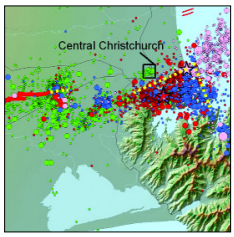
Geomatics World

MARCH | APRIL 2012

Issue No 3 : Volume 20

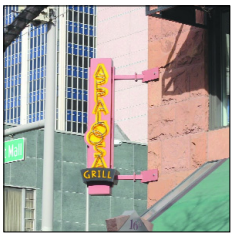
Surveying for geographical and spatial information in the 21st century

Shaken and stirred: New Zealand's cadastral challenge

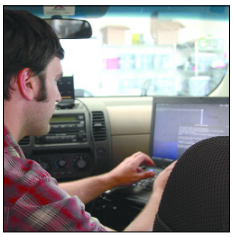


Get ready. Gen Z is coming for geomatics

LiDAR experts gather in mile high state



Mining the streets for 3D data with earthmine.



Oil & Gas Producers update GNSS Guidelines

The shortest distance between two points
is not a trip back to the tripod.

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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, Richard Groom, Alan Haugh, James Kavanagh, Professor Jon Mills, Dr Stuart Robson, Dr Martin Smith

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

Reprints: Reprints of all articles (including articles from earlier issues) are available. Call +44 (0)1438 352617 for details.

Advertising: Information about advertisement rates, schedules etc. are available in the media pack. Telephone, fax or write to PV Publications.

Subscriptions: Yearly subscription (six issues) is £45 (UK) £49 (worldwide). For more details, including special offers, go to: www.pvpubs.com
 ISSN 1567-5882

Printing: The Manson Group, St Albans, UK

PV Publications Ltd
2B North Road,
Stevenage, Herts SG1 4AT
T: +44(0)1438 352617
W: www.pvpubs.com

COVER STORY
RICS is celebrating 40 new members joining Geomatics from the Land Registry. Our cover pic shows **Nicola Gibbons** receiving her certificate of membership from RICS Land Group Director James Kavanagh (left) and Chief Land Registrar Malcolm Dawson turn to page 07 for the full story.

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Would you like to receive the electronic version of GW?

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

http://www.pvpubs.com/OverseasRICS

and register your requirements.

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

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

Next issue

The next issue of *GW* will be that for May / June 2012.

Copy dates are: Editorial: **10 April** Advertising: **20 April**

The digital natives have arrived

Gen Y? Gen Z? Where do you fit in the digital divide?

Which generation are you, X, Y or Z? Or are you like me, wondering where you fit into the marketing and social pundits classifications. Maybe some of us are just "off the clock"!

These ruminations are prompted by an article on page 12 of this issue by two Australian academics who have been doing some intriguing research into whether it is possible to define any differences between those born between 1980 and 1995, who are generally highly technology literate, and those born after 1995 into an age of mobile phones, the Internet, personal computers: Generation Z, the digital natives.

Their research has been prompted by the familiar academic topics: falling student admissions, an ageing workforce and a growing economy. Britain and Europe can certainly identify with the first two problems even if the latter is eluding our UK government. I won't spoil all of their findings but there are some strong messages out of this research for geomatics from both groups, gen Y and Z. They found that few students were aware of the diversity of career paths before they joined courses but worryingly they found "little evidence of prestigious and successful careers". There is clearly more work to be done by employers but most of all by the professional institutions in attracting those digital natives.

Preparing for the digital future

In the last issue I highlighted the challenging times publishers face, not just in the recession but with the rise of the web and its impact on print publications. A double whammy has hit most publishers: both advertising and content has been moving to the web. No publisher can avoid having a web presence but few have realised that having a website as part of the public face of a printed magazine is only part of the answer and at best is only temporary as we move ever deeper into the digital future. Too many sages have been predicting the demise of print – Microsoft thinks it will all be gone in less than a decade – so it will happen over the next decade or two as the "digital natives" take over.

To prepare for the future I've been reading a book described as a primer for the Internet. *From Gutenberg to Zuckerberg*, subtitled *What you really need to know about the Internet* is by John Naughton, professor of the public understanding of technology at the Open University. I've been following Naughton's occasional columns in *The Observer* for over a decade, indeed since I read his earlier work, *A Brief History of the Future: Origins of the Internet*. Why Guttenberg, the founder of the printing press? Naughton begins by imagining what its initial impact was like back in the 16th, 17th and 18th centuries; think the Reformation and the Enlightenment, even childhood as education became more widely available.

In his latest work he identifies nine big ideas that we need to grasp about the Internet. The number comes from research done back in 1956 that showed our short term memory was only capable of grasping between five and nine chunks of information. Perhaps the most significant of the ideas he puts forward is that disruption is a feature of the Net and to understand it we need to start thinking ecology rather than economics. We also need to understand that the computer is increasingly becoming the network – think cloud computing and software as a service. I won't reveal more other than to say it's an easy and gripping read that will help you understand a little more about where we're all heading.

What's in and on

Following the catastrophic earthquakes in New Zealand last year I am pleased to be able to present the first part of an intriguing article by Roy Dale that traces the country's land registration problems caused by techtonic movements. In the second, which we will publish in the May/June issue, he explains the substantial work that lies ahead for cadastral surveyors in the "Shaky Isles".

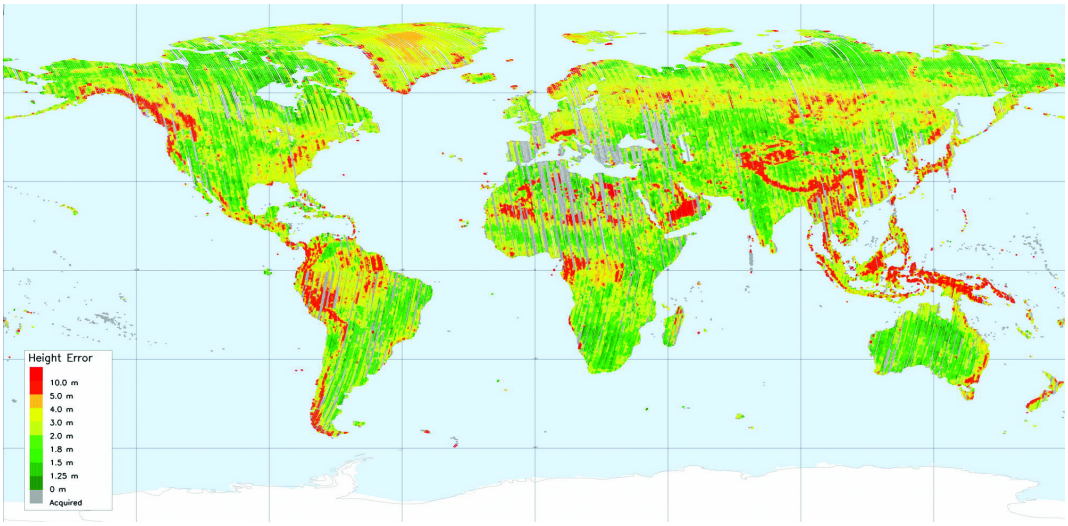
We also have an especially insightful *Overcurrents* column from Nick Day, following a visit and trip out with 3D data capture company *earthmine*, one of a growing number of mobile data capture providers who are able to supply 3D urban data with ever greater accuracy and speedier delivery.

Finally, don't forget to come along to GEO-12 on 21st or 22nd March at the Holiday Inn London Elstree. We have a great programme of seminars lined up for you and a record number of exhibitors. If you were planning to come to the Gala Dinner, which features a presentation by Mr *Down Under Currents* **John Brock**, unfortunately all tickets are now sold but we'll do our best to convey the flavour of the event in the next issue. There's more at **www.pvpubs.com/events.php**

Stephen Booth, Editor

The editor welcomes your comments and editorial contributions by e-mail: *editor@pvpubs.demon.co.uk* or by post:
Geomatics World
PV Publications Ltd
2B North Road
Stevenage
Herts SG1 4AT
United Kingdom

TanDEM-X maps Earth



Green tinted areas already comply with a the requirement of a two-metre accuracy. Yellow-coloured areas must be recorded a second time, reddish surfaces also require recording from a different angle. Grey-shaded strips have been recorded, but have yet to be processed. Image courtesy DLR

After a year in service, the German Earth observation satellite TanDEM-X, together with its twin satellite, TerraSAR-X, have completely mapped the entire land surface of the Earth for the first time.

TanDEM-X and TerraSAR-X, have been moving through space in close formation. Strip by strip, they have recorded Earth from different angles and transmitted high-resolution radar data from their orbit at an altitude of 514 kilometres down to the three ground stations – Kiruna (Sweden), Inuvik (Canada) and O'Higgins (Antarctica).

"The mission is running better than expected and there have been no unscheduled interruptions in the programmed formation flight of the two satellites. All safety mechanisms are functioning robustly and in a stable manner," enthuses Manfred Zink, project manager for the TanDEM-X ground segment at Germany's space agency, DLR.

The strips of terrain recorded by the satellites are processed into elevation models measuring 50 by 30 kilometres. Due to the ultra-precise calibration, when this 'basic data' is compiled at the end of the process to generate a global 3D map, it is already of very high quality.

By mid-2013, TanDEM-X and TerraSAR-X will have imaged the complete land surface area of Earth – roughly 150 million square kilometres – several times. The intention is to create an exceptionally accurate, global and homogeneous 3D elevation model that promises to be of equal interest for commercial and scientific purposes.

The level of precision depends upon how well the ground reflects the radar signal back to the satellites. Areas of poor reflectance, such as sandy desert, as well as heavily vegetated areas such as rainforests and mountainous regions will require two or more passes to gather the data required. The DEM will have a raster cell size of 12m, a relative accuracy of 2m and absolute accuracy of 10m.

For more information search the *GW* online archive for Nov/Dec issue 2008: TanDEM-X: A global mapping mission.

RICS Geomatics Evening Lectures 2012

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

Thursday 1 March
BIM isn't geospatial. . . or is it? Dr Anne Kemp, Director, WS Atkins. What BIM (Building Information Modelling) means, and how ultimately it is geospatial in nature.

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

LightSquared is (not quite) dead

The lightsquared saga appears to be coming to a close. Both sides are still sniping at each other but Harbinger Capital, LightSquared's parent, has suffered a dramatic fall in value as the company appears to be folding under the combined weight of the GNSS industry and a report supported by nine US government departments that spells out what could happen if LightSquared were to have its way.

Will LightSquared's demise be the end of the matter? Not so, writes Prof. **Durk van Willigen** of Delft University of Technology, writing in Coordinates magazine. He argues that pressure on the spectrum will only increase and it would be foolish for the GNSS industry to ignore the lessons from LightSquared. He praises receiver developers Javad for creating a filter for their new receivers that counters interference from LightSquared. Indeed Javad Ashjee himself took an eight-page advertorial in the February 2012 issue of the American magazine *Point of Beginning*, in which he argued that GNSS equipment should be fitted with better filters in order to shut out the noise presently coming from neighbouring wavebands, whether or not there is any threat from LightSquared. Willegen also points out that governments sell spectrum to telecom users – in the UK the cost is 22 euros per head per year. GNSS users, on the other hand, currently pay nothing.

RICS director to keynote

James Kavanagh, RICS' Director of the Land Group will be the keynote speaker at Optech's 6th International Terrestrial Laser Scanning User Meeting. He will consider a range of issues that affect users of static and mobile laser scanning systems. Kavanagh is a chartered land surveyor and chartered geographer and studied survey and mapping at DIT Dublin, Ireland and the University of East London. He has worked on some of the largest civil engineering projects in Europe, including Canary Wharf and Broadgate-London, and also spent several years mapping Palestinian refugee camps in the Middle East while working for the United Nations. Kavanagh regularly lectures on professional practice and is also the author of numerous surveying and mapping journal articles – and of course is Geomatics World's regular Policy Watch columnist! The conference will be held on 26-27 June at the Novotel Nice Centre in Nice, France www.optech.com/i3dugm

Vision for Cities competition

The Vision for Cities global essay competition for RICS student members has now launched online. The competition is open to all RICS (and SCSI) student members (pre-APC) across the globe, currently enrolled on undergraduate or postgraduate courses. The grand prize is an expenses-paid trip to attend RICS' COBRA 2012 conference in Las Vegas, with free e-learning courses from RICS training and the promotion of the top three winning essays by RICS. The competition will close midnight (GMT) 30 April 2012. All information can be found at www.rics.org/studentessay

Guidance on conflicts

RICS Guidance: *Conflicts of interest, 1st edition, January 2012 (UK)*, the latest guidance note from the Dispute Resolution Professional Group, is now available online. The publication concerns the appointment of surveyors as arbitrators, independent experts, mediators, adjudicators and other dispute resolvers.

Consortium to build further Galileo satellites

The consortium led by OHB System AG and Surrey Satellite Technology Ltd (SSTL) will build a further eight satellites for the European Union's Galileo satellite navigation programme under the supervision of the European Space Agency. The new contract was announced by European Commission Vice President, Antonio Tajani, and will see SSTL continuing its role as payload prime, assembling, integrating and testing the navigation payloads in the UK. OHB System, as the prime contractor, will build the eight satellite platforms and execute the final integration of all the satellites in Germany. The SSTL-OHB partnership is already building fourteen satellites for the Galileo programme and will draw on its experience to produce the additional satellites to schedule.

Tracking update

Following last issue's beach pebble tracking article we hear that the surveyor working on the beach at Eastney in Portsmouth with the hand held RFID tracker was approached by a local thug (complete with Pitbull) and told to hand over the "metal detector". Unfortunately the thief was unable to get the device in his car so he broke the handle in half and shoved it in the boot and drove off. The Police soon recovered the broken kit reports Ted Read, who adds, "Please bear in mind this happened very near to an estate in Portsmouth where a local vigilante gang beat up a Paediatrician on the grounds he was a Paedophile!"

CONTRACTS & PROJECTS

Leica wins OS contract

After an 18-month competitive tendering process, Leica Geosystems has been awarded a contract to supply over 200 survey grade Viva GS15 GNSS receivers to Ordnance Survey Great Britain. The contract also includes a similar number of DISTO D8 handheld distance meters plus options for multiple reflectorless total stations. The GS15 receivers will replace the 250 Leica 500 GPS receivers supplied to OS field surveyors in 2002.

Driving down congestion

The use of 3D laser scanning could revolutionise the investigation of motorway collisions following the award of £2.7 million (US$ 4.2 million) in funding for UK police forces by the Department of Transport. The funding will enable 27 police forces to purchase 3D laser scanners to collect detailed 3D images of crash sites easing congestion following accidents.

Two companies that stand to benefit from this move are Leica Geosystems and 3D Laser Mapping. The former has announced an order for its ScanStation C10s. 'In a matter of minutes the ScanStation C10 automatically captures the complexity of the scene including the road markings and topography,' says **John Rusted**, chairman of the Institute of Traffic Accident Investigators (ITAI) and senior collision investigator for Humberside Police.

Meanwhile 3D Laser Mapping's Riegl scanners are already being used. 'Having run a pilot in which we tested a number of scanners, we found the Riegl laser scanner collected 30 percent more data, in less than half the time of any other pulse scanner and it has helped us cut the road closure times in London by an average of 90 minutes,' says **Richard Auty**, senior collision investigator in the Metropolitan Police Road Death

Land Registry staff join RICS

Above: Land Registry Surveyor Richard Savage receives his certificate from RICS Land Group Director James Kavanagh (left) and Chief Land Registrar Malcolm Dawson.

The Law Society Chancery Lane was the venue for Land Registry to celebrate the success of its Land Registration Law and Practice Qualification students and those who have achieved RICS Associate membership during the last year. Last year was a bumper year for Associate membership for Land Registry with 40 staff becoming members.

