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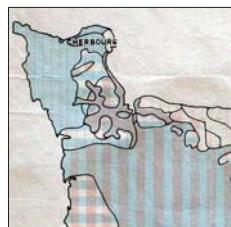
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# Leica Nova MS50 workshops

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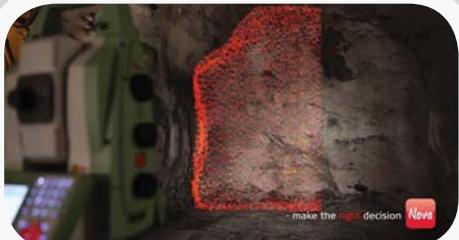
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**Deformation  
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**Nova**

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#### COVER STORY

Digital data is increasingly going into the cloud. Does this pose problems for surveyors? What are the risks? One company has already taken the plunge (page 20). See also our Digital Extras.  
*Cover image: Dreamstime*



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#### GW's Digital Extras

You can read more articles from this issue online including:

**BIM meets Geospatial!** - Does BIM suffer from 'shiny kit' syndrome? Can we convince clients of the benefits of BIM's joined-up thinking throughout the building lifecycle, asks **Lee McDougall**?

**The cloud and independent software** - **Richard Groom** sets the scene and asks **Dr John Strodachs** of Applications in CADD about security, business plans and platform independence for small software companies.

**A cloud solution reduces turnaround, journeys and fuel** - Topcon's **Peter Roberts** explains how their Magnate cloud solution with GNSS and 3g enabled tablet has helped the mobile service teams of a mapper of underground pipeline and utility assets.

**Coastal & Marine Management** - unmanned surface vessels have a number of inshore hydrographic applications. **Adrian McDonald** explains the technology. Go to:

<http://www.pvpubs.com/archives.php?titleid=1&issueid=215>

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*Note: the electronic version can now be downloaded as a PDF for printing.*

#### NEXT ISSUE

The next issue of GW will be November/December 2013.

Copy dates are: Editorial: **07 October** Advertising: **18 October 2013**

# Nothing Comes Close



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– vastly reduced convergence times that, in turn, reduce your occupation time when collecting high position and precision reliable data.

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The technologies available to the surveyor today are changing the nature of our work. But let's pause a moment to remember someone whose career began in a very different world.

The editor welcomes your comments and editorial contributions by e-mail: [editor@pvpubs.demon.co.uk](mailto:editor@pvpubs.demon.co.uk) or by post:  
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## Follow the news to enlightenment

**B**IM, UAVs, cloud computing, marine policy, windfarms, global mapping issues... we have quite an issue of *GW* for readers. Something for everyone to aid and inform their professional development. Let me try and introduce some of these topics as a teaser to whet your appetite ahead of diving in.

One of the Holy Grail's of modern survey is to be able to apply QC to data whilst the surveyor is still onsite. The mobile internet is clearly the key to achieving this and Murphy Surveys have done it through a system approach, which has included drawing on the technologies used by courier companies, such as smart phones and GPS based fleet tracking, to augment their instruments' connectivity. See page 20.

### Read all about it!

Our news columns (extended by two pages this issue) are always a source of the latest technology developments. The interesting thing is that new survey technologies and techniques continue to emerge. In the News (page 08) we report on how scientists are developing acoustic scanning to measure the thickness of individual layers of water in the ocean. Often we are told that new technologies may take awhile to emerge from the boffins' research. It is therefore encouraging to note that GNSS precise point positioning techniques are now being used for aerial survey applications (page 08. See also *GW September/October 2012*).

LiDAR has come of age now that the industry has available standard data formats. The LAS file format is a public binary file format for the interchange of 3D point cloud data as xyz triplets. A separate format has also been announced for full wave form geo-referenced lidar known as PulseWave. See page 08.

UAVs have developed from military drones. We first highlighted their potential use as survey tools as long ago as 2005 in an article in *Engineering Surveying Showcase* by Dr David Park and Jamie Uff, both of Nottingham University, which at that time was trialling three different UAVs. It may seem surprising that it has taken so long for them to reach technical maturity but there have been several obstacles. Our article on page 18 highlights the Civil Aviation Authority's restrictions on UAVs. The CIA regard them as piloted even if the pilot is on the ground, which is why they call them unmanned aircraft and not UAVs.

### Epic career spanned dogs to GNSS

The capture of data for topographic survey, detailed engineering surveys or mapping can increasingly be done remotely by using non-contact technologies. The range of technologies available to the surveyor today must surely have been beyond the wildest dreams of those who began their careers in the 1950s and 60s. But a few did see the potential and *GW* pays tribute to the remarkable **Alan Wright** whose career spanned surveying in Antarctica, when dog teams were still the order of the day, to the early EDMs through to GNSS. See page 11.

Finally we would like to hear from UK readers who have experienced difficulties in reconciling their topo surveys with Ordnance Survey and the Land Registry Index Map. We are aware of a number of problems in this area with both public bodies shrugging their respective shoulders and basically saying, 'nothing to do with me mate'. In the age of Google, GNSS positioning and the Internet this isn't good enough.

Stephen Booth, Editor

### TEN YEARS AGO: *GW September/October 2003*

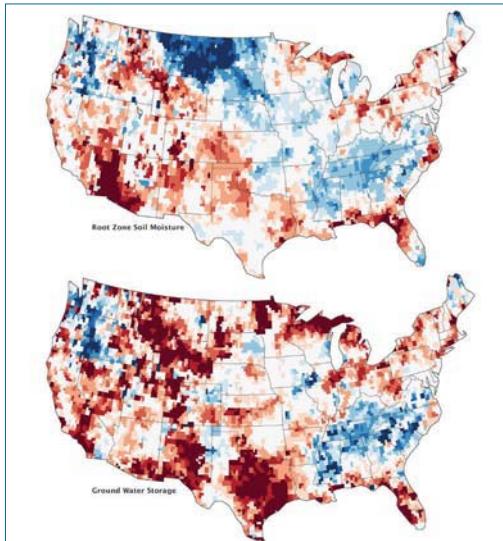
2003 was the 300th anniversary of the death of the experimental scientist, surveyor and polymath Robert Hooke. The late **Michael Cooper** was one of a small number who had championed Hooke's work for several years prior to 2003. The year also marked the 200th anniversary of the beginning of measurements for India's Great Arc.

With the financial crash still some four or five years away things were booming with plans for a marine spatial data infrastructure from UKHO and plans for a Global Map from EuroGeographics were unveiled with a pan European dataset to get things started.

For those wanting to learn more about the Open Geospatial Consortium (mentioned in our report of the 2013 Cambridge Conference) **Carl Read** neatly explained it in terms of Lego building blocks. The article is still relevant; check it out via our archives.

There was a debate going on over the merits of fixed boundaries v general boundaries. **David Powell** had kicked it off in the March/April issue. **Louis Charlebois** was making the case for fixed boundaries.

## GRACE detects droughts



These maps show the amount of water stored in the root zone (upper map) and shallow aquifers (lower map) across the USA on 3rd June 2013. They were produced by NASA by combining data from the Gravity Recovery and Climate Experiment (GRACE) with other satellite and ground-based measurements. The maps are experimental products funded by NASA's Applied Sciences Program and developed by scientists at NASA's Goddard Space Flight Center and the National Drought Mitigation Center. They represent changes in water storage related to weather, climate, and seasonal patterns.

### Shipwrecks found

Members of the Libyan Navy, training with crew on UK warship HMS Echo, have literally charted new waters with the discovery of five large wrecks in Libyan waters. The sunken vessels were found using advanced sonar systems during a two-week training exercise with the Libyan Navy. None of the ships had appeared on any previous charts. Three of the wrecks lie off the coast of Tripoli, including two that are just

900 metres apart. The largest of these, first detected by HMS Echo when it visited Tripoli last year, is 150 metres long and stands 22 metres from the ocean floor. On this trip, a detailed 3D image of the wreck has been acquired and, whilst hosting and training Libyan Naval officers, four further vessels were discovered. Two of these were found off the coast of Al Khoms in waters that had never before been charted.

*Source: Libyan Herald*



### RICS Geomatics Evening Lectures 2013-14

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

**Thursday 07 November**  
Scan to BIM special.

**Thursday 05 December**  
Annual Christmas Lecture and Michael Barrett Award.

**Thursday 23 January 2014**  
Geo Forum annual Lecture

**Thursday 27 March 2014**  
Engineering Surveying - tbc



### IRNSS-1A launched

The first of the seven satellites that will constitute the space segment of the Indian Regional Navigation Satellite System (IRNSS) was launched on 2nd July 2013. IRNSS is an independent regional navigation satellite system designed to provide position information in the Indian region and 1500 km around the Indian mainland. IRNSS will provide a standard positioning service for all users and a restricted service to authorised users. The entire constellation is planned to be completed by 2015-16. A second satellite (G-SAT14), planned for launch on 19 August, was unexpectedly curtailed hours before launch.

### CryoSat maps crater

ESA's CryoSat satellite has found a vast crater in Antarctica's icy surface. Scientists believe the crater was left behind when a lake lying under about 3 km of ice suddenly drained. By combining new measurements acquired by CryoSat with older data from NASA's ICESat satellite, the research team has mapped the large crater and even determined the scale of the flood that formed it. From 2007 to 2008, six cubic kilometres of water – about the same amount that is stored in Scotland's Loch Ness – drained from the lake, making it the largest event of its kind ever recorded. That amount of water equals a tenth of the melting that occurs beneath Antarctica each year. Since the end of 2008, the lake appears to be refilling but six times slower than it drained. It could take decades to reform. CryoSat carries a radar altimeter that can 'see' through clouds and in the dark, providing continuous measurements over areas like Antarctica that are prone to bad weather and long periods of darkness.

