Surveying for geographical and spatial information in the 21st century

- Scanning is default assumption on Thameslink.
- Bathymetric & altimetric data for Esri’s OceanBase Map.
- £3m scanner package to help police get traffic moving.
- ‘stupidity on a global scale’, or a great adventure?

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The next issue of GW will be that for September / October 2011.

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Next issue
The next issue of GW will be that for September / October 2011.
Copy dates are: Editorial: 08 August Advertising: 19 August

Cover Story
A blissful summer river scene that only lacks Mole, Ratty and Toad’s boat to sail into view beside this remotely operated craft fitted with an Acoustic Doppler Current Profiler (ADCP) and RTK GPS. Read on page 14 how this technology can also yield dimensional data.

July / August 2011 Geomatics World 03
The concept of risk is well understood in relation to health & safety. But with surveying, people tend to focus on accuracy and precision. Nevertheless, there are technical and commercial hazards in surveying and they come with expensive risks for clients.

The consequences of a survey ‘accident’ can be significant. Projects can be delayed. Cost implications can be substantial. Sometimes they can be catastrophic and render a project unfit for purpose – like an Olympic-sized swimming pool built too short.

This guide is intended to help those who commission and manage surveys to recognise the hazards and manage the associated risks.

In two parts, Part 1 deals with Managing Survey Projects and includes 20 key topics in preparing contracts and specifications as well as managing the work once a survey firm has been appointed. This is essential reading for professionals working in the built environment who appoint or manage survey companies.

Part 2 sets out the Principles of Surveying and covers over 30 topics, which may help reveal the hazards that can lurk in surveying processes. Engineers, architects, other professional disciplines as well as older surveyors in need of a reference point or a refresher course, will find this a reliable reference point.

The Guide is therefore intended as an essential reference source. It can also be an ideal source book on surveying for academic courses. Younger readers will find all of the essential techniques presented together with current technology and its applications.

The author is an experienced chartered surveyor with many years experience working in both the private and public sectors as well as in the UK and overseas.

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We found the missing link but didn’t tell anyone!

With the retirement of Professor Paul Cross (page 12) and the tenth anniversary of the launch of this title, it seems an appropriate moment to review the “G” word – Geomatics.

Professor Cross was closely associated with the adoption and dissemination of the word in the UK, both at the University of Newcastle upon Tyne and University College London, the latter backed by one of the industry’s key suppliers when he became the Leica Professor of Geomatic Engineering.

The origins of the word are not lost in the mists of time; they can be clearly traced back to Canada and the University of Calgary where Professor Gérard Lachapelle and his colleagues were amongst the first to recognise that in order to attract students to dull sounding “land surveying courses” something rather more inviting was required; something that better reflected the growing use of satellite positioning and computer-based geographical information systems. Geomatics was the answer.

The word provided a missing link – a generic title that embraced a multitude of activities and applications: land, engineering and hydrographic surveying, measured building surveying, mapping, GIS, photogrammetry, air- and spaceborne remote sensing, geodesy, etc. At last our profession had a catch-all word, like the word medicine provides for doctors and other health professionals.

As I argued at the time, geomatics was not about changing how you described your day-to-day business activities. I wrote in this column: “If you are comfortable calling what you do surveying, and that is what your clients expect and understand, then carry on. But do understand that for many younger practitioners the word [surveying] is an inadequate description for their skillset; it carries too much baggage from an earlier age – welly boots and hard hats or Landrovers and sunsets.”

Alas, when the RICS voted to change the name of its Land & Hydrographic Survey Division few bothered to vote and of those that did the result was less than overwhelming, with several eminent sirens speaking out against the move (‘Geomatics is for the robots’ said one pitily). Worse, there was no serious attempt, either before the vote or after, to explain and promote the new title to other professionals and industry organisations.

Disappointingly, neither The Survey Association or the Institution of Civil Engineering Surveyors adopted the word. Worse, other words – particularly geospatial and geoinformatics – began to be used by universities and bodies and, in one case, a magazine. To add to the confusion some people, particularly from academia, began to use the word ‘geomatician’. Given the medical analogy, surely a non sequitur.

So where are we today? Geomatics is used and understood by the supplier side of the business and particularly in North America and Canada. It would be silly therefore to attempt to turn the clock back just as it would be absurd to try another name. But RICS needs to do much more to promote what geomatics means and to try and persuade other industry bodies to accept its definition as an all-embracing term. As a start, I would argue that the Geomatics Professional Group should seek special funding from RICS, academia and industry for a wider campaign as suggested above to raise awareness of what geomatics is. Let’s hope that in another ten years no surveyor can seriously say he or she doesn’t know what geomatics is. Better still, that architects, engineers and other professionals understand what the word embraces. That can only mean more business for all of us.

Enjoy the summer unless you’re down under!

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

TEN YEARS AGO: from SW July/August 2001

Apart from the impending Geomatics change a decade ago the industry was busy finding out what its new toys could do. Alan Haugh explained that airborne laser scanning was becoming a useful tool for capturing height data in inaccessible places, while Peter Dale was arguing for a new model to help developing nations update their mapping and a joint paper by Colin Bray and Roy Morgan, respectively from OS Ireland and OS Northern Ireland, explained how in their politically divided island at least the mapping was firmly joined up.

On the commercial side, sales and purchases continued apace. Leica had just acquired ERDAS; Thales bought Magellan (now Ashtech but recently bought by Trimble); and the French mapping agency IGN opted for UK software supplier Cadcorp’s Spatial Information System.
**Aquarius in orbit**

A satellite designed to study the relationship between the saltiness of Earth’s oceans and the climate should now be in orbit. At time of writing, the $287 million Aquarius satellite is set to launch 10 June atop a Delta 2 rocket from Vandenberg Air Force Base on the central coast of California. As it orbits 408 miles above Earth, Aquarius will continuously take measurements on the concentration of dissolved salt at the ocean surface within a 250 miles wide swath. After each seven-day period, the satellite observatory will have enough data to compile a global map of ocean salinity. The Aquarius/SAC-D mission has an expected lifetime of at least three years and is a collaboration between NASA and Argentina’s space agency, Comisión Nacional de Actividades Espaciales (CONAE). The project has also included participation from Brazil, Canada, France and Italy. 

Source: article by Denise Chow, 18 May (www.space.com) Image Credit: NASA

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**€500 million saved? Let's buy 6 satellites!**

According to a report on the BBC website, the Galileo project has benefitted from budget savings of €500 million which it has earmarked for the purchase of six more satellites, in addition to the eighteen that are planned to be operational in 2015/16. The broadcaster reported the announcement by European Commission Deputy President Antonio Tajani at the Paris Airshow on 22nd June. However, neither the European Space Agency nor the European Commission websites have reported the saving. For these two organisations, the main business in Paris was the signing of the two remaining manufacturing and construction contracts which complete procurement of the space and ground segments for the eighteen-satellite constellation.

With eighteen satellites, Galileo will be able to provide the free Open Service basic signal, which everybody can use, the Public Regulated Service comprising two encrypted signals with controlled access for specific users like government bodies and the Search and Rescue Service for humanitarian activities. The first two operational satellites are due to be launched on 20th October 2011.

**Land/engineering survey and hydrographic routes**

Several new routes for AssocRICS members were launched in June including the long sought after technical routes for the geomatics professional group. Two AssocRICS routes are now available for geomatics - Land & Engineering surveying and Hydrographic surveying. These fill a real need within the UK and international geo industries for technically qualified personnel. Read more on page 27.

**RICS accredits Oz course**

The Royal Institution of Chartered Surveyors (RICS) has approved an Australian surveying course for global accreditation. The undergraduate course, bachelor of applied science (surveying), is run at the school of mathematical and geospatial sciences, The Royal Melbourne Institute of Technology (RMIT) University, Melbourne, Australia (www.rmit.edu.au). The RICS now accredits the programme from the 2010 first year student intakes onwards.

**Japan Quake: Underwater geodesy reveals sea floor movement**

Undersea geodetic measurements have revealed that the sea floor immediately above the epicentre of the massive earthquake that rocked Japan in March, and caused the subsequent devastating Tsunami, moved by up to 24m in the horizontal and 3m in the vertical.

Ten years ago, the Japan Coast Guard installed five transponders on the seabed and have been measuring their positions three times a year ever since. They were measured in September 2010 and then again in March, following the quake. The survey method involves a combination of GPS to measure the position of an observing vessel and the distance to the transponder using sonar methods.

Dr Makiko Sato of the Japan Coast Guard presented the results in online submissions to the journal Science. See www.scienceexpress.org.

**Challenge in Malaysia!**

An engineering survey of the Universiti Teknologi Malaysia has been completed following a challenge set by surveying company, Jalal Johari Consultants. The company wanted to compare the performance of the vehicle-based laser mapping system, StreetM apper, against traditional total station surveying. 3D Laser Mapping’s system was praised for speed of data capture, surveyor safety and ease of use. ‘However, perhaps the most significant advantage of the StreetM apper system is the accuracy of the data it captures,’ says Jalal Johari, principal licensed surveyor. ‘During analysis of the trial results, the StreetM apper data was found to fall exactly within the systems’ stated capabilities’.

**Two centuries of mapping**

From military beginnings through to the modern digital age, Britain’s national mapping agency has been charting the nation for over two centuries. On Tuesday 21 June marked 220 years since the establishment of Ordnance Survey. Dignitaries and senior military officials from the Royal Engineers gathered to dedicate the organisation’s new war memorial, which remembers the sacrifice of the 123 OS staff who gave their lives during the two world wars. The surviving five directors general were then invited to plant a commemorative tree.

**LR automates data processing**

Land Registry is using SAS, a business analytics software and services company, to decode data and generate statistical reports detailing the performance of its mainframe computer system to help senior management make more informed decisions. Rolling out online services has meant a growth in the amount of data to be processed for the organisation. After automating the process with SAS, the benefits include a reduction in the time spent extracting and processing the data, a reduction in the...
likelihood of errors and the ability to collect more metrics from the system.

**Quicker marine licensing**

The Marine Management Organisation (M M O) and Fivium, an IT company, have implemented a fully centralised IT system to handle the processing of new UK marine licences. The system will enable greater transparency for users and the public and will accelerate the approval process for marine projects such as offshore wind farms and construction. Users can also apply for marine wildlife licences in order to mitigate circumstances where projects impact on local protected wildlife. ‘The whole process has been completely simplified,’ says Anthony Ashton, director at Fivium. ‘Applicants are now able to apply, pay and track the progress of their licence applications online as well as use interactive mapping to visually plot the location of their project. In most cases, applicants will only need to apply for one licence whereas previously they may have been required to submit multiple applications.’ Further functionality, including harbour orders, public register of licences and a public consultation process, is expected by the end of 2011.