Candidates used a variety of the routes to membership, from the level 4 NVQ Spatial Data Management, a combination of mapping experience and completing specified units from the NVQ. The remainder used their Land Registration Law and Practice Qualification as the academic criteria for their route to membership. They were some of the last candidates to use the "old" Associate membership route by completing three case studies in which they use their experience to demonstrate the mandatory core and technical competencies.

The certificates were presented by Chief Land Registrar and Chief Executive Malcolm Dawson and RICS Land Group Director James Kavanagh. James spoke of "the long and tortuous journey" of associate membership and he welcomed the successful candidates to the RICS family.

Surveyor Richard Savage of Croydon Office was glad his RICS studies were over. "The reward is membership of a professional body," While Jean Temple of Durham Office completed the course holding down two jobs and raising two children. "Though tough at the time, on reflection, I feel it was a great achievement."

There was also special recognition for Nicola Gibbons, judged to have produced the best case study. "The decision to sign up was not taken lightly as I understood the commitment to the process would require a lot of organisation and the support of family and friends. Definitely a worthwhile experience, our learning and experiences at development events has resulted in a greater understanding of Geomatics within Land Registry and the wider community"

Topcon gets preferred supplier status

itmsoil Holdings ltd CEO Mark Kirkbride (left) signs the supply agreement in the presence of Ian Stilgoe from Topcon Europe Positioning.

Topcon has been chosen by itmsoil Holdings Ltd as its preferred global supplier for monitoring survey instrumentation. itmsoil, will utilise the Topcon's MS AX high accuracy total station range for monitoring projects around the globe. 'A part of our work entails installation of monitoring systems throughout existing rail infrastructure including in London for the Crossrail project,' says CEO Mark Kirkbride. 'We therefore need to source suitable instrumentation that would enable us to rapidly and efficiently set up works, and the MS AX with its Matrix Detection functionality is perfect.' The Matrix Detection feature is designed to save time and increase efficiency whilst setting up complex arrays of prisms for monitoring systems.

Investigation unit. 'It is an amazing tool that has transformed how we collect evidence at collision scenes; allowing us to provide the courts with the collision scene in a virtual world.'

Veripos has won an extension of its contract with Siem Meling Offshore DA, the Stavanger-based shipping concern jointly owned by Siem Offshore and OH Meling. The three-year extension continues the provision of GNSS positioning facilities to support Siem Meling Offshore's fleet of platform supply vessels (PSVs).

Wisconsin based AeroMetric has upgraded two of its Z/I Imaging Digital Mapping Camera (DMC) sensors. The upgrades replace the sensors' original hard drives with a state-of-the-art solid state system, enhancing reliability and portability. The upgrades are expected to yield greater consistency in colour tone and balance. Improved flight management hardware and software have also been installed.

BRIEFS

Leica Geosystems has been named strategic supplier/partner of the year 2011 by Speedy, a provider of equipment rental and support services, beating a group of finalists from over 300 suppliers. Leica's EMEA channel manager for volume & rental, Frank Grunder, and UK national key account manager, Ian Pennington, collected the award from David Graham, MD for Speedy's UK Hire business at the company's recent national conference.

Leica Geosystems is seeking papers for its tracks at Hexagon 2012 on 4-7 June at the MGM Grand Hotel, Las Vegas, Nevada. Those interested in presenting should submit abstracts of approx. 150 words by 9 April for the following: Trends in Mapping & Positioning for Government & Industry to Agnes.Zeiner@leicageosystems.com and on HDS/Laser Scanning to: Geoff.Jacobs@leicaus.com; and Geospatial Solutions: Doug.Flint@leicaus.com

The Hexagon Group has acquired all outstanding shares of Canadian-based MicroSurvey, a developer of surveying and mapping software for the land surveying, construction, and forensic markets. The company continue to operate as a separate business entity under the umbrella of the Hexagon Group of companies with its products still available to purchase.

The Bavarian Agency for Surveying and Geographic Information has equipped all its cadastral offices with Viva TS15 total stations. Leica Geosystems GmbH Vertrieb will supply the Bavarian Administration for Surveying with up to 500 TS15 total stations over five years. The first batch of 154 total stations was delivered in December 2011.

GeoPlace has announced the full renewal of its ISO 9001:2008 certification for another three years following an external audit by Lloyds Register Quality Assurance (LRQA). GeoPlace creates and maintains the National Address Gazetteer Database from which Ordnance Survey makes available the range of AddressBase products. Note that the databases are sold by Ordnance Survey and not by GeoPlace as suggested in GW Jan/Feb News p.06.

Events Calendar 2012

• SEMINARS • CONFERENCES • EXHIBITIONS • COURSES

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

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

Geospatial World Forum
23-27 April, Amsterdam, The Netherlands.
Contact: www.geospatialworldforum.org

First FIG Young Surveyors Conference: Knowing to create the future
4-5 May, Rome, Italy.
Contact: www.fig.net/fig2012/youngsurveyors.htm

FIG Working Week 2012: Knowing to manage the territory, protect the environment, evaluate the cultural heritage
6-10 May, Rome, Italy.
Contact: www.fig.net/fig2012

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

Geo Maritime 2012
13-14 June, London, UK.
Contact: www.wbresearch.com/geomar/home.aspx

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

GEO-12: The GEO Event
World of Geomatics & GIS Innovations
21-22 March 2012 at the Holiday Inn, London-Elstree, UK.
For more information, contact: Sharon Robson
sharon@pvpubs.demon.co.uk or +44 (0)1438 352617

Online Visitor registration closes 16 March 2012
www.pvpubs.com/events.php

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

The International Federation of Surveyors (FIG) has organised the First FIG Young Surveyors' Conference (www.fig.net/fig2012/youngsurveyors.htm) to be held 4-5 May 2012 at the Cassa Geometri in central Rome. The conference will precede the FIG Working Week (www.fig.net/fig2012), which will be held at the Rome Cavalieri Hotel from 6-10 May 2012.

Hydro12, the International Federation of Hydrographic Societies' 17th European conference, will take place on 13-15 November 2012 with the theme of taking care of the sea (www.hydro12.com). Organised by Hydrographic Society Benelux, the conference will be held aboard *SS Rotterdam*, **the former Holland-America liner now permanently moored at the Port of Rotterdam in the Netherlands.**

GAF AG, a provider of project design and implementation services, has established in Kabul a training centre and an attached demonstration mine to support the training of mines inspectors of the Ministry of Mines in Afghanistan. A team consisting of senior mining, environmental and mechanical engineers as well as GIS and IT experts is on-site to transfer know-how and to consult.

Blom ASA has divested its Danish subsidiary, BlomInfo A/S, to the Danish engineering and consulting company, NIRAS A/S. The company will receive a consideration of DKK 19.4 million as compensation for the equity in BlomInfo A/S and working capital provided by Blom to BlomInfo A/S. Meanwhile the mapping company has won an NOK 8 million contract with Saudi Arabian firm Unicom to provide professional services for the production of base maps and 3D modelling of the city of Medina in the Kingdom of Saudi Arabia.

Sterling, the software division of Sterling Power Group, has been appointed as distributor for Intergraph's leading geospatial product families, ERDAS and GeoMedia in Great Britain.

OceanWise has announced two new on-line distributors for its digital marine mapping products, Marine Themes and Raster Charts – emapsite.com and findmaps.co.uk – in addition to its existing on-line distributor, GeoStore.

Z+F UK has recently changed its name to ZF UK Laser Limited. The new company address is based at 9 Avocado Court, Commerce Way, Trafford Park, Manchester, M17 1HW.

This year's AGI Annual Conference - AGI GeoCommunity '12: Sharing the Power of Place - will be held in Nottingham on the 18 – 20 September 2012. This is the 6th year of AGI GeoCommunity and the second year at the East Midlands Conference Centre. More at http://www.agi.org.uk/geocommunity/

Topcon rings the changes

Topcon Europe Positioning has appointed a regional sales manager in the Sub-Saharan region of Africa. Based in Cape Town, **Katharina Wöhl** will focus on GIS / GNSS and the company's mobile mapping products. Previously, Wöhl has worked at Esri South Africa and as a sales executive at Omnistar / Trimble Navigation South Africa. She has also studied development and environmental studies at the University of Stellenbosch plus a post-graduate course in geographical information systems.

Also, **Mark Burbidge** (above) has been appointed as GNSS infrastructure business manager. Primarily based in Europe, he will focus on expanding the current TopNet+ services, plus the integration of shared GNSS network market segments. Burbidge has over twenty years' experience and started his career as an electronics engineer with Sokkia UK.

A further appointment is promotion for **John Downey** who takes over the role of Laser Products Sales Manager. John has been with the company since 1998 and headed up Topcon Ireland as business manager. He is a graduate in civil engineering from Carlow Institute of Technology.

Meanwhile Topcon Great Britain's **Stephen Cooper** has taken on the role of business manager for positioning instruments division. Cooper will oversee all activities relating to the company's positioning business in the UK. He has been involved within the survey industry for eighteen years and has held various roles with a number of manufacturers.

3D changes structure

Jon Chicken (above) has been appointed as managing director of 3D Laser Mapping, taking on the day-to-day running of the company and managing its worldwide expansion. Chicken joined the company in April 2011 as sales director with responsibility for managing growth of laser scanning hardware, software and systems. The company's founder, Dr **Graham Hunter,** takes on the position of executive chairman. He will focus on the management of key suppliers, development of joint ventures plus research and development.

Riegl appoints new executive

Johannes Riegl Jr has been appointed to the executive management group for Riegl Laser Measurement Systems GmbH as chief marketing officer. He will join Dr **Johannes Riegl**, founder and chief executive officer, and Dr **Andreas Ullrich**, chief technical officer. Riegl Jr graduated from the University of Applied Sciences in Vienna in business management and joined the company in 2009 as an assistant to the management.

KOREC appoints Harris

Chris Harris has been appointed Survey Sales Consultant for the North London and East Anglia region by KOREC. Chris has over 12 years site based experience in surveying and project management roles and has gained extensive hands-on experience of both GNSS and optical instruments in his previous position as a senior surveyor for a leading practice. Having specialised in channel surveys, Chris will now be putting his waders aside to manage the sales and hire of the full Trimble range of survey instruments and the FARO Focus3D laser scanner within his area.

We're the survivors, for the moment!

By Malcolm Draper

Gators at dawn to burning bushes and the famous Irish rice fields are amongst the gems this issue.

The new year has got off to a cracking start at the Royal Geographical Society. The most recent lecture I went to was Professor Richard Fortey on 'Survivors', a book title and BBC4 mini series. It's about organisms that have survived millions and even billions of years without change. From horseshoe crabs, coelacanths, sponges to Stromatolites, a rare rock like oxygen producing organism found in shallow waters in Australia that grows imperceptibily slowly through accretion and has been around for some 3.5 billion years. As his TV show's producer wryly observed, 'They don't do much do they?'

Photographer, writer and traveller **Nick Danziger**'s photos are stunning and have featured on the front covers of top magazines like Time, Le Monde and the Sunday supplements. The subjects range from Tony Blair to the poor and dispossessed around the world. In Iran, a striking image of a turbaned mullah sitting cross-legged is interviewing a heavily veiled woman. Farsi script on the wall behind where he sits fascinates Danziger, so upon his return to England he gets it translated. It says: "Turn left for gas and electric repairs!"

He finds, like so many of us, that people around the world have much the same interests. Wandering in the desert in Somalia he meets an aged man. After the traditional salaams, always exchanged amongst travellers in a moslem country, the man asks him, "Is it really true **Frank Lampard** is going to AC Milan?"

I've been staying with friends in Florida recently. They live on the edge of a golf course with a lake. . .

and this is what greeted me when I got up to look out of the bedroom window on the first day. These beasts seem amazingly calm, as do the lingering golfers. Maybe they accept that the gator will take the odd one from time to time!!

Things you can't do with a sat-nav

In the onward rush to adopt technology sometimes we need to stop and think it through before we throw away what has previously stood us in good stead. Two walkers who became stranded on Kinder Scout in the Peak District were fortunate to have a paper map. Once they'd alerted the rescue services, they set fire to their paper map so the South Yorkshire Police helicopter could see them. The helicopter's thermal imaging camera system was able to locate them following a call they made to a friend to raise the alarm. *Source: BBC News*

Keep The Faith (KTF)

Our deepest sympathies and commiserations to Formby Surveys MD **Andy Roberts** whose wife Jenny, the company secretary, passed away on 18 February after a long battle with cancer. Andy had been away from the business for awhile caring for his wife as she continued her fight against cancer. Jenny was diagnosed in March 2008, just six months after they took over Formby Surveys Ltd.

Just for the record!

Derek Browning writes from East Devon to say that as soon as the latest edition of *GW* is on his doormat, he drops everything and, rushes to read 'Undercurrents'! He says, "I always hope there might be a snippet or two from the days before our work was 'Geomaticated', and once again you have come up trumps with news of my old pal **Ron Craven**. Ron and I had a good business relationship for many years and even formed a joint firm to exploit terrestrial photogrammetry in this country - but that is another story. . ."

Derek has also been in contact with **John Webb**, whom he reports plays snooker with 92-year old **Walter Smith** [former Director General of Ordnance Survey] once a week.

Canada calling

Steve Vickers writes from Canada to say he'll be presenting at Spar2012 in Houston in April, on a scanning project he did at the Aerospace Museum in Calgary. Meanwhile he had to take his truck in for some repairs; the one parked next to him had a "Now Hiring " sign. See opposite.

Miscellany

The Editor reports a recent visit to Kuala Lumpur where naturally he looked for that essential rallying point for expats, the Irish Bar. Studying the bar snack menu, which featured "Traditional Irish dishes", he was struck by. . . Kedgeree(!) described as "Traditional Irish rice with hard boiled eggs, served with salmon flakes and lemon wedges." He assumed the rice was cultivated in "Paddy" fields.

Some more of those entries from a *Washington Post* competition asking for a two-line rhyme with the most romantic first line, and the least romantic second line:

I see your face when I am dreaming.
That's why I always wake up screaming.

Kind, intelligent, loving and hot;
This describes everything you are not.

I want to feel your sweet embrace;
But don't take that paper bag off your face.

I love your smile, your face, and your eyes.
Damn, I'm good at telling lies!

My feelings for you no words can tell,
Except for maybe 'Go to hell.'

Who said poetry is boring?

English is used all over the world to greater or lesser success. The following are the actual writings of the Registrar at Mpumalanga Hospital, South Africa:

Examination of genitalia reveals that he is circus sized.

The patient has no previous history of suicides.

She has no rigors or shaking chills, but her husband states she was very hot in bed last night.

On the second day the knee was better, and on the third day it disappeared.

The patient has been depressed since she began seeing me in 1993.

She stated that she had been constipated for most of her life, until she got a divorce.

Bud the cowboy

A cowboy was overseeing his herd in a remote mountainous pasture in Montana when a brand-new BMW advanced toward him out of a cloud of dust. The driver, a young man in a Brioni® suit, Gucci® shoes, RayBan® sunglasses and YSL® tie, leaned out the window and asked the cowboy, "If I tell you exactly how many cows and calves you have in your herd, will you give me a calf?" "Sure, why not?" says the cowpoke.

The yuppie parks his car, whips out his Dell® notebook computer, connects it to his Cingular RAZR V3® cellphone, and surfs to a NASA page on the Internet, where he calls up a GPS satellite to get an exact fix on his location, which he then feeds to another NASA satellite that scans the area in an ultra-high-resolution photo. He then opens the digital photo in Adobe Photoshop® and exports it to an image processing facility in Hamburg, Germany. . . Within seconds, he receives an email on his Palm Pilot® that the image has been processed and the data stored. He then accesses an MS-SQL® database through an ODBC connected Excel® spreadsheet with email on his Blackberry® and, after a few minutes, receives a response. Finally, he prints out a full-colour, 150-page report on his hi-tech, miniaturised HP LaserJet® printer, turns to the cowboy and says, "You have exactly 1,586 cows and calves." "That's right. Well, I guess you can take one of my calves."

