delivering down to one centimetre accuracies even in extreme GNSS environments.

Equally impressive is the ProMark 100, which is one of the most versatile post-processing solutions on the market designed for easy and efficient land survey. These products will be complimented by a range of Mobile Computers, the TruPulse Laser Rangefinder devices and our versatile GIS/Mapping software solution PocketGIS.

**Stands 4&5 – Precision Geomatics Ltd Gold Sponsor**

Precision Geomatics Ltd are the sole importer into the UK of the SOKKIA range of survey and setting-out equipment and are proud to be launching at the GEO-11 exhibition the very latest SOKKIA SRX Robotic and the all new X range of total stations, together with the latest models of construction lasers.

We will also be showcasing the new SOKKIA GRX1 VRS GPS System; it is extremely easy to use and very cost effective.

Visit our stand and see SOKKIA world class instrumentation, details of our special offers, also the opportunity to enter our competition and win a mountain bike.

**Stand 20 – RouteWare –with Higher Mapping Solutions Gold Sponsor**

RouteWare will be launching its new FleetEngine application. It's an advanced optimiser for solving complex vehicle routing problems, ranging from sales force planning to school bus routing and waste collection. It comes with multiple API's (webservice, COM, desktop) making it easy to integrate it with other applications or just use it for ad-hoc runs. Features include: capacities, time windows, curb side handling, detailed street network set-up, built-in distance matrix calculation and definition of multiple vehicles. We will also have our usual suite of products on hand for demonstration. Please visit our stand for more information.

**Stand 28 – South Survey**

Launching a range of survey packages: Gstar CAD software, the affordable CAD alternative & Field Genius software allowing sites and buildings to be measured and logged quickly and accurately.

Survey Marker plates for fixed datum points on site, creating useful benchmarks for everybody to work to, for quality assurance.

Our range has been developed by a number of surveyors, with years of on-site experience, bringing you a range of the best equipment from many sources including precision optical and laser plumbets.

For more details, visit us at GEO-11 stand 28, call us on 01200 429870 or visit our website

[www.southsurvey.co.uk](http://www.southsurvey.co.uk)

**Stand 29 – Spheron-VR**

On display will be Spheron's latest HDR (high dynamic range) – photogrammetric camera systems. Also on display will be Spheron's SceneWorks business division's

technology – a solution for onsite visual scene documentation, which allows the integration of HDR spherical images into a comprehensive visual database. SceneWorks have tailored solutions for security, critical infrastructure and industrial industries such as plant, construction and other facility management applications. Such documentation allows virtual access to a scene or site from anywhere at any time. GEO-11 will also be the first UK public showing of our latest SceneWorks software solution (version 1.3).

Spheron is arranging presentations from some of its customers to show how they have successfully utilised this camera technology on various projects.

**Stand tbc – The Survey Association (TSA)**

The Survey Association (TSA) is the trade body representing the UK's surveying fraternity. Formed in 1979, the membership stands at over one hundred and thirty member companies from a variety of disciplines. In addition to commercial surveying companies and manufacturers, Ordnance Survey and English Heritage are also in membership as are two of the country's senior universities. TSA is run by an elected council and a full-time Secretariat based in Newark on Trent. TSA liaises regularly with leading industry bodies such as RICS, ICES, CECA, UKCG to name but a few. More information and free downloadable technical guidance notes and documents are available on the website at: [www.tsa-uk.org.uk](http://www.tsa-uk.org.uk)

**Stand 16 – Z+F UK Gold Sponsor**

Experience the latest software and hardware innovations from Z+F designed to improve productivity.

**Hardware** – Learn more about the latest solutions from Z+F including the new Z+F IMAGER® 5010, the only completely eye-safe, high-speed phase-based laser scanner in the world. The 5010 can scan up to 187m whilst still providing extremely high quality data with a very low range noise.

**Software** – Attend the booth to see the latest software developments, including LFM Server™ 4.0 for managing huge datasets comfortably, and LFM Netview™ 2.0 for sharing laser data over the Internet.

LFM is hardware and CAD vendor neutral; this means that LFM accepts 3D laser scan data from any scanner and can interface seamlessly with any CAD package.

*Other exhibitors include the Association for Geographic Information and the Royal Institution of Chartered Surveyors.*



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Just how many countries are there in the world? Our columnist has ticked off a few in his time but which ones are on the "must visit" list? One ancient fluvial place should be high on the list with its long tradition of height measurement and land records.

**Below:** a walk-in measuring device – Looking down the cylindrical well, and right, the entrance to the flight of stairs, at the Kom Ombo temple's nilometer.



**W**hen I visited Egypt and Jordan last year, they became the 46th and 47th countries I have lived in or travelled through. Of course, the number depends on what counts as a country. And therein lies the rub! Just how many countries are there in the world, and what are the listing criteria?

My research turned up 192, 193, 194, 195, 196, 203, 249 & 257 – quite a range. The last two can be explained away by the inclusion of what are considered dependent areas and disputed territories. Differences in the lower numbers depend on whether Vatican City, Kosovo, Taiwan, Palestine, Puerto Rico, and Greenland are included. As of May 1, 2008, the UN had 192 members, which included the two newest nations of Montenegro and Serbia, but not the Vatican and Kosovo.