### Robot sees and maps

Computer vision algorithms that enable Samsung's latest humanoid robot, Roboray, to build real-time 3D visual maps to move around more efficiently have been developed by researchers from the University of Bristol. By using cameras, the

robot builds a map reference relative to its surroundings and is able to "remember" where it has been before. The ability to build visual maps quickly and anywhere is essential for autonomous robot navigation, in particular when the robot gets into places without GPS signals or other references.

Roboray is 140 cm high and weighs 50 kg. It has a stereo camera on its head and 53 different actuators including six for each leg and 12 for each hand. The technology of rapid 3D visual mapping, developed at Bristol, is internationally renowned because of its ability to robustly track and recover from rapid motions and occlusions, essential when the humanoid moves and turns at normal walking speeds.

- For more see *Journal Advanced Robotics* (Volume 27, Issue 10, 2013).

### Bomber Command visit

2013 is the 70th anniversary of significant events in the Second World War involving RAF Bomber Command, most notably the Dams and Hamburg Raids. The Defence Surveyors Association (DSA) is planning a visit to Lincolnshire this autumn to study Bomber Command, including 617 Squadron. The visit is scheduled for Tuesday 1st to Thursday 3rd October. Contact Dr John Peaty [johnpeaty@aol.com](mailto:johnpeaty@aol.com)

### Landslide predicted

On April 10, one of the largest open-pit mines in the world, Bingham Canyon in Utah, USA, produced the largest, non-volcanic landslide in the history of North America when 65–70m<sup>3</sup> of dirt and rock thundered down the side of the pit. While the size of the slide was unexpected, the timing was not. The company that operates the mine had installed an interferometric radar system months before the event, that made it possible to detect subtle changes in the stability of the pit's walls. Signs of increasing strain prompted the mine's operators to issue a press release seven hours before the collapse, with a warning that a landslide was imminent. "The main lesson to be learned is that large rock slope

failures like this are not unpredictable 'acts of God,'" notes University of Utah geologist **Jeffrey Moore** in an email. "They typically show many precursory warning signs, and with the right monitoring system and proactive approach, the time of failure can be forecast with reasonable accuracy. This is a real success for the mine and a lesson to others in the community."

*Source: NASA*

## Dormant volcanos awake

Images taken from space indicate that some of the world's unmonitored volcanoes may not be as peaceful as we thought. Interferometric satellite radar has shown that the surfaces of a number of volcanoes within the East African Rift are deforming – inflating and deflating – possibly a precursor of eruptive activity.

To understand the geophysical processes behind the deformation signals, researchers from the University of Bristol placed seven ground-based GNSS receivers on two of the volcanoes within the rift, Alutu and Corbett, which show the biggest deformation signals and two reference receivers on stable ground. Analysis of the GNSS results will aid interpretation of the deformations seen from the satellite data. Research could benefit the geothermal industry, as drilling activities are expected to begin on both volcanoes in the coming year.

*Source: Bristol University website*

## China's 100Mpx camera

The Chinese Institute of Optics and Electronics has developed a camera featuring a 100-megapixel charge-coupled device (CCD) chip. The camera, IOE3-Kanban is capable of producing images with  $10,240 \times 10,240$  pixels but is also small and light, with its widest part measuring only 19.3 cm and can be used in temperatures from -20 to +55°C. Its high sensitivity and high dynamic range (HDR) features mean it will be useful in high-resolution imaging in the fields of aerial mapping, city planning, disaster monitoring and intelligent transportation systems.

## GLONASS uses reserves

Following removal from operation

of a satellite that suffered a signal transmission failure and the loss of three Glonass satellites during a failed launch in June, Russia has put into operation one of its four orbiting reserve satellites to re-establish global coverage. A group of 29 Glonass satellites is currently in orbit, with 24 spacecraft in operation, three spares, one in maintenance, and one in test flight phase, according to Roscosmos. By 2020, Russia plans to have 30 Glonass-M and new-generation Glonass-K satellites in orbit, including six in reserve.

## Geospatial Challenge

Intergraph has announced its inaugural Geospatial Challenge for students participating in the company's Global Education Program — Intergraph U. Students from around the world are asked to submit an abstract describing the scope of a problem, their geographical area of interest, and the dataset(s) and Intergraph solution(s) used. From the abstracts selected, qualifiers will provide a research paper and accompanying video demonstration showcasing how Intergraph software was used to transform their data into actionable information. Winners will receive a \$2,500 travel sponsorship to attend the 2014 HxGN LIVE conference and other benefits. The competition is open from November 1, 2013 until January 31, 2014. For more information visit:

[www.intergraph.com/education](http://www.intergraph.com/education)

**Grave map for Richard III**  
Researchers at the University of Leicester are combining laser scanning with digital photogrammetry to produce an interactive map of the grave of Richard III, discovered at the Grey Friars Church by archaeologists in September. The remarkably accurate reconstruction will preserve the grave as it was, following the excavation of Richard's skeleton and will be a useful tool for studying the grave's condition in future. The researchers hope the reconstruction will be made available to the general public in the proposed Richard III Visitor Centre.

## Abu Dhabi win

Proteus, a provider of satellite-derived mapping and

## Mine Safety



An integrated mine monitoring system is helping Eurasian Natural Resources Corporation improve safety at copper /cobalt open pits in the Democratic Republic of Congo. The integrated RIEGL VZ-1000 laser scanner and SiteMonitor monitoring software system, purchased from 3D Laser Mapping, will be used to monitor high wall stability helping to predict future wall movements.

classification services, has been contracted by Abu Dhabi's Environment Agency to deliver fine-scale terrestrial and marine land use/land cover (LULC) and habitat maps for the Emirate. The multi-million dollar project will include 60,000 km<sup>2</sup>. of land area and the coastal marine environment down to the 15m contour. The project calls for extraction of LULC and habitat features from high-resolution multispectral satellite imagery. In the offshore mapping, highly accurate bathymetric and seabed classifications to depths of 15-20 metres in the Persian Gulf will be extracted.

## OS targets agreed

Ordnance Survey Great Britain's performance targets for 2013-14 are:

- to achieve an operating profit of £28.2 million
- to achieve a free cash flow before exceptional items of £15.8 million
- ensure some 99.6% of significant real-world features greater than six months old are represented in the database.
- to continue to reduce the underlying cost base of the core business by 5% per annum measured against a baseline of 2008-09 adjusted running costs.
- to achieve a customer index score of at least 80%.

- to achieve an innovation index score of at least 80.

## EA in Philippines

Over the last 18 months, the Environment Agency (England) has supported the Philippines Government in rolling out surveying technology to develop flood risk models and maps for a third of the Philippines land mass, covering 18 major catchments. Geomatics Technical experts **Alastair Duncan** and **Patrick Hogarth** supported partners in the Philippines to undertake the initial LiDAR surveys and analyse the data as part of the University of the Philippines' Disaster Risk Exposure and Assessment for Mitigation (DREAM) project. The work was funded by the Foreign & Commonwealth Office and the

## Correction

Leica Geosystems has asked us to point out that the sum quoted in the July/August issue of GW for hiring the new MultiStation MS50 is incorrect. Readers interested in hiring, purchasing or leasing the instrument, together with training and discussing applications, should contact Leica Geosystems on 01908 256505

## Scan to BIM for Beverly Center



Mollenhauer Group were selected to provide an as-built BIM model of one of the largest and most exclusive shopping malls in Los Angeles, the Beverly Center. The Mall was scanned with a Leica P20 and the data is currently being used to create an accurate Revit model by the team. The model will form the foundation for planning and redesign by an international team of architects and engineers led by Neumann Smith Architecture. [www.mollenhauergroup.co.uk](http://www.mollenhauergroup.co.uk)

Philippines Government.

### Ocean scanning

Marine geophysicist, **Helen Piete** from the University of Brest and colleagues has devised a means of scanning the upper ocean down to 150m using acoustic techniques. The technology is used to identify the boundary between layers of water, possibly

only 1 metre thick, of different salinities and temperatures. Hitherto, it has not been possible to investigate the upper ocean in this way because sound is only reflected weakly and the signals are subjected to excessive noise, for example from ships. For more information visit [livescience.com](http://livescience.com)

### Innovation competition

The European Commission has renamed its Earth observation programme GMES to Copernicus. An earth monitoring competition, Copernicus Masters, allows participants to choose from a total of nine challenges covering topics such as environmental monitoring, cloud computing, and mobile services, as well as the innovative use of radar and very high-resolution satellite imagery. Participants compete for their share of a €350,000 prize pool from 1 June to 15 September. Visit: <http://www.copernicus-masters.com/>

### China boundary grab

Following our article by **Robert Beckman** on territorial claims in the South China Sea (*GW March/April 2013*), the Philippines has protested about China's recent publication of a new "10-dash line" map that places sprawling offshore territories it claims within Beijing's "national boundaries". The new Chinese map, which was

first published in January by China's state mapping authority Sinomap Press, features 10 dash lines instead of the previous nine dashed lines to mark a huge swath of the South China Sea in a tongue-shaped encirclement as Chinese territory. Brunei, Malaysia, the Philippines, Taiwan and Vietnam have been contesting China's massive claim of the territory. Nine dashes in the new Chinese map are in the South China Sea and a tenth dash has been placed near Taiwan, purportedly to signify that territory's status as a Chinese province.

Professor **Carl Thayer** of the University of New South Wales at the Australian Defence Force Academy comments, 'The significance of China's latest map of the South China Sea lies not in its ten-dash lines but the naming of numerous features in the South China Sea that had not been listed on previous maps. China appear to be laying the ground for claiming sovereignty of every feature, such as reefs, shoals as well as rocks, islets and islands'.

*Source: GMA News Online*

### TerraStar PPP for African aerial surveys

Johannesburg-based GeoDuster Technologies has commissioned the TerraStar-D Precise Point Positioning (PPP) service for a series of aerial geophysical, exploration and environmental surveys being carried out in Africa by Terrascan Airborne of Germany aboard a specially-equipped light aircraft. Using a combination of GPS and Glonass satellite signals, the high-precision service is being deployed in conjunction with Septentrio dual-frequency AsteRx2eL GNSS receivers for georeferencing high-density magnetic gradient radiometric measurements, often acquired in remote locations and difficult environments. Seamless positional accuracies are typically better than 10 cm with enhanced update rates precluding any use of local base stations, radios or cell coverage.