He watches the young man select one of the animals and looks on with amusement as he stuffs it into the trunk of his car, then says, "Hey, if I can tell you exactly what your business is, will you give me back my calf?" The young man thinks for a second and then says, "Okay, why not?"

"You're a Congressman for the US Government", says the cowboy. "Wow! That's correct," says the yuppie, "but how did you guess?" "No guessing required, you showed up here even though nobody called you; you want to get paid for an answer I already knew, to a question I never asked. You used millions of dollars worth of equipment trying to show me how much smarter than me you are; and you don't know a thing about how working people make a living - or about cows, for that matter. This is a herd of sheep. Now give me back my dog".

Ron Craven snapped this pic (right) of a cutting from the Burning Bush of Bible fame while visiting St Catherine's Monastery in Sinai. If you look closely at the bottom left someone has thoughtfully fixed a fire extinguiser. . .

. . . meanwhile Steve Vickers noticed this sign on a truck.

Knowing your place in the universe

Finally, if times are tough, the workload small and the money's slow just cheer yourself up with this brilliant little ditty from we think one of the Pythons. It will give you a true sense of perspective and the absurdity of human life: http://dingo.care2.com/cards/flash/5409/galaxy.swf

Got a tale to tell?

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

Enter Gen Z – the next Spatial Professionals

by Gita Pupedis and Chris Bellman

In "Promoting the Survey Profession" (Jan/Feb, 2011 issue of GW) Craig Roberts and Ian Iredale described the Australian geomatics profession's response to a recruitment crisis including some imaginative marketing ideas. Here, two authors from Australia's RMIT (Royal Melbourne Institute of Technology) University urge the profession to target the next generation – "Gen Z". They give some pointers on how to do it.

"Is this really a different generation of learners...?"

Despite the fact that "Spatial" has become ubiquitous through the use of location based services, Web 2.0, smart phones and other advances in technology, the surveying and spatial science industry in Australia still grapples with the issue of attracting qualified staff into the industry. One aspect of the problem is the declining numbers of students studying tertiary programmes in these disciplines. This is compounded by a growing economy and an ageing workforce. While this article focuses on an Australian example, the problem is not unique to this country and appears to be a world-wide phenomenon.

In 2006, the Australian Spatial Information Education and Research Association (ASIERA) raised concerns with both industry and government about student recruitment into Spatial Science programmes (McDougall et al, 2006). There was clear evidence of a worrying decline in enrolments and industry studies confirmed a deep and long-term gap between supply and demand of skilled labour in the sector (SEAC, 2007; Lyons & Davies, 2011).

Marketing to Gen Y or Z?

ASIERA was suggesting an impending crisis that might well threaten the viability of most higher education programmes in the geospatial sciences. The recognition of these problems resulted in several promotion initiatives, some based on comprehensive market analysis and others on instinct and experience. The Surveying Taskforce in Victoria and Destination Spatial nationally were key responses to the crisis. Details of these can be found in Pupedis & Bellman (2009; 2011). In these campaigns, the marketing gurus were clear that Generation Y was the target and that the message needed to resonate with them. But has the game changed? Gen Y is moving on and Gen Z (digital natives; net generation) is taking over.

Demographers tell us that the next generation (Gen Z) source their information quite differently to previous generations and that other factors may influence their decision making. As the next generation of spatial scientists will come from this group, we need to promote careers in our industry in a way that resonates with them.

At RMIT University, we wanted to better understand the issues involved in marketing to this new generation. With the help of some student volunteers, we were able to gather information from two groups of students: those recently enrolled in a programme in spatial science or surveying and those about to complete a similar programme. This enabled us to compare students from Gen Y with those on the cusp of Gen Z, with a view to identifying the differences and common elements in their motivations, desires and needs.

A look at the Generations

We are rapidly approaching the time that those entering higher education from high school will be those from Gen Z – people born from 1995 onwards (McCrindle, 2010). Are there any differences between the Gen Ys and the Gen Zs? Is this really a different generation of learners and do we need to market spatial sciences to them in a different way?

Generation Y: This generation (those born approximately between the years 1980 and 1994) are generally considered to be highly technologically literate. Raines (2003) describes this group as: sociable, optimistic, talented, well-educated, collaborative, open-minded, influential and achievement-oriented. Howe and Strauss (2000) also point out that they: gravitate towards group activity, believe "it's cool to be smart", are focused on grades and performance, are busy with extracurricular activities, identify with parents' values, are respectful of social conventions and institutions, have a fascination for new technologies and are racially and ethnically diverse.

Generation Z: This is the world's first 21st Century generation. They are true digital natives and have not known a life without mobile phones, personal computers, the Internet and gaming systems (Mueller, 2011). They are both comfortable with and dependent on technology. Socialising is not necessarily about physically being in the same location as your friends, it can be on-line, engaged in a collaborative pursuit (McAneny, 2010). At the same time, this generation is not tied down to one desktop computer in one location. They carry their technology around with them and are often perpetually hooked up, often doing multiple tasks at the same time (Mueller, 2011). McAneny (2010) states that this dependence on technology and need for instant gratification has a darker side, termed by some mental health experts as "acquired attention deficit disorder". As people are so accustomed to a constant stream of digital stimulation, they feel bored when it is absent.

McCrindle (2011) states that Gen Z is also growing up faster, is in education earlier and is exposed to marketing when younger. While many are vying for their attention, Gen Zs'

consumer decisions are most often made through social networks (Ross, 2010). However, it is not necessarily using Facebook or Twitter, whose users' average age is in the mid to late thirties (Ross, 2010).

Student Perception Survey 2011

In May of 2011, 21 first year students and 30 final year students in programmes in geospatial science at RMIT University completed a student perception survey, covering a broad range of topics. These included: their work experience prior to commencing study; how they became aware of the geospatial sciences; what marketing activities and other factors had affected their decision making; the use of social media for marketing and; their perceptions of what generation they belong to. 71% of the first year students who participated were under the age of 21 (on the cusp of Gen Z) and 97% of the final year students were over the age of 21, with nearly all being in Gen Y. A few mature age students belong to Gen X. In addition, eight students volunteered to participate in a follow-up focus group, to discuss the topics raised in greater depth.

Although there were more similarities than dissimilarities between the two year groups, some differences were quite striking. The survey indicated a much larger proportion of the year 1 group had undertaken work experience in the discipline prior to enrolling in the programme; that year 1 students use YouTube much more frequently than the final year students; and there was an apparent decline in the influence of careers teachers in programme selection. A more complete description of the results can be found in Pupedis & Bellman (2011).

All of the students in focus groups were quite suspicious of the generational labels. While they could identify some different trends, they didn't feel there is a significant difference in the way they do things or in their attitudes. Both Gen Y and Gen Z argued that they don't like being marketed to directly and were quite cynical about many marketing attempts. In Gen Z, this trend was perhaps more pronounced and they were much more influenced by their peers and a loose collective view. Perhaps paradoxically, many of the students were aware of the spatial industry's promotional activities and did not appear cynical about these. This was particularly apparent with the year 1 cohort.

Social media was also not the dominant marketing influence that we thought it might be. While most students use social media, they do not see this as part of their professional or academic life and have little desire to have formal social media sites available that are linked to their studies. They would prefer an informal approach, with social media sites emerging and disappearing as their individual professional needs change.

Are these students, born since 1995, any different from their predecessors?

Videos work

However, there was a clear divide on the use of YouTube with the Year 1 students placing much greater emphasis on its use, influence and importance. Students suggested the industry should make greater use of short, sharp, entertaining videos on mediums such as YouTube, as it is an increasingly popular source of both entertainment and information. Marketing campaigns designed around "viral" strategies seem to fit well with the idea of being influenced by peers.

Perceptions of the prestige of the industry were also raised. Students felt that along with the low awareness of the industry, there was little evidence of prestigious and successful careers. None of the students understood the diversity of career paths available and in some cases, claimed this was the greatest surprise that they encountered after commencing their studies. Again, they pointed to video presentations as a good method of conveying this message.

"Students felt that along with the low awareness of the industry, there was little evidence of prestigious and successful careers."

Go to Schools

While the use of technology was an important means of communication, many students were also influenced by more traditional means of promotion; in particular, work experience with someone in the industry and school visits by professionals, students and academics. These raise awareness of both the area of study and the careers available in the discipline, not just to students but also to teachers. While there was an apparent decline in the influence of careers teachers, the focus groups suggested that their role was important but at times their knowledge of the industry was patchy and incomplete and therefore lacked impact.

Adapt to the marketplace

The marketplace for recruiting students into tertiary programmes continues to evolve. As we move into the next generation of recruits, our marketing message and methods need to adapt to the changing requirements of the marketplace.

Opportunities exist for the clever use of technology in raising awareness of our industry and the careers available in the spatial sciences. However, this is also an increasingly crowded space and attention spans are short. While the efforts made to date have had an

impact, there is little room for complacency. New approaches will need to sit beside more traditional methods to expand the multi-pronged marketing strategies that seem to be necessary in today's world.

There is no doubt that a continued and concerted effort will be required in the future to ensure the message about careers and opportunities in the spatial sciences is heard loud and clear.

Acknowledgement: This article is a summary of a paper first published in the Proceedings of the Surveying and Spatial Sciences Conference, 21-25 November 2011, Wellington, New Zealand.

"New approaches will need to sit beside more traditional methods to expand the multi-pronged marketing strategies that seem to be necessary in today's world."

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About the authors:

Gita Pupedis is a lecturer in Cartography at RMIT University, where she has been first year coordinator for undergraduate programmes in Geospatial Science for many years. In addition to teaching cartographic theory and design, she was the chief instigator of a map-based calendar series that has been produced by final year cartography students for the past six years and used as an important marketing and promotional tool. She has extensive experience in the recruitment of students into geospatial science programmes and has coordinated many of the marketing efforts of the group.
Email: *gita.pupedis@rmit.edu.au*

Chris Bellman has a background in surveying, photogrammetry and GIS. He has been Discipline Head of Geospatial Science at RMIT for the past six years and prior to that, programme leader for five years. In that time, he has been responsible for a number of marketing initiatives aimed at raising the profile of the geospatial sciences. He is a past president of the Spatial Sciences Institute (now the Surveying and Spatial Sciences Institute), a member of the Victorian Spatial Council, the Surveying Taskforce and the Spatial Education Advisory Committee.
Email: *chris.bellman@rmit.edu.au*

Clarifying where you work and who owns your social network profile

By Carl Calvert

Two recent but unrelated cases, one in the UK Supreme Court (UKSC), the other in the European Court of Justice (ECJ), have far-reaching implications for professionals and copyright holders working either in the UK or abroad.

The UKSC case was that of *Ravat v Halliburton Manufacturing & Services Ltd* [2012] UKSC 1 (also reported in *The Times* of 15 Feb 2012). Like many cases the question was quite simple: 'Does an employment tribunal have jurisdiction in relation to individuals who are resident in Great Britain and employed by a British company but who travel to and from home to work overseas?' In this case the UKSC ruled that if the relationship with the GB company was stronger than with the country in which the employee worked then the employment tribunal did have jurisdiction. It was a matter of degree.

UK commuter. . . working in Libya

The Appellants, Halliburton Ltd, are based in Aberdeen, and are a subsidiary of Halliburton Inc, which supplies tools and services to the oil industry. Mr Ravat is a British citizen from Preston, Lancashire, who was employed for 16 years until 2006 when he was made redundant by the Appellants. At the time of his dismissal he was working in Libya for a German subsidiary of Halliburton Inc, but his terms of employment described him as a UK commuter with his salary being paid in sterling with deductions for UK income tax and National Insurance into a UK bank. The grievance hearing, and appeal all took place in Aberdeen at the offices of Halliburton Ltd.

The judgement in the Supreme Court was that: (a) the Employment Rights Act 1996 did not state the geographical limitation of an employee who had worked under a contract of employment; (b) in the case of *Lawson v Serco Ltd [2006]* UKHL three categories of employee were identified by Lord Hoffman but Mr Ravat fell into none of these categories. It was therefore necessary to consider what Parliament had intended in the legislation and not try to set out a list of fixed rules that Parliament had not included in the Act; and (c) Mr Ravat, prior to leaving for Libya, had been assured that the contract of employment had been those under UK law.

This case demonstrates that it is often a matter of degree rather than the fact itself on which a case turns. For many of our readers who work abroad for a British company it is as well to consider what rules apply and whether the connection to Great Britain is strong enough to enable UK legislation to apply with a sufficient degree of certainty.

> *"...the Employment Rights Act 1996 did not state the geographical limitation of an employee who had worked under a contract of employment..."*

Filtering files is too onerous

The second case is that of *Belgische Vereniging van Auteurs, Componisten en Uitgevers (SABAM) v Netlog NV* Case C-360-10, where it was held that a social networking site (Netlog NV) could not be required to set up a general filtering system for all its users to prevent the unlawful use of audio and visual media. This is of great importance to both copyright holders,who may see their copyright diluted and to service providers of networking sites who see that they do not have the onerous duty to filter all files on their servers.

The case was brought by SABAM, the Belgian management company that manages the intellectual property of authors, composers and publishers. SABAM said that the social networking site run by Netlog had a 'profile' for each user into which the users could place video clips with the profile being available globally and thus circumventing payment to SABAM.

The facts are that in June 2009 SABAM applied to the Belgian Court for an injunction to require Netlog to stop making audio visual data available unlawfully. Netlog, in defence, claimed that the E Commerce Directive prohibits a general requirement to monitor (Article 15 of Directive 2000/31/EC of the European Parliament and of the Council of 8 June 2000 on certain legal aspects of information society services, in particular electronic commerce, in the Internal Market - OJ 2000 L 178, p. 1) . The Belgian Court referred the matter to the ECJ for an opinion whether the Directive did prohibit indiscriminate monitoring of all traffic for an unspecified time and at the service provider's expense.

It was common ground that in order to provide the filter Netlog would have to identify which files contained such information and whether or not that information was unlawful and then prevent its distribution. These processes would

require every file submitted by the user to be examined by the service provider. This, the ECJ stated, was contrary to the E Commerce Directive.

In *Scarlet Extended SA v SABAM* Case C-70/10 delivered on 20 November 2011 it was held that in adopting the injunction requiring Scarlet to install such a filtering system, the national court would not be respecting the requirement that a fair balance be struck between the right to intellectual property, on the one hand, and the freedom to conduct business, the right to protection of personal data and the right to receive or impart information, on the other.

Further the identification of files and their ownership affected the provision of personal data security and as such would contradict the Charter of Fundamental Rights of the EU: secondly an injunction would affect the freedom of information since the system could not distinguish between lawful and unlawful files.

It seems that in both of these cases, that in the UK Supreme Court and that in the ECJ highlight a fine balance, one of degree, the other of conflicting freedoms or rights. In law the balance has tended to vary over time and perhaps the results obtained this year may well be different in a few years time as technology and politics change, but at the moment these judgements look to set the landscape for a long time.

• *Carl Calvert MA MSc PgDLaw FRICS CITP MBCS, is the sole principal of Calvert Consulting, specialising in Boundary litigation. He also lectures part-time in GIS law.*
www.calvertconsulting.co.uk
Email: carlcalvert@aol.com or 023 8086 4643.

Geomatics is once again punching above its weight, reports our chair **Stuart Edwards**. There is also an opportunity for members to engage with him ahead of an important lecture on the future of geomatics education.