**KOREC to sell FARO’s Focus3D**

KOREC has signed a distribution agreement with FARO Technologies UK to supply FARO’s Focus3D laser scanner. Launched last year, the scanner weighs in at 5kgs and is believed to be the smallest ever built. Offering a 120m range and touch-screen control, it can scan at a speed of up to 976,000 points per second. Combined with Trimble’s RealWorks software, KOREC believe the scanner is ideal for a range of applications including building surveys, forensics and for the emerging BIM market. Andrew Beckerson, KOREC’s director of sales said, "The FARO Focus3D is a ‘game changer' in 3D laser scanning; it is small, light, user-friendly and very competitively priced giving the possibility to open up many opportunities for laser scanning to both new and existing adopters of this technology."

**CONTRACTS & PROJECTS**

**OS contract completed**

Blom has completed its data integration framework agreement with Ordnance Survey in the UK. Since 2002, the agreement has provided the mapping agency with aerial imagery and mapping services to maintain the accuracy and information content of its core databases. The company has delivered in excess of 100,000 sq kms covering the disciplines of aerial photography, image processing, ortho-rectification, imagery mosaics and digital map update.

**BRIEFS**

**A UK-based company in the film, TV, visual FX and forensic 3D data capture market, has purchased a Leica ScanStation C10. 4Dmax will use the laser scanner with other geomatics technology to offer a 3D data capture and modelling service to clients.**

The dates for Defence Geospatial Intelligence 2012 (DGI) are confirmed as 23-26 January and will be held at the QEII Conference Centre in London, UK. For more information, visit http://www.wbresearch.com/dgieurope/.

The European LiDAR Mapping Forum 2011 will take place in Salzburg, Austria from 29-30 November. The technical committee has launched the call for papers with a deadline of 25 July for submitting an abstract. For more information, visit www.lidarmap.org.

The use of laser scanners to collect data for crash investigations is helping to drive down the £1bn estimated annual cost of congestion caused by collisions on UK motorways. An announcement by the UK roads minister, Mike Penning, of a £3 million fund for police forces to purchase laser scanning technology has resulted in 3D Laser Mapping supplying one road death investigation unit with the Riegli VZ-400 laser scanner. In regular use, it reduces the time spent collecting evidence at the scene, can be operated in all conditions and is being used to produce graphics and detailed plans of collision scenes for use in court. Comparison with total station surveys has identified an onsite time saving in the region of 50 per cent. This means a reduction in road closure by an estimated average of 1.5 hours.

A graduate geography and environment research hub at the University of Southampton was officially opened recently by Ordnance Survey’s director general and chief executive, Dr Vanessa Lawrence CB. The research hub will provide facilities for graduate doctoral students as well as visiting scientists.

RapidEye has launched a new corporate identity to reflect the company’s growth, including an updated logo and more user-friendly website (www.rapideye.de).

A partnership agreement now allows ImageSat International, the owner and operator of the EROS A and B imaging satellites, to use RapidEye’s imagery to colour its panchromatic 0.7 metre resolution imagery. Also, Geoconsult International in Lebanon will now distribute RapidEye products throughout Africa, except Algeria, Egypt, Libya, Morocco, Tunisia and Western Sahara.

Fugro has acquired JDR Cable Systems Holdings Netherlands BV and its marine cable subsidiary, JDR Cable Systems BV, which together comprise the marine cables division. Current annual revenues of the company are around Euro 25 million. The division has been renamed as De Regt Marine Cables.

Altus Positioning Systems has delivered 22 APS-3 GNSS survey receivers to the Royal Canadian Mounted Police. The force is pairing the receivers into 11 systems with MapScenes Evidence Recorder (EvR) software to reconstruct traffic accident scenes in Alberta, Manitoba and Saskatchewan. The order for the GNSS units, which can each be used as a base station or a rover, was placed through dealer, Butler Survey Supplies in Canada.

The Open Geospatial Consortium (OGC) has announced new membership options for organisations based in emerging economies. The fee structure, based on world
Students who graduated from The Survey Association (TSA) course at The Survey School this year received their certificates on 17 June, the final day of their course. Dan Gosling was winner of the best student 2011 award (TSA & Leica prize), and Rudderdal Gurung was winner of best assignment 2011 award (ICES prize).

economic indicator data compiled by the World Bank, gives discounts to certain categories of organisations including: government, academic, research, not-for-profit, individuals and some for-profit organisations.

A three-year global multi-flex licensing agreement delivered by Autodesk is giving CAD users at consulting firm, COWI, access to a suite of 28 applications, providing more choice and reducing costs.

Mining software developer, Maptek, has established an office in New Delhi to service the Indian mining market.

Airborne Imaging, a multi-disciplinary geospatial data provider based in Calgary, Alberta, has purchased Optech’s Lynx Mobile Mapper to expand its service to clients.

In a joint initiative covering the VR suite of photogrammetric and lidar processing products, Optech and Cardinal Systems, producer of the VR mapping software, will enhance existing software and develop new software products for Optech’s line of imaging products.

The Intelligent Trench underground mapping tool has won the health and safety at work award at the recent Chartered Institution of Highways and Transportation annual awards ceremony. The tool is enabled by technologies from 3M, Exor, Infotec and Trac-ID.

PEOPLE

MD off to Mongolia
David Price, Leica Geosystems UK and Ireland managing director, will enter the Mongol Rally this month to raise money for the Care for Children charity. Over 200 teams will depart from the Goodwood Race Circuit in the UK on 23 July hoping to reach the finish line in Ulaan Baatar in Mongolia. For more on David’s adventure turn to page 17.

Sales manager for Ireland
John Kerrigan has been appointed by Leica Geosystems as direct sales account manager for Ireland. He will be responsible for the direct sales of the company’s instruments across all product groups and market segments. He will also support the distribution partner network and the company’s education campaign with colleges and universities. Kerrigan joins from Topcon where he was the technical sales representative for the surveying and engineering market in Ireland and the UK. He is a member of the Irish Institute of Surveyors and studied geomatics at DIT Bolton Street.

New chair for UKHO
The UK Hydrographic Office has appointed Sandra Rogers (right) as its non-executive chair for an initial term of three years. Rogers has been on the UKHO board for over eight years having joined in July 2002 and has been interim chair since October 2009. She is currently the director for inside sales and emerging markets at Cisco and has been in the IT and telecommunications industries for over 30 years.
Geomatics GPGB charts the way with new style PG meeting

New routes to membership were key amongst recent discussions of the Geomatics Professional Group. PG Chair Stuart Edwards reports from the group’s first teleconferencing meeting and the first RICS Chairs Day for professional groups.

The newly formed Geomatics Professional Group met in Edinburgh on 26th May. The meeting not only brought our new professional group together it made extensive use, for the first time I believe, of international teleconferencing at a regular PG meeting. At 1400 hrs BST those gathered in Edinburgh were joined by Martin De Beer (South Africa), Helen Murray (Northern Ireland) and Chris Gray (Americas). I should add at this point that their calls were routed through RICS communications and so charged at a local rate. The topics of discussion ranged over a number of key strategic areas including:

- Building Information Management (BIM) – this new and complex area will be of key importance in relation to project deliverables.
- Data transfer standards.
- Declining numbers of students on accredited courses.
- Land tenure and ownership issues in Africa.
- Importance of the internationalisation of AssocRICS and the new relationship structures with emergent world centres of surveying education.
- Importance of the status of the RICS qualification and brand in all world regions.
- Understanding the limitations of digital communications in emerging economies in supporting professional activities, from application to CPD.

Spinning out of the above, a number of key strategic development areas for the PG were identified and will form the basis of our work during the coming year. Overall, the experience in the use of teleconferencing was extremely positive and will be a permanent fixture at future meetings. Indeed, it would be excellent if the use of video-conferencing became the norm for those whose internet connectivity can support it. However, despite a multimillion pound refit at Great George Street such facilities have not been installed and I see no urgency among Governing Council to implement a solution!

Professional Group Chairs Day

On 21st June I attended my first Chairs Day meeting, where the chairs of all 17 current PGs met to discuss issues of concern and to receive feedback on current and future initiatives as determined by Governing Council. It was most pleasing to note that in this gathering there were, as of right, two further geomatics representatives, namely, Ruth Adams (Land Group Cluster rep) and Ken Hall (Elected rep). Put to this James Kavanagh’s strong geomatics identity/allegiance and our PG comprised over 20 % of those present – further proof that geomatics is punching above its weight within RICS governance.

Amongst the topics discussed was AssocRICS and the news that on 7th June, seven new AssocRICS pathways were launched including the long awaited Hydrographic and Land and Engineering Surveying (L&ES) routes. These new membership routes fill a very real need within the UK and international geo industries for technically qualified personnel. The hydrographic route allows direct entry to AssocRICS membership to all Cat B qualified hydrographic survey staff, whilst the L&ES route permits direct entry to AssocRICS for all technical members of ICES. Further direct entry criteria will be added in due course but these new routes demonstrate that the AssocRICS is sufficiently flexible to allow candidates with previous technical qualifications such as NVO’s/HNC/HND or non-accredited university qualifications.

Whilst welcoming these launches, I noted that there had been unacceptable delays, which were not of our PG’s making. I was assured that much had been learned in bringing these new routes to market and that in future such delays should not be incurred. I hope this to be the case as we are already working on a further generic ‘surveying’ pathway with greater flexibility than the current L&ES route. Ruth Adams expressed concern that two potential members had recently had a very poor experience in their application process. Their plight underlines that our PG has a key role to play in the early phase of technical assessment of potential members.

One other snippet of news from the day is that whilst the Professional Experience Route (PER) is still at the piloting phase, it is hoped that it will be signed off by the Membership Board later this year. The flexibility of this route should allow our PG to bring further recruits who have been practising for five years or more into the fold.

Overall, my impression of the first Chairs Day was that our PG has already grasped and is addressing many of the governance and strategic issues cascading down from Governing Council including: the development of a strategic five-year plan, a recognition of the requirement to spend 60% of its time developing guidance and good practice and actively engaging with other world regions. However, I am afraid I cannot say the same for many of the other PGs; some still have a very long way to travel. That said we must not for a moment become complacent as the new RICS Strategic Business plan (2011-2014) goes to Governing Council for final approval in July. I am sure this will provide further challenges to our PG but I am also sure we are well placed to meet them.