### Public file format for LiDAR

The LAS file format is a public file format for the interchange of 3D point cloud data. Although developed primarily for exchange

of lidar point cloud data, this binary file format supports the exchange of any 3D x,y,z triplet. The LAS 1.4 specification was approved by the ASPRS Board on November 14, 2011 and is the most recently approved version of the document. As of July 2013 the lidar mapping community has the ability to customize the LAS file format to meet their application-specific needs. The mechanism that makes this possible is the LAS Domain Profile, which is a derivative of the base LAS v1.4 specification that adds (but does not remove or alter existing) point classes and attributes. For example the Topo-Bathy Lidar Domain Profile adds point classification values for bathymetric point (e.g. seafloor or riverbed; also known as submerged topography), water surface, derived water surface, submerged object, IHO S-57 object, and bottom-not-found depth. Extra Byte Variable Length Records (EXTRA\_BYTES or Extra Byte VLRs) are added for pseudo-reflectance, uncertainty, water column depth, figure of merit, and for processing specific flags.

*Source: ASPRS website*

### EMODNet Hydrography

The latest phase of the hydrography part of the European Marine Observation and Data Network (EMODNet) has commenced with a meeting in Lisbon, hosted by the Portuguese Marine and Atmospheric Institute (IPMA). The project involves hydrographic offices and marine institutes, agencies and private companies across Europe. OceanWise is heading the UK effort, with the National Oceanographic Centre (NOC) acting as regional centre for North West Europe. The objective is to migrate fragmented and inaccessible marine data into interoperable, continuous and publicly available data streams for complete maritime basins via a central, INSPIRE compliant, portal. The project will also develop a medium resolution digital elevation model (DEM) of European Seas using single beam and high-resolution multi-beam survey data.

### PulseWaves

PulseWaves is an open source

## TSA's graduation day

The Graduation Ceremony of The Survey Association's Introduction to Surveying course was held at The Survey School in Worcester on 14th June. The Best Assignment Award which is sponsored by CICES went to Oliver Doyle of The Lisheen Mine and the Best Student Award which is jointly sponsored by The Survey Association and Leica Geosystems went to Phil Tett of RPS Group.



vendor-neutral exchange format for geo-referenced full waveform LiDAR called PulseWaves. The format is similar to the ASPRS LAS standard, but instead of storing discrete returns, it stores geo-referenced laser pulses and those parts of the outgoing and returning waveforms that were digitised. The source code and the specification of the PulseWaves format will be released under the terms of the LGPL on [github.com/PulseWaves](https://github.com/PulseWaves)

## TerraStar GRACE base

TerraStar GNSS, suppliers of precision positioning services for worldwide land and near-shore applications, has established a base at the University of Nottingham's GNSS Research and Applications Centre of Excellence, part of the Institute of Engineering Surveying & Space Geodesy (IESG). Under the collaborative venture TerraStar, which maintains its own worldwide network of DGNSS reference stations, will

contribute and have access to the centre's support facilities.

## BRIEFS

**Her Majesty's Land Registry Great Britain and two organisations from the Republic of Azerbaijan have become members of EuroGeographics.**

Altus Positioning Systems has signed Geo Instrumentos as a new dealer for its GNSS surveying products in Chile. The company is based in Santiago and will provide sales and service to customers in the mining, construction, mapping, survey, and government sectors.

**UAV service provider, Cyberhawk Innovations, has announced a £1.25m investment led by Scottish Equity Partners (SEP) along with the Scottish Investment Bank. The funding will enable the Livingston-based company to accelerate its growth,**

**create jobs and expand its products and services.**

RTCM Special Committee 104 has just completed an amendment to RTCM 10403.2. The amendment introduces an ephemeris message for the Galileo Open Service (F/NAV), and also a set of BeiDou messages in the new Multiple Signal Message (MSM) format. Visit [www.rtcm.org](http://www.rtcm.org) for more information.

**Land Information Minister Maurice Williamson has announced that 85 per cent of New Zealand's most current, publicly held aerial imagery data has been opened up for public re-use.**

More than a hundred delegates attended an 'Innovations in 3D' product showcase event organised by 3D Laser Mapping at University College London on 25th July. The event featured presentations from **Stuart Robson**, Professor in Laser

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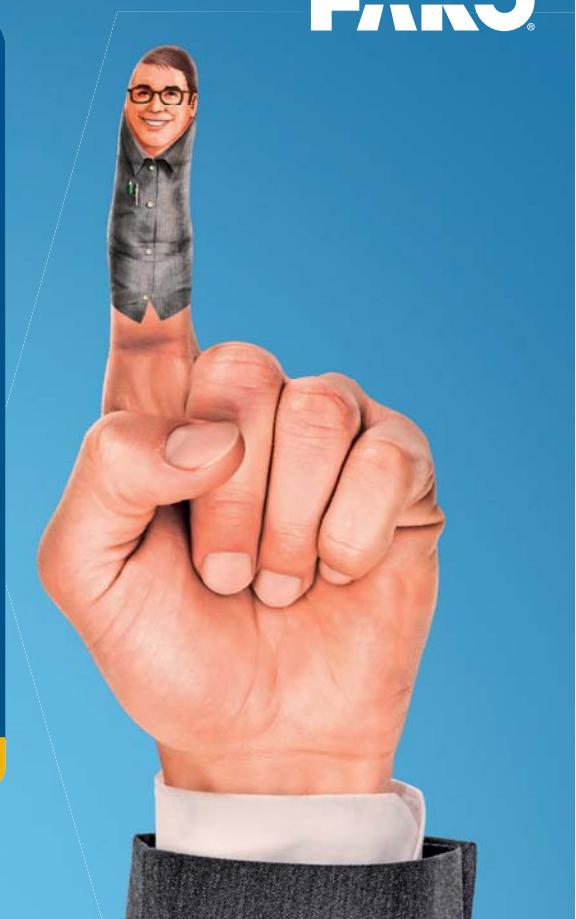
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Scanning at UCL, as well as representatives from 3D Laser Mapping, including executive chairman and founder Dr Graham Hunter.

**Leica distributor Opti-cal has opened an office in Huddersfield manned by sales account manager, Steve Hall. This is new territory for the company, which already has three offices in the south**

### including the head office at Aldermaston, Berkshire.

Coastway Ltd, has added the QuestUAV 200 to their fleet of UAVs. The unmanned aircraft is a fully auto-piloted vehicle with a DSLR Sony Nex7 24Mpx camera. It can be launched from virtually any location and can survey an area up to 100ha in an impressive 15 minutes. It can also fly in winds of up to 65km/hour.

**Ordnance Survey Great Britain has launched a free mapping software development kit (SDK) to add OpenSpace maps to apps on the iPhone, iPad and iPod Touch.**

Following recent flooding in Alberta, Canada, MDA Corporation has made flood maps available to local, provincial, federal agency or non-profit organisations. The maps

were produced by comparing SAR images of the area taken under normal conditions with those taken at the peak of the flooding.

**OHB AG, manufacturer of the five-satellite SAR-Lupe radar satellites, has signed a €816m contract with the German defence procurement agency, for the three-satellite SARah radar reconnaissance system to be operational in late 2019.**

## PEOPLE



**Wylde honoured**

The International Association of Oil and Gas Producers has honoured the efforts of Richard Wylde (above right) on the occasion of his retirement from the Geomatics committee after nine years' service, 2½ as chair. He was presented with a crystal oil-rig obelisk by management committee chair, Brad Carson, who highlighted Richard's role in changing the perception of geo-information technology within industry, developing formats for the exchange of seismic data, enhancing EPSG Registry and creating the Seabed Survey Data Model.

### Rixon moves to COWI

Stephen Rixon has taken over from Mike McKay as director for COWI Mapping UK. The business is centred around an important OSGB framework agreement, however, more recently, additional framework agreements have been added as well as contracts for clients within consultancy and infrastructure.

### Moore's award

The Royal Institute of Navigation (RIN) has awarded Professor Terry Moore with the Harold Spencer-Jones Gold Medal for 2013, the Institute's highest honour for outstanding contributions to navigation. He is one of the youngest recipients of the award.

Professor Moore, who is director of the Nottingham Geospatial Institute, said: "It is a distinct honour to receive this

prestigious award. When I look down the list of previous winners I feel extremely proud, and very humble, to be counted alongside such esteemed navigators."

### Move for Hall

Tom Hall has been named senior business development manager for Network Mapping Ltd. He will be responsible for all UK business development and contribute to the long term strategy of the business. Hall moves from Astrium Geo-Information Services where he worked directly with customers to create new and innovative approaches using multiple datasets.

### New faces lead BARSC

Alistair Maclean, managing director of Quarry One Eleven has been elected as the new chairman of the British Association of Remote Sensing

Companies (BARSC). Sam Lavender, from the Pixalytics consultancy is the new vice-chair.

### Loss of Hunting stalwart

Laurie Whitmore, who has died at the age of 79, joined Hunting Aero Surveys at the age of 17 in 1951 as a trainee photographic technician. In 1953 he served two years national service in the RAF and returned to Hunting in 1956 for his first overseas tour, to Teheran and Damascus. In 1965 he transferred to air crew as camera operator/navigator –

at this time working mainly in Africa, Ghana, Kenya and Nigeria, mainly on government contracts, photographing the landscapes to enable clients to plan and design infrastructure. He also spent many years working in the Middle East, in Saudi Arabia, Syria and Dubai, but his favourite location was Sabah where he was joined by his wife, Judy, with whom he recently celebrated their golden wedding anniversary. He leaves his wife, a daughter Katie, a son Antony and five beautiful grandchildren.