Strong showing gains credit for Geomatics

Spring is in the air and somehow things seem to take on a more upbeat tone. . . at least as far as the RICS Annual Review 2010/11 is concerned, anyway. Browsing the report there seemed to be positive news on every page! I noted particularly in the Presidents' foreword that geomatics can take much credit for its introduction of TWO of the 12 new AssocRICS pathways (Land/Engineering Surveying and Hydrographic Surveying). This achievement reminded me that such accomplishments flow from the hard work and dedication of members who already have very busy lives and I would like to extend my thanks to them all.

In 2012 the Professional Group Board is set once again to undertake a broad portfolio of activities that will promote geomatics and the profession at both the national and international level. Leading off with Oceanology 2012 (13th-15th March), followed by the 2012 General Assembly for the Council of European Geodetic Surveyors in Edinburgh (29th – 31st March), and then on to the Ordnance Survey HQ, Southampton for the launch of the findings from the second phase of research into Network RTK performance in Great Britain. Coincidentally, this will be the subject of the final lecture in the 2011/10 lecture series set for RICS HQ on 17th May 2012. Again, both will be recorded for dissemination via social media including 'Youtube' and 'Twitter'. I believe this is excellent practice but it still presents challenges for colleagues working in areas of the world where high-speed broadband is still a long way away (literally!). One colleague reported a 1.3hr download period for a single ten-minute portion of video equating to ~ a full day to download one lecture. Things will only improve I'm sure; but we mustn't lose sight of such issues if we are to serve our members fully.

Geomatics also has a strong showing in the up-coming edition of RICS Land Journal. Articles on laser scanning for high speed underground surveying and the UK's location strategy serve to demonstrate that fellow professionals and our professional group members are punching well above their weight in terms of research and innovation. The latter of these articles further demonstrates how geomatics practitioners are reaching beyond the narrow definition of surveying and engaging directly with government and policy makers. The article on land registration and cadastre in China will also be of interest to members.

In another coincidence and following the publication of the column 'Geomatics Education' in the January/February issue of GW, I have been invited to address the AGM of the TSA (The Survey Association) on the very topic of the future of Surveying Education in the UK and its relevance to industry. I would therefore like to invite anyone (academic, teacher, employer, practitioner etc.) with views on this topic to contact me prior to April 6th. I will then aim to synthesise all opinions with those of my own and add to my presentation. I welcome your comments and thoughts on this and any other topic you may wish to raise so please email on the following address: *geochair.rics@gmail.com*

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

New Zealand Report – Earthquakes and the Cadastre, part 1

By Roy Dale

In this, the first part of an article on the recent earthquakes on New Zealand's South Island, **Roy Dale** sets the scene with an historical overview of seismic activity on 'The Shaky Isles'.

"The road is now open and we are expecting mail in tonight. I feel that you will be looking out for news of us. Especially now that it seems from all accounts that we are in the very heart of the disaster. You can have no idea of the relief it was to hear that Christchurch had hardly suffered at all. All through that wretched Saturday I kept picturing it as a mass of ruins, and how we did long for definite news of you all. During the whole of Saturday the ground never ceased rocking, and I think it was that which gave us all such dreadful headaches – Sunday was nearly as bad." [1]

A New Zealand human interest story of recent report? Many Kiwis, well aware of the current Canterbury earthquakes, would express surprise at the date of the above extract from a letter written on 21st November, 1901. But this is not the earliest recorded earthquake in the area. An earthquake with an estimated magnitude of 7.0-7.3 on the Richter scale, struck North Canterbury on 1st September 1888, causing the first instance of damage to the spire of Christchurch cathedral[2].

New Zealand lies along the western boundary of the geologically active Pacific Ring of Fire, on the interface of the Indo-Australian and Pacific tectonic plates, and is subjected to frequent earthquakes. Not without reason, the country has been dubbed "The Shaky Isles"; few areas of these islands remain unaffected by seismic activity.

I started to write this a few months after the Canterbury earthquake of 4th September 2010, which registered 7.1 on the Richter scale. The main aim was to describe the remedies Land Information New Zealand (LINZ) had developed to repair the damage wrought on the cadastral survey network in that area. That earthquake shocked the local population, but there were no deaths, partly because it occurred at 4.35 am, and damage to most buildings was considered repairable. However, before I could conclude my article, the many-times more destructive aftershock of 22nd February 2011 struck Christchurch and the surrounding area of Canterbury again. This time there was considerable loss of life, massive structural damage to much of the Central Business District (CBD) of Christchurch (New Zealand's second city), liquefaction of the subsoil and distortion of building foundations in many suburbs making thousands of houses irreparable and severely damaging infrastructure.

"Christchurch today has something of the air of the London Blitz – not only because troops, until recently, manned the cordons sealing off the CBD and other dangerous areas[4] but because of the courage of its citizens..."

Situation in Canterbury

Malcolm Anderson's personal account of that February, lunch-time, earthquake (*Geomatics World*, May/June 2011) brings home the sheer horror of it all. Although this aftershock was of lesser magnitude at 6.3 on the Richter scale, its epicentre was not only equally shallow but much closer to the city of Christchurch. Additionally, the peak ground acceleration of the aftershock was measured at 2.2g (2.2 times the acceleration due to gravity), the highest value ever recorded in New Zealand. Two relatively modern multi-storey buildings collapsed; many of the dead were in these. Other victims were felled as they shopped, or rode on a bus. New Zealand's population is about 4 million people; in a major disaster such as this it is inevitable that many will have a link with at least one of the casualties.

Meanwhile, the earthquakes continue. On 6th June, 2011, the Queen's Birthday public holiday, yet another aftershock struck. Measured at 5.5 on the Richter scale; it was centred 22 kilometres south-west of Christchurch at a depth of 15 kilometres. Described by observers as "a bit on the large side" it was seen as a rolling wave crossing the pitch by players and spectators at a school rugby match. Amidst a number of strong aftershocks, one on 13th June, registering 6.3 on the Richter scale, at a depth of 6 kilometres with an epicentre 10 kilometres south-east of Christchurch, stands out against a background of strong tremors. It was preceded four hours earlier by an anxiety-inducing 5.6 shake. Six months later, just as Christmas shoppers were busy preparing for the much needed holiday, three more, strong, shallow, aftershocks (5.8, 5.3 and 6.0 on the Richter scale[3]) struck in the early afternoon of 23rd December 2011, unnerving the city's embattled population, causing some of them minor injuries as well as further damaging the already fragile infrastructure of Christchurch.

Now, substantial swathes of the CBD, not already reduced to rubble, are being demolished. The abandoned twenty-six storey Hotel Grand Chancellor, although of recent construction, is tilting dramatically and is being dismantled with great care. A shear wall, which should have absorbed the earthquake stresses, failed, causing one side of the hotel to settle 0.8 metres with relation to the other sides, leading to irreparable distortion of the structure.

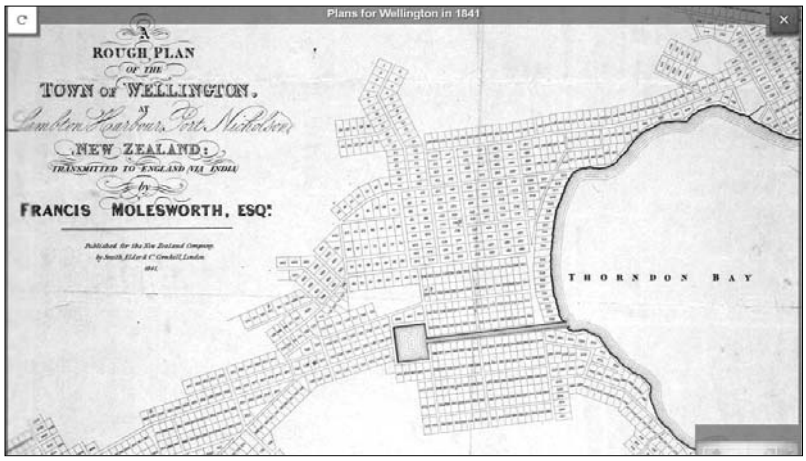


Fig 2: Part of Wellington layout plan as proposed by the New Zealand Company, London, 1841. By kind permission of the Alexander Turnbull Library, National Library of New Zealand.[7]

Christchurch today has something of the air of the London Blitz – not only because troops, until recently, manned the cordons sealing off the CBD and other dangerous areas[4] but because of the courage of its citizens, often encapsulated in gritty humour. There has been no let-up as 2012 evolves. A swarm of seventeen aftershocks in eighteen hours were recorded by GNS Science (New Zealand's geological research body) just after New Year's Day; two shakes were stronger than magnitude 5 and another six between magnitude 4 and 5 on the Richter scale[5].

Previous 'quakes

Earlier destructive events in New Zealand, where significant horizontal and vertical displacement occurred, include the Murchison quake of 1929; the Hawke's Bay quake of 1931; the Inangahua quake of 1968 and the Edgecumbe quake of 1987. Two hundred and fifty-six died in the Hawke's Bay quake or in the fire that consumed the city of Napier immediately after. Seventeen died in Murchison, a remote West Coast, South Island town. Close by, in the Inangahua quake, two died. Remarkably, nobody died in the Edgecumbe quake although railway locomotives toppled and the nearby Matahina hydro dam was damaged, necessitating a controlled draw-down of the reservoir.

One of the first severe earthquakes to strike New Zealand, after European colonisation commenced in the first half of the nineteenth century, rocked the settlement of Wellington (the present capital located on the southern tip of the North Island) in 1855. Much of today's inner city was planned in Britain by Francis Molesworth of the New Zealand Company, a private company responsible for the first European settlements in the islands during the 1840s. One distinctive feature of the city plan was a proposed broad canal from the harbour leading to a Canal Basin which was to be developed by dredging and developing a lagoon (see Fig 2). The lagoon was drained by a stream[6], which would have formed the basis of the canal. However, all this came to naught when the 1855 earthquake raised the canal area by 1.8m, transforming the lake into a swamp, making it unusable for its original purpose. Instead, the Canal Basin became the Basin Reserve, the location of many cricket Test Matches; the land for the proposed canal was converted to a (unusually for Wellington) wide thoroughfare, wide enough to accommodate two three-lane roads separated by floral gardens dominated by Queen Victoria's statue. "The Basin", as it is known colloquially, is reputed to be the largest roundabout in the Southern Hemisphere.

The 1855 Wellington earthquake, although of severe intensity, struck when the settlement was but thinly populated with most buildings being of single storey wooden construction. One person was killed by a falling brick chimney. The next severely destructive quake occurred on the 4th February 1931 in Hawke's Bay where the CBDs of Napier and Hastings were virtually destroyed, causing substantial loss of life. In Napier, a fierce fire consumed the broken buildings and their contents. At the local offices of the Lands and Survey Department (a government department that evolved into LINZ) all survey records including plans, records of surveys and certificates of title for the Hawke's Bay province were burnt to a crisp. Banks in central areas of Napier were known to house clients' personal copies of official plans and certificates of title. These were similarly destroyed.

Title guaranteed

In New Zealand, since early colonial times, title in the cadastral system has been guaranteed by the Crown. A firm foundation of the economy, confidence in individual titles lies in the evidence provided by record documents whether from the paper-based system in use at the time of the 1931 Napier earthquake or the digital system introduced in the early twenty-first century. Today, a rigorous system of backed-up disaster copies is in place.

Once the citizens of Napier and Hastings had recovered from their shock, buried their dead and witnessed the clearance of the rubble, there was a strong drive in the community to rebuild. Because of the obvious large ground displacements, it was clear to the officers of the Lands and Survey Department that extensive resurvey would be required to re-establish cadastral boundaries, preferably before reconstruction was started. Surveyors of the district were requested to provide any survey or title information that they held. Understandably, the response to this call was good; this was the time of the Great Depression; no doubt the prospect of a considerable workload would have been more than welcome[8]. The Lands and Survey Department first re-observed sufficient of the existing provincial plane surface, meridional circuit[9], triangulation network to provide the

"Today, a rigorous system of backed-up disaster copies is in place."

basis of a new network based on a new Transverse Mercator projection. In Napier and Hastings, the two major towns destroyed by the earthquake, provision of new standard (chained) traverses connected to the new triangulation was made[10]. From these, fixed-width streets and lot boundaries were re-established after forensic examination of the available evidence.

The solution evolved after the Hawke's Bay earthquake was judged not to be applicable to the recent Canterbury scenario as will be seen in Part 2 of this article[11] in the next issue of *GW*.

References

1. A letter from Bessie Giles to her mother, Emma Davie, after the Cheviot earthquake of Saturday 16th November 1901. Supplied by Dick Brittan, a descendant.

2. http://www.teara.govt.nz/en/historic-earthquakes/4

3. The first was at a depth of 8km and centred 20km East of Lyttelton, the port for Christchurch. The last was just 6km deep and centred 10km East of Christchurch. Source: http://www.geonet.org.nz/canterbury-quakes /significant.html , accessed on 6th January 2012.

4. http://www.army.mil.nz/our-army/operations/operation-christchurch-quake-2011/default.htm

5. http://www.geonet.org.nz/earthquake/quakes/recent_quakes.html Sourced on 6th January 2012.

6. Wellington City Council history website accessed at www.wellington.govt.nz/services/history and Cricket Wellington accessed at www.cricketwellington.co.nz/content/about/Basin-Reserve.

7. Reference number: MapColl-832.43799gbbd/1841/Acc.16266

8. Reconstruction of the title and survey records was made, inter alia, by provision of the Hawke's Bay Earthquake Act 1931 and the Land Transfer Hawke's Bay Act 1931.

9. Geographical area. There were 28 such plane survey meridional circuits established on the recommendations of Major Palmer, Royal Engineers, who visited New Zealand, at the invitation of the colonial government, in 1874 after repeating Cook's observations of the Transit of Venus made a hundred years earlier. The circuits still exist today, underpinning the cadastre. They are now in terms of the geocentric semi-dynamic NZGD2000. See also Blick in Technical Report No 8, "Proposal for Datum 2000 Meridional Circuits",LINZ 16th April 1999.

10. By provision of The Napier Alignment Regulations 1932.

11. Mark Smith, Mack Thompson, and Don Grant. "Re-establishment of cadastral boundaries following the 2010-2011 Canterbury earthquakes, September 2010 to June 2011", Proceedings of the Surveying & Spatial Sciences Biennial Conference, 21-25 November 2011, Wellington, New Zealand, s3.3 p9.

About the author

Roy Dale joined the Ordnance Survey in 1966, enlisting in the TA Survey Squadron in 1971. A surveyor for the New Zealand Ministry of Works from 1973-1998, he then formed Anglia Surveys Ltd. Roy was elected MRICS in 1987.

Airborne and terrestrial solutions in the Mile High City

By Adam P. Spring

A trip to Denver, Colorado (above) found our reporter at the 2012 International LiDAR Mapping Forum. From laser maps to bathymetric data, there was plenty to study. But sometimes captured data can prove all too accurate, as one presenter reported.

From January 23rd to 25th 2012, Denver, Colorado, hosted the 12th Annual International LiDAR Mapping Forum. Situated in a city made famous for being one mile exactly above sea level, this mecca for airborne sensor aficionado's continues to go from strength to strength. Even multi-sensory lawman – Riegl's **Andreas Ulrich** – rode into town to take questions and demonstrate new features in RiAQUIRE, part of the company's mobile mapping solution.

History and development

The Forum has rotated between Denver and New Orleans, Louisiana, since the inaugural gathering in 2000. A UK-run, but US-based event, the forum expanded into Europe as ELMF in 2010 – a larger conference with steady attendance figures of around 1500. Part of its evolution has included a move away from TMS International Ltd in an organisational capacity (though it is still a partner) to Intelligent Exhibitors. The Gloucestershire based company still works closely with **Alastair McDonald**, TMS International's MD and one of the original team responsible for ILMF. In 2012 Alastair took the reigns as conference chairman, encouraging questions and stimulating debate.