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

July / August 2011 Geomatics World 09
Looking for the bricky’s benchmarks

By Malcolm Draper

A tribute to one of surveying’s great characters, a visit to one of the world’s greatest museums and some travellers’ experiences.

My last column trailed the evening of 16 May when we honoured the career of Professor Paul Cross, who very kindly invited me as a guest. As expected, the evening was a great success with many top class surveyors from the world of surveying, both survey companies and academia. I am a great admirer of Paul Cross, even though he was the first to introduce the “g” word to UK surveying courses. Indeed, he claims to be the only person to have introduced a geomatics department at two universities – Newcastle upon Tyne and University College London.

It was a great evening although I was surprised to find that I am still frightened that Vidal Ashkenazi is going ask me a technical question I can’t answer! He really is a towering intellectual luminary amongst us mere mortals but he paid very fulsome tribute to Paul’s career as well as claiming to have been the person who introduced him to his future wife. Also there for the evening were David Maltby and Alan Thunhurst, with whom the Editor and I dined afterwards. Others included the ever bubbly Juliet Ezechie, Jim Smith, Mark Phillips, Ken Hall, Sally Baskerville and Professor Marek Ziebart (who also organised and presided over the evening).

Although Paul is retiring, his first task is going to be to walk the breadth of England along Hadrian’s Wall for a blood cancer research charity. You can sponsor him at: www.justgiving.com/paul-a-cross

The formal side of things was rounded off when Ordnance Survey director general Vanessa Lawrence presented Paul with an unissued brass OS benchmark mounted on a wooden plinth. The award recalled an experience both Paul and I have had of looking for benchmarks on brick walls only to be momentarily puzzled by finding the arrows upside down; the wall had obviously been rebuilt at sometime and the benchmark carefully preserved but the bricky blissfully unaware of its precise locational significance.

Through the glass to architectural photos

For every issue of Undercurrents the editor and I get together, usually somewhere interesting to discuss the material we’ve been sent, gleaned from around the world or dredged up from the depths of the Internet. This month, we met at the V & A, one of London’s greatest museums. The Victoria & Albert Museum houses some of the most fantastic artefacts ever assembled in one place. It is so vast you could easily lose a week in there so we decided to see what special exhibitions were on.

Now one of the many delights of the V & A is that to get to where you want to go you will usually have to pass through several galleries. This time was no exception and having begun the search for our chosen exhibition we were seriously waylaid in the section on glass. We were amazed at the numerous glass objects from as far back as 4000 BC (Egyptian period) before we even entered Room 129, the Märit Rausing Gallery of contemporary glass. This is really stunning with so many beautiful examples of contemporary glass, most of it sculpture rather than usable objects.

The elegant Room 129 at the V & A houses some of world’s most amazing and beautiful modern glass.

LightSquared

A somewhat alarming story has come to our attention regarding a threat to the GPS signals
upon which almost all surveyors now rely. It comes from the US but what happens there is usually only a short while ahead of what happens in the UK, Europe and the rest of the world. Apparently a company called LightSquared has been licensed by the US FCC authorities to set up a wifi broadband network across the country. Alas, the signal band they’ve been allocated is only a gnat’s whisker away from the ultra weak GPS signal (once described as like looking from the Earth for the light from a struck match on the Moon). We hear that the results of tests are awaited on the likely interference but it would be inconceivable surely for the mighty US Department of Defense to allow these wifi plans to go ahead if it meant disrupting the thousands of surveying, location and logistics businesses, not to mention emergency services, that depend on GPS. We await more news from Undercurrents’ boffins around the world.

Puzzles
From the last issue, did you bother to check-out the nine-letter word that remains a word as you remove the letters one by one right down to a single letter? The clue was already there in the introduction: “The answer was quite STARTLING”.

Let’s try something to get your brains spinning a bit faster. You are driving in a car at a constant speed. On your left side is a drop of 18-20 inches below the level you are travelling. Close on your right is a fire engine travelling at the same speed as you. In front of you is a galloping horse, which is the same size as your car and you cannot overtake it. Behind you is a galloping zebra. Both the horse and zebra are also travelling at the same speed as you. What must you do to safely get out of this highly dangerous situation?

Answer at the bottom of the column.

Travel
It is an old cliché that travel is supposed to broaden the mind. Well it doesn’t work, leastways not based on the following excerpts from recent complaints to Thomas Cook Holidays. Many reflect the deteriorating geographical knowledge of the average Brit.

“One on my holiday to Goa in India, I was disgusted to find that almost every restaurant served curry. I don’t like spicy food at all.”

A tourist at a top African game lodge overlooking a water hole, who spotted a visibly aroused elephant, complained that the sight of this rampant beast ruined his honeymoon by making him feel “inadequate”.

“No-one told us there would be fish in the sea. The children were startled.”

“We went on holiday to Spain and had a problem with the taxi drivers as they were all Spanish. . . .”

“It took us nine hours to fly home from Jamaica to England; it only took the Americans three hours to get home.”

“The brochure stated: ‘No hairdressers at the accommodation’. We’re trainee hairdressers - will we be OK staying here?”

“I was bitten by a mosquito - no-one said they could bite.”

A heartening tale
Whilst on the travel theme, here’s a heartening tale of the goodwill of travel agents.

A travel agent looked up from his desk to see an old lady and an old gentleman peering in the shop window at the posters showing the glamorous destinations around the world. The agent had had a good week and the dejected couple looking in the window gave him a rare feeling of generosity. He called them into his shop: ‘I know that on your pension you could never hope to have a holiday, so I am sending you off to a fabulous resort at my expense, and I won’t take no for an answer.’

He took them inside and asked his secretary to write two flight tickets and book a room in a five-star hotel. They, as can be expected, gladly accepted, and were off! About a month later the little old lady came in to his shop. ‘And how did you like your holiday?’ the travel agent asked eagerly. ‘The flight was exciting and the room was lovely,’ she said. ‘I’ve come to thank you, but one thing puzzled me. Who was that old bugger I had to share the room with?’

The UK Border Agency is asking folk to keep a lookout for a red 1951 Chevy that they suspect is being used to smuggle illegal immigrants from Calais to Dover, through the Channel Tunnel. If you see the Chevy, pictured above, listen carefully. It is not a hybrid but there is no engine noise and that might give you reason to believe that it is suspicious. You are urged to contact your local police station - which will probably be shut, so please leave a message on the voicemail so that someone can deal with your sighting within the next couple of weeks. We must clamp down on illegal Chevys.

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
Professor Paul Cross

From molas to satellites – a life in Geomatics

In May the RICS hosted an evening event to mark the career of one of its members with as an eclectic and wide-ranging career imaginable. Professor Paul Cross will need little introduction to readers of GW.

There are times when it is possible to get a man’s arm so far up his back he has little alternative but to do what you want. So it was, metaphorically speaking, that Marek Ziebart was able to make Professor Paul Cross an offer he could not refuse. Who indeed could turn down the chance of an evening for others to celebrate one’s achievements in the now refreshed RICS Lecture Theatre with its historic carved oak panelling, paintings and lists of past presidents.

The event was to pay tribute to the remarkable career and to mark the retirement of Professor Cross after almost half a century in academia. And it has been quite a career!

By universal acknowledgment Paul Cross is a modest and unassuming man. Apart from a reluctance to allow the event, he repeatedly discouraged colleagues from putting his name forward for major international prizes despite their conviction that he was head and shoulders above the eventual winners. Yet his highly personable and collaborative approach has seen him successfully mentor 52 PhD candidates, one of whom is working in the City advising insurers of space launches. As colleague Professor Ziebart observed, ‘while grossly deficient in his own regard he was highly regarded by colleagues and students as a supportive, pioneering and inspiring leader.’

While head of the UCL research group he was quite selfless in letting his colleagues get on with the science while he handled the university administration and politics. He transformed the department and made it relevant on the international stage.

Just as importantly Cross has an unerring reputation for cutting through the techno speak and jargon to explain to those outside geomatics its importance in the world. As Marek Ziebart says, ‘he is able to communicate with other communities of academics who don’t share our vocabulary. He is a calm and consummate professional.’

When you look back on your life it is not too difficult to see those ‘What if?’ moments. When if you had taken the alternative path things would have been very different. So it was for Paul Cross who upon graduation from University of Nottingham gave up a potential (and better paid) career with contractor Taylor Woodrow to pursue a PhD in geodesy. But then his enormous potential had already been spotted by the formidable Vidal Ashkenazi, who had earlier suggested an unusual topic for his final year thesis: “Strength of Figure in Networks used for Setting out Precise Structures”, work that was to stand out in his good stead as his career developed.

In 1972, Paul Cross contributed to the Ordnance Survey Professional Paper: The redjustment of the retriangulation of Great Britain and its relationship to the European terrestrial and satellite networks. It caused quite a stir and became a model for similar work in other European countries. Indeed, the West German mapping agency was at the time embarking on a massive programme to measure every distance in their triangulation network. But on reading Cross’s contribution to the paper they learnt that measuring more than 5 to 10% of the lines in the network would not improve the solution and curtailed the programme.

From this foundation Cross’s fame spread around the globe and soon he was called in to advise the UK’s then burgeoning oil & gas industry. This proved an early driver for the adoption of positioning by GPS. His work contributed greatly to the development of high precision GPS. ‘Without Paul Cross’s guidance the industry would not have grown as quickly’ was Neil Ackroyd’s judgement on the work he did in defining one of the world’s most accurate geoids for Great Britain and the means of fitting it to the fundamental benchmarks to produce the OSGM 02 correction surface which we use today to turn GNSS co-ordinates into heights above ODN. Then working for Trimble Navigation, Ackroyd who is now Director of Data Collection at Ordnance Survey, paid tribute to Cross’s collaborative approach in engaging with all of the GPS suppliers at that time. Today, Ordnance Survey’s Geodetic Suite owes much to the mathematical models and algorithms developed by Paul Cross.

A former student, Washington Ochieng, now Professor of Positioning and Navigation Systems at Imperial College, paid tribute to the massive contribution Cross has made to training so many high quality personnel as well as advancing the science of the technology underpinning geodesy, navigation and metrology. Professor Ochieng showed us some of the complex algorithms developed by Cross that are applied to 4D air navigation, where the temporal as well as the x,y,z is essential if that are applied to 4D air navigation, where the temporal as well as the x,y,z is essential if Europe is to safely expand its air flight capacity.