So, where does that leave us? Well, it appears that 193 or 194 are the most likely answers. As I write this, the Sudanese have overwhelmingly voted in favour of splitting their strife-torn country, and if all goes well (hard to believe!) they should be two countries by July. Will they become North and South Sudan, or choose different names? And will there be more splits before the decade is over? Perhaps 48 US states and the two new countries of Texas and California? I've even seen rumblings of "Cascadia" (named for the Cascade mountain range), an amalgam of Oregon, Washington and British Columbia, who feel they're far removed from their seats of government.

#### Talking Rubbish Again!

'Vedi Napoli e poi muori', or translated, 'see Naples and die'. It means that before you die you must experience the beauty and magnificence of Naples. Some argue that it's such a dangerous and chaotic city it will kill you anyway! Last there at the tender age of



# The Past... or Past it?

By Nick Day

13, it seemed pleasant enough to me. Although lengthy strikes by garbage workers, years later, causing mountains of stinking rubbish for weeks on end, might have changed my mind. The phrase, found in the book *Italian Journey* (1786), was supposedly coined during the reign of the Bourbons of Naples, considered the city's Golden Age. Until its annexation to the Kingdom of Italy in 1861, the Kingdom of the Two Sicilies was the wealthiest and most industrialized of the various Italian states. Naples was the third most populous city of Europe (after London and Paris), and one of the most opulent.

Now where am I going with this serendipitous and tangential thought? Well, a couple or so years ago, I attended a very interesting lecture at the RGS on the Zabbaleen, a minority religious community of about 60,000 plus Coptic Christians who have served as Cairo's informal garbage collectors for the past 70 or so years. The Zabbaleen, meaning "garbage people" in Egyptian Arabic, support themselves by collecting trash door-to-door from Cairo residents. They recycle up to 80% of the waste they collect, a feat unmatched by Western garbage collecting companies that manage only about 25%. Using donkey-pulled carts and small trucks, the men pick up and transport the garbage to their homes in Moqattam Village, where nimble fingered women sort it, then either sell to middlemen or create new materials from their recycling.

And, so it came to pass last year that I was lent a well-known travel book of biblical proportions by a well-meaning friend of similar proportions — *1000 Places to See Before You Die*. Well, "I don't need no stinkin' lousy book" (spoken in a true Chicago mafioso mobster accent – the type who now seem to run waste operations) to suggest where to spend my final days on earth. After a peremptory perusal, it acquired the status of doorstop. Even visiting five places a year – a stretch at best – would take 200 years, and I just don't have that kind of time. Although, as many friends are getting replacement knees, hips, shoulders, hearts, livers, kidneys, etc, I suppose it's possible that hi-tech advances may allow me to acquire a new brain and last beyond the "past due" date. However, I'm not holding my breath, and have made my own short "bucket list."

#### Go East Young Man!

So, where else to start but the birthplace of land surveying and cadastre? Egypt. From time

immemorial, the Nile would flood each year, sending torrents of water down to its delta at the Mediterranean Sea. The good news was that the water brought tons of fertile silt along with it that spread across the farmlands adjacent to the Nile. The bad news was that it obliterated evidence of property boundaries and land ownership. Something had to be done, especially as the rulers derived revenues from the land and had to know whom to tax. Enter the world's second oldest profession – surveying.

The Nile has two major tributaries, the White Nile and Blue Nile. Although shorter, the latter is the source of most of the water and fertile soil. The White Nile rises in the Great Lakes region of central Africa, with the most distant source in southern Rwanda, and flows north through Tanzania, Lake Victoria, Uganda and southern Sudan. The Blue Nile starts at Lake Tana and flows into Sudan from the southeast, with the confluence near its capital, Khartoum. The northern section of the Nile flows almost entirely through desert from Sudan into Egypt. Most of Egypt's population and cities lie along those parts of the Nile Valley north of Aswan, and nearly all the cultural and historical sites of Ancient Egypt are found along riverbanks. While most Egyptians still live in the Nile Valley, the 1970 completion of the Aswan High Dam ended the summer floods and their renewal of the fertile soil, fundamentally changing farming practices.

My trip started in Cairo ("Al-Qahira" in Arabic – "The Conqueror"), whose population exceeds 19 million and a metropolitan area over 33,000 square miles that sprawls to almost the foot of the pyramids. Tourism is Egypt's second largest source of revenue after the Suez Canal, which I passed under later during a somewhat tortuous 17-hour overnight bus ride from Luxor, across the barren Sinai Desert, to Dahab on the Gulf of Aqaba.

After visiting the various pyramids of Saqqara and Giza, and the Sphinx, a 13-hour overnight train took me along the luxuriant Nile Valley up to Aswan. Although extensive and functional, the High Dam could hardly be described as interesting from a visual or engineering perspective, certainly not in the same league as say Hoover Dam. Two-days and two nights of sailing on a picturesque felucca – an amazing experience, which included meeting with a Nubian family – then took me from Aswan to Luxor and full immersion into ancient history.