Growth and development

Established with airborne sensors and markets in mind, the forum has continued to evolve with the times. Over 30 presentations, 773 delegates from 30 countries and nearly 60 exhibitors were at Denver's Hyatt Regency. Rather bigger than the first ILMF in 2000, which attracted 80 delegates and 2 exhibitors.

Included in its development is a cross over into other markets, user communities and sensory applications. In line with the current industry zeitgeist of integrated technologies synergy between sensor and information flows this theme was explored to great extent (see also *GW* Sept/Oct 2011 *Hexagon's integrated technologies*). In part this was encouraged by a clear demand for combined datasets, multi-sensory work flows and common sense thinking.

LAS 1.4 and laser mapping

In the opening plenary, **Lewis Graham** set the tone for the ASPRS Hot Topics session. A supporter of ILMF, the director of the organisation's LiDAR division was well placed to go over the latest LAS 1.4 updates. Backwards compatible with older versions, this latest offering takes advantage of the fledgling terrestrial equivalent, E 57 also.

Graham went on to discuss a series of recurrent themes that cropped up over the three days. Included was the need for better and more universal guidance for horizontal data validation in aerial LiDAR capture, increased multi-sensor utilisation and multi-channel data management. Keen to reaffirm these ideas, speaker Karl Heidemann was quick to point out, 'until we know data is geometrically good we should not move on from such issues'.

Laser maps

Representing the next generation of users was **Ashleigh Turner**, an Appalachian State University Master's student. Much like **Jann Bohm**'s 2005 work on laser mapping, in which an HDS3000 was used with other data to map buildings in urban areas, Ashleigh used a GPS equipped Leica C10 to combine terrestrial and airborne data. Taking the best of both worlds, she was able to predict potential flood zones on her university campus. Ironically the technique proved all too accurate – the building she determined would flood did so shortly after the prediction!

Bathymetric data

Vegetation and canopy penetration using airborne LiDAR systems is well established and a 'loaded gun' in terms of application. The increased role such systems continue to play in river and shallow seabed information capture, however, is rapidly improving with each new development in sensor technology. In his presentation, *Collaboration on Coastal*

There was plenty to attract the record number of delegates (right) including a live band (above).

Louisiana Airborne LiDAR Acquisition, **Jeffery Danielson** was quick to point out how topobathymetric information is providing insight into past events and helping to understand and inform potential risks as part of future management strategies. Currently popular in research on areas like river basins and shallow coastal / tidal zones, it is only a matter of time before depth of capture increases. The Loch Ness Monster had better have a LiDAR cloaking swimsuit ready and waiting.

Mobile mapping

A focal point in terms of ideas and application, mobile mapping played a prominent role at ILMF 2012. With several vendors in the exhibition area, live demonstrations and vehicle tours outside, the laser mapping process was a stand out feature. Andreas Ulricht and Riegl USA's mobile mapping team played a prominent role throughout along with the myriad of players' vehicles. The absence of photogrammetric solutions like earthmine (see **Nick Day**'s *Overcurrents*, page 26) however, was unfortunate and one to invite to future events.

Motion is our friend

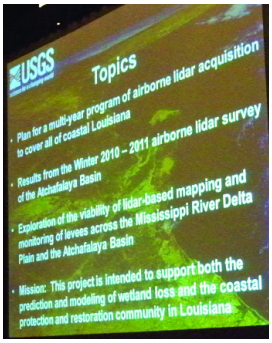
No stranger to terrestrial modes of moving data capture was CEO of Allpoint Systems and Carnegie Mellon Robotics graduate, Dr **Aaron Morris**. In a thought-provoking talk on feature extraction examples from work previously done, such as the California Transport Agency, Morris highlighted that once you know what you're looking at, the world becomes a very regular place in terms of mapping. That is, at least in terms of urban environments.

Grammy nominated exhibitors

No stranger to the irregular was grammy nominated LiDAR specialist, **Rick Yoder**. Part of the San Francisco Bay Area based company Velodyne, Rick produced the landscape scans for Radiohead's video for "House of Cards" (2007). Unphased by the rock 'n' roll lifestyle, Rick was quick to point out that the concept for the original video was greatly altered by time restrictions. In addition, what would have been classed as data noise in conventional applications was reinterpreted as artistic licence by a post MTV generation.

The kinky state

A landscape known for its mesas and mountains, Colorado is no stranger to mapping prior to becoming joint home for the ILMF. One of three states not to have a natural border – Wyoming and Utah being the other two – its shape was defined by lines of longitude and latitude. In fact a minor error in its boundaries by the original survey teams (1855 - 1961) literally makes it the kinky state. A mistake, it is hoped, that would not have occurred if present day technologies had been used.



Above, from left to right: The USGS Lousiana LiDAR programme; robotics graduate Dr Aaron Morris; Andreas Ulrich welcomes a visitor to the Riegl stand.

Hyatt Regency

The Hyatt Regency was a venue that embraced the vernacular and essence of what makes Denver unique. With 1,100 rooms, spectacular panoramas of the mountains and city as well as concierge extraordinaire **Roger Feakes**, the hotel was well equipped for three days of light fuelled geometric data capture discourse. Decorated with art from the city's vibrant arts and craft movement, the hotel presented an absolute sense of place. This was reiterated by outdoor civic sculptures like Lawrence Argent's "I See What You Mean" - or **The Big Blue Bear** as it has become known by native Coloradoans.

The Napa Valley of beer

Tuesday's social gathering was held at the Wynkoop Brewery in the city's lower downtown or 'LoDo'. Housed in the J. S. Brown Mercantile Building (1899), the bar was opened in 1988 as part of a successful redevelopment strategy for the oldest section of Denver. This, in part, was aided by a major league baseball team coming to the area also.

Since that time the Wynkoop has become a topic of conversation and springboard its owner and entrepreneur, *Time Magazine* featured Mayor and current Democrat Governor for Colorado, **John Hickenlooper**. Cited in the Denver Business Journal as the "Napa Valley of beers", the bar is the first of many brewpubs in Colorado. In fact the centennial state, nicknamed due to its formation as the 38th state in 1876, has topped the beer charts many times in the US. It still remains top of the pops in terms of beer production per capita and second in number of breweries.

Conclusion

The international LiDAR Mapping Forum 2012 was an event where the seeds of data fusion had started to emerge. Though mindsets were still centered in the (point) clouds, the possibility of a union between airborne and terrestrial systems had started to gain gravity. It is only a matter of time before what transpires in the air translates to users on the ground on a wider scale and vice versa. Either way the conference certainly brought new meaning to joining the mile high club.

> *"...once you know what you're looking at, the world becomes a very regular place in terms of mapping."*

Adam P. Spring is a reseller for Adam Technologies 3DM Analyst Photogrammetry package, freelance consultant and Visiting Lecturer on the University of Plymouth's Archaeology BSc (Hons) programme.

New Year sell-out spells success for GEO-12!

This year's GEO Event (21 & 22 March, Holiday Inn Elstree) promises to be one of the best yet. Read about all the latest exhibitors in this preview and keep an eye on www.pvpubs.com/events.php for updates and the full seminar programme. To register to attend go to: www.pvpubs.com/ events.php?action=register. Online advance registration closes 16 March!

PLATINUM SPONSORS

FARO develops and manufactures portable systems for the measurement and 3D documentation of spaces and objects. Our products permit rapid and highly precise 3D measurement for inspection, quality control, alignment, surface modelling, asset management, and documentation needs. The simple-to-use solutions are ideal for applications in various industries, including manufacturing, automotive, aerospace, architecture and civil engineering, energy and forensics. FARO currently has more than 20,000 installations and 10,000 customers globally. Principal products include the best-selling portable measurement arm – the FaroArm, ScanArm, Gage, the FARO Laser Tracker, Laser Scanner, 3D Imager and the CAM2 family of advanced CAD-based measurement and reporting software. FARO is ISO-9001 certified and ISO-17025 laboratory registered. For more information, visit **www.faro.com**.

Leica Geosystems' stand will provide an excellent opportunity to find out what's new from our innovation experts in Switzerland. Our team will listen to your needs and provide guidance as to which of our many solutions and services are most relevant to your business or organisation. You will find the Viva total stations and GNSS that are fast becoming the platform of choice for many surveyors. This is due to the performance of the hardware; the outstanding SmartWorx interface; great training and technical support. Similarly you will find the market leading laser scanners ready to demonstrate why they provide the all round flexibility demanded by the survey industry. We look forward to seeing you there!

Opti-cal Survey Equipment is a Fully Accredited Authorised Leica Geosystems Distribution & Service Partner supplying precision measurement technology to the surveying and engineering industries. The company sell, hire and service new and re-conditioned land survey and laser equipment and provide training and support. Opti-cal invests heavily in its workforce and has some of the most experienced and highly-trained service technicians in the country. With the acquisition of Swift Surveying Services, the company doubled its workforce and opened a new service facility at Pease Pottage, Crawley, near Gatwick. This service centre also provides the latest test software and equipment enabling an extremely high standard of work to be carried out. In July 2010 they further expanded by opening a third office and service facility near Milton Keynes.

SCCS is an Authorised Leica Geosystems Distribution & Service Partner specialising in the sales, hire and repair of surveying equipment. With our continued investment in Leica Geosystems technology, we offer a comprehensive hire fleet and provide a unique service to our customers. With years of experience in providing a quality service to the civil engineering, surveying and construction industries we are committed to enhancing our reputation with innovative products, solutions and services. We are the only company in the country to achieve UKAS accreditation for our EDM baseline. See us on our stand to pickup our brand new catalogue. We will be demonstrating the latest Leica imaging Total Station, 3d Disto, C10 Laser Scanner and Geo Moss monitoring software. Our representatives will be on hand to discuss any specific requirements you may have. SCCS: Call 01480 404888 or email **sales@sccssurvey.co.uk**.

GOLD SPONSORS

3D Laser Mapping specialises in creating systems for capturing, analysing and distributing geospatial business intelligence. In addition to StreetMapper and SiteMonitor, we develop bespoke solutions that enable our customers to operate efficiently in a rapidly growing geospatial marketplace. Established in 1999, our technology draws on years of experience integrating laser scanners in innovative ways. Achieving unique solutions for the mining, mapping and modelling industries and through long-standing partnerships with leading suppliers, we are able to deliver high value and dependable information to our customers.

Gatewing is a leader in the design of unmanned aerial vehicles for mapping and surveying. Based on the X100 lightweight aircraft, Gatewing built a remote sensing solution that consists of image acquisition, field operation and fully automated image processing. The X100 has an on-board, calibrated camera which captures images with a resolution of 5 cm at a default altitude of 150m. The X100 fills the gap between traditional terrestrial surveying and conventional photogrammetry. Gatewing also offers Stretchout, highly-automated software that converts your raw X100 image data set with just a couple of clicks in high quality orthophotos or digital surface models.

GeoMax is internationaly active and provides a portfolio of integrated instruments for the surveying, mapping and construction industries. Both occasional and professional users are addressed with an easy-to-use, yet highly productive, range of Total Stations, GPS, Lasers and Levels. GeoMax is part of the Hexagon Group, Sweden: a global technology group, world leader in multidimensional measurements within the measurement and positioning market. This cooperation grants GeoMax access to state-of-the-art development and production facilities in Europe, America and Asia. This enables GeoMax to focus on delivering products that "work when you do" by optimising quality and productivity. During GEO-12 GeoMax will introduce, amongst others, its new ZOOM80 Robotic and Zenith10/20 flexible GNSS receiver solutions to the UK Survey market.

Handheld are a leading supplier of rugged mobile computers and one of the fastest growing companies in this sector. Our products are widely used in mobile field and vehicle applications. All Handheld products have the memory and storage capacity to handle the most demanding field or industrial applications, carry high IP-ratings, meet stringent MIL-STD-810F/G military standards for withstanding water, dust, drops, vibration and extreme temperatures including sunlight readable displays. With over 20 years' experience and a strong network of global Business Partners in multiple vertical markets, Handheld supply complete mobility solutions to the public transportation, logistics, geodesy, construction, field service, forestry, military, and public sector and forestry industries. For more information and contact details to offices throughout the UK, Europe, the US and Asia Pacific visit **www.handhelduk.com** / **info@handhelduk.com**

Hemisphere GPS is pleased to introduce the new S320 family of land survey RTK receivers. Based on the popular Eclipse dual frequency GPS/GLONASS receiver technology, the S320 is a Canadian-made high-specification survey receiver system, which incorporates UHF radio, GPRS modem, SD card logging at an affordable price level. The system is stocked and supported in the UK by the European Distributors Saderet Ltd. and UK Dealer, GNSS Solutions who offer demonstrations and user training.

Landmark Information Group Envirocheck, a Landmark Information Group service, provides site-specific digital mapping, property and environmental risk information. Envirocheck Export satisfies the growing demand for digital data and the flexibility that this format offers for large and complex projects. Export provides a fast, flexible and efficient online service catering for all your digital mapping and data needs in a range of formats for GIS and CAD systems. Offering a range of current and historical mapping, planning applications, constraints data, local plans and aerial photography, Export removes the need to digitalise features of interest by hand and your requirements are met with the convenience of a single portal. www.envirocheck.co.uk.

MBS Survey Software GEO-12 sees MBS Floorplans v5.40 go live! This is a substantial new release, with in excess of 25 new features. These offer excellent workflow improvements for the large number of tablet computer users. A significant new feature is the ability to add a Ceiling or Floor Grid and its subsequent interaction with symbols. Other significant features include modification to the stairs and beams functions, as well as some significant quality assurance features; including the exporting of cross-braces into the .dxf file and a tolerance flagging tool. We will be demonstrating these new features, so please come along to our stand!

NCTech are developers of unique panoramic camera technologies that enable the capture of a location instantly, automatically and accurately in full 360 degree high resolution, without the need for prior photographic skills or experience. NCTech's immersive imaging systems deliver state of the art but affordable solutions for high threat security and emergency response planning. Further, the ability to "pre-visualise" a location provides a valuable tool to multiple industry sectors, including

Military, Police and Homeland Security, Construction, Engineering and Heritage Documentation.

Ohmex will present the new SonarMite MTX multiplexed echo sounder system for use in shallow water hydrographic surveying. The system combines three individual depth measurements into one stream of data. This portable lightweight system gives wider data coverage per boat pass than one singlebeam echo sounder without the associated problems of using a multibeam system in shallow water. Using three SonarMite active transducers the narrow beams pass vertically through the water column avoiding the measurement refraction error inherent in 'side' shots from multibeam systems particularly in turbid water conditions. Described as the "mini sweep" system, the unit is supported by new drivers in the Hypack data collection and processing software. The equipment on display will include the combination of the echo sounder with the Trimble SPS461 RTK dual antenna GPS, which provides the software with accurate position, roll and heading information.

Positioning Resources will demonstrate the latest products from Ashtech, including the latest laser technology for the TruPulse range, the 360R. The MobileMapper 10 is the latest compact lightweight, rugged and accurate receiver. The MobileMapper 100 is capable of delivering down to one centimetre accuracies even in extreme GNSS environments. Equally impressive is ProMark 100, a versatile post-processing solution designed for efficient land survey. All products can be utilised with our GIS/Mapping software PocketGIS, which gives users powerful mobile GIS functionality on their portable devices. These products will be complimented by the TruPulse Laser Rangefinders and a range of mobile computers.

Z+F UK Laser manufacture phased based laser scanners for many sector of industry and OEMs. The IMAGER 5010 is their most advanced phased based 3D laser scanner with reliability and quality synonymous with Z+F's build reputation. Our IMAGER EX remains the only intrinsically safe phased based scanner available. The Profiler 9000, a 2D laser scanner running at 200Hz, will be launched shortly, offering greater speed & accuracy for mobile mapping. Z+F supply a complete suite of software for many applications incorporating LRC and LFM brands for numerous CAD applications. For colour mapping we can offer a number of options. The M-Cam displayed can supply automated functions to speed up the data capture and laborious mapping process.