## Events Calendar 2013

• SEMINARS • CONFERENCES • EXHIBITIONS • COURSES

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

#### Jeremiah Dixon Exhibition

Ends 6 October, The Bowes Museum, Barnard Castle, County Durham.  
Contact: [www.jeremiah-dixon.co.uk](http://www.jeremiah-dixon.co.uk)

#### Intergeo 2013

8-10 October 2013, Essen, Germany.  
Contact: [www.intergeo.de/en/index.html](http://www.intergeo.de/en/index.html)

#### Everything Happens Somewhere Conference and Exhibition 2013

9 October 2013, Institute of Education, Bedford Way, London, UK. Contact: [www.geoplace.co.uk/geoplace/link.htm?nwid=263](http://www.geoplace.co.uk/geoplace/link.htm?nwid=263)

#### The 1st FIG Young Surveyors European Meeting

17-18 October, Lisbon, Portugal.  
Contact:

<http://figysn.ordemengenheiros.pt/pt/>

#### Hydrographic Society UK Conference

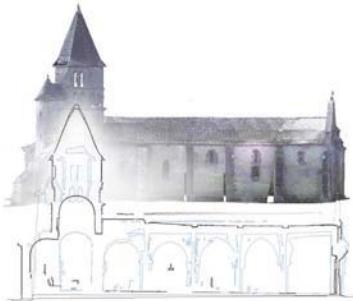
29-30 October 2013, Southampton Solent University Conference Centre, Southampton, UK. Contact: [www.hydroconferences.org/digitalhydro](http://www.hydroconferences.org/digitalhydro)

#### European LiDAR Mapping Forum / SPAR Europe Conference

11-13 November 2013, Passenger Terminal, Amsterdam, The Netherlands. Contact: [www.sparpointgroup.com/europe](http://www.sparpointgroup.com/europe)

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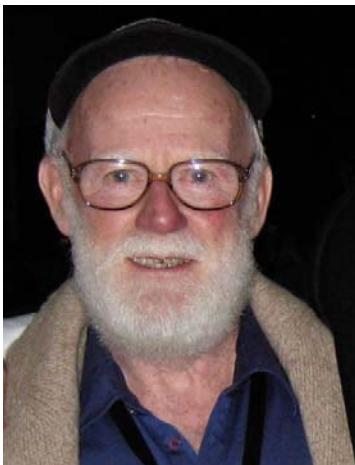
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## Alan Frederic Wright MRICS, FInstCES 1934 -2013



Churchill once said of one of his opponents that he was a modest man with much to be modest about. This could not be said of Alan Wright, who has died after a heart attack. Whilst Alan was a 'modest man' he indeed had little to be modest about. Close friends and colleagues who had known this quiet, softly-spoken man for years were often unaware of his many achievements and activities beyond their own sphere of interest.

Alan was born, lived and died in the same house in Quinton, Birmingham. In between he visited some 80 countries, making lifelong friends in many of them, several of whom travelled great distances to pay their respects at his funeral, one travelling from Australia.

### Early years

Attending King Edwards School Edgbaston, he gained A levels in Maths and Sciences before going to Birmingham University where he graduated in mechanical engineering. His first job was with Siddeley Engines on rocket research. In 1960 he applied to join the British Antarctic Survey (then still known as FIDS - Falkland Islands Dependencies Survey) where skiing and dog team skills were still the order of the day.

The experience was one that remained with him for life, enjoying many reunions with former FIDS colleagues. He completed two winters there with distinction having a peninsula named after him (the Wright Peninsula on Adelaide Island) and earning the Polar

Medal. Alan, ever somewhat absent minded and rarely sartorially inclined beyond his trademark double-breasted blazer of later years, turned up for the investiture by the Queen without a shirt or tie! An obliging security guard ensured he was properly attired for Her Majesty.

### Electronic pioneer

Upon his return from Antarctica, and after a brief spell with a construction company, Alan joined the firm of Tellurometer. This put him amongst that small band of pioneering surveyors in the late 1950s who were the first adopters of electronic measuring instruments, such as the Tellurometer, the first practical instrument capable of accurately measuring a distance for a baseline of up to 35 miles. Hitherto, surveyors had faced the long and laborious task of accurately measuring a baseline (the starting point for a mapping triangulation) by steel tapes.

When GPS arrived in the 1980s Alan was amongst the first to see the potential of the technology for engineering surveying on construction projects. Establishing his own company, Global Surveys Ltd, he was a familiar figure on construction sites at that time travelling the length and breadth of the UK in his blue Renault Espace people carrier, which he had converted as both office and sleeping quarters. He even attempted (to no avail) to persuade the Inland Revenue that it was his registered business address!

### Manners made the man

Although sometimes regarded as a mildly eccentric figure and perhaps a loner, Alan was unfailingly polite, one of life's true "gentle men". He was always ready to offer the benefit of his wisdom and vast knowledge on surveying and instruments to colleagues, students and young professionals and could not comprehend how some people could let you down so badly. After problems on a survey involving a colleague, a friend recalls that Alan 'perhaps trusted people almost too much, and in a positive sense, he was almost too nice a person to be running a company'.

He was also ready to defend the honour of any lady publicly slighted. At a big survey dinner the entertaining but bawdy after-dinner speaker picked on one of the few young ladies present making her the butt of a rather lewd joke. Afterwards Alan apologised profusely to the lass and upbraided the speaker.

His work in GPS took him around the world, where he made many friends and he became a stalwart of CICES and of FIG, the international federation of surveyors, attending meetings all over the world and in retirement playing an especially active role in the federation's history group. In 2008 he co-authored the book *The Tellurometer. From Dr Wadley to the MRA7*.

### Eclectic interests

In retirement he supported many organisations and committees where he was often the quiet man in the corner who may have taken the minutes but when he did ask to speak everyone listened carefully.

For many of today's surveyors he will be fondly remembered for his curatorship of a unique collection of early electronic surveying instruments, which he tenderly cleaned, polished, maintained and even managed occasionally to get working.

Away from surveying Alan remained a keen skier, a skill he first taught himself ahead of his first trip to Antarctica, with broom handles! He was still

skiing this year with a trip to the Alps. Locally in Quinton he was a scout leader and pillar of his local Methodist Church where he acted as chauffeur for the luncheon club, gave talks to schools and was an active member of the Dudley Canal Trust. He died just a few weeks after taking part in the Cross Wales Walk, where he reached the top of Plynlimon Mountain, the highest point in mid Wales.

In concluding his address at Alan's funeral his minister and friend, the Rev Dr Paul Beetham said 'a dear friend who will be missed by all who knew him. Always happy and cheerful, with a knack of bringing the best out in people. In short, a wonderful member of the human race'.

Alan is survived by his brother Peter and two nephews.

*Jim Smith adds:* His one big disappointment was the failure, over many years, to find a permanent home for his near complete collection of Tellurometers. His untimely death leaves that problem still unanswered and if readers of this can make any suggestions they would be much appreciated.

• *With thanks and acknowledgements to Keith and Anita Price, Jonathan Walton, Jim Smith and Malcolm Draper.*

*The Guardian newspaper also published an obituary online at: <http://www.theguardian.com/theguardian/2013/aug/12/alan-wright-obituary>*

### Mike Sharp FRICS

**A further loss to report is that of Francis Michael Sharp who served with RME, DOS and worked as a private consultant. A full obituary is published in our Digital Extras, see page 03 for details of the link.**



# We may have been doing it for years but there are new challenges

Is a design bias hiding the long-term value of BIM?

Geomatics Group chair **Chris Preston** argues that BIM is applicable across all sectors. The challenge ahead is to change perceptions and to manage today's huge datasets.

**Chris Preston** welcomes your comments and thoughts so please email on the following address  
**geochair.rics@gmail.com**

Well summer in the UK did arrive, for a while. However, by the time you read this it will probably be a distant memory and it will be back to business as usual.

## BIM musings

No not a new form of "yuppy" dwelling but BIM has certainly been making the headlines over the last year or so but how many of you are actively involved in undertaking surveys on BIM related projects?

Although we could say that we are all involved in BIM, as most surveyors I know have been producing 3D data for years, so is BIM really only a new spin on an old story? I believe it is a lot more than that and is particularly about cultural change in thinking and towards more collaborative working. Do any of you sense that a design bias is hiding the long-term value of BIM? Moreover, many procurement policies seem counter to collaborative working and it will require a big change from the adversarial approaches of the past to a more open-book share of the gain and pain.

This has been identified more readily with the building sector but is also relevant to engineering and especially the field I am more involved with: infrastructure management. The real challenge though is creating and managing huge datasets that are constantly changing and altering the perception of the importance of recording change (location especially), whereas this was not considered to be important in the past. How many organisations spend huge sums on projects but then fail to integrate the project information into existing datasets in a meaningful and consistent manner?

Data, data everywhere but not a lot to use We have now developed effective and efficient techniques to gather more and more data in shorter timescales but the analysis of

the data to provide the business critical information has lagged behind and until the algorithms are easier to develop to create such data it will always lag behind.

## SUAVs

On the subject of new datasets, few can have not noticed the increased profile of small unmanned aerial vehicles (SUAV) and how they are becoming the "gadget" of choice for some. I can't help but wonder where the miniaturisation will stop but there is clearly a balance to be made between size, weight and quality of data capture. I was fortunate to attend The Survey Association SUAV seminar at Newark earlier in the year and this demonstrated the sheer scope of such devices. Once a device is designed that can carry a small LiDAR sensor as well as cameras, we will really start to see some good action. It will be interesting to see how the UK Civil Aviation Authority react to be called upon to approve more and more flight plans and deal with flying in more urban areas.

## SME hub

RICS is conscious of the need to assist members and has set up a "Small business hub" on the website with a plethora of information to help those of you in SMEs. One such example is the red tape toolkit around compliance with statutory legislation. Factsheets and links to government resources covering guidance on compliance with business law, health and safety, employment and environmental legislation:

<http://www.rics.org/uk/knowledge/more-services/professional-services/small-business-shortcut/small-business-toolkit/red-tape-toolkit/>

As ever I await your news and views through the usual e-mail address.