So what did the man himself think of all these encomiums? He reflected for a moment on his 45 years in academia and geomatics and observed that he’d followed an idea from Vidal Ashkenazi and ended up making coffee for Marek Ziebart! ‘He had found his career a
how she first came into contact with Paul Cross when he was recommended as someone who could undertake a review of OS's proposed Positional Accuracy Improvement project. Lawrence was struggling to understand why the move was necessary and therefore sought a second opinion. Not only did Cross's review confirm the necessity of the change that would see OS mapping shifting, in some cases several metres, from the National Grid, despite the inconvenience it might cause customers, he was able to easily explain the reasons. ‘He has world class skills in communication’ said Lawrence’. Presenting Cross with a brass plaque recording a benchmark position (an unissued one GW was assured and not one of those mythical ones stored in a police station!), Lawrence declared that he was ‘the world’s greatest promoter of the word geomatics’, a view GW entirely concurs with.

What of the future? Paul Cross is not going to continue in geomatics but has not decided what he will do next. He did however assure us that he is will keep in touch. Since retiring he has found enjoyment in walking and is set to walk from the west to east coast along the route of Hadrian’s Wall in August. He is raising money for a blood cancer research charity. For those who are interested, see www.justgiving.com/paul-a-cross
ADCP: a surveying tool?

By Nick Martin and Richard Groom

A DCP is a technology that has been around for many years. Its primary inland purpose is to measure the flow of water in a river, but as a by-product, it can also be used to survey the riverbed. If the technology is to be used for bathymetric surveying it is of interest to Geomatics and we need to know how it works.

Acoustic Doppler Current Profiling (ADCP) was first used in the 1980s and developed by the United States Geological Survey (USGS) – the body that has responsibility for monitoring water resources in the USA, a task which includes river flow measurement.

The instrument uses the Doppler effect to measure the movement of minute particles in the water column, which are safely assumed to be moving at the same rate as the water body itself. The effect is well known and easiest to visualise in the situation in which a police car with siren blaring passes a bystander. The velocity of the approaching car causes the wavelength of the sound as received by the bystander to be shorter and therefore the frequency is higher. As the car speeds away, the wavelength of the received sound is longer and the frequency is lower.

Measuring the velocity of particulates

An ADCP instrument commonly has three, four, five or (for deeper rivers) nine transducers fitted into the bottom of a shallow draft boat. However, the need for easy transportation has led to the design of smaller surfboard designs to be used via ropes held on either bank or from a fixed cableway and also more recently, custom-made remote control boats. In some cases ADCPs are fitted to Autonomous Underwater Vehicles (AUVs) to provide navigation, depth and velocity data whilst submerged but the data can still be used for bathymetry purposes in large lakes.

A minimum number of three beams is needed to compute 3D water velocity, but generally four are used to provide redundancy. On a five-beam system, four beams are used to measure velocity whilst the fifth is a vertical echo-sounder beam, which is used specifically for depth measurement. For nine-beam systems, two sets of four slanted beams operate on different frequencies in deeper rivers and the ninth beam is vertical, specifically for depth measurement.

In general, the velocity measuring beams point away from the vertical by a certain angle – usually 20 - 30° in the forward, aft, port and starboard directions, depending on the manufacturer. The transducers transmit pings, or acoustic pulses, which are reflected (backscattered) from particulate matter that is suspended in the water column. The received signals are time-gated in order to detect particle velocity throughout the water column at different depths. If there is no particulate matter, then the system will not work, but this situation is very rare – even tap water, which appears clear to the eye, has enough mineral content to backscatter the acoustic pulses.

An acoustic measurement system that relies on the Doppler effect to measure water flow can also yield dimensional data, explain Nick Martin and Richard Groom.

Measuring boat velocity

Boat velocity can be determined from the component of the Doppler-shifted return signal arising from the pings returned from the bed; this is commonly known as bottom tracking. In most scenarios the bed will not be moving and thus can be used as a reliable reference for computing movement of the boat. However, in certain situations, particularly high flows, the bottom track shows a Doppler shift from the bed even if the boat is stationary on the water surface. Depending on the system’s frequency and the bed material, a dense layer of sediment being transported just above the bed is detected by the ADCP causing it to simulate boat movement; this phenomenon is known as a moving bed condition. Similarly, bottom tracking does not work well in vegetated watercourses, because the vegetation yields false bottom responses.

Alternatively, one manufacturer, SonTek, offers an integrated RTK GPS solution within the ADCP so that the boat can be positioned in E, N and height. Provided there is good GPS coverage this method is more reliable than relying on bottom tracking. However, it should be remembered that the primary purpose is to survey velocity profiles, not bathymetry. The survey-grade RTK GPS

“If there is no particulate matter, then the system will not work, but this situation is very rare – even tap water... has enough mineral content to backscatter the acoustic pulses.”
The measured velocity data cannot be recorded for about 10% of the profile above the bed, depending on the manufacturer and the angle of the beams from the vertical. ADCP current profile measurements can be turned into some impressive graphics. These are striking to look at, but more importantly they reveal the detailed movement of water, including eddies and backflows that may not be apparent using conventional flow meters. The blank areas just below the surface and just above the bed on the velocity profile have to be filled in if the total flow in the river is to be calculated. This is done by extrapolation to the surface and interpolation to the bed from the measured velocity data.

**Measuring bathymetry**

To calculate the total flow in a river, the cross-sectional shape of the bed has to be measured. Most ADCPs compute a single water depth from the simple mean of the individual depths taken from the three or four velocity profiling transducers. This produces a smoothed bed profile that will tend to be most inaccurate near the edges of the channel and in deeper water. For example, if surveying a standard trapezoidal channel, beam averaging would cause the trapezoidal channel to appear rounded at the corners. With a 25° beam angle the spread of the beams equates to a footprint that is 0.93 of the water depth. In water that is 5m deep the depth as reported by the upstream beam will be 4.65m away from the beam pointing downstream. SonTek’s RiverSurveyor S5 and M9 systems incorporate a dedicated vertical beam that provides independent depth data measured directly below the ADCP. Soundings can also be computed for each individual beam using post-processing software that uses the on-board compass with pitch / roll sensor to calculate adjusted positions and soundings for the slanted beams. Despite this it is best practice to minimise the magnitude of pitch or roll to less than 5°.

As with all echo sounders, the depth will also be affected by water temperature and salinity. Nearly all ADCPs have a thermistor installed to measure the temperature of the water at the face of the instrument; however the salinity has to be entered by the user. The instrument then calculates the speed of sound next to the transducer face, which will enable the velocity part of the measurement to be correct, but not always the depth. For Doppler shift measurements, changes in sound velocity caused by variations of temperature along the outward path from the transducer cancel those on the returning backscattered signal, so the speed of sound need only be known at the head of the instrument. However, the signal that is used to measure depth will be refracted as it passes through different density layers and thus takes longer to reach the bed. If using the slanted beams to measure the depth this error can be magnified when compared to the vertical beam. As for echo-sounding and multibeam surveys, speed of sound should be measured throughout the vertical column using a bar check, or instruments such as YSI’s CastAway.

Instrument offsets between the ADCP and the survey point of reference on the boat have to be determined. Level control can be provided through direct levelling of the water surface if the survey is of a lake. On flowing watercourses, frequent water level measurement might be acceptable but it is generally more accurate to derive level control either from RTK GNSS observations or observations to a prism on the boat from a total station on the bank.

By using the vertical and the slanting beams to measure depth, ADCPs can be used to...
Bathymetric Surveying

produce bathymetric data. Furthermore, if the surveyor programs the boat to follow a pattern of close parallel runs, the resulting data can appear not dissimilar to the gridded multibeam output from a swathe survey. When surveying a river that is up to 5m deep, each run should be 7m apart in order to produce parallel lines of soundings at 2.3m spacing using data from the vertical and the slanting beams. For shallower water, the runs would have to be closer together to produce even coverage. Check lines should also be observed across the lines of soundings. The point should not however be lost that a swathe bathymetry point cloud contains orders of magnitude more data, which can be used to identify discrete objects.

In summary, ADCP measures the bed profile as a necessary part of the process of flow measurement. It therefore makes sense to use it to measure bathymetric cross-sections and flow when the primary purpose of the cross-section is to measure flow. ADCP can also be used as an echo-sounder system to measure bathymetry without measuring water velocity. There are circumstances where this could be an attractive secondary use for equipment that has been purchased for the primary task of measuring velocity but is not fully utilised for that purpose. It is also possible that the velocity data might yield useful added value for clients whose primary interest is bathymetry.

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About the authors
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Richard Groom is Technical Specialist in Geomatics at the Environment Agency and Technical Editor of Geomatics World.
Mongol Rally

While the rest of us are lazing on the beach, catching up with our reading and otherwise enjoying the summer, one Leica Geosystems employee has rather different plans, reports Stephen Booth.

With little more than a past enthusiasm for outdoor pursuits and a keen desire to get off the beaten track and study different cultures, David Price, Leica Geosystems UK and Ireland managing director, will be braving the ultimate motor adventure. While the rest of us are contemplating pleasant balmy holidays, he will be joining around 200 teams that will leave Goodwood Race Circuit in the UK on 23rd July setting out on a journey that will take them through a dozen or more countries to arrive, hopefully, in Ulaan Baatar, the capital of Mongolia.

The 16,000 km Mongol Rally, billed as “Motoring Stupidity on a Global Scale”, is not for the feint-hearted Sunday driver. It will cover approximately a third of the Earth’s circumference and will take at least three weeks, maybe much longer. Moreover, this is not an organised motor rally with route maps, check points and detailed vehicle inspections: you’re on your own from day one.

What are the chances of making it?
The rules stipulate that you must drive a car under 1200cc or an emergency service vehicle. David has opted to drive a nine-year old decommissioned Vauxhall ambulance that has already covered over 200,000 miles. If he reaches his destination (around 50% of contestants don’t make it) the ambulance will be donated to the Mongolians. In the meantime, he will be raising money for the organisers’ charity and for Care for Children, which is developing foster care for orphans in China, Korea and in Mongolia.

He is naturally excited about the coming adventure. ‘This is a once in a lifetime opportunity. After several years of longing I’m finally taking part in the Mongol Rally 2011’. Although colleague Martin Kentish will join him at Astana in Kazakhstan, for much of the trip David will be on his own driving through remote mountain ranges, uninhabited deserts and inhospitable environments, hundreds of miles from civilisation, with no support or backup team.