SILVER SPONSORS

Applications in CADD (AiC) will launch a stand alone version of 4Site, our DWG (AutoCAD) data capture software. This negates the need for a full copy of AutoCAD. 4Site is also used for specialist data collection applications in rail surveys, hydrographic surveys and dimensional control. Our n4ce software will be on show with new features. It comes in 4 editions with functionality and prices to meet every user's needs and pocket. The Lite versions onward have an integrated CAD editor, supplementing survey mapping and ground modelling making n4ce a field to finish product, with contours, sections and volumes. Sections are plotted with user definable tables in paper space or in model space. Exports to AutoCAD are via DXF, supporting paper space/model space Drawings with Viewports.

C.Scope International Ltd, a manufacturer of Pipe and Cable Location equipment, will be exhibiting it's new range of Data Logging Locators. For the first time, a C.Scope Locator, that is capable of pinpointing the location of buried pipes and cables, can be linked wirelessly to GPS survey equipment. This allows the position of the detected pipes and cables to be recorded instantly rather than the time consuming 'two-stage' process of detecting the buried services and marking them on site and secondly returning to record those marks with survey products.

GeoPlace, a public sector limited liability partnership between the Local Government Association and Ordnance Survey, creates and maintains the National Address Gazetteer Database and National Street Gazetteer for England & Wales, providing definitive sources of publicly-owned spatial address and street data. Through agreement with Scotland's Improvement Service Company, the plan is to extend the coverage to Scotland. The National Address Gazetteer Database is the data storage and internal set of processes bringing together the local authority sourced Local Land and Property Gazetteers with Ordnance Survey, Valuation Office Agency and Royal Mail data. AddressBase™ products are produced from the National Address Gazetteer Database and made available by Ordnance Survey.

Mapping Solutions Ltd is the distributor for the ILRIS terrestrial Lidar manufactured by Optech Inc.. ILRIS is a compact, battery-powered, fully portable and highly integrated package with digital image capture and sophisticated software tools, ideal for the commercial survey, engineering, mining and industrial markets. ILRIS has the highest dynamic range available on the market: from 3 m to beyond 3 km. With our extensive expertises in ILRIS scanner and Hyperspectral camera system we can provide you with a combined terrestrial laser and hyperspectral scanners solution, which allows you to not only to 3-D view your area of interest but to look at its chemical and physical properties as well.

Penmap.com is launching the Flint S-series, the world's first GPS+Galileo handheld receiver to provide sub-meter accuracy in a 230g lightweight, ruggedised housing, running Windows Mobile 6.5 and Penmap Mobile Geodata software. Penmap encore v8 is the next generation of a Digital Plane Table with interfaces to AutoCAD, ESRI and other CAD and GIS packages, powerful interfaces to Leica TPS Flexline and TS15 Viva Robotic series and the free Penmap Cloud service. This offers an easy Share & Backup service for your field data to review, edit and print your field survey on any PC or Mac and iPhone / iPad while your field crew is still on-site.

Phoenix Surveying & Safety Equipment is a leader in the hire, sale and repair of surveying, construction and safety equipment. They will be joined by **Topcon**, with a raft of exciting new surveying technology for 2012. The new GR5 GPS receiver featuring Topcon's patented Fence antenna provides industry-leading tracking sensitivity and multipath rejection. The MS01 and MS05 measuring stations are built for high precision, remote monitoring over prolonged periods in the harshest of conditions. Magnet is a new family of cloud based software applications which allow users to store and access all project data, connect with each other on the field, and exchange common office files through the enterprise cloud. Also on show will be two new revolutionary Total Station models promising a leap forwards in surveying.

Spheron VR On display will be Spheron's latest HDR (high dynamic range) – photogrammetric camera systems. We will also display Spheron's SceneWorks business division's technology – a solution for onsite visual scene documentation. The solution allows for the integration of these HDR spherical images into a comprehensive visual database. SceneWorks have tailored solutions for areas such 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.

Stanburys provide building & topographical, condition, 360° spherical photographic and thermography surveying. As official distributors for FLIR Systems infra-red thermal imaging cameras, we announce the re-launch of the introductory i-Series camera range and incorporated features on their suite of thermal imaging cameras. Andrew Baker, FLIR says: 'The technology can be used to visualise energy loss, detect missing or defective insulation, source air leaks and find moisture. It's ideal for detecting pipe leaks, under floor heating problems or mould build-up and locating thermal bridges or leaks in flat roofs. The technology is equally suited to inspection of electrical and mechanical systems and certain camera models can be used to capture dynamic events'. FLIR's cameras are ergonomically designed and software is windows based for accurate analysis and evaluation of thermal inspections. Stanburys offer technical training in thermography.

Virtalis is a virtual reality & advanced visualisation company. Our systems allow understanding of complex information, from maps, photogrammetry and boreholes to GIS source data. Interaction becomes easy when using *GeoVisionary*, fostering communication between teams, senior management and other stakeholders. Our technology helps many market sectors, including academics, utilities, power, research bodies, engineers, geoscience, geotechnical, retailers, military, security, mining, oil/gas exploration and geologists. Our mission is to demonstrate that advanced visualisation, simulation and VR offer a valuable return on investment, providing tools to improve the competitive position of our clients in the marketplace. Virtalis' stand will have a 50" 3DTV showing GeoVisionary running a geological model of the UK, entire model of Mars & point-cloud model.

Industry Sponsors

Association for Geographic Information is the UK national membership body for all with an interest in GI. Membership comprises individuals & organisations, including government departments & agencies, local authorities, other national organisations, educational institutions, utilities, commercial software companies and data suppliers.

British Cartographic Society provides a forum for sharing knowledge and passing on the cartographic skills associated with all aspects of mapping. When there is pressure to cut projects or spend less, the ability to learn from others and apply best practice is paramount.

Royal Institution of Chartered Surveyors is the largest organisation for professionals in property, land, construction and related environmental issues worldwide. We promote best practice, regulation and consumer protection to business and the public. RICS offers the chartered designations of Land, Hydrographic & Engineering surveyor within the geomatics faculty.

OGP Geomatics updates guidelines:
GNSS, surveys, data models and more

The International Association of Oil and Gas Producers (OGP) Geomatics Committee has recently launched four documents that will be essential for those working in the industry whilst also being of interest to the rest of us writes **Richard Groom**.

The use of global navigation satellite systems (GNSS) for positioning is critical to the success of a wide variety of oil and gas-related surveying and positioning projects.

The new *Guidelines for GNSS Positioning in the Oil and Gas Industry* reflect the pervasive nature of the technology and the fact that GNSS is no longer specifically for the offshore industry. Though titled for use in GNSS surveying and positioning-related activities for the oil & gas industry, it could also be applicable to similar operations in the service of renewable energy, telecommunications and engineering projects both offshore and onshore.

The new Guidelines consist of seven sections. These include:

- *an introduction summarising the global navigation satellite systems available and the observables*
- *the relative and absolute positioning systems and techniques available and*
- *updated coverage of the augmentation services that are now available from a variety of providers.*

Practical guidance is also provided in sections dealing with installation and operation issues, geodetic considerations and atmospheric and other environmental influences.

Importantly, the new guidelines retain recommended measures for assessing the quality of GNSS position fixes. The section on quality assessment and statistical testing includes examples and provides a comprehensive overview of the recommended statistical testing and quality measures based on the so-called Delft method. There are also sections covering the recommended competence of operators and users as well as the various common data formats used for the exchange of positioning data.

Accurate positioning of oil & gas exploration and production rigs is critical.

Guidelines for the conduct of offshore drilling hazard site surveys

A properly-conducted drilling hazard site survey for an offshore drilling location is essential. It minimises the risk of harm to personnel and equipment and helps to protect the natural environment.

The new guidelines for the conduct of offshore drilling hazard site surveys describe oilfield good practice for conducting geophysical and hydrographic site surveys of proposed offshore drilling locations. The document also covers the use of exploration 3D seismic data to enhance, or to replace, acquisition of a site survey.

The guidelines explain the requirements that different types of offshore drilling units have on a site survey. Emphasis is also given to the differing site survey requirements of shelf and deep-water environments.

The guidelines summarise the objectives of site surveys and the site survey process, providing suggestions on all the phases of a site survey. These include initial desk studies and planning, data requirements and geohazard analysis and reporting.

Associated technical notes, to be published separately later this year as OGP Report No. 373-18-2, will provide supporting technical information and background theory on the various phases of a site survey project and on the vessels and equipment used to acquire site survey data.

These guidelines are applicable for the conduct of offshore drilling hazard site surveys. While they do not set out to directly address planning and delivery of other types of survey projects, the techniques described may also be applied to other types of seabed surveys, such as pipeline or cable route surveys, etc.

Seabed Survey Data Model

Version 1 of the data model was launched at last year's Esri Petroleum User Group conference. The data model has been in preparation since January 2010 with the support of oil and gas companies, survey companies and software vendors.

The aim of the data model is to:

- Facilitate a streamlined workflow for managing seabed survey data for oil and gas companies.

- Provide a consistent data model to enable simpler integration of seabed survey data.
- Enable the simpler exchange of seabed survey data with joint venture partners.
- Provide an industry data model that survey contractors can use for providing seabed survey deliverables.

The Seabed Survey Data Model (SSDM) is an industry template/standard for how seabed survey data is delivered to and then managed by oil & gas companies. The main areas of SSDM application are platform and drilling hazard site surveys, sweep and bathymetric surveys and pipeline route surveys.

Various data types are collected and interpreted from seabed surveys such as shallow geohazards, seabed features, sediments, environmental samples, and bathymetry and survey project details.

The Seabed Survey Data Model comprises:

- OGP Technical Guidance note.
- ESRI geodatabase template.
- Data dictionary.
- ESRI symbology stylesheet.
- Conceptual data model diagrams.
- FAQs document.
- User and contractor guidelines.
- Corporate database (ArcSDE) implementation guide.

Improving geospatial integrity within geoscience software for oil and gas operators

Thanks to a newly-launched initiative by the OGP, geoscience software developers and users will be able to rely on an industry best practice for evaluating the geospatial integrity of their software. Geospatial Integrity for Geoscience Software (GIGS) is a process developed in response to concerns arising from violations in the geospatial integrity of data when using geoscience software. This has led to inaccurate results and ambiguities for the user community. Integrity issues such as these will be of concern to the oil & gas industry. As a consequence, the OGP's Geomatics Committee launched the GIGS review process as a way of mitigating such risks.

GIGS can make a qualitative evaluation of any software's geospatial capability by means of a series of checklists, and perform a quantitative evaluation using approved test data sets. Software vendors, developers, clients, and users can all benefit from the results of a GIGS review.

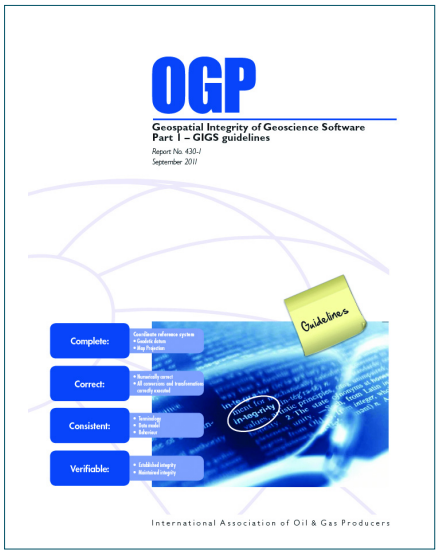
The need for GIGS has become evident during the past decade, as over 95% of the industry's data is spatially referenced. In 2007 a Joint Industry Project (JIP), comprising a significant number of major oil & gas E&P companies, together with smaller regional operators, initiated a study to provide geoscience software developers with recommended guidance concerning industry best practice for ensuring geospatial integrity. This resulted in a number of international workshops.

The JIP delivered its findings to OGP in mid 2010. The Association's Geomatics committee refined this work into three documents, each supplemented with additional files, as described below:

- ***Part 1 – Guidelines*** (OGP report number 430-1), describing the GIGS process. This guidance note is supplemented by a companion MS PowerPoint slide pack (with notes) 'GIGS Overview.ppt' explaining the GIGS process and business benefits.

- ***Part 2 – Software Review*** (OGP report number 430-2), containing a software review checklist to enable structured testing of geoscience software. This software review document is supplemented by an MS-Excel spreadsheet version of the checklist, 'GIGS Checklist.xls', intended to facilitate the execution of a geoscience software review and capture its results.

- ***Part 3 – User guide for the GIGS Test Dataset*** (OGP report number 430-3). This user guide supports a series of data files – the GIGS Test Dataset – to be FINAL version 10th October 2011 used for testing of the algorithms and data exchange capabilities of the geoscience software.



Above: *published by the OGP's Geomatics Committee in three parts, guidelines are laid down for geospatial integrity in geoscience software.*

> *"GIGS can make a qualitative evaluation of any software's geospatial capability by means of a series of checklists, and perform a quantitative evaluation..."*

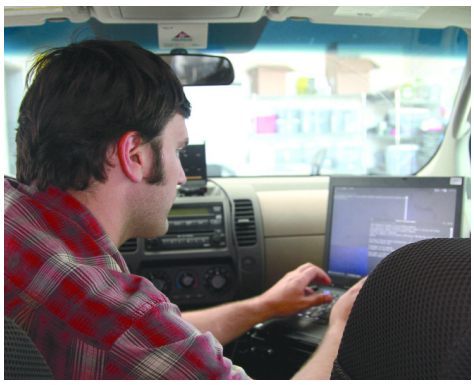
About OGP

The International Association of Oil & Gas producers (OGP) is a unique global forum in which members identify and share best practices to achieve improvements in every aspect of health, safety, the environment, security, social responsibility, engineering and operations.

OGP encompasses most of the world's leading publicly-traded, private and state-owned oil & gas companies, industry associations and major upstream service companies. OGP members produce more than half the world's oil and about one third of its gas.

The Geomatics Committee plays an active role in publishing guidelines and standards. These can be downloaded free of charge from the OGP website: **http://info.ogp.org.uk/geomatics/**
For further information, **contact abby.findlay@ogp.org.uk**

International Association of Oil & Gas Producers



Mining the streets for data: how *earthmine* is modelling cities

by Nick Day

The growing demand for metric 3D street data from around the world is continuing to provide opportunities for start-ups as well as established firms. Our US correspondent takes a look at Berkeley California based *earthmine,* already capturing data at 1-2cm accuracy.

I consider myself rather lucky living at the hub of both today's and yesterday's hi-tech revolution. I'm surrounded by such companies as Intel, HP, Cisco, Sybase, Apple, Pixar, Google, Facebook, Yahoo, Autodesk, ESRI, Twitter, Microsoft Bing, and NASA Ames, to name but a few. I always hope a little knowledge will rub off by osmosis, but keeping up with change is a 24/7 process. As respected guru **Ben Bajarin**, director of consumer-technology analysis & research at Creative Strategies Inc, put it, "One of the things you learn living in Silicon Valley your whole life is how fast things can change. Big companies can come and go in extremely short periods of time. Yahoo! was once what Google is today. MySpace was once what Facebook is today. Innovation happens everywhere and waits for no company." One entrepreneurial company I've been following for some time now is barely a stone's throw away.