### **Surveying and the Nilometer**

Surveying has been an essential element in the development of the human environment since the beginning of recorded history (about 5,000 years ago), and is thought to have started in Egypt and Babylonia. When the Nile overflowed its banks and washed out farm boundaries, they were re-established by a surveyor, or "rope-stretcher", through simple geometry. The nearly perfectly square

dimensions, and north-south orientation, of the Great Pyramid of Giza (c. 2700 BC) shows the Egyptians knew a thing or two about surveying. And, they even had a land register as far back as 3000 BC.

Nilometer was the name given to one of several devices that measured water levels in the Nile, and allowed the keeping of comparative historic records. Records from Pharaonic times show that one out of every five years saw an inundation that was either too much or too little. The ability to predict the volume of the coming inundation was part of the mystique of the Ancient Egyptian priesthood. It also played a political and administrative role, since the quality of the year's flood was used to determine the levels of tax to be paid by the peasantry to their rulers. The Pharaohs delegated the task of collecting taxes to the temple's High Priest, who monitored the day-to-day level of the river and announced the arrival of the summer flood.

I found one of the best preserved examples at Kom Ombo Temple, more accurately known as the Temple of Sobek (crocodile god) and Haroeris (falcon-headed god) – a magnificent edifice on the banks of the Nile, between Edfu and Aswan, that dates from Ptolemaic times (180 BC). Today, Kom Ombo is home to many Nubians, displaced from their ancestral homes by the rise of Lake Nasser. Apart from tourism, sugar cane, harvested on the river banks and felucca-building yards are the main industries.

The simplest nilometer design is a vertical column submerged in the waters of the river, with marked intervals indicating the depth of the water. Another comprises a flight of stairs leading down into the water, with depth markings along the walls. The graduated scale on the walls was certified by inscriptions in demotic script – Greek, Arabic and French. The most elaborate design involved a channel or culvert that led from the riverbank, often quite a distance, to a well, tank, or cistern. Nilometer wells were usually located within the confines of temples, where only priests and rulers were allowed access. Kom Ombo contains such a design, with a deep, cylindrical well and culvert opening in the surrounding wall. While nilometers originated in Pharaonic times, they continued to be used by later civilizations, but were finally rendered obsolete by the Aswan High Dam.

So, who or what will be rendered obsolete next? You, me, or dictators who have been in power for too long? Revolution and change are upon us all!

Next stop, Jordan – floating in the Dead Sea, overlooking the Holy Land from Mt Nebo (as Moses did), spending the night in a Bedouin tent in the spectacular red-rock wilderness of Wadi Rum (home to the Seven Pillars of Wisdom), and the spectacular complex of Petra.



**Above:** Hieroglyphics at Kom Ombo showing the decimal system of numerals used by the Ancient Egyptians, who also devised a 365 day calendar.

### **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*

# Mobile Scanning on Test in Denmark

by Alan Barrow



Figure 3 (Left):  
A typical marker

Last year we published an article by **Alan Barrow** on how his company had developed a kinematic scanning system for highway mapping. Alan now updates that article with some impressive test results.

In September last year ABA Surveying took their mobile scanning rig to Denmark at the invitation of COWI, the Danish international consulting engineers. Among several projects to be carried out during the week was survey of a section of expressway at Odense that was to be used as a test area by the Directorate of Highways in Denmark.

This test area is a 5km section of motorway with two lanes and a hard shoulder in each direction. Along each hard shoulder at 100-metre intervals a series of survey markers had been established and pre-marked with a white thermoplastic square approximately 400mm × 400mm. Each survey marker consisted of a raised dome-headed nail set at the centre of the square, which had been coordinated and levelled to National Grid and Datum.

In the layout (figure 1) it can be seen that there is a grade separated roundabout almost in the centre of the test section. This was where it was decided to locate a GNSS base receiver, after finding a secluded location that was also open to the sky.

### Spanning three grid zones

The system computes in real time and for QA the area of scanning is normally monitored against the national mapping in digital format. To do this we needed to set the parameters of the National Mapping Projection and the Geoid model to be used. Denmark utilises three mapping zones with different parameters for each and, of course, ABA found themselves working in all three zones, so that the versatility of the software was also tested.

The scanning was to be undertaken after

eleven o'clock in the morning during the full flow of normal traffic. An impact protection vehicle had been arranged and was stationed a discreet distance behind the van so that a rolling lane closure could effectively be

established. 'We were advised that because of wind resistance when the direction arrow on the protection vehicle was erected, it would not be able to travel at more than 50kph', explains ABA's Alan Barrow. 'This meant that the second run in the fast lane that we had planned to do at 80kph would have to be done at 50kph instead.'

### Picking up the control

The first run in each direction would be along the hard shoulder and it was planned to do this at 30 kph. The reason for this slow run was to ensure that there was sufficient definition in the point cloud to be able to accurately take off the survey marker positions. Figure 4 shows that the position of the pre-mark could be determined easily by mapping the intensity value of points reflecting off the pre-mark to blue.