The event sets off from the ‘Festival of Slow’ at Goodwood on 23rd July. David’s route will take him through Western Europe via the Czech Republic, Ukraine, Russia (twice!), Kazakhstan and eventually Mongolia and is expected to take up to four weeks to complete.

The locals are more helpful...
The ambulance however, which was donated by South Central Ambulance Service NHS Trust, has been the subject of quite a bit of strengthening for those dirt roads and tracks of central Asia. It’s been ‘battle hardened by I&J Bodyshop’, David assured us. But he readily admits to being ‘non mechanical’ and will be relying on duct tape and cable ties as well as his charm to persuade locals to help him if things go wrong. He has done plenty of reading ahead of the trip. ‘What I have discovered is that the further east you go the more helpful and ingenious people are in assisting travellers’.

For much of the journey he will have only 1:2 000 000 scale mapping to guide him; and the rules frown upon the use of GPS. . . have the organisers checked his day job? During this epic journey David told us, he will be staying in a mixture of hotels, camping or in the ambulance (let’s hope he doesn’t need the stretcher). Should he make it, he is hoping that the legendary hospitality of the Mongolian people will see him invited into a yurt and offered the local speciality dish: sheep’s testicles. So what’s the name his team? “May contain nuts”.

David hopes to keep us updated via his Leica tablet PC and once he’s on his way you can follow him on www.tinyurl.com/davidmongolrally

And if you’d like to donate to the charity David is raising funds for, go to: http://www.justgiving.com/mongolianambulance

We hope to tell readers more about David’s adventures in the next issue of GW.
The Thameslink Programme (TLP) is a £6 billion upgrade of a major railway line running North-South through Central London, which will include the purchase of new trains to provide longer and more frequent services. Providing topographic, engineering and measured building survey information in 3D, with limited site survey opportunities to capture it, has led to the creation of one of the largest scan survey databases of any rail project in the UK, at seven terabytes (see figure 1). The benefits brought by this approach continue to be reaped as the project moves through design and on into the construction phase. Indeed the success of using laser scanning has led to a default assumption that it should be employed for all topographic surveys on the project, unless there is a justification not to do so. Additionally, Thameslink has commissioned a study, partly funded by the EPRSC, into the potential use of laser scanning for other survey purposes on the TLP, such as monitoring.

**TLP Area & Works**
The geographical extents of the TLP run from Bedford and Peterborough, north of London, to Brighton and Kent in the south, passing through central London via Kings Cross, St Pancras, Farringdon, Blackfriars and London Bridge. TLP is the pre-cursor to Crossrail, another cross London rail link running East-West. The first major TLP stage (Key Output 1 – KO1) is expected to be complete by the end of 2011. KO1 includes platform extensions at stations outside central London to handle 12-car or 240-metre long trains as well as increasing train frequency to 16 per hour (a train every 4 minutes). Complete rebuilds of Blackfriars and Farringdon Stations, with the latter becoming a major interchange for the new Crossrail line, are also due to be completed in Spring 2012. Key Output 2 (KO2), already commenced with major works at Borough Market, is not due to be complete until 2018. It involves the complete re-building of London Bridge station and completion of the new viaduct already partially built at Borough Market. It also includes bringing into use a set of tunnels (the Canal Tunnels) which connect St Pancras with the East Coast Main line, and further outer areas works including depots, stabling and sidings and yet more platform extensions. Train frequency in central London will then increase to up to 24 per hour and require automatic train operation (ATO). See Figure 2.

**Laser Scanning from the start**
Laser scanning has been employed on the

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Laser scanning has proved to be an invaluable tool for the Thameslink rail project. **Barry Gleeson** updates us on the programme and explains some of the problems that were solved through the use of the technology.
project from as far back as 2002. This was inspired in large part by a major rail consultant (Balfour Beatty) and survey supplier (ABA). Working innovatively together on early development of the TLP they used laser scanning to solve two of the most significant problems in construction: time and how to apply 3D methods.

**Solving the time problem**
Designers need survey data in order to start the design process. This puts collection of baseline survey information firmly at the start of the critical path. But when an initial design programme is put together there is often no appreciation of the time required to complete surveys or the type of access needed. In the rail industry these issues become much more acute when you need to survey tracks.

As the railway has to remain open whenever possible, even with major station rebuilds, opportunities to get access for surveys are few and far between. When access is given (known as a possession of the railway) it generally comes at night and is limited to short engineering work hours (i.e. 4 hours or less). Only over two years of carefully planned possessions has it been possible to access all parts of the TLP in central London. See Figure 3.

The approach taken from the outset has therefore been to capture as much as possible in the short possession times available. Laser scanning combined with precise surveying for control and high accuracy details (i.e. track alignment) has proved invaluable in solving this time problem.

**Solving the 3D problem**
Figure 4 shows a complex 3D overview of the new Farringdon Station. LUL’s Circle and Metropolitan Lines (dark grey) run adjacent to the Thameslink line (light grey) with Crossrail’s proposed new tunnels (light blue) passing below. In between all these run numerous other services including the culverted River Fleet. While it is possible to present all this information in 2D, via plans, elevations and sections, the data capture itself must be 3D in the first instance. With advances in 3D CAD software and its expanding role in design and construction processes, designers and clients are also increasingly looking at 3D information directly to help them understand and provide a solution to the design options. This has put surveyors in the front line of solving the 3D problem and is expanding increasingly to the 3D delivery and presentation of information.

On the TLP this has resulted in the entire core area route being surveyed in high definition laser scanning and being published online via TruView™, as well as being delivered in a combination of 3D string models, 3D registered scan clouds, 3D wireframe models and 3D surface models.

**How it has worked in practice**
Figures 5 to 7 give a sample overview of what types of survey information have been produced on the Thameslink Project.

*These types of information can be used directly for design or further enhanced by being developed into 3D surface, solid and virtual reality models. Much of this has been done by the TLP’s design consultants or by the internal Engineering Data Management team which includes 3D and 4D CAD experts.*

**Figure 3 above:** these images give an insight into why it has taken two years to gain access to all the tracks. The picture on the left is the approach to London Bridge with 12 tracks. The network diagram to the right shows the different train services operating through this area. While some can be closed to facilitate works such as surveys, there has not been a single opportunity to date on the TLP when all lines are available together, so creating a fully coordinated survey over this area has proved challenging.

Inset: Figure 7 – Registered Scan Cloud Data. Image courtesy of ABA Surveying.
The design of pier extensions at Blackfriars serves as another example of the re-use of scan data. The surveyor was originally requested to supply a 3D wireframe model of the bridge structure along with full 3D high definition scanning. Although the designer initially worked on the wireframe model, the TLP was able to supply additional surface models of the piers (via ABA who did the 3D surfacing) including full details, such as block course joints and deformations in the stonework. This allowed a very complicated 3D pre-cast extension piece to be fitted directly to the surface of the stonework at all points. See Figure 9.

Following discussion with the designers, TLP realised that if the full pier could be surveyed down to low tide, and that if the ±10mm accuracy could be guaranteed, further savings could be made in the design of the more complicated pier extensions that were planned on the other side of the bridge. By assuring the accuracy at ±10mm the designers advised they would be able to reduce the size of the precast units – previously designed oversize to allow for...
uncertainty in the stone profile – and consequently reduce the weight that would need to be lifted to get the pieces into position. As they were being lifted from a water-mounted crane this was a significant construction as well as cost benefit. See Figure 10.

**Outer Areas example**
The advantage of laser scanning to outer areas projects included the validation of a bridge installation at Luton. Three bridge decks were replaced over a weekend possession in Easter 2010. This was the only possession available in the following nine months that would be long enough to allow the installation so it was critical to the design and construction programme that everything fitted on site first time.

While fabrication surveys were being done on the bridge decks, assembled off-site, a colour laser scan was carried out on the existing bridge to provide clash detection and alignment validation for the installation. The scanning survey supplier (Plowman Craven Ltd) was commissioned three weeks before the installation and was able to deliver a fully registered scan cloud and simplified 3D wireframe model within seven calendar days. The TLP Engineering Data Management Team (EDM) took the registered point cloud and merged it with the design model of the new structures to assess the alignment. The EDM team produced a series of drawings as well as a fly-through virtual model for the design team who validated the final setting-out alignment of the new decks. See Figure 11.

3D scanning has been beneficial to the wider design of outer area stations. Fig 12 shows how scan data can be used as the basis for a virtual reality model, which can be used to validate the position of signals. Once again, the critical advantage of scanning is its ability to survey ‘difficult to measure’ features, such as overhead lines. Validating such features with traditional topographic techniques is both time-consuming and extremely difficult. CAD is used to plan the construction and, while 4D modelling doesn’t require the same level of accuracy, having a precise 3D model available from survey adds value to the construction planning tool. Figure 13 shows the model that was developed for construction planning of the bridge replacement work at Luton.

**Borough Market**
A current example of a joined-up approach to 3D survey and design can be seen at Borough Market in Central London. On May 1st a new 70-metre long bridge was slid into place over one of the busiest streets in the capital. The work involved assembling the new bridge on top of a section of newly constructed viaduct. In places, pinch points in the design and construction works went as close as 25mm to existing features, requiring precise engineering and laser-scan surveys to ensure the task was fully understood in 3D. See Figures 14 & 15.
Thameslink Project

Again, the TLP was able to combine 3D registered point clouds with the design to review the pinch points as well as extract information for design and construction processes without re-survey. See Figures 16, 17 & 18.

Pointcloud datasets as standard
Experience on Thameslink to date has shown that utilising laser scanning to capture and present data in 3D has been very beneficial to the TLP. The benefits are still being realised as the project moves forward to construction and the data is used for tasks which were not always anticipated when the surveys were commissioned. This has led to a default assumption that the TLP should consider laser scanning from the outset of every project unless there is a good reason to remove it from the scope. See Figure 19.

The most recent station survey (2010) at London Bridge has led to the use of high definition colour and laser scanning, as an upgrade to the approach in previous areas. This has meant that both colour and light intensity TruView databases are hosted online for end users. The ability to present 3D information in various formats such as TruView, has led to a wide appreciation and re-use of survey data. The ability to manage, store, display and manipulate data, as well as extract 3D string and model information is hugely beneficial to design and construction processes. Survey companies are in a unique position to add value to this process as well as act as the experts in scoping and capturing 3D information. See Figure 20.