Mining his own business

Founded in 2006 by **John Ristevski** and **Anthony Fassero**, Berkeley-based earthmine inc is a street-level, 3D mapping company devoted to "indexing reality," and providing hosting and software solutions. They use technology licensed from the Jet Propulsion Laboratory (JPL) to capture 3D data at regular intervals while driving. Collection is accomplished using the same wide-angle stereo imaging technology from the Mars exploration rovers; a system that employs a set of cameras that can be mounted on the roof of an SUV, or one of earthmine's custom pedestrian area platforms, such as a tricycle.

earthmine build their own cameras, but use Sony's CMOS sensors, widely considered the industry leader. This is a direct challenge to the likes of Google and Microsoft with new maps that provide 360-degree panoramic views of city streets, and at far greater accuracy when required. The collected data is processed to create a library of 3D panoramic imagery, from which measurements can be made. Users simply point and click on objects depicted within the panoramic view, generating 3D coordinates for entry back into the database. A set of tools allows users to access data through a flash application or a smart phone.

An Aussie, with degrees in Geomatics Engineering and Law, John was pursuing a PhD and working on GIS systems and laser scanning at UC Berkeley when I first met him a few years ago, along with **Simon Barnes** and **Chris Gray**. He then had a spell with CyArk, the philanthropic organization set up by Cyra Technologies' founder **Ben Kacyra**, and a stint lecturing at Stanford University, before venturing out on his own. Shortly after setting up earthmine, Chris and I had another chance to visit him and Anthony to take a ride in one of their Nissan SUVs for a demo mapping of a street near their office. An on-board laptop in the passenger seat showed acquisition in real time. Soon after being back in their office, one of their CAD guys had downloaded the data and we were seeing 3D images and measuring distances on the screen.

Case study symposium

Late last October, I joined earthmine, some of its world partners (Autodesk, ESRI, etc), and end users, for presentations at the Berkeley Marina Doubletree Hotel. Kicking off the meeting, Anthony Fassero outlined where the company had been and where it was going. Perhaps their largest project to date has been mapping 150 French cities for the *PagesJaunes Group* (French Yellow Pages). UrbanDive is a local search platform that provides users with a new way to explore their geographic and social environments; it combines content from PagesJaunes, Mappy, Allocine.com, Expedia, Evene.fr, Fnac and Qype, presenting them with a wealth of information they can navigate and explore from a street level perspective.

earthmine's software suite and data provide the foundation for the UrbanDive experience. In their turn, and showing the value of the data, PagesJaunes have been able to resell the mapping to cities for GIS applications. Mapping of the streets was at 32Mpx, with 8 million 3D points per image; a higher density than LiDar. Measurement accuracy can vary from 10mm to 10cm depending on distance from the cameras. Global accuracy is always

Key features of earthmine's system

- **High resolution panoramic imagery and 3D point data for every pixel.**
- **32 Mpx 360° (H) × 180° (V) stereo panoramic imagery.**
- **Wide angle 360° (H) x 165° (V) 3D data capture.**
- **Up to 8 million 3D points per image and 24 million points per second (scene dependent).**
- **High accuracy global position and orientation sensors.**
- **Self-calibrating metric cameras for robust field operation.**
- **Easy-to-use earthmine Capture Control software for controlling data collection.**
- **Flexible mounting system for deployment on vehicle or pedestrian platforms.**

sub-metre and typically less than 30cm. In good collection conditions, absolute best accuracy is <20cm, and relatively, within a given scene, John tells me they achieve 1-2cm.

Anthony then highlighted the asset management schedule they provided to the City of San Francisco after spending three weeks mapping over 1200 miles of streets; this used 1.4 terabytes of capacity. The Fire Dept found the ability to determine building heights extremely helpful. Entire cities' infrastructure can be stored and accessed, with earthmine's cloud server based on Amazon's web services. Add-ons work seamlessly with ArcGIS 10, as do apps for iPhones and iPads.

Julian Ware, with Oakland's GIS unit, gave an excellent overview of the myriad uses his city has found for earthmine's imagery. One has been the rapid evaluation of ADA (Americans with Disabilities Act) accessibility, i.e. where wheelchair ramps are needed, and whether existing ones are in compliance. The City Attorney's office expressed extreme confidence in the data and that it provides date and time taken. Oakland has over 400,000 residents and covers 79 square miles; there are 900 miles of street centerlines, and 20,000 curb ramps. A 2006-07 citywide sidewalk survey, that involved sending people out on the street, cost $1.2 million or $1100 per mile; the earthmine survey for the same area was less than $100 a mile or about 1/10th of the cost! (Note: for very large projects, >10,000 miles, costs can go below $50 a mile). Julian stressed four important features:

- **all about visual cues**
- **helps leverage the environment – people comfortable with Wii/PS3, but not GIS, can now relate and incorporate**
- **topology is important, as is relationship and the fact everything is there, rather than accuracy (6" good enough for them)**
- **flexibility of system for future directions.**

One unexpected benefit to the city, of mapping combined with social networking media, has been crowd sourcing. Members of the public have been "Tweeting", texting, or calling the City's GIS department when they see street lights out, graffiti, illegible signs, or whatever. A map of the area is instantly brought up, the problem noted, and an immediate electronic work order generated for a crew to go and fix. This boosts the maintenance depts efficiency and productivity, not to mention public confidence that concerns are heard, action is being taken, and tax dollars are spent wisely. Permit tracking and code enforcement has also been a valuable use for the system. The nuts and bolts of Oakland's system are: earthmine Cloud v.1.1.1, ESRI ArcGIS 10 SP-2, and Oracle 10g database.

Oakland's traditional approach was records and field-based, which is time-consuming, requiring several site visits, and a large backlog of as-built updates. Using earthmine Add-in for ESRI, a visual assessment takes <1 min per intersection, ramp edits take about 2 mins, and data delivery is immediate into Enterprise Geodatabase.

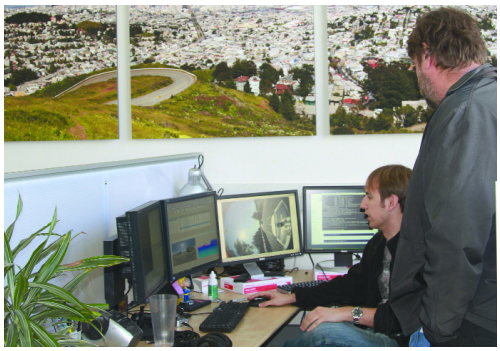
Above: *Anthony Fassero, Chris Gray and John Ristevski discuss the capabilities of earthmine's camera array on the Nissan SUV.*

Ken Huisman, MGIS in San Diego, started off his case study by saying there was a downside to earthmine and its system. We waited with bated breath! Turns out they had a large road mapping project in Hawaii to determine pavement condition and need for repairs. With traditional mapping he would have needed an initial site visit, with a follow-up check on whether all required data had been collected. As it was, he was done out of staying at a nice hotel, and sipping Mai-Tai cocktails under swaying palms at the end of the work day. So, is technology the ultimate "kill-joy?"A discussion in itself for another day!

The mapping procedure was to run along streets one day in one direction, then next day in the reverse direction. This not only provides more accurate GPS results, but allows mapping areas missed the first time due to parked vehicles, and interpretation of data due to adverse lighting conditions and reflections. We were shown this on screen where in some areas pavement cracks were not clear, but in the reverse direction were pin sharp.

Right: *Ken Huisman, MGIS, San Diego, describes how they did pavement mapping in Hawaii.*

Far right: *Julian Ware of the City of Oakland's GIS dept presents an in-depth case study.*



Back in the office data is downloaded by a CAD operator. A panorama of photo data can be seen on the wall behind.

***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*

Add-ons and Apps

The company's products include: earthmine SDK for Flash, which enables interaction with real spatial information all within a web browser; earthmine API, a customizable and programmatic way to access a library of street level imagery and 3D data for custom applications, such as batch imagery requests and precise georeferencing tasks; earthmine SDK for iOS for integrating street level 3D data into iPhone or iPad applications; and earthmine Server, which allows organizations to host and manage the earthmine platform on their own servers.

Map 3D features can be accurately displayed on top of the panoramic imagery via direct integration between products, thereby truly integrating GIS, CAD and earthmine data into a seamless solution. Several clients that had used the ArcGIS plug-in, and combined their existing GIS with the earthmine system, thereby moving assets to where they truly belong, found they'd been off by up to 200 feet compared to Google Streetview. Streetview isn't metric, and there's no guarantee of quality or any accuracy standard.

Current users and the future

Earthmine currently has 26 value-added resellers in 14 countries, and an exclusive partnership with the JPL and Caltech (California Institute of Technology).

Uses are only restricted by one's imagination, but so far the company's products have been applied to engineering and construction, city infrastructure management, R&D, real estate, architecture and design, insurance, local search, homeland security, emergency services, disaster management, transportation and mass transit, urban planning, utilities, and travel markets.

earthmine maintain that their solution is the only metric 3D panoramic system with a corresponding XYZ data point for every pixel in every image, one where users can take measurements between any two points to get real-world length, width, and height information, or string together multiple points for perimeter, and area calculations. By combining high fidelity and resolution panoramic imagery the result is quantifiably more than just pretty pictures. They feel their spatial platform is ideally suited for use as a precise 3D reference dataset for localizing the viewpoint of camera-equipped mobile devices, to enable augmented reality applications.

A fascinating morning out, and a company I shall be watching closely for future developments.

What the papers are saying

GW is a professional journal and acknowledges that around the world there are similar publications that publish articles and papers that will be of interest to readers. **Richard Groom** offers an edited selection.

"…It produces 700 bachelor geomatics graduates, 300 masters graduates and 70 PhD graduates every year!"

Secrets of the Sunstone revealed

One of the great mysteries of navigation is the means by which the Vikings were able to navigate across the North Atlantic without compasses. The sun is the obvious answer, but how does that help during the endless twilight of the winter months and when the sun is obscured by clouds? Following the discovery of an Iceland spar crystal on a wrecked Elizabethan ship, **Guy Ropars** et al have studied the optics and undertaken experiments to show that such a crystal can be used to determine the direction to the sun to within a few degrees, even under overcast and twilight conditions. For more, visit the Royal Society website, where Ropars's paper can be downloaded:
http://rspa.royalsocietypublishing.org/content/early/2011/10/28/rspa.2011.0369.abstract

Internet-based GPS processing tested

The October 2011 issue of *Coordinates* (www.mycoordinates.org) had an article by **Harun Kenan Subasi** and **Reha Metin Alkan** from Istanbul Technical University which compares the performance of three internet-based GPS processing services.

For all services, the surveyor collects data using his GPS receiver and then sends it to the service where the baselines are calculated from continuously operating reference stations (CORS) and the results returned. These services have the advantages that the surveyor does not need processing software and only needs one GPS receiver. The danger of errors arising through inexperience is also greatly reduced. All services are free of charge.

The Online Positioning User Service (OPUS) is operated by the American National Oceanic and Atmosphere Administration (NOAA). It calculates the baselines from three CORS stations in the US or three IGS stations if used elsewhere. Computations are by PAGES software.

The Australian online GPS processing service (AUSPOS) from Geoscience Australia computes baselines from the three nearest IGS stations and takes into account precise orbit data, earth rotation parameters and position vectors of the IGS stations. The service uses MicroCosm processing software.

Scripps Coordinate Update Tool (SCOUT) is provided by California University. The service uses GAMIT software to calculate baselines from three user-selectable IGS stations.

The study used GPS data from Turkish CORS collected in 2008. The researchers used BERNESE software to compute the coordinates of their GPS receiver and compared the results with those from the three online services. They are tabulated in the paper and all came within 22cm in plan. However, to obtain sub-decimetre accuracy in height, the authors recommend that at least two hours of data are required.

International University Rover Challenge

The Fall issue of *Ontario Professional Surveyor* carried an article by **Jordan Bailey** and **Shailja Sahani** about the York University Rover Team, which was a national winner at the International University Rover Challenge, a project of the Mars Society (http://urc.marssociety.org) – the website is worth a visit. Every year the team builds a new rover for the competition and achieved first place in 2009. This year the team intends to enter NASA's Lunabotics Mining Competition.

The world's biggest Geomatics faculty

GIM International published an interview with Professor **Liu Jingnan** by **Durk Haarsma** in its November 2011 issue. Prof Liu was head of Wuhan University from 2003 to 2008. This is an interview packed with startling statistics.

The university has three schools engaged in geomatics education. It produces 700 bachelor geomatics graduates, 300 masters graduates and 70 PhD graduates every year! China has a 100 universities providing geomatics education; the annual output is 7000 bachelor geomatics graduates. If those figures are not sufficiently mind-boggling, it is estimated that over 400,000 people are employed in geomatics in China.

Bilby towers and Lake Pogamasing

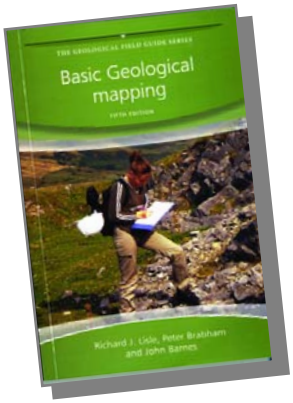
For surveyors interested in history, *American Surveyor* had an article on Bilby Towers in Volume 8 No 4 of 2011while *Ontario Professional Surveyor* had historian **Andy Thomson** describing the critical role of early surveyors in the opening up of Canada. For more visit:
http://www.aols.org/lib/db2file.asp?fileid=11243

The Elevation Certificate Translated

For surveyors who have been trying to introduce insurance companies and government to the importance of building floor levels when assessing flood risk, there was a two-part article in *American Surveyor* Volume 8 No 5 and No 6 of 2011. The first part is of greatest interest as it provides an insight into how the Americans manage insurance of flood risk and highlights the key role that surveyors have to play. The authors bemoan the poor quality of survey work currently presented but give some useful hints on how to do the job properly. They also warn of the possible consequences for the profession of complacently conducted work. On a humorous note, the authors advises that latitude and longitude of the property being surveyed needs only to be correct to within "four poles"!

Basic Geological Mapping, Fifth Edition

a straight-forward read, packed with detailed information spiced with a little humour



By Richard J Lisle, Peter Brabham and John Barnes. Wiley-Blackwell, 217pp, p/back, £22.50 ISBN 978-0-470-68634-8

This is a "how to do it" book and excels in being a good straight-forward read, packed with detailed information and advice, spiced with a little humour here and there. Some of the advice seems straight-forward and is certainly based upon experience. It seems that geologists are just as capableas the rest of us of heading for the field having left their common sense at home!

This reviewer's knowledge of geology was never much more than sketchy and is now hazy as well, but it is clear that geology is the purpose of book and that the geological information is all sound stuff.

When it comes to mapping, the traditional techniques are well covered, although map projections are dealt with in a paragraph that rather loses its way. Much of the coverage of newer technology is sound although there are a few errors and omissions. In particular, the section on autonomous GPS does not discuss the pitfalls that can ensnare the unwary in transforming between WGS84 and the national mapping coordinate system when using a high street GPS receiver. It does, however, stress that GPS receivers don't work under trees or in canyons.. The text dwells on DGPS because geologists typically work at a scale of 1:10,000 or smaller. Indeed, the book is clearly intended to be a handbook for small scale geological fieldwork and mapping, but the authors have been tempted to stray into larger scales bordering on the geotechnical. Perhaps it would have been better to have a 'further reading' chapter on large scale geological mapping. This would have been a more fitting home for discussion of more precise GNSS positioning techniques than the main text. A table showing the accuracy of the various GNSS methods would also have been useful.

This is the 5th edition of a book that was first published in 1981. Sometimes, one feels that revisions of earlier works are too reverential towards the original authors by retaining the structure of the original text and bolting on additional material. Although this work is fairly seamless, there are some anomalies. For example, aerial photography and derived photographic products are covered in the chapter on topographic base maps, whilst LiDAR, radar, levelling, total stations and DGPS are given rather sketchy coverage in a chapter entitled "Technological Aids to Mapping", which has a rather 'toys for boys' feel about it. Clearly, one would not start looking at LiDAR during or after having completed the fieldwork, so perhaps aerial photography and LiDAR should have been covered in a chapter on research of available data and preparation for fieldwork.