The total field time was one hour and a quarter, during which time both carriageways were scanned along the hard shoulder and along the fast lane. 'We also travelled the section again a third time to capture the on and off ramps and the elevated roundabout,' adds Alan. 'When the work was finished we commandeered the local fire station, or rather their car park, and carried out a calibration procedure. This only takes about ten minutes and is an indispensable part of the quality assurance for our clients.'

### Point cloud processing

Back in the office all the resulting point clouds were loaded into Cyclone software, this being ABA's software of choice for processing large point cloud datasets. A template was set up to approximate to the shape of the pre-mark and it was then an exercise in Cyclone to "best mean fit" the template to each pre-mark in the point cloud. The unique scan pattern showed itself to advantage here with at least two points showing clearly the edge extents of the pre-mark.

For the determination of the height values, all points falling within the pre-mark template (a few hundred points) were exported and the average taken. The coordinates and elevations for some 100 plus pre-marks were thus tabulated in a spreadsheet for comparison with the control values.

ABA were asked to produce two sets of

Figure 1 (below): The test area at Odense

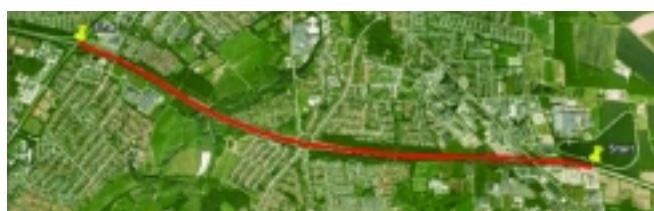
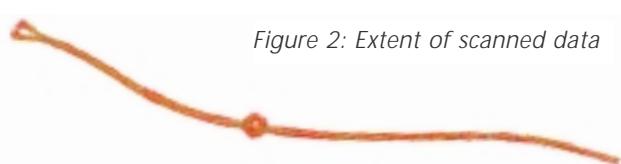


Figure 2: Extent of scanned data



residuals. The first set were called the unconstrained set and were simply the differences in x, y and z for values deduced by GNSS against the control values. The second test was to constrain the point cloud onto every other pre-mark and then deduce the elevation values for the pre-marks in between. This is analogous to photogrammetry where the exterior orientation of the model is to set it down onto ground control points. Figure 5 shows part of the spreadsheet showing the unconstrained and the constrained results. The full spreadsheet is available electronically on request.

### 3mm accuracy is achievable

The headline rmse figures for unconstrained results were:

$$x = 11\text{mm}, y = 11\text{mm} \text{ and } z = 7\text{mm}$$

When the point cloud was constrained to alternate pre-marks the rmse of the elevation values for the other pre-marks came down to 3mm. In this way the test was able to show both the absolute error and the relative error of points in the point cloud.

These results demonstrate that, with the right combination of hardware and software,

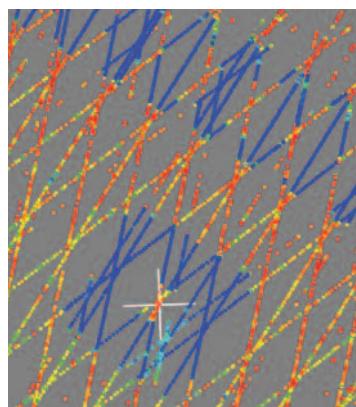


Fig. 4 (above left): Identifying the extents of the marker from intensity value of return signals. Fig. 5 (above right): Part of the spreadsheet showing unconstrained and constrained results.

it is possible to use mobile laser scanning to achieve accuracies that will satisfy the most demanding engineering design. Surveying highway corridors to engineering accuracy is now faster, safer, more accurate, more complete and achieved at much less cost and disruption than ever before.

ABA's Alan Barrow adds, 'Our conclusion from the test results is that our system now works at the accuracy limit of the GNSS and it will not be until we have Galileo or some other system additionally operational that any further accuracy improvement will be possible.'

- For more on ABA's technology turn to Geomatics World Jan/Feb 2010, "A breakthrough for mobile scanning". See also, contact: [alan@ABAsurveying.co.uk](mailto:alan@ABAsurveying.co.uk)

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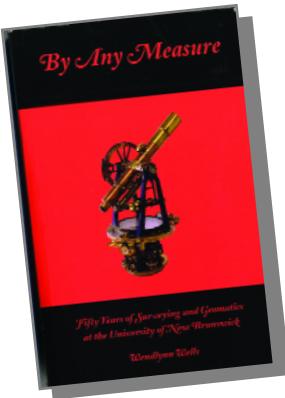


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## By Any Measure – Fifty Years of Surveying and Geomatics at the University of New Brunswick



By Wendlynn Wells

University of New Brunswick,  
272pp, p/back, CAN\$36.75  
Order from:  
<http://gge.unb.ca/50/Book/OrderForm.pdf>  
ISBN 1-55131-143-7

In the fifty years of its existence, the Department of Geodesy and Geomatics Engineering (GGE) has certainly made its mark on our profession. Its reach has truly been global, with over 1414 students from 58 countries graduating in the degree, diploma and certificate programmes.