From a survey supplier point of view, strong capability in the field of laser scanning combined with traditional skills in engineering surveying are still essential to the overall success of this approach. This is particularly important for establishment of control and scan registration. Traditional on-track surveying skills and competences such as Personal Track Safety (PTS) are also fundamentals along with Link Up Registration. The new Network Rail Survey Standards make it obligatory for all Network Rail projects to comply with required accuracies, grids and procedures. On Thameslink, project specific procedures are aligned with these but also identify project specific requirements.

"... a default assumption that the TLP should consider laser scanning from the outset of every project. . ."
Future direction

Regarding laser scanning, Thameslink has already commissioned a study on the use of non-contact survey methods for monitoring. This has been part-funded by the EPSRC in collaboration with University College London and is a four-year study. As a pre-cursor, an MSc student project was completed in 2010 looking at a specific survey problem at London Bridge. This involved monitoring a train shed support column, which had to be completely underpinned and tied into the adjacent Shard Development site. See Figure 21.

Within Network Rail there are also studies looking at the use of laser scanning in gauge clearance, which involves kinematic trolley (TMD) mounted scanners. Laser scanning is also proving an invaluable tool for validation and verification of surveys and as-built designs. Combining registered point clouds with 3D design models or survey string models using software such as Cloudworx™ is part of the standard toolset available to designers within Network Rail. Suppliers who have the expertise to develop scan clouds into multiple formats such as 3D surface and solid models are also likely to have a bigger role in the value added side of survey work in the rail industry. See Figures 22 & 23.

About the author

Barry Gleeson is currently the Survey Systems Engineer on the Network Rail Thameslink Programme. He is responsible for assurance of all Geomatics products delivered to the project.

Previously he has worked as a Survey Manager for a multi-disciplinary survey company in central London, a senior and lead surveyor to a specialist UK engineering surveying company internationally. Prior to that he founded and ran a sole practice in Ireland for ten years. He has a degree in Architecture Building and Planning, an MSc in Surveying and is a chartered surveyor member of the RICS.
I used to be a Surveyor, now I... teach English in Vietnam

When freezing rain is coming down like stair rods and there are still two days fieldwork remaining on what was supposed to be a one-day job, there can’t be many surveyors who haven’t wondered what else they could be doing.

A change within surveying becomes more difficult as you reach senior positions but I needed a complete change. For much of my professional life I had been training assistants and chainmen, so I saw teaching as a possibility. I had worked in enough countries where English wasn’t the first language to know that I would manage and my experience in sales had prepared me for addressing large groups. Perhaps the answer was teaching English as a foreign language.

As the world gets smaller, the dominant language is becoming English. People everywhere see an ability to speak English as a passport to a better life, whether in their own country or by emigrating. The internet reveals that there is work in the strangest of places as well as within the UK or Europe. Whether it’s called TEFL, ESL, ELT or whatever, the main requirement for teaching English is to be a native speaker. Reading, writing and grammar can often be learned from books, but it’s listening and speaking skills that prove the stumbling block to students.

Although many people, mainly gap year students and backpackers, end up teaching English without any training or experience they are likely to get only very low-paid work on a temporary basis. Most countries require that you have been educated to degree standard, have a police check and that you have passed a one-month CELTA (Certificate in English Language Teaching to Adults) or similar training course. These courses have the same content wherever you take them in the world but the advantage of taking them where you plan to work is that you have that month in which to become familiar with your new home and, if the course is run by a local language school, you will probably then be offered work. You also have an instant group of contacts which are all in the same boat.

It had to be Vietnam

Everywhere in the world seems to need ESL teachers and the Far East and China appear most regularly on websites. Having worked and travelled in many countries in the world, the only one that took my fancy was Vietnam. A few years previously I’d spent three weeks there and the scenery, the people, the climate and the food was enough to convince me that I wanted to return.

Everyone wants to learn

There are some very large language schools here with many branches throughout the country or there are single site schools with only a few classes; there are universities and colleges or opportunities to set up your own private lessons or one-on-one teaching. Most opportunities occur in language schools where teaching takes place in the evenings and at weekends. Students range from pre-school toddlers to university students and business people but the majority are teenagers sent by their parents and they can be difficult to motivate. Language schools are big business and it all comes down to ‘bums on seats’ so there’s a wide variety of ability and enthusiasm.

In nearly four years of teaching I have tried everything, not always out of choice. It largely comes down to being in the right place at the right time. I currently work in a regular high school. There is no evening or weekend teaching but they follow a Western Australia curriculum and have June and December off. So, no work, no pay for those two months!

Introducing... the 20 hour week!

Most teachers reckon to need an average of 20 hours a week to break even, although the number of hours available varies throughout the year and gets a bit thin around the annual Tet and Lunar New Year holidays in February, when most schools close for two weeks. People work through Christmas, which is not an official holiday here.

Some teachers try to juggle several jobs to boost the hours but most...
Cold and damp or hot and wet?
Whereas the north of Vietnam has four seasons and gets uncomfortably cold and damp in winter, the south has only two: a hot summer and a wet summer. I chose the latter. I gave in my notice in England; rented the house out fully furnished; took a CELTA course at Thames Valley University; made contact with the Geomatics Department at the University of Technology in Ho Chi Minh City and set off for Vietnam. My intention was to teach English to Geomatics students but this was not possible so I ended up teaching general English in the University's language school. After a while I moved on to a large language school and other jobs followed.

There is a wide mixture of ages amongst teachers including singles and couples. Some move on after six months to try Japan, Korea or Thailand, some like me marry a Vietnamese and settle here. Many leave to go home and reluctantly get a ‘proper’ job.

Despite being a communist state Vietnam has one of south-east Asia’s fastest growing economies and aims to become a developed nation by 2020. Hanoi, in the north, is the capital but Ho Chi Minh City, often still referred to as Saigon, is the economic powerhouse. Whilst many still associate it with what is known here as ‘The American War’, the country has moved on to embrace capitalism with gusto. It has huge potential in oil, minerals, tourism, agriculture and fisheries, a young well-educated population as well as an increasing manufacturing base. High-rise buildings sprout up on the skyline and swathes of the old city get demolished to make way for more offices, hotels and shopping malls.

With some eight million official residents and millions more who drift in from the surrounding countryside, Ho Chi Minh City never quite got around to putting in the transport infrastructure to support that size of population. Six underground lines are planned along with monorails and trams but the delivery dates keep slipping. Meanwhile everyone, yes everyone, travels by motorbike or scooter with the accompanying noise and pollution.

Learning Vietnamese...
The Vietnamese language remains a mystery to most foreigners and despite months of lessons my knowledge has stuck near zero. With a few extra vowels and each vowel having a choice of six tones (accents), few people can master all the different sounds involved in even basic ‘taxi talk’. Despite being assured that my pronunciation of a word is spot on, the shopkeeper still looks blank. It’s often much better to write the word down from the dictionary or point at what you want. As for the cost, just hold out a selection of notes and they’ll take what they need!

No waste
Morning, noon and night, the Vietnamese always seem to be eating and the variety of food, available at very reasonable prices, is amazing. Fruit, vegetables and seafood abound and it is said that if something moves, the Vietnamese will eat it. Nothing is wasted and a roast chicken is chopped up into small pieces with the beak at one end of the plate and the feet at the other. The only part of a pig they don’t eat is the ‘oink’, whilst the trotters and ears as well as lots of unmentionable innards are considered delicacies. Snakes, field rats and bat’s blood are available while dog is considered a northern dish.

In many respects it can feel like a time warp, with women going to the local market every morning and most shopping still done in ‘mom and pop’ stores where they know you. There are supermarkets, but getting the shopping home on a motorbike can prove a problem. Despite being packed out they still manage to charge higher prices than the local shops.

Vietnam has some amazing tourist attractions from stunning beaches all along the coast to the mountains of Sa Pa and the famous Ha Long Bay in the north. In the south we have the Mekong Delta, the tunnels at Cu Chi as well as all the sights and sounds within Saigon.

Our Man in Saigon
Shortly after arriving here I made contact with a senior RICS member who said that they were just setting up a Working Party with a view to establishing an official presence in Vietnam. I joined that group and when we were eventually given government approval to open an office in late 2010 I took on the role of part-time administrator. I’m involved in answering queries from members and prospective members and, as we become established, organising presentations as well as CPD and recruitment events. I am the sole Geomatics member amongst over thirty who are involved in real estate and property in Vietnam.
Climb every mountain... ‘til you find your dream

By Nick Day

A holiday finds our columnist Nick Day studying the history of photography and reaching for the sky by rail (and not a cuckoo clock in sight).

My column is a tad short this issue as I’ve been travelling again. I don’t need much of an excuse to pry myself away from California to the green pastures of England and Europe. A miserably wet and cold winter and spring back home (summer is shaping up no better), and the chance to attend GEO-11 in early April, plus an old school reunion, was a “no-brainer.”

Staying by Lake Geneva with a Swiss family for a few days in late May, provided an opportunity to learn first-hand how and why Switzerland is set up the way it is, and what makes it tick (no, it’s not the cuckoo clocks!). I visited the Photography Museum in Vevey where Charlie Chaplin lived and died. What a wonderful experience, marred only by the fact I couldn’t stay longer than half a day. If ever you’re near the area, don’t miss it!

The permanent exhibition occupies 500 sq metres on six floors of an 18th century building, and tells the story of nearly 200 years of the art and technology of photography. It covers inventors, advancement of techniques, and a vast collection of cameras and photographic equipment – camera obscuras, magic lanterns, nickelodeons, early forms of animation through spinning mirror images and slits in wheel effects, right up to current digital photography. One sees the original 3D of the Stereopticon and stereoscopic photo viewer, all the rage in the Victorian age. Early forms of tintsypes, ferrotypes, and gum arabic prints are on display, as are hand-tinting for early colour photos, and the development of large format bellows cameras. There are elegant old Contax, Alpa, Hasselblad, Rolleiflex, Voigtlander, Polaroid Land camera, aerial cameras, and an exquisite phototheodolite.

Photographic cameras were a development of the camera obscura, a device dating back to the ancient Chinese and Greeks, which uses a pinhole or lens to project an image of the scene outside upside-down onto a viewing surface.

Nicéphore Niépce took the first photos around 1817 using self-made cameras; at first these were not permanent, and faded away. Cameras continued to change through many generations, including Daguerreotype, calotype, dry plate, film, and digital. Film was pioneered by George Eastman, who started manufacturing paper film in 1885 before switching to celluloid in 1889. His first camera, which he called the Kodak, went on sale in 1888.