## Changing address or moving on?

If you receive **GW** as part of your RICS membership, you must inform the Institution of a change of address – the publishers of *Geomatics World* cannot change the RICS membership database for you. Call +44 (0)870 333 1600 or login to the RICS website or write to: RICS Contact Centre, Surveyor Court, Westwood Way, Coventry, CV4 8JE, UK or email [contactrics@rics.org](mailto:contactrics@rics.org)

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**PV Publications Ltd, 2B North Road, Stevenage, Hertfordshire, SG1 4AT, UK.**

## RICS Policy Watch



The summer may have been quiet for some but RICS has been busy, reports **James Kavanagh**, director of the Land Group at RICS.

THE UK SUMMER nears its end with the usual flurry of industry related issues and news. RICS members should update their details on the main [www.rics.org](http://www.rics.org) website with particular attention being paid to selecting 'geomatics' as your primary area of practice. Online CPD recording is now available, easy to use and free and can be accessed at <http://www.rics.org/uk/aboutrics/what-we-do/continuing-professional-development/>

Members should also watch out for a couple of guidance consultations coming their way, our new editions of *Boundaries 3rd ed 2014* and *Measured surveys of land, buildings and utilities 3rd ed 2014* (a complete update of the industry standard 1:500 measured surveys specification) will be going in a full member and industry consultation process this autumn. All members are fully encouraged to comment.

The 2013-13 evening lecture sessions will be starting again on Thursday 07th Nov with a scan to BIM event followed by the traditional Christmas lecture on 05th Dec (both events here at RICS HQ). More details to follow.

### BIM at work

RICS is using building information modelling on its London head office and plans to share its experiences. In the first of a series following the project over the next year, RICS Land Journal talks to the main players involved. The latest edition of the Land Journal also features articles on a new open marine data initiative from Crown Estate, windfarm development, an update on FIG and an article on the SafeAs surveying

app. More @  
<http://www.rics.org/uk/knowledge/journals/land-journal>

### Expert committee for international standards appointed

The International Property Measurement Standards Coalition (IPMSC) – a group of 20 professional organisations from around the world, of which RICS is one – announced details of the expert committee that will be responsible for drafting the new international standard. The Standard Setting Committee (SSC) is made up of 19 experts based in 11 different countries across five continents. Between them, committee members have first-hand experience of property measurement practices in 47 countries. Former RICS President, Max Crofts, has been appointed chair of the SSC with Alexander Aronsohn (Professional Groups) elected as executive secretary. The IPMSC will

act as trustees of the new standard and aim to have the new standard launched from June 2014.

### National Information Infrastructure and new benefits cases

There has been quite a lot of action on UK open data during the summer months with Heather Savory and the Open Data User Group (ODUG) commenting on the continuing progress of the opening of public sector datasets. The ODUG commentary is focused on HM Governments detailed response to the Shakespeare review. This review was launched in October 2012 by Stephan Shakespeare, chair of the Data Strategy Board and CEO of YouGov, who was asked to look at progress so far on opening up public data and to set out his assessment of how the UK government should best use Public Sector Information to support economic growth. His report was published on 15 May 2013. The government response to the reports conclusions can be sourced @

<https://www.gov.uk/government/publications/government-response-to-shakespeare-review>

### Speakers Corner Trust – forum for debate

RICS recently participated in a debate on 'Land: private property or public asset – can the circle be

squared?' The debate pitted Dr **Richard Grover** FRICS RICS FIG comm.7 delegate against **Ashley Seager** former economics editor of *The Guardian*, the conclusions can be sourced @ <http://www.speakerscornertrust.org/forum/forum-for-debate/>

### Surveyors' Indaba

The South African Conference and Exhibition (Indaba) for Surveying, Geospatial Information, GIS, Mapping, Remote Sensing and Location-Based Business was recently (July 2013) hosted by the South African Geomatics Institute (SAGI) and endorsed by the government body of the South African Council for Professional and Technical Surveyors (PLATO).

This years Indaba was attended by over 600 surveyors from South Africa as well as a small contingent of some 20 or so delegates from mainly Southern African countries and was a complimentary event to the recent FIG Abuja working week.

The Indaba always attracts high level government dignitaries and policy makers and with the event focused on land reform issues the Minister of Rural Development and Land Reform for South Africa, Mr **Gugile Nkwinti** gave a key note opening address.

RICS in South Africa has an



Rob Mahoney FRICS HonSec (3rd from left) with Minister Gugile Nkwinti (4th from left)

extremely good relationship with the leadership of both PLATO and SAGI and was invited to give a key note address as well as take part in a number of panel discussions during the course of the Indaba.

**Rob Mahoney** FRICS, honorary secretary of RICS and former chairman of RICS Geomatics Professional Group, along with RICS regional manager **Craig Hudson**, were in attendance. Rob was in excellent company with the twin stream conference featuring speakers such as Prof **Michael Barry**, **Roger Haagmans** and **Paul Marshall**.

Each session was followed by panel discussions and Rob took part in one on "South Africa's Spatial Data Infrastructure (SASDI) furthering the goals of the government's National Development Plan". This was attended by all delegates and the Minister, who admitted that he knew very little about geomatics but had learned a lot from the panel of distinguished local and overseas speakers. Rob also took part in the panel discussion on the second day on "Using Geospatial Tools and Technology for Infrastructure Development in Africa".

Rob gave his key note address entitled "RICS: Global Standards, the Interface". The presentation was well attended and did much to promote the RICS in South Africa.

RICS has also just opened a "Direct Entry" route to RICS membership for Professional Surveyors registered with PLATO and there was a lot of interest around this new development and opportunity for South African Licensed Surveyors to become members of the RICS. The ongoing development of a 'robust model' of engagement and direct entry routes to membership for national professional surveying bodies such as SAGI and PLATO is an important element of the Land & Resources Global Strategy.

Rob also mentioned the RICS Dispute Resolution Scheme programme during his presentation and the RICS in South Africa has recently made a

major breakthrough when the SAGI Board officially endorsed the RICS DRS programme.

Throughout the two-day programme both Rob and Craig met and networked with many geomatics professionals and firms and went a long way towards overturning the perception, sometimes negative, that South African surveyors might have of RICS.

### Honorary membership of RICS conferred on Alfred Russel Wallace

*James Kavanagh MRICS reports an a very special evening at RICS.*

RICS Governing Council were treated to a very special event on the evening of Sunday 30th June 2013 when senior members and staff, international representatives, the natural History Museum and Wallace champion and TV personality Bill Bailey posthumously welcomed the great Victorian botanist, land surveyor and co-originator of the Theory of Evolution Alfred Russel Wallace to honorary RICS membership. The over 50+ strong membership of RICS Governing Council were visiting RICS HQ Parliament Square for their summer council meeting and Wallace took centre stage during the start of the evening.

RICS Honorary Secretary **Rob Mahoney** FRICS welcomed everyone to RICS and then introduced a marvellous video clip that RICS marketing had put together, which succinctly told the incredible story of how Wallace had gone from a poor background to training as a surveyor to exploring, mapping and collecting in the deepest jungle of the Amazon and the Malay Archipelago. Rob Mahoney then underlined many of the essential skill-sets that Wallace would have gleaned from several years of working and training as a 19thc land surveyor in rural England and Wales. A true tale of Victorian derring-do and adventure, always something that inspires many young people to go into surveying and geography. Rob spoke on some of Wallace's astonishing achievements, the



*A new double act? Bailey and Kavanagh.*

Wallace effect, the Wallace line (<http://www.rics.org/uk/knowledge/news-insight/news/crossing-the-wallace-line/>), how he survived in such an unforgiving environment as the rainforests of South America and Malaya (now Indonesia) and of course how he, even whilst engaged in intense field work, co-discovered the Theory of Evolution in conjunction with Charles Darwin. This theory is widely quoted as being 'the most original thought ever to enter a human mind'.

### Star and fan

Rob then introduced **Bill Bailey**, the undoubted star of the evening. Bill is a true fan of Alfred Russel Wallace and spoke of how inspired he felt whilst discovering more about the great man. Bill also mentioned that this was his first gig to a room of chartered surveyors but that he felt it was going well and he'd never seen such a well organised and neat seating plan! Perhaps he'll fit RICS into his next world tour. Bill also mentioned that he had missed the legendary festival at Glastonbury that weekend and added some personal reminiscences, but as he said, 'he's changed!'.

Bill quoted from Wallace's biography when he stated that the youthful experiences of working outdoors as a land

surveyor had been the singular most important part of his formative experience and gave him his first insights into the natural world. He also spoke of Wallace's upbringing, the part that being an outsider to the Victorian establishment played and his sometimes fraught relationship with Darwin and the academic and scientific communities. Bill also stated that he was sure that Wallace would have been proud to receive such a 'singular' honour from RICS as would his family.

Bill then presented the HonRICS certificate to Dr **George Beccaloni** from the Natural History Museum. Dr Beccaloni added some words of thanks to RICS and for our ongoing support of the Wallace 100 project. This rediscovery of the outstanding legacy of Wallace will culminate with the unveiling of a new bronze statue to Wallace in the Natural History Museum. This statue will be unveiled on 7th November 2013, to commemorate the centenary of Wallace's death. Somewhat poignantly, the statue will stand outside the NHM Darwin centre but looking towards the skies! More information on the Wallace 100 project can be sourced @ <http://wallacefund.info/wallace100>



## Farewell to a rocket engineer and polar explorer

A farewell to a good friend, a building in the wrong place, the rescue of a piece of WWII history from a skip and the unlucky Mr Gorsky.

The loss of Alan Wright to the survey world cannot be underestimated. As Jim Smith commented in his obituary on the FIG website it "stunned his many friends in the U.K. and has left a large hole in the activities of a range of organisations."