Produced by a member of the department of thirty-eight years standing, it is packed with material. Wendlynn Wells is herself a history graduate who

**an unusual study that relies heavily on local published material and recollections**

chose to present the book in an unusual way. Rather than writing from scratch from source material, she has compiled articles about the department's activities, largely from the local Fredericton newspaper, The Daily Gleaner, UNB Perspectives (UNB's internal magazine) and Canadian Surveyor. This approach will I think attract those who like dipping into the text at the points that most interest them. If I have one criticism, it is that The Daily Gleaner assumes little surveying knowledge, and so the articles tend to cover ground with which surveyors are familiar. Newspaper articles also have to stand on their own, so there is inevitably some repetition.

Of course, in the early days GGE did not catch the eye of the Gleaner and so contributions to the first chapter are from the author with reminiscences from others who were involved at the time but in many cases written years later. Professor Gottfried Konecny joined the Department of Civil Engineering as the surveying lecturer in 1959 and is the father of surveying engineering at UNB. By the time of his departure in 1971, the subject was a department in its own right with eight permanent staff and 119 students. The department changed its name in 1994. These early articles contain many names which will be fine for those in the know but is quite difficult for an

outsider to assimilate.

The book is organised into chapters by decade. For the reasons mentioned, I found the chapter on the 1960s quite heavy going but on picking up the book a few days later and entering the 1970s, more articles come from the newspaper sources written at the time. The style is different and one does experience something of the excitement of the moment. There are interesting nuggets. For example in 1964, Adam Chrzanowski arrived in Fredericton bringing with him "Cracovian Calculus"; a Polish invention that predated the use of matrices by surveyors by thirty years. In 1982, Dr Richard Langley noticed that there was a strong correlation between variations in the Earth's rotation and fluctuations in the world's atmosphere and jet streams. The first I heard of this interesting connection and it would be interesting to know if it was ever followed up.

It is probably fair to say that The Ocean Management Group (OMG) is the jewel in GGE's crown and its development is well charted throughout the book. I had no idea that so much of the software used for processing multibeam data originated in this corner of Canada, but when you consider that the country has 250,000 km of coastline, perhaps the interest on hydrography should not be surprising. The development of

the group is also a prime example of what can be achieved when government, the private sector and universities work together. As well as the serious stuff, the OMG was involved in a search for the Loch Ness Monster in 1992. Flying across the resulting model, The Daily Gleaner reports that there was a 'stalagmite' projecting up from the bed of the loch. Could this have been the elusive Nessie?

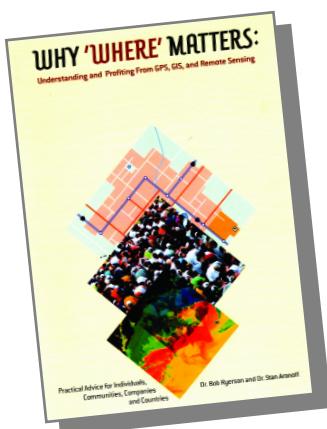
The history is illustrated with many photographs that are positioned in a strip along the foot of each page. This makes them quite small. The exception is a large photo of CASSIOPE, a research satellite due for launch in 2011 which will be used to study 'space weather'. The effect on GNSS of ionospheric disturbance in arctic regions is a major area of research for GGE.

The final chapter includes reflections on the past, what's current and a look at tomorrow. It is a collection of contributions from present and former members of the faculty. In some of these the ego level is a little overwhelming. This is followed by details of the surveying curriculum as it has developed over the five decades.

I enjoyed the read but wonder if a price tag of £23 might be off-putting for all but those who have associations with UNB.

Reviewer: Richard Groom

## Why "Where" Matters



**a wonderful resource with many practical examples that are driving the geo economy, but with some hard-hitting criticisms for Brits and Ordnance Survey**

By Dr Bob Ryerson and Dr Stan Aronoff  
Published by Kim Geomatics Corporation 2010 ISBN 978-0-9866376-0-5

The book is subtitled "Understanding and Profiting from GPS, GIS and Remote Sensing" and aims to offer "Practical advice for individuals, communities, companies and countries". Clearly the authors are not short of ambition! Over nearly 400 pages it is a tour de force of geospatial

technology, applications and policies with a wealth of references and a good index.

Dr Ryerson is the president and owner of Kim Geomatics Corporation (based in Ontario, Canada and also the publishers) and was also director general of the Canada Centre for Remote Sensing for three years. Dr Aronoff is a senior associate of the same consulting company.

The world is apparently at the beginning of a new economic era - the GeoEconomy. The authors

believe that some governments, companies and organisations 'get it' and may therefore prosper; whereas those that don't will fail. However, in the first chapter - "GeoSpatial Knowledge" - there is enough history (and some good examples) to show that all civilisations have required geographical information to expand and survive. There is then - without apparent logic - an attack on the Ordnance Survey's pricing policy as compared to that of the US Geological Survey.

For Brits there is a key quote "In our opinion the quasi-public Ordnance Survey's competition with the private sector explains why the UK, a nation that was once the world's leader in mapping, has declined to a position of importing almost all of their mapping technology and even much of their base data. By contrast the USGS policy of not competing with industry and providing low cost high quality geospatial data has made it a trusted data source widely used by Americans and the world." Wow! Discuss - or dispute?