I learnt that the first 35mm camera put into production was the Leica 1 in 1925, and how it was derided for some time by the “serious” large format camera brigade. Incidentally, many years later, introduction of the digital camera was applauded and embraced by the PC/hitech community, but scorned by 35mm buffs. Still the owner of a superb, working Leica M3 – bought second hand when I was 21 – and Nikon Nikkormat SLR, I recently moved on to a digital 18mp Canon 7D.

Railing about Switzerland

I’d like to say I just fulfilled a boyhood dream by riding the great railways of Switzerland, but I’d be lying. The idea came to me last October after seeing an ad in a Brit newspaper. I never grew up wanting to become an engine driver, but I do love to ride trains. The dream turned into reality late May as I began a series of train, cog rail, and funicular rides all across Switzerland. Starting in Tirano, Italy, I caught the Bernina Express to St Moritz that climbed quite rapidly, via a series of spirals from nearly 1500’ to over 7300’ at the Bernina Pass, with its frozen lakes and glaciers, before descending to 5850’ in St Moritz about 2½ hours later. Truly a remarkable feat of engineering skill and vision, not to mention breathtaking scenery.

Two days later, the Glacier Express (billed as the slowest express train in the world) took me from St Moritz to Zermatt, via Chur. At 7½ hrs it’s quite tiring as there’s so much to see. Passing over 291 viaducts and bridges, and through 91 tunnels, displayed Swiss ingenuity. On several occasions, a lake or mountain that would be on the left before entering a tunnel, would be on the right after emerging.

The weather closed in on arriving in Zermatt, and the Matterhorn was shrouded in cloud. Undeterred, I stayed an extra day and was rewarded by blue skies and perhaps the clearest view of one of the world’s most recognisable mountains. A quick dash down to the railway station and I was whisked up to Gornergrat, at over 10,200’, by cog rail in about 35 mins. The panorama at the top included nine mountains over 14,000’.

A few days later I was off on the Golden Pass rail from Montreux to Interlaken, another spectacular ride and tribute to surveyors and engineers. Then, what seemed like a Disneyland ride on speed, I took the steepest and longest funicular in Switzerland up to Harder Kulm, a trip of little more than 10 mins that rises over 2500’, for a view of the Jungfrau. An exhausting, but exhilarating holiday, with thousands of digital photos to sort through.
RICS Policy Watch Summer 2011

By James Kavanagh, Director of RICS Land Group

Much has already been reported in this issue on the two new AssocRICS routes for geomatics: Land & Engineering Surveying and Hydrographic Surveying (see pages 6 & 9). Both routes are aimed at unqualified staff or technically qualified surveyors. There is an AssocRICS route for everyone with a candidate guide available for each route. More can be found @ http://associate.rics.org/uk-home11/how-to-qualify/landengineering-surveying-pathway/ Hydrographic surveying at: http://associate.rics.org/uk-home11/how-to-qualify/hydrographic-surveying-pathway/ Both are international in scope and fully applicable outside UK. We hope to combine these routes with a ‘Land’ group amalgamated route and a renewed emphasis on Direct Entry and relationship building with ‘licensed’ bodies.

Land update from the Law Commission

The UK Law Commission has recommended reforms to simplify and clarify laws that govern relationships between neighbouring plots of land. The proposals will make it easier for people who develop, mortgage, sell and buy land to identify and manage the rights and responsibilities that attach to it. Remembering your land law, as I’m sure you all do, these new obligations include these effects:

- make it possible for the benefit and burden of positive obligations to be enforced by and against subsequent owners;
- simplify and clarify the rules relating to the acquisition of easements by prescription (or long use of land) and implication, plus the termination of easements by abandonment;
- give greater flexibility to developers to establish the web of rights and obligations that allow modern estates to function;
- facilitate the creation of easements that allow a substantial use of land by the benefiting owner (for example, rights to park a car);
- expand the jurisdiction of the Lands Chamber of the Upper Tribunal to allow for the discharge and modification of easements and profits created post-reform.

Recommendations are made to enhance the law of easements, covenants and profits à prendre. These rights are essential to the effective use of land and are relied upon by a significant proportion of property owners in England and Wales. The Commission states that ‘parts of the current law are ancient, contradictory and unfit for modern society’. The recommendations would not affect the validity and enforceability of existing rights.

http://associate.rics.org/uk-home11/how-to-qualify/landengineering-surveying-pathway/

China delegation visits RICS

RICS was delighted recently to welcome a high level delegation from the National Administration of Surveying, Mapping and Geoinformation (NASG – formerly known as the State Bureau of Surveying and Mapping). China has launched a new ‘licensing’ regime for (land) surveyors, and RICS was keen to explore the connectivity between the new Chinese licence and RICS professional membership.


Training academy goes online

Finally, a new RICS training academy offers a range of ‘learning’ facilities from webinars to podcasts, to APC resources and traditional ‘face to face’ courses. More @ https://training.rics.org/
Another review of intellectual property rights

By Carl Calvert

In May 2011 an independent report, Digital Opportunity – a review of Intellectual Property and Growth by Professor Ian Hargreaves was published by the UK Intellectual Property Office (IPO).

The second sentence of the Forward reads: ‘The Review was needed’, the prime minister said, ‘because of the risk that the current intellectual property framework might not be sufficiently well designed to promote innovation and growth in the UK economy.’

There was a previous report by Gowers in 2006, which after initial acclaim by ministers was contradicted as the UK sought tactical positions in negotiations. There were 54 recommendations in Gowers of which 25 have been implemented in full or in part. So it may be that this latest review too will be lost in part.

Given that UK IP laws are not fit for the digital age the review sought economic evidence on which to base their judgements as well as ‘fairness, culture, and just reward.’

Advanced economies such as the EU and UK have become more knowledge based with intensive – and increasing - spending on IP investments. As an example, the UK spent £137 billion on intangible investment, or investment in IP, compared to £104 billion on fixed assets in 2008 (NESTA 2011).

So what then?

The US ‘fair use’ rules that govern occasions when copyrighted material can be used without explicit consent of the right’s holder were considered but under EU law would be infeasible. In fact ‘fair use’ is achievable through the current exemption in EU law.

There are ten main areas which Hargreaves picks out:

1. Building, by 2012, a ‘Digital Copyright Exchange’ is the first major change. It is envisaged that the digital one-stop shop for digital copyright would simplify transactions, thereby making it faster and cheaper; also, in my opinion, easier to audit.

Of course, as with many bold ideas good leadership is required, together with significant resources and commitments from current rights holders. If the example of the Gowers review is followed then, unless government and the large companies for which copyright is their lifeblood can see an economic advantage both strategically as well as tactically, it will be lost.

2. There was a public hearing, in April 2010, of the European Commission addressing the problems of the Single Market. The hearing considered the outcomes of the European Commission’s recommendations in 2005 for online music licensing. The consensus seems to be that what Hargreaves is recommending reflects what was said in Brussels in 2010. A cross-border framework with common codes of practice seems to be the way forward.

3. ‘Orphaned works’ are works where the copyright holder cannot be traced. When this happens the work is in limbo as it cannot lawfully be used commercially without specific permission of the rights holder. The solution proposed is that the work is only described as ‘orphaned’ if it cannot be found on the proposed Digital Copyright Database.

4. There is a recommendation of mass licensing of orphaned works and a clearance procedure for those works. In that way works, which could never be used by organisations such as on the BBC or BFI, could be used.

5. The EU-sanctioned exemptions to alter the format of a piece of music for personal use or to use it in parody, have not been taken up by the UK and neither has the exemption for great libraries to archive digital copyright material. The consequence of the latter is that ‘much of it is rotting away’. There is also a recommendation for scientific and other researchers to use text and data mining techniques, which are currently prohibited by copyright law.

6. Patents and Designs suffer from 38 different patent regimes within Europe and national patents have to be litigated separately in each member state according to that country's laws. The recommendations are for the government to ‘take a leading role in promoting international efforts to cut backlogs and manage the boom in patent applications by further extending “work sharing” with
change has increased and the dependence on IP has grown. There are many instances where we view information from the Internet without realising the IP in the data, systems and visualisation methods involved. The need to consolidate our laws in a transparent way so that they are equally well understood within the EU would be a good start. It will also enable geographic information and data to be more easily available – and that can only be a good thing.

It is expected that the government will make a response to Professor Hargreaves’ review next month. But given the current financial climate I cannot see rapid progress being made unless the holders of intellectual property rights, including the Crown, see both short term and long term financial benefits to themselves and society at large.

7. Designs are the largest sector of intangible investments in the economy and the IPO should make an evidence-based assessment of the relationship between design rights and innovation and consider including these in the Digital Copyright Exchange.

8. Enforcement should be integrated and it is recommended that the government introduce a small claims track in the County Court for low monetary IP claims.

9. The IPO should be able to give advice to small businesses and should involve lower cost providers of IP legal and commercial advice.

10. By 2013 the IPO should publish an assessment of those measures recommended in the review which have been accepted by government.

The difference
So what’s different now from 2006 when Gowers reported? Quite simply the rate of

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Cruising Sydney Harbour, Australia’s first kit home plus a report on the exotic experience of the FIG Working Week in Morocco, have all attracted our columnist’s eye.

From Sydney Harbour to Marrakech

History House in Sydney is the HQ for the Royal Australian Historical Society as well as the venue for a lecture on the recent book by Lyn Fergusson about New South Wales first Governor, Arthur Phillip. The enigmatic founder of Australia is finally becoming more well known through the dedication of historians like Lyn. Meanwhile, a cruise of the inner Sydney Harbour suburban coastline in the steam tug Waratah was magical even though the weather was dark.

Bowral historic houses
This year’s selection of historic houses open for inspection to National Trust members were quite irresistible to a surveyor. Wingecarribee is the first kit home reassembled in Australia dating to 1847 and re-erected by the son of the third Surveyor-General of NSW, John William Molesworth Oxley whose name was also John. This superbly maintained residence has been restored by the descendants of the original owners, Bill and Marcia Yates. This most gracious lady proudly took Kerima-Gae and I through some hidden aspects of the homestead including the travelling medicine case of the S-G himself, which was still in perfect order nearly 200 years later. There were estate plans of later subdivisions on the walls of the billiard room with a plaque displaying that the grandson of the S-G (once again John!) was a licensed surveyor in the late 1800s.

When Brocky dreamt of Jeannie...
At a very recent celebrity visit by the cast of the famous comedy “I Dream Of Jeannie” I was very fortunate to be at the venue at the perfect time to get photos with Larry Hagman (Major Tony Nelson) and the still voluptuous Barbara Eden who played the quirky and delicious Jeannie the female genie. Barbara is alleged to be 76 years old!