[[http://www.fig.net/personalia/2013/Alan\\_Wright\\_Obit\\_2.pdf](http://www.fig.net/personalia/2013/Alan_Wright_Obit_2.pdf)]

Alan was a very good friend of mine. I first came across him more than 40 years ago, when I was with WS Atkins survey department, when he came to demonstrate the Tellurometer to us. Alan was such a genuinely nice person; no side, as they say, and a real gentleman although he had his English eccentric side. We heard from close friends of his we met at the funeral, **Keith and Anita Price** (Alan's secretary for many years), how on the day he went to pick up his Polar Medal (see below) from the Queen he was casually dressed. Fortunately a kindly security man was on hand to lend him a shirt and tie. In later years Alan was nearly always smartly turned out in what became his trademark double-breasted blazer.

No wonder so many came to his funeral at Quinton south of Birmingham in early August. It was standing room only for many. The survey profession was well represented too. I counted the following so apologies to others who were there that I missed: **Jim Smith, Alan Thunhurst, Simon Mears, Jonathan Walton, Rory Stanbridge, Ron Weekes (who came all the way from Australia), Phil Sargent, Keith Pope, Bert Palmer, Stephen Booth, Ian Logan, Alistair MacDonald, Jan de Graeve (who popped over from Belgium), Keith Hofgartner, Richard Otto, Mark Breach and Brian Whiting.**

Alan was a leading expert on GPS and GNSS as well as electronic distance measurement. But I was amazed to learn that after he graduated in mechanical engineering, he worked on rocket engines. So we really did have a rocket scientist working in the world of surveying, where there isn't much "rocket science" except inside our ever more complex electronic instruments. I was also surprised to discover he had a slice of Antarctica named after him (the Wright Peninsula) and was awarded the Polar Medal by the Queen. He was also a pillar of his local Methodist church, a Scout Leader and involved in the Dudley Canal Trust. He lived a very full and busy life.

Alan's one regret, as Jim Smith says in his obituary of Alan, which is one I share, was that he was unable to find a permanent home for the collection of electronic and mechanical instruments and calculating machines he looked after on behalf of me who first started the collection.

The collection comprises nearly 90 items apart from assorted tripods, staves and other measuring equipment. It really is serious stuff and would form a sound basis for any museum that wanted to show the history of surveying from the dawn of the electronic age and earlier as well as being a very fitting memorial to Alan. So if anyone has ideas or practical suggestions for a permanent home I would love to hear from them.

Although a fulsome obituary is published on page 12 of this issue of GW the Editor also managed to get an abbreviated version in the online edition of *The Guardian*. Go to <http://www.theguardian.com/theguardian/2013/aug/12/alan-wright-obituary>

I have a piece of Bletchley Hut 6 from where the RAF's Air Chief Marshal Dowding was fed information, from which he was able to provide an appropriate response, regarding the Luftwaffe's intentions during the 1940 Battle of Britain.



### A new term for something being in the wrong place

When something is wrongly positioned as a result of surveyors or engineers we usually call it a blunder or an error. But an entirely new term seems to have come into use. It is reported in the Huntingdon, St Ives & St Neots News & Crier that builders have put an £8 million cinema in the wrong place – for the second time. The 32,000 sq ft development – originally due for completion early this year – had to be dismantled and rebuilt in May when it was found to be 75cm out of place. The developer's MD commented: "It's all to do with regularising the building. It's imperceptible really. But given the building being under such high scrutiny we

thought we should regularise it." So remember, when your client next complains over incorrect setting out, it wasn't a mistake – it just needs regularising.

### Tim Leon

I was pleased to receive a letter from Tim Leon's wife, who wrote on his behalf that he can no longer read due to macular degeneration and a stroke. But I was delighted to hear that Tim, who will be 80 this month, still enjoys having Undercurrents read to him. Hang in there Tim, there's plenty more juicy columns to come!

### Canadian discoveries

**Mike McKay** emails from Canada where he's touring and finding numerous plaques and monuments to surveyors (why don't we have these in Britain? Ed: we do, they're called OS Trig points and benchmarks!). Mike found a fine statue to **Samuel de Champlain** complete with astrolabe, who mapped his way through Canada (for more on this surveyor see Robert A Fowler's article in GW July/August 2004).

Mike also found plaques celebrating hydrographer **Henry Bayfield** who charted the St Lawrence River and one which at first sight looked to be dedicated to a Trimble base station but upon closer examination marked the work done by US and Canadian surveyors in establishing a pan North American datum.

### Back to Bletchley

A year ago in Undercurrents we reported on a visit to Bletchley Park, home of the enigma code breakers in WWII. I've been there again but this time I visited the National Computer Museum, which is within Bletchley's site. There are many examples of early computers including the rebuilt Colossus machine, built to crack the German's final coding machine of the War, the Lorenz. They also have a hard disk drive that looks to be about 3 feet across; it held 4 megabytes!

Bletchley is a monument to British eccentricity and determination. The work they did in their garden sheds has been estimated to have shortened the war by two years. They're currently renovating the wonderful huts where the code-breakers worked and I was lucky enough to grab a piece of wood from Hut 6 that was otherwise headed for the skip. Hut 6 became the main centre for decoding the German air force and army messages. It has been said it was from here that the RAF's Air Chief Marshal Dowding was fed information, from which he was able to provide an appropriate response, regarding the Luftwaffe's intentions during the 1940 Battle of Britain. I shall treasure the piece of wood.

### True love

And now from the Mills & Boon of surveying literature: "I might not be rich, I do not have bundles of money, villas, cars, yachts and companies like my friend John, but I love you

### Essential kit

This recent photograph, which highlights the reliability of Geodimeter equipment long after the company passed into the hands of Trimble, also reveals the essential extra kit surveyors in South Sudan need. Maybe we should start equipping our lads who work around London with the same to deter all these nasty thefts we keep hearing about.



and adore you". She looked at me with tears in her eyes and hugged me like there is no tomorrow and whispered in my ear... : "If you love me, introduce me to John."

### Hebronics

Last of all we turn to the subject of Hebronics, a mainly New York based language amongst Jewish people that combines a certain amusing cynicism with sentence structure different from ordinary English. We shall try and give more examples in coming editions of *Undercurrents* but here is a flavour:

*Remark: 'I like the tie you gave me; I wear it all the time.'*

*English answer: 'Glad you like it.'*

*Hebronic response: 'So what's the matter; you don't like the other ties I gave you?'*

### One small step for Mr Gorsky

On July 20, 1969 **Neil Armstrong** was the first person to set foot on the moon. His first words were televised to earth and heard by millions. But just before he re-entered the Lander, he made the enigmatic remark, "Good Luck, Mr Gorsky."

Many people at NASA thought it was a casual remark about a rival Soviet cosmonaut. But upon checking, there was no Gorsky in either the Russian or American space programmes. Over the years, many people questioned Armstrong as to what the 'Good Luck, Mr Gorsky' statement meant, but he always just smiled. On July 5, 1995, in Tampa Bay, Florida, while answering questions following a speech, a reporter brought up the old question again.

This time Armstrong responded because Mr Gorsky had died, so the astronaut felt he could now answer the question. In 1938, when he was a kid in a small mid-western town, he was playing baseball with a friend in the backyard. His friend hit the ball, which landed in his neighbour's yard by their bedroom window. His neighbours were Mr and Mrs Gorsky. As he leaned down to pick up the ball, young Armstrong heard Mrs Gorsky shouting at Mr Gorsky. "SEX! You want SEX?! You'll get sex when the kid next door walks on the moon".



Does anyone know what this piece of antique instrumentation is? No telescope but otherwise it looks like a theodolite. Maybe the telescope was nicked!

### Got a tale to tell?

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

*Undercurrents, in strictest confidence if you wish (we promise to change names, places, etc to protect the guilty!), via e-mail: [rentamalc@aol.com](mailto:rentamalc@aol.com)*

# Unmanned

# aircraft for survey apps: cleared for take-off

by Richard Groom

The Survey Association recently held a seminar and series of demos to show what UAVs could offer surveyors. The event at Newark was not blessed with good flying weather but despite this many came to learn more about this new technology, as **Richard Groom** reports.

A large and enthusiastic group came to Newark Showground to learn all about UAVs on a windy day last May, and almost the first thing we learnt was that they should be known as Unmanned Aircraft (UAs). This may sound pedantic, but (thankfully) logic and order is the landscape in the world of air traffic control and the first speaker came from that world. **Gerry Corbett** is an ex Royal Navy pilot, turned air traffic controller who is now in Flight Operations Policy at the Civil Aviation Authority (CAA). He explained that the same principles apply to piloting of aircraft, whether they are manned or unmanned. Both have pilots who operate the aircraft, and have the same responsibilities, even if piloting remotely.

UA's range from hornet sized (16g) up to the size of an airliner but those currently used for surveying are all less than 7kg in weight, which puts them at the lower end of the lowest CAA category. In fact all the fixed-wing aircraft on display at the conference weighed less than 680g.

## Certification

Unmanned aircraft can only be operated within line of sight, which is nominally 500m, and at an altitude of lower than 400 feet. The rules for UA operation in the UK are contained in the Air Navigation Order, of which articles 138, 166 and 167 apply. The purpose of the

rules is to ensure the safety of third parties and there are a number of additional rules restricting where UAs can be used.

The CAA licenses UA operators via EuroUSC's BNUC-S qualification – gained through attending a two-day examined course, which equips

the operator with the knowledge to operate an aircraft safely. There are currently 180 licensed pilots and the number increases by around twenty a month. The licence is valid for a year, after which the operator has to undergo a refresher. The CAA encourages licensed pilots to contact them to discuss situations when they want to adapt and can justify adapting the rules for their particular use. For example, some users have been able to relax the maximum flying height and others, the maximum operating range from the pilot – by using spotters located to monitor the flight when it ventured further than 500m.