The conclusion of the second section hammers at the same policy theme - with many valid arguments and with the benefit of the authors' experience of worldwide cost benefit studies. Arguably the tide has turned on "cost recovery" policies in the UK and some other jurisdictions with the advent of INSPIRE for the EU; the Public Service Mapping Agreement in England & Wales; OS OpenData in Great Britain; and, not least, the intervention of Sir Tim Berners Lee and co in the more general open government debate.

Section 3 "NOW!", covers the technologies that are driving the

geo-economy and which policies are helping or hindering. It is an eclectic mix of descriptions of geospatial and related technologies; an explanation of the datasets thereby created; the policies being applied; and the overwhelming need for these datasets in many applications.

Sections 4 and 5 cover the "convergence and societal" impacts of GI in the present and the future. We are all experiencing the convergence of technologies and datasets - just look at your latest mobile phone and its multi functionality. As I write we are told that a standard mobile phone is to be trialled as an on-board controller for a complete remote sensing satellite! But are we able to keep up with the technology and ensure that appropriate, effective and efficient use is made of geospatial data in our daily business? Clearly not, judging by some of the examples quoted. Why? Information or decision making overloads are factors; so is deliberate blindness on the part of decision makers. A company director might argue that ignorance is a better defence than trying to withhold unflattering information about land or

property. Politicians are renowned for not wanting to be confused with the facts! The book has several specific examples in the text and references.

One of the authors observes that there was at one point a negative correlation between the health of the economy and the use of satellite imagery. Has this been repeated in the last few years? Is the opening up of government data an example in practice?

The penultimate chapter is entitled "Gaining the Geo-Advantage". Anyone in the industry will recognise most of the examples quoted - whether in theory or in practice. One intriguing example concerns our own careers! The authors have identified 25 cities across the world that are clusters of geospatial expertise and are "poised to reap the rewards of the GeoEconomy". This research is based on over forty factors including existing business, research capability and government policy. One suspects the list will soon be outdated with the rapid advances of China and India. For those of us in the UK the future is bleak - no clusters at all. But we have a right to work in

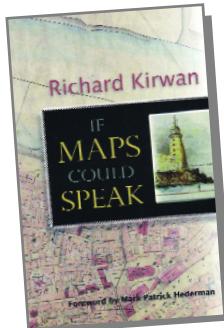
Enschede, Wageningen, Munich, or Montpellier. And, if you have enough points on the immigration ladder, head for Melbourne or Perth!

The book concludes, naturally, that the use of appropriate geospatial information is beneficial to individuals, companies and governments: "If we leave one message, it is that very often one can see that the reasons for the successes - and the failures - in everything from our environmental protection to our economic decisions, are directly tied to how well we use geospatial or geographic information. ... those who 'get it'... do well. Those who do not depend on 'geo-luck'.

This book is a wonderful resource for anyone looking for examples of technologies, applications and policies in the geospatial arena - almost any page will provide a pithy quote or a great example of the use of GI. It might even help convince your boss that you are worth your salary whatever the state of the geo-economy! It certainly achieves its aims.

*Reviewer: Robin Waters*

## If Maps Could Speak



By Richard Kirwan  
Published by Londubh Books,  
Dublin €4.99/£12.99

This is an extremely well written and vivid account by the author of his life from childhood to leadership of Ireland's mapping agency, Ordnance Survey Ireland; all set against a backdrop of Ireland's history and culture. Dick Kirwan offers fascinating insight into his childhood in Waterford where a map of the district first sparked his interest. Once begun

## a well written and enlightening memoir that stands out from the rest

on his career with Ordnance Survey, he sets his surveying travels around the country against the extraordinary history of Ireland as well as the characters he worked with and encountered on the road. In my own experience Ireland remains one of those places where you can meet people with time to chat and wonder upon the world. Kirwan captures this well with tales of questions asked on the best path to a summit only to get a commentary on the habits and beauty of the swallows in the hedgerow nearby.

Many readers may not realise that Ireland was the first country in the world to be fully mapped at large scale (6 inches to the mile) by the then British Ordnance Survey's sappers under Thomas Colby. Kirwan reflects on the struggles the English soldiers had in naming places as the locals either mispronounced place names, used various different

forms or deliberately misled them. This ubiquitous problem of mapping is amusingly dealt with in Irish writer Brian Friel's play, Translations. He explains how they eventually had to employ Irish language scholars to guide them; all of this before the terrible famine that engulfed the country and probably did more than anything else to set the Irish on a determined path for independence.

When Kirwan joined Ordnance Survey Ireland in the early 1970s it was indeed a backwater amongst mapping agencies. All employees, apart from the director general's secretary, came from the military and the mapping was struggling to keep up with new roads and estates as the economy began to burgeon. To meet the need for up-to-date mapping Kirwan and his predecessor took the bold decision in the early 1980s to opt for aerial photography and computerised mapping. The latter an expensive

process at that time. Despite many trials and challenges, visits to far-flung parts of the globe to visit suppliers, the move paid off with Ireland being a world leader in this type of mapping and Kirwan in demand worldwide as a consultant since his retirement in 2006.