FIG 2011 Marrakech
Figuring the Working Week in Morocco with 1700 other surveyors was a great occasion. With 96 of the 124 member countries represented it was a resounding rebuff to the cowardly terrorists who had bombed a restaurant in the host city of Marrakech only four weeks before.

Our Moroccan hosts staged a magnificent Welcome Reception held in the Mansour Eddahbi Hotel which gave a very warm and safe introduction to the truly peaceful Marrakech with its most congenial hosts. At the FIG Foundation dinner the exceptional Moroccan Restaurant Palais de Jbilats saw us enjoying traditional music complete with the most alluring belly dancers accompanied by drummers and other musicians. Full lambs on platters were served for the main meal. A full house was treated to a great night’s entertainment enhanced by the best of local cuisine at the Gala Banquet in Le Pacha Restaurant.

FIG 2011 Marrakech – an absolute triumph and to our 2012 Italian hosts “Viva Italia!” – see you there next year.
**Quantm road planning**

Quantm Desktop Alignment Planning software has been designed to support road planners and engineers in identifying the best horizontal and vertical alignments for small road schemes such as bypasses. The technology generates millions of alternative alignments and returns a range of 5-20 best options for review. The Trimble software is available in two editions: Desktop Premium performs corridor identification and full horizontal and vertical alignment optimisation while Desktop offers vertical optimisation only. Korec is the UK and Irish distributor of Quantm software.

**Feature recognition**

French company, Viametris, has developed software to recognise and vectorise 3D features from point clouds via their product, MAGELAAN – MApping, GEodesic data Localisation and Automatic ANalysis. Their aim is to make better and cheaper use of mobile mapping data by speeding up the input of features into GIS. Their software can be trained to recognise shapes, such as bollards, phone boxes and lighting columns from point cloud data. From imagery combined with lidar the software can detect and use character recognition to analyse road signs and markings, including pedestrian crossings. MAGELAAN can also extract road edges and calculate geometry as well as sight lines and road camber. The company has a significant R+D capability that is available for development of new algorithms and prototyping.

**Swinglet flies into action**

Korec has recently become the UK and Irish distributor of Swiss company SenseFLY’s unmanned flying camera. The swinglet CAM is a lightweight, unmanned airborne vehicle (UAV) with a high-resolution electronically integrated digital camera. Designed for small scale aerial mapping projects, it can be deployed in under a minute, is hand launched and has a take-off weight of 500g. The camera records 10-40 cm/pixel images and can produce over 100 hectares of aerial photo coverage during its 30-minute flight. An integrated GPS-based miniature autopilot ensures that the camera starts, flies and lands silently on its own. Its flight path is defined in PC-based software and can be updated during the flight. GW is having a demo of this device and will report to readers in due course.

**SmartAntenna plus**

The Leica Zeno GG02 Plus is a centimetre accurate GNSS SmartAntenna combining dual-frequency GPS and optional Glonass support. The antenna together with a Zeno field controller can deliver centimetre accuracy positioning in difficult environments like urban canyons and tree canopies. The Zeno GIS Rover integrates a dual-frequency GPS and Glonass SmartAntenna with cm accuracy, either in real-time or after post-processing. A rugged design ensures the unit is able to work in extreme temperatures. Other features are: an exchangeable all-day battery, two megapixel camera and in-built 3.5G modem. The company has also released the Zeno Connect app for third-party software applications to manage and configure the Zeno GNSS sensors (GS05, GS06 and GG02 plus) and receive NMEA messages. Plus, the Zeno Field v2.0 and Office v2.0 software are available.

**Cable-free scanner**

Leica’s new ScanStation C5 laser scanner has been designed for as-built and engineering surveys as a fully integrated, cable-less system. It has an onboard interface with a high-resolution colour touch-screen and integrated high-resolution zoom video. The scanner also features a laser plummet and tribrach mount and interfaces to standard survey accessories such as TPS batteries, total station prisms and the Leica GIS SmartAntenna. Owners can add high-accuracy tilt compensation, internal digital camera access, higher scan speed and longer range via simple upgrades. The scanner is also fully compatible with Leica’s Cyclone software.

**Software standards**

Trimble RealWorks version 7.0 software incorporates the newly approved ASTM International (formerly the American Society for Testing and Materials) E57 E2807 data exchange standard for 3D imaging systems. The software allows 3D laser-scanning users to use their design software of choice, depending on their applications and workflow. RealWorks is a stand-alone software suite for the interpretation and 3D rendering of scanned point cloud data.

**Long-range radio**

The TDL 450H radio is a long-range edition of Trimble’s radio modem series designed to support GNSS surveying applications. With 2-35 Watts (user programmable) of power, the radio transceiver’s range enables work in difficult terrain and urban areas and a multi-function user interface streamlines field configuration and troubleshooting. The radio modem allows users to adapt to conditions: for longer baselines, surveyors can dial up the power and, when the work area is smaller, a lower power output can extend battery life. The TDL 450 series is available in two frequency bands to cover the entire commercial UHF band and it also allows the user to select from either 12.5 or 25 kHz channel bandwidth. The modem comes with a new protocol offering 9600 bps in a 12.5 kHz channel without loss of range.

**Added support in eGIS**

The latest version of eGIS running on Topcon’s GRS-1 and FC-236 handheld GNSS field controllers offers support for real-time volume calculation. A user can measure the boundary of an area at the top and bottom and assign them to the volume calculation tool to get results within seconds. The function can benefit those who use a Trimble TDS or Sokkia Ranger surveying instrument.

**Measure in one**

With the Leica 3D Disto laser distance meter, location, height and distance can be measured in XYZ from one location, in one measurement. A combination of distance and angle measurements determines the position of each point, targeted with the integrated camera and captured with the laser beam. Data is captured and stored and can be post-processed. The sensor can be placed on any stable surface or mounted on a tripod. The Disto is controlled by a remote-control hand-held unit and features an intuitive user interface with "wizards" to assist with complex measuring tasks.
Basemap for maritime GIS

The Ocean Basemap is a comprehensive map of the world’s oceans and coastal areas designed to support maritime GIS applications. Created by Esri, it is available as a cached map service in ArcGIS Online. The basemap includes fine-grained bathymetric and altimetric data from coastal areas and was created with uniform cartography for consistency and a muted colour palette. Authored down to a scale of 1:1,000,000, the basemap is built using various publicly available authoritative ocean data.

We have recently made improvements for RICS and IIS members and subscribers accessing our website. In addition to viewing the latest edition online, you can now download a PDF of the page for personal use and printing.

• If you’re an RICS member you should be able to get your user name and password using your RICS membership number. IIS members and subscribers should use their address but do make sure it’s the address we send the magazine to!

• As a subscriber or institution member you have access to an online searchable database of a decade of articles from Geomatics World. Readers and subscribers can now buy books, subscriptions and other services using credit cards or PayPal.

We are constantly looking for ways to improve the website and welcome serious feedback. Email your comments to editor@pvpubs.demon.co.uk  www.pvpubs.com
Sales Consultants - KOREC Group

The Company
KOREC is a well-established company providing a variety of solutions for the Construction, Survey and GIS Mapping markets. We are one of Trimble’s largest distributors worldwide and have offices in the UK and Ireland. Trimble applies technology to make field and mobile workers in businesses and government significantly more productive. Solutions are focused on applications requiring position or location - including surveying, construction, fleet and asset management, public safety and GIS. KOREC has enjoyed excellent sales growth and is looking to build upon this success with the appointments of three key sales roles - Mapping, Survey and Machine Control.

All roles require excellent communication skills, written and verbal, and outstanding negotiation and presentation abilities at all levels; above all you will have the confidence, commitment and ability to sell innovative solutions.

The right candidates will be self-starters, with evidence of sales success in a business-to-business sales environment, be ambitious, tenacious and have a ‘sense of urgency.’ Candidates will have excellent communication skills, written and verbal, and outstanding negotiation and presentation abilities at all levels. Above all you will have the confidence, commitment and ability to sell innovative positioning solutions. These are outstanding opportunities to join a rapidly growing company with a young and ambitious team. Full Product and Professional External Sales Training will be provided. A substantial package, including company car, is available to the right candidates.

The Roles

Mapping Sales Consultant – Scotland & North East England
The successful candidate will be responsible for maximising the sales of Trimble Hand Held GNSS Data Collection solutions for a wide range of applications. You will have experience in GIS Data Collection, Land Surveying or GIS Software solutions.

Machine Control Sales Consultant – Southern England
The successful candidate will be responsible for Machine Control Sales for the Southern counties of England. You will be responsible for maximizing the sales of specialist Machine Control solutions for a wide range of applications such as road, rail, environmental and infrastructure projects, including the use of GNSS and Robotic Total Stations.

Survey Sales Consultant - Eastern England
The successful candidate will be responsible for maximising the sales of Trimble Surveying Solutions in Eastern England, including Robotic Total Stations, Trimble GNSS, Software and Spatial Imaging. You will have experience of construction or land surveying GPS equipment.

Applications
All applicants should forward a letter of application marked Private & Confidential to HR Manager, “The Role Name you are applying for”, KOREC, Blundellsands House, 34-44 Mersey View, Liverpool L22 6QB, or by email to hr@korecgroup.com. Closing date - Friday 29th July 2011.
GW RECRUITMENT
For effective recruitment call 01438 352617 All ads go online immediately. Next issue: Sept/Oct, copy date: 19 August

HayesDavidson

Planning Visualiser / Image Technician

Hayes Davidson is a market leading, award winning planning visualisation and architectural illustration studio based in Paddlington, London.

Because of continued growth, Hayes Davidson are recruiting a Planning Visualiser / Image Technician. Responsibilities will include 3D modelling of architectural information, image rendering, assisting with the preparation of Accurate Visual Representation (AVR) and verifiable imagery, post production illustration / editing and supporting the coordination of technical / planning projects.

Essential Skills
- Competent Photoshop user / experience of post render technical / accurate illustration
- Experienced architectural modeller and renderer using 3ds Max / AutoCAD.
- Proven experience and abilities in a technical environment with a history of accurate and consistent output.
- Classified to degree level in a relevant 3D / Architectural discipline

Desirable Skills
- Experience in planning and property and/or design/creative industries
- Experience of Surveying / GIS / Mapping related software
- Experience of data management and coordination
- A keen interest in photography
- Knowledge of London/UK architectural and/or property environment

This is an opportunity to work with the market leaders in an exciting and fast growing sector, supporting the development of some of the UK’s most exciting new architecture.

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