The latter relaxation would only be possible if the plane itself can operate safely at the proposed range and for this purpose the aircraft itself has to be certified with the CAA. **Tor Erik Djupos** (known to one and all as 'Ted') from Trimble's Gatewing UA manufacturer took delegates through type approval of the aircraft and the pilot certification process.

## Inconsistent safety

Corbett was at pains to point out that the purpose of CAA regulation is safety, but this did not quite gel with the CAA policy of requiring only pilots of commercial aircraft to be licensed. Surely safety has the same importance whether you are a paid or an unpaid pilot. The point was made several times that incidents have to be avoided at all costs, or the future use of UAVs would be put in jeopardy. At the same time there was some evidence during questions that everyday health and safety standards amongst some UAV operators is not that high. Although all operators record each flight, one did not get the impression that many, or indeed any, record near misses and minor incidents, or were aware that there is an established relationship between the frequency of near misses, injuries and fatalities.

## Privacy issues

Safety is the main concern in the UK but in the USA the UA industry also has to contend with privacy. **John Palatiello** of the Management Association for Photogrammetric Professionals (MAPPS) (see GW May / June 2013 p20) told delegates via a video presentation that privacy of the individual is an issue in the USA and guaranteed by the constitution. At present, two states have



While some models like the AibotX6 multicopter (above) take-off without any assistance or can be hand launched, others require the assistance of a ramp.



passed bills to prevent use of UAs for 'surveillance' but with specific exclusions to enable them to be used to take UA imagery for mapping purposes. But there is the ever-present possibility that aerial photographers will have to gain the permission of all land owners before taking photographs of their property, which would clearly render the technology unviable. Indeed one small town in the US has threatened to shoot down any UAV that strays into its airspace!

### Choosing your UA

There were several UA manufacturers and operators at the conference but it was dominated by Gatewing owner, Trimble and their UK dealer KOREC. **Martyn Palmer**, KOREC's mapping / GIS sales consultant described the capabilities and uses of the UAs they sell: the fixed-wing Swinglet CAM, eBee and Gatewing X100 and the 'multicopter' AibotX6. Fixed-wing UAs are better suited to mapping projects, while the multicopter can carry a high quality SLR camera and is controllable in narrow spaces, making it ideal for inspection work. Trimble also own Inpho, developer of photogrammetric software, which has been extended to manage image data from UAs.

### Processing the data

Pix4D's **Christophe Strecha** gave an illuminating talk on the software that takes the mass of image data collected by the UA and turns it into orthoimagery and digital surface models. Development of Pix4D has its origins at university but is now available either via cloud-based processing or in a desktop version. Strecha drew a contrast between conventional photogrammetry – precise, calibrated, large format photography with small overlaps, precise GNSS positioning and precise IMU data – and that taken with UAs, which uses uncalibrated cameras, small format photography with large overlaps, navigation grade GNSS positioning and less precise IMU data.

Why does it work? The answer is in the overlaps. By flying with 80% overlaps there is massive redundancy within the stereo imagery – effectively thousands of tie points on multiple overlaps, which means that the data itself can be used to calibrate the camera and carry out precise relative orientation. This just leaves exterior orientation, which can be achieved roughly using the aircraft GNSS positions measured during the flight. For anything more accurate, ground control points are required.

The process is an iterative one, in which the results from pixel matching are used to refine the position and orientation parameters for each photograph, as well as other unknowns – such as camera calibration. Finally, a point cloud can be produced which can be draped with colour from the imagery.

The accuracy of the results is not far removed from that obtainable using conventional photogrammetry. As a rule of

*A Windy day in Newark meant more time indoors to inspect closely the aircraft.*



thumb, the accuracy will be one to two times the ground sampled distance.

### Against the wind

The first part of the afternoon session had originally been devoted to demonstrations but conditions were too windy for all but the Gatewing X100, and were even a bit marginal for that. But Ted did his dynamic risk assessment and decided that flying was possible. The Gatewing was placed on its ramp and was duly launched, achieved a couple of runs before landing. This left plenty of time for viewing the exhibition and networking.

### UAs in action

When the conference sessions reconvened there were three presentations. Ted returned to the podium to talk about the data workflow and analysis of Gatewing data and gave the results of a test carried out on a site with lots of ground control. The result was an average positional error of 31mm with a maximum – on a relatively isolated point in the model – of 60mm. **Alan Cooper**, head of geomatics at Sky Futures spoke about how his company uses its three UAs – Gatewing, Aztec Falcon 8 and Aeryon Scout. They issue NOTAMS (a notice to airmen) for all the surveys that they carry out and gave a rather alarming account of a survey in Wales when a low flying military aircraft crossed their site minutes before they had planned to take off. Clearly his NOTAMS had been ignored. **Duncan Farrow**, senior client account manager at the Geoinformation Group then spoke about a 3D creator / viewer that the company has developed in conjunction with English Heritage which can be used to produce 3D images viewable with glasses on 3D televisions.

The day was rounded off with a question and answer session. Regarding insurance, one company said that it maintains £5 million PI insurance cover (but surely the major risk is to third parties?). A question about bare earth models drew the response that 'there are packages out there' that can filter photogrammetric DSMs to produce DTMs – not very convincing.

To sum up, the day was well run, enjoyable and useful. The presentations were relevant and generated plenty of discussion during the Q&A sessions and during the coffee breaks.

*“...the same principles apply to piloting of aircraft, whether they are manned or unmanned.”*

# REAL-TIME SURVEY MANAGEMENT: Bringing the Field into the Office

By Niall Murphy

Communications between the office and the field are crucial to survey management. **Niall Murphy** describes how Murphy Surveys overcomes the problem using mobile and cloud technology.

Pressures to meet continually escalating demands from clients in relation to cost, timeliness, data accuracy, and the environment, all drive the adoption of new technologies in our company. In the past two years, some large-scale contract wins with public sector and global blue-chip companies have highlighted the potential for improvement in the management of survey crews and data, leading to interesting work in this area.

## Towards real-time QC

We recognised two major factors that we wanted to address as a priority. Firstly, we wanted our office-based data processors to receive data from the site-based survey crews while the surveyors were still on site. This would enable data verification and quality checking in almost real-time, so that any errors or omissions can be rectified without costly return visits to the site later on. Secondly, we wanted to enable the project managers to manage their crews remotely; to know where they were and what they were doing, and to instantly transfer data each way thus maximising our cost and time efficiency and helping the managers to drive productivity.

An Information and Communications Technology (ICT) strategy was developed, bringing about the implementation of a series of cutting-edge communications technologies, including data exchange solutions from Leica and Trimble, GPS tracking from Fleetmatics and a bespoke Smartphone app.

## Cloud potential

Data exchange technologies allow real-time communication and file transfer, replacing email, FTP and paperwork for data exchange from office to field, field to office and within

With open communications and complete clarity on what is going on at the site and in the office at all times, the client can be kept fully informed on the progress of the work.



the field from surveyor to surveyor. Using a mobile internet connection, site crews can send their work to the office team to start processing the data immediately, and to instruct them if additional data is required. Non-disruptive alerts notify users on the status of data sent, received, and in use. Design teams can send the most up-to-date files to site crews who are instantly notified that new data is available. Site crews can also send photos of the site directly from total stations and data controllers with built-in cameras, which is helpful if they need guidance from their office-based colleagues.

Being integrated into the equipment, it cuts out the need for the surveyor to set up a laptop on site, e.g. base mapping data for a topographic survey is available directly within the equipment. Other data can include survey points and files for processing at the office and can be sent back and forth in any format.

## Bringing the field to the office

As well as meeting the personnel and data management objectives, data exchange technologies bring a host of other benefits. Surveyors can be based nearer to the work site, with no need for regular visits to the office to upload their data or to exchange paperwork. This significantly reduces field to office drive time, improving fuel usage and the company's effect on the environment. Further benefiting the environment is the reduction in paper use and waste. The direct transfer of data greatly speeds up processes. Project progress can be tracked and reported in real-time, and anything that may be causing a delay can be quickly identified and remedied. Work is completed faster and errors and omissions are drastically reduced.

With open communications and complete clarity on what is going on at the site and in the office at all times, we can keep the client fully informed on the progress of the work. We can keep things running smoothly and make any necessary changes that may arise; preventing delays, additional costs, and any need for later revisit work. Above all, we believe that the client values communication.

An element of concern in the implementation of the new technologies was usability. A user-friendly and intuitive system meets less resistance from staff, ensuring a smooth implementation and optimising its benefits in the long-term. Minimal training was required for the chosen solutions: Leica Exchange and Trimble Connected Community.

The technical team created workflows that were distributed to users as a reference guide. Site crew members are equipped with a netbook and a dongle for use if there is ever a problem with the equipment on site, a situation which is yet to occur.

### Leica Exchange

We were approached by Leica in September 2011 to become one of a select few to test their Exchange service in its beta version, and have continued using it ever since. It is built into Leica Viva hardware such as the CS15 Data Logger and is available as a download for office-based users.

Any transfer of confidential or sensitive client data incurs the need for security. Leica Exchange offers the best protection of any of the cloud-based data exchange solutions investigated by the company. Their "Trusted Services" IT infrastructure does not store transferred data, reducing the risk of any security compromise. The data is passed from A to B in a transmission protocol and is then completely removed from the Leica servers. Other security features include the ability to lock out a piece of equipment if it is lost or stolen.

One aspect of the system that could be improved is the data allowance that comes with a basic licence. Using a built-in camera to transfer photos from the site to the office uses up the data allowance quickly, and to increase it you must pay for a higher level licence.

### Trimble Connected Community

A web-based portal that hosts all data centrally, Trimble Connected Community connects our office and field-based staff when Trimble equipment is being used. Anybody granted permission by the administrator can connect from anywhere with any device. Users are granted varying levels of access depending on their role, and can then communicate and collaborate instantly.

Trimble's VRS iScope Live! is a complementary service, which enables our office-based users to track in real-time the progress of a GPS survey as it occurs point by point at a client's site. It enables live checking of observation quality and the equipment in use, and is another key tool for improving asset management and project scheduling. However if a file is to be deleted from the cloud, it must be deleted from both the office and the equipment on site at the same time or else it will re-upload from one of the sources, so this requires some co-ordination.

### GPS Tracking

Utilising GPS fleet tracking and management gives further clarity to project managers on productivity, facilitating effective personnel management remotely. We began to use Fleetmatics earlier this year as part of the overall strategy to improve personnel and data management. The system uses satellite



technology to track company vehicles and record vehicle activity. Like the data exchange solutions, it provides real-time data and transparency, enabling cost-savings and other improvements across the board in areas such as the environment, fuel consumption, scheduling and productivity.

### Bespoke Smartphone App

Whilst seeking new ways to improve personnel and data management with ICT, we looked to other industries for ideas that could be adapted. Smartphone and tablet PC applications in use by courier services proved an inspiration. We worked with a developer on a bespoke smartphone application, which is currently being rolled out. Project managers will update the app daily with details on the work scheduled to each surveyor, so that the surveyor can check at anytime from anywhere for information such as specifications, reference numbers, contact details, maps and data files. The exclusive, custom-made app also features customisable forms for data collection on site. The site crew can input data as they collect it for automatic transmission to the office-based team. This digital data collection replaces tedious paper methods, eliminating wasted paper and wasted time transferring data from paper to digital format.

The Smartphone of choice is the Samsung Galaxy Note. With the stylus, users can collect signatures on forms, e.g. for health and safety. They can also sketch and include their sketches within the form. Photos taken with the phone can also be included in the form, as well as metadata, survey data, mapping, and even timesheets, which can make payroll processes more efficient.

### Looking Ahead

Our ICT strategy has gone from reactive to proactive, with a revised objective to give us scalability and a competitive edge. The company maintains close relationships with surveying equipment manufacturers, and keeps a close eye on trends in the surveying industry and beyond.

*The Smartphone of choice for the field surveyor is the Samsung Galaxy Note with a stylus.*

**“The site crew can input data as they collect it for automatic transmission to the office-based team.”**

### About the author

Upon graduating with a degree in Geomatics in 2004, Niall joined his brothers Colin and Raymond in growing the family business, which now employs more than 200 people. Niall has a strong background in surveying that includes project management experience on several large-scale projects. As a director his focus is the strategic development and long-term growth of the company.

# Seminar honours military mappers and charters

By Robin Waters

The Defence Surveyors' Association's seventh annual "Maps & Surveys" Seminar on historical military and hydrographic surveying, mapping and charting attracted an audience of 80 to the Royal School of Military Survey near Newbury in June. As a graduate of the Army Survey Course at the school in the sixties and a Directorate of Overseas Surveys surveyor for several years **Robin Waters** thought it was about time to find out what the DSA is all about.

**Below:** Part of World War II airfield construction probability map of NW Europe at scale of 1:1million: areas of pale colour are 'good', intense colour 'bad'

**Right:** Key to airfield construction probability map  
(both courtesy of the Shotton Archive, Lapworth Museum of Geology, University of Birmingham)



I guess part of the answer is pure nostalgia – to meet many ex military and DOS surveyors that I haven't seen for, in some cases, 45 years! But the content of the seminars was pretty good too, with an eclectic mixture of surveying and mapping on several continents, at sea and in the air. In time these ranged from hydrographic charting in the 18th C to on-going boundary disputes in the 21st C and in space from the Americas, through Europe and Africa to South East Asia. Naturally the defence element was prominent with coverage of colonial wars, both world wars, the cold war and 21st C border skirmishes.

We kicked off in Bermuda with Adrian Webb of the UK Hydrographic Office giving an account of the Hurd survey which took ten years from 1789. At that time Britain had just lost the 13 American colonies and needed Bermuda's anchorage which was the only shelter between Nova Scotia in the north and the Bahamas near the Spanish colony of Florida. Although the reefs around the island are very dangerous and complex the survey might have taken less than ten years in a less attractive part of the world!

## Top innovator in photo recce

**Hugh Hamshaw Thomas**, known to his friends as 'Ham' was a world renowned palaeobotanist who served as a photo interpreter in both world wars. In the Royal Flying Corps he was a photographic officer in both Europe and the Middle East and was credited with some of the earliest map-making from air photos during Allenby's campaign against the Ottomans in Palestine. In 1939 he joined up again and became an RAF Wing Commander and photo interpreter at RAF Medmenham with a particular role in the investigation of the V weapons at Peenemünde and their launch sites in northern France and the Netherlands. He not only helped with the war efforts but went on to enthuse the surveyor general in India to use air survey techniques and also pioneered the use of aerial photography in his academic studies. **Chris Halsall**, a trustee of the Medmenham Collection now displayed at Chicksands in Bedfordshire, really put across the innovative nature of this work for its time.

## All you need is... three geologists!

The prize for best presentation of the day would surely go to **Ted Rose** with his short but really heartfelt tribute to the very few geologists officially employed as such by the army during WWII. Ted is an honorary research fellow at Royal Holloway, University of London and was senior geologist in the Royal Engineers from 1974-90. His magic number is three: there were three official geologists in the army in WWI, three in WWII and there are still three in 2013! He compared this to the several tens employed by the Germans in both wars and concludes that it is the number we should stick with. He picked out Major **Bill King** in France 1939-40; Captain **Fred Shotton** in Egypt 1941-43; and Major **Steve Stephens** in Sicily and Italy 1943-45; Bill King was succeeded by **Fred Shotton** for D-Day planning and subsequent operations in NW Europe 1943-45. Their contributions varied from predicting the best site for water boreholes to 'going' maps that show where different vehicles are best deployed in the field and the colours were kept to a minimum for the available printing facilities and also so that they were simple enough for the top brass to understand!

## Gooseberries and shellfish?

Most of us have heard of the Mulberry harbours assembled on the Normandy beaches after D-Day. But have you ever heard of the Gooseberries that provided the outer breakwaters? Chris Howlett from the UK Hydrographic Office described their

construction, transport and assembly and how some of the 'bits' have been used since then to build bridges in France, plug dykes in Holland and provide homes for shellfish where they lay. In 2011 a team of surveyors from UKHO conducted an extensive survey of the remains of Mulberry B located at Arromanches-les-bains, using a modern multibeam echo sounder to record the submerged remains and a terrestrial laser scanner for above water elements, to make a complete database of the current state of the harbour. The area is now being recommended for World Heritage status and this survey will aid in the bid although French law has already protected the remains from any serious damage.

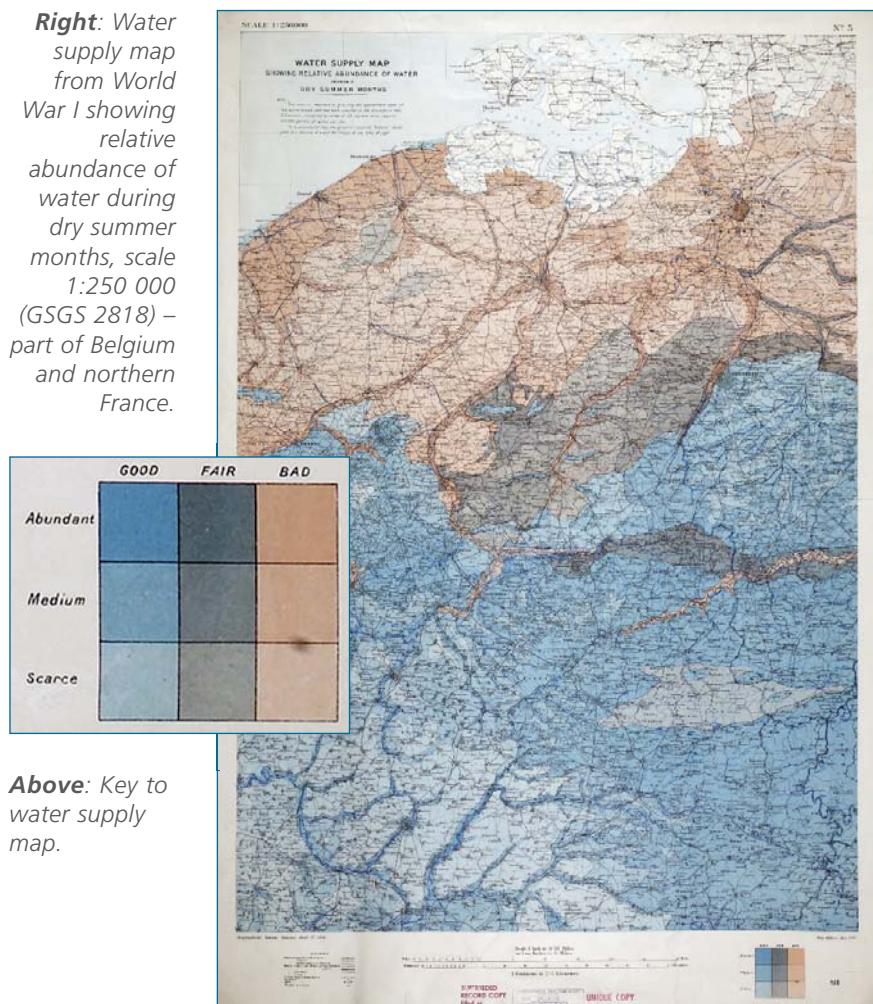
### Supersonic analogue mapping

Analogue moving map displays were used by the RAF for some forty years and well into this century. **Richard Chesney** began working on these at the Survey Production Centre, RE and saw them eventually replaced by digital equivalents from the renamed Defence Geographic Centre. Although early experiments started even before WWII, it was not until the late 1960s that serious production was initiated and these displays were standard in all Harrier, Jaguar and Tornado aircraft from the 1970s. But the display in the cockpit is the easy bit – making and checking the film strips carried by each aeroplane was a complex and innovative process apparently carried out in different ways in different NATO countries. The 'Heath Robinson' looking map rectification machines all depended on working from full size printed air charts which would have been produced through their