Over the years I have read many biographical accounts by those in mapping and surveying but none stand out like this one. It really is an enlightening memoir that invites the reader to carry on turning the page to the end. The author gives a candid account too of the vice too many in his position succumb too: overwork. His personal story, its effect on his family and the path it eventually took him is revelatory. Wisely, Kirwan undertook a writing course before he began the work. I think he should try his hand at a novel next.

*Reviewer: Stephen Booth*



**A 3D point cloud model in Pointools of a Ford motor car plant in the USA. The point cloud is comprised of approximately 4.5 billion points and was captured by a FARO Photon 120 scanner.**

A new software bundle for working with point clouds gives users a portfolio of applications and plugs-ins designed to streamline the conversion, processing and reuse of point cloud models. Pointools Suite includes the company's POD Creator (to convert a range of 3D laser-scan formats to the company's native POD model format); Edit (for selecting, editing, segmenting and animating the largest point cloud models); and plug-ins for Rhino, Google SketchUp and AutoCAD, Civil 3D, Architecture, Map 3D and Land Desktop. The suite is available now for £3,250 (€3,950 / US\$ 5,250). Pointools will be exhibiting at GEO-11 on 6 & 7 April (see pages 27- 29).

# SURVEY REVIEW

**Survey Review** is a leading and prestigious journal published quarterly by Maney Publishing on behalf of Survey Review Ltd. The journal brings together an unrivalled body of knowledge in the land and engineering survey profession, with papers on research, theory, practice and management. All papers are refereed and drawn from world-wide sources; government, private industry and academia. The journal is invaluable to practitioners, academics, researchers and students alike anxious to maintain the currency of their knowledge in a rapidly developing field.

Further information and abstracts of recent issues can be found at [www.surveypreview.org](http://www.surveypreview.org). Orders and specimen copy requests should be sent to: Subscriptions Department, Maney Publishing, Suite 1C, Joseph's Well, Hanover Walk, LEEDS, LS3 1AB, United Kingdom. Email: [subscriptions@maney.co.uk](mailto:subscriptions@maney.co.uk)

#### April 2011 Contents:

- Accuracy of 3D models derived from aerial laser scanning and aerial ortho-imagery
- Tslihqt'in Nation v. British Columbia
- A regression study on relative GPS accuracy for different variables
- Deformation measurement of a structure with calculation of intermediate load phases
- Accuracy of GPS positioning in the presence of large height differences
- Evaluating the repeatability of RTK GPS
- Inverse eigenvalue problem applied to weight optimisation in a geodetic network
- Orthorectification of Quickbird ortho-ready imagery: A case study over mountainous terrain

## Augmented GPS

With its GPS Augmentation Network, Leica aims to ensure 24/7 positioning coverage in adverse GPS situations for fleet application. The terrestrial network incorporates positioning technology developed by Locata Corporation in Australia, to fill holes in coverage. The LocataLite transceivers create a positioning network called a LocataNet that can operate in combination with, or independent of, GPS. Using this technology, the Leica Jigsaw360 fleet management system can replicate the GPS satellite constellation from the ground, enabling a level of control that is not always possible from the satellite GPS network. Leica will be exhibiting at GEO-11 on 6 & 7 April (see pages 27- 29).



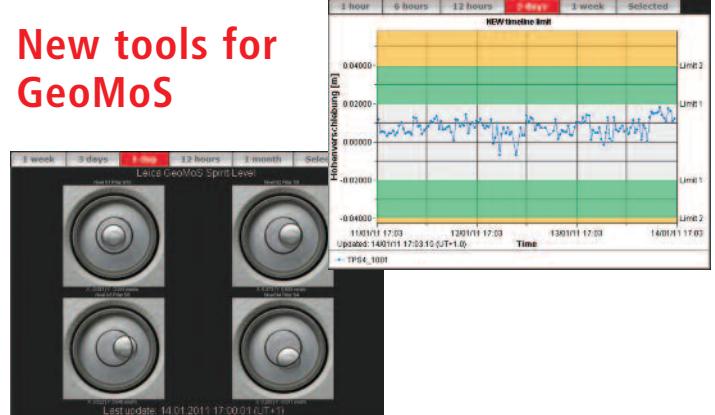
Trimble's new GeoExplorer 6000.

technology to increase the availability of positions and boost accuracy in areas affected by satellite shadow. The series' GeoXH handheld comes standard with the floodlight technology and achieves decimetre accuracy in real-time. The GeoXT version provides 75cm accuracy in real-time and 50cm accuracy after post-processing; the floodlight technology is also available as an option. The hand-holds also include: a dual-frequency GPS and Glonass receiver and antenna; five mega-pixel camera; built-in Wi-Fi and 3.5G data modem; and are supported by the company's mapping and GIS software.

## Floodlight against satellite shadow

The GeoExplorer 6000 series of hand-held computers for field workers delivers improved GNSS positioning for data collection in difficult environments, such as urban canyons and under tree canopy. The GNSS hand-holds from Trimble use "Floodlight" satellite shadow reduction

## New tools for GeoMoS



The Leica GeoMoS Web v2.0 service for visualisation and analysis of monitoring data includes an automatic reporting tool to create monitoring reports. The templates can be managed within the online service so reports can be created according to customer needs. Within the SaaS (software as a service) on-demand service, additional features include: manually remove outliers to exclude them from data processing; tolerance limits can be displayed in the timeline graph; a smoothing functionality, allowing the graph of the available data to be smoothed based on a median filter; and the circular levels of connected inclination sensors can be displayed as a new graph.

## SceneCenter 1.3

The SceneWorks division of Spheron-VR has launched version 1.3 of its SceneCenter Forensic and SceneCenter Framework visual content management software. New features include: the ability to produce customised video screen recordings; improved 3D measurement description controls; ability to track the workflow and activity of individual users by monitored tracking history; can all now be documented in published reports. SceneCenter is available in standalone mode or can be client/server-based, allowing real-time updates over a secure internet connection. Spheron-VR will be exhibiting at GEO-11 on 6 & 7 April (see pages 27- 29).

## New data collectors

Spectra Precision, a Trimble company, has introduced additions to the Ranger and Nomad data collector series that operate with its Survey Pro field software. The three Ranger 3 models, 3L, 3XC and 3RC, come with an 800 MHz processor, 256 Mb of memory, a full VGA display, integrated Bluetooth, GPS, compass and Wi-Fi. Optional features depending on the model include: a 3G GSM/GPRS/EDGE (WWAN) modem for real-time GNSS workflows; a five mega-pixel camera; and a 2.4GHz robotic radio module to support robotic total station survey workflows.

Powered by an 806 MHz processor optimised for graphics processing, advanced caching and a journaling file system, the latest Nomad 900 series offers a rechargeable long-life lithium ion battery, up to six GB of flash memory and a sunlight visible VGA touch-screen display. The series has an IP67 rating and meets MIL-STD-810F (military standard) for drops, vibration and temperature extremes.

## Collect and deliver

A new controller from Trimble, the TSC3, is optimised for use with the company's Access field software. The unit includes: a digital camera, integrated communications and a GPS navigator, compass and accelerometer. It also features: a

4.2 inch, high-resolution, sunlight-readable touch-screen display; integrated Wi-Fi and Bluetooth wireless capabilities; ruggedised bumpers; a long battery life; and optional QWERTY or alphanumeric keyboards.

## VRS Now in Benelux

Trimble has announced the launch of its VRS Now RTK correction data services for Belgium, the Netherlands and Luxembourg. New service plans allow users to perform precise positioning with centimetre-level accuracy in all VRS Now networks across Europe, simplifying access to high-precision GNSS corrections.

## BRIEFS

**Leica has announced a digital surface model (DSM) extraction module for its line sensor workflow software, XPro.** Users of XPro 5.0 can now generate stereo-viewable image frames from line sensor data acquired with the company's ADS airborne digital sensor.

The latest version of Leica's MobileMatriX software integrates Viva total station range. With the imaging support of the TS15 and TS11, users can take an image with and store it in a GIS database enabling users to supplement their GIS archive with information about the situation on site.

**Seazone has merged numerous depth surveys to give one seamless layer of best available bathymetry around the UK.** TruDepth Grids are available in half degree (~50km) tiles, with a 1 arc-second (~20m) resolution, in ASCII Grid and Esri binary grid formats.

Following Ordnance Survey licensing changes, Landmark Promap is now able to offer larger areas of mapping, allowing customers to access and order mapping data up to GB size (over 200km<sup>2</sup> mapping data), as well as access to new datasets, like the integrated transport network (ITN) layer and VectorMap Local, through a bespoke online ordering process.

## As-built railway surveys



Trimble's latest railway product provides as-built survey documentation for railway track maintenance and modernisation. The GEDO CE Trolley System, acquired from Sinning Vermessungsbedarf GmbH, Germany, includes three software components: Track, for correction values directly on site; Office, for data handling with continuous and integrated data transfer; and Calc, for verification and documentation for the construction of slab track. The modular track surveying system, using optical and imaging total station technology on board the vehicle, is particularly suited for surveying older railway tracks.

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## GW RECRUITMENT

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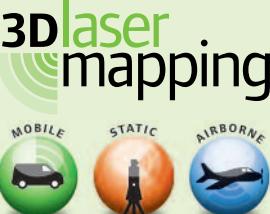
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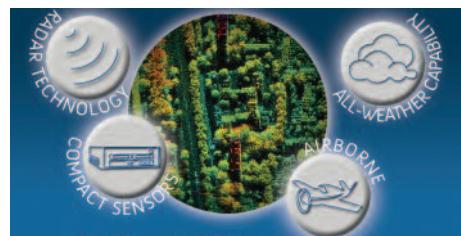
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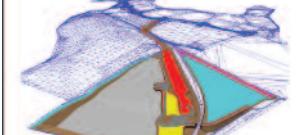


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