For the other techniques mentioned, coverage is thin, boarding on misleading. Simplification does not necessarily mean introducing errors, and when the authors stray into territory that is not really theirs, they would have been well advised to find a man (or woman) who knows, or to refer to other documents – such as the RICS client guides.

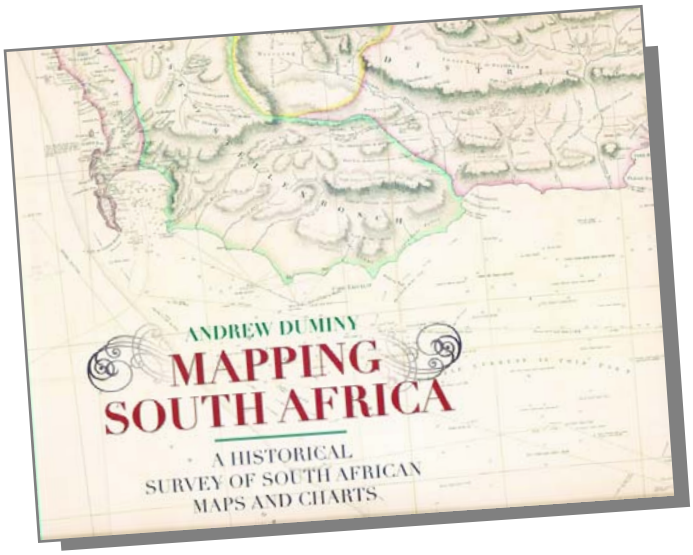
The recording of geological information in the field in field-books using sketches is sensible, but it is surprising that tablet computers are barely given a mention. One would have thought that the merits of a GPS-enabled tablet loaded up with topographic base mapping or even Google Earth would at least be worth discussing.

After the field expedition is over, the geologist has to fair draw his map, cross-sections etc. Again, although the text mentions computer aided mapping (in a rather archaic way), the emphasis is on fair drawing by hand.

Reviewer: Richard Groom

Mapping South Africa, a historical survey of South African Maps and Charts

acceptable as a coffee table book but otherwise a catalogue of errors



By A Duminy. 2011. Jacana Media (Pty) Ltd. Auckland Park 2092. South Africa. 136 pages. Numerous colour maps. ISBN 978-1-43140-221-2. Price. South Africa R236 = approx. £22 but variable figures apply.

When this book came my way the initial reaction was that it was well produced and should be both informative and interesting to read. How wrong can first impressions be?! One should only be influenced by the substance of a book, not its cover.

The chapters cover the Measurement of Latitude and Longitude; Early explorers and their maps; The periods of Dutch and British rule; The Great African Survey; The Eastern Cape frontier; Exploring the interior and Southern Africa; Colonial Natal; The Transvaal and Orange Free State; the Geodetic surveys and the arc of the 30th meridian; the Anglo-Boer War and New ideas: Fourcade and Wadley. Different parts of the book refer to cartography, astronomy and geodesy and my comments here are not only mine but from world experts in these three fields.

For myself I turned first to chapters 10 and 12 – namely "The geodetic surveys and the arc of the 30th meridian" and "New ideas: Fourcade and

Wadley." So full of errors are they that the author ably illustrates what he says in the Preface "The possibilities for error are endless. The mistakes I have made will I hope be forgiven by experts in these fields." Why didn't he pass the draft to those with the technical know-how?

We read that the Tellurometer (which should always be spelt with a capital T), was "soon followed by" the Geodimeter, which is incorrect as the latter was first used some ten years earlier. Between "three and fifty kilometres" the Tellurometer is given an accuracy of 3 parts in 106. That is an error that makes a nonsense of the sentence but could be taken as gospel by the uninitiated. In fact this was only part of the accuracy quoted for the early Tellurometer, normally given as 50 mm + 3ppm.

There is reference to Wadley producing "corrections for moisture and air density" but no mention of why he should have done that, what it was used for or whether they were the only parameters involved (they were not). To read that there is "No longer … (any requirement for) careful measurement of angles in order to calculate the distance between two points … these could be read off photographically" is very misleading. This statement probably resulted from not understanding a more detailed description of just what happens; but that is no excuse.

The Struve Arc becomes tangled up with the 30th Arc as if the former extended to Greece and the latter referred to an arc from the Arctic to South Africa.

In other chapters Galileo is credited with making certain observations some 150 years after his death. Maybe that is why a page or two later a particular planet is credited with moons that it does not have.

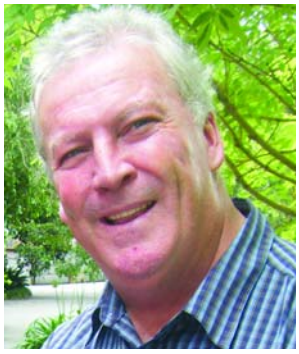
In chapter 2 there is reference to Mannevillette, a French navigator who was in South Africa at the same time as LaCaille. It is stated that "… he helped LaCaille in measuring a baseline…" There is no indication in LaCaille's journal (See D.S.Evans, Lacaille: Astronomer, Traveler) that he was assisted by Mannevillette on the baseline.

In chapter 5 there is the interesting comment that the result of the French Arc measure from Dunkirk to Barcelona was used to define the new unit of the metre but was "2.29m short of the actual distance from the North Pole to the equator, as measured by today's satellite surveys." As the Arc was used, with other information, to DEFINE the metre how can it now be described as short? Different, perhaps. The 2.29m equates very nicely to 90 inches or one per degree of latitude. That is an accuracy of 1 in 4.4million. Need one say more than that the figure of 2.29m has no useful meaning.

The cartographers and astronomers have similarly come up with comments on the numerous suspect, garbled or incorrect statements. These I am sure will appear in due course in longer and more detailed reviews. The list runs to several pages.

On the flyleaf of *Mapping South Africa* it is suggested that the book "… will long remain a standard work of its kind… " I hope and trust that will not be the outcome. It simply highlights and reinforces the fact that writing books on technical topics should be left to those knowledgeable in the subject and not dabbled in by authors more proficient in writing fiction. What could have been a very useful and interesting book cannot be recommended. The illustrations on their own could have been acceptable as a coffee table publication although there are also criticisms of some of them.

Reviewer: Jim Smith



A Valentine's Day tour, a Goon's brother, a once forbidden island and a date with an Anglo-French expert on Roman surveying are at the heart of this issue's column.

Trips and tours are almost throttled!

By John Brock

What could be more romantic than a river cruise on the paddle wheel steamer The *Nepean Belle* on Valentine's Day with Topp Tours? Our good weather sail defied the prevailing conditions of the coldest/wettest summer for over 30 years with the Nepean River scenery bathed in spectacular sunshine until an afternoon storm, which nearly obliterated some Penrith residences with hail damage!

Christmas with Spike's brother

I am not sure how many Englishmen know that the brother of the legendary "Goons" comedian Spike Milligan lives in Australia quite close to where I reside. Well, as you can see from the slapstick pose with **Des Milligan**'s hands around my throat he does possess the comedic genes of his sibling. Des recited some of his brother's humorous poetry at the Brush Farm Historical Society Christmas Party.

Bar Island unbarred

Up until last year Bar Island in the middle of the mighty Hawkesbury River had been denied access because of unsafe anchorage but late in 2010 the Hornsby Local Council opened up a newly constructed wharf for public use jointly funded by the Heritage Council. So, always being quick off the mark Kerima-Gae arranged for a Topp Tour of the historic island cruising out to the small islet on a local vessel upon which we also had a delicious morning tea and lunch while cruising along the great waterway. The brick fireplace – the remains of St John's Church of England erected there in 1876 plus the small adjoining graveyard – remind us of the intrepid early settlers who first inhabited this little piece of Australia. Surveyor G.M. Pitt made the first survey of land in 1871 for the pioneer John Greer but it was not occupied.

Gooning around with the late Spike's brother Des Milligan.

Brocky and the English Frenchman

Anyone taking the effort to come to my FIG History Workshop on Friday 4 May at the Biblioteca Casanatense in Rome this year will be aware that one of my great array of speakers is **Michael Ferrar** who will amaze us with his presentation on the Roman Survey of the World, commenced under orders from Julius Caesar about 45 BC.

Michael told me that he comes from France but he actually left England ten years ago to live there with his wife Diana in a country area called Betaille in the Orange District. They arrived in Sydney for their first visit to Australie at 6 am on 17 February after a 40-day cruise then flew out in the afternoon the next day! However, with advance knowledge of their blink-or-you'll-miss-it trip, I created a walk of Sydney that showed off the 1967 tall tower Australia Square (a round building, of course?) with its Alexander Calder sculptor "Crossed Blades" (1987) made of steel from Saché in France, then our very special Old Lands Department building in Bridge Street which showcases sandstone statues of many surveyors/explorers including the latest addition, emancipated Irish convict James Meehan (2010). A stroll along Pitt Street took us to our lunch venue – Sydney Tower Restaurant with 360° views of the City from the highest eating spot in the Southern Hemisphere.

After an excellent meal accompanied with fine beer, I took my guests to the Archibald Memorial Fountain (1932) in Hyde Park, St. Mary's Catholic Cathedral (1866 with two spires added in 2000), St. James Anglican Church (1822) designed by Francis Greenway, Hyde Park Barracks (1817-19), Sydney Mint (1816), Sydney Hospital (1881), NSW Parliament House (1816), Mitchell Library (1881) with a mosaic tile floor of the 1644 Tasman Map, the Botanic Gardens, Conservatorium of Music (1815), Government House (1845), Sydney Opera House (1973), Customs House (1844-45), The Rocks (early Sydney town) to conclude with wine and snacks at the Sydney Observatory (1855-57). On Saturday morning I showed off Australia's unique fauna at the fabulous Featherdale Wildlife Park in Sydney's west where they got up close and personal with koalas, wallabies, quokkas and wombats before I dropped them to Sydney Airport for their flight home.

• *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.*

Three new series from Topcon/Sokkia

Right: Topcon's new OS series. Far right: The Sokkia CX series. Both feature a web based anti-theft system.

Topcon and Sokkia have launched three new series of total stations featuring Class 1 Bluetooth and a telematics module to locate and protect against theft. The Topcon OS series features LongLink, a communication system that uses Class 1 Bluetooth to allow users to control the instrument from up to 300m away. Meanwhile, TSshield, a telematics-based communication module can locate the instrument from a remote server to automatically disable it should it be reported missing or stolen. The series is available in three levels of angular accuracy (1", 3" and 5") and runs Windows CE 6.0, plus the company's Magnet onboard data collection, management and transfer software, which allows interaction with the cloud.

Topcon's new ES reflectorless series also features LongLink and the TSshield module. Available in 1", 3", 5" and 7"arc second accuracy, the ES models have a non-prism operating distance of 500m and 4,000m with a prism; a standard operating temperature range of -20°C to +50°C; IP66 water/dustproof rating; and a battery life of 36 hours on a single charge.

Sokkia's new CX series also feature TSshield, Bluetooth Class 1 wireless data communications and can utilise Magnet software. The CX models (1", 2", 3", 5", and 7" accuracies) feature RED-tech EDM technology and can shoot up to 500m reflectorless and 4,000m with a prism. The CX101 and CX102 total stations also have independent angle calibration system (IACS). This technology allows for 1 arc second accurate measurements.

GstarCAD 2012 launched

Based on IntelliCAD software, South Survey's GstarCAD is an alternative to other cad software on the market, providing OpenDWG file compatibility, similar environment, plus full support for AutoCAD commands, menus, scripts, styles, patterns etc. The 2012 version includes Boolean operations on polylines – a feature that enables users to either subtract, union or intersect on closed polylines. The Polyline Boolean command is easy to use and the polyline remains as a polyline, which is convenient for editing. Users can now export tables into Excel spreadsheets and an incremental copy text feature allows copying text while increasing the specified number or letter automatically in either alphabetical or numerical order. For further details, visit www.southsurvey.co.uk

SceneWorks update

Spheron-VR's SceneWorks division has updated its SceneCenter Forensic and SceneCenter Framework visual content management software for virtual onsite scene documentation. The technology allows clients to connect spherical imagery, take 3D photogrammetric measurement and interconnect other digital asset information. Enhanced features of version 1.4 include new SceneCenter Client support for Windows 64-bit operating systems; when exporting interactive SceneCase projects, these are now compatible with both 32-bit and 64-bit OS environments; new individual client controls for the setup of SceneCenter graphics interface – including controls for specifying thumbnail preview layout styles; and enhanced support for exported publications directly to Word format.

Topcon multi-task laser

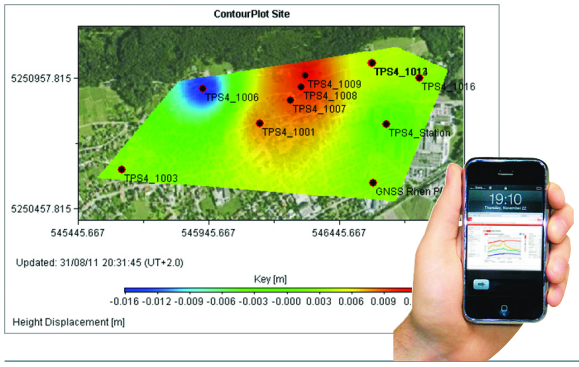
Topcon's RL-SV2S multi-task dual slope laser is designed for general construction or engineering projects. With an operating range (radius) of 400m, the tool slopes up to ±15 degrees and can be used in either the X or Y axis. It can be turned on its side and used for layout and alignment; has a battery life of 100 hours/alkaline and 60 hours rechargeable Ni/MH; a water/dustproof rating of IP66; and operating temperatures from -20C to +50C.

BRIEFS

Altus Positioning Systems has launched two GPS-based data acquisition systems. One is an evidence mapping system for law enforcement, which is includes an ikeGPS multi-sensor integrated laser rangefinder, 3-D compass and digital camera with MapScenes' Evidence Recorder custom software. The second system (also ikeGPS based) is Seismic Surveyor. It comes with custom software from MicroSurvey allowing users to stake hundreds of points a day and quickly compute positions of target items.

American distributors, F4Devices, have announced the Flint S series of GNSS handhelds for GIS field applications. Theyfeature a full VGA screen, 5Mpx camera, an 800 MHz processor, high accuracy GPS and an IP65 rating to withstand harsh environments. Mobile GIS Services, a UK provider of GPS hardware and GIS software, now also sell the Flint devices as well as Digiterra Explorer Software http://mobilegisservices.co.uk

Aerial survey company Bluesky has launched a comprehensive online LiDAR map of the UK. Covering approximately 75 per cent of England and Wales, including all major towns and floodplains, plus areas of Scotland. The coverage ranges in vertical accuracy from 5cm to 15cm, and in spatial resolution from 25cm to 2m. Visitors to www.bluesky-world.com **can search the online map using a place name, postcode or geographical coordinate before purchasing their chosen area and downloading digital files.**



Updates for GeoMos

The latest update of GeoMoS Web, the software as a service (SaaS) for visualisation and analysis of monitoring data via the Internet, provides advanced visualisation capabilities and can be accessed by using a web browser, PDA or mobile phone. For version 2.1 of Leica's SaaS, new contour graphs have been implemented to the graph type management. Such contour graphs deliver status information regarding the monitoring project.

Additional enhancements include: zooming is supported by all graph types; reporting now includes "copy" functionality of templates; and it is now not only possible to assign sites to the overview image but points as well. Assigning points directly to the overview image is helpful for smaller or GNSS only projects where the zoning in different sites is not reasonable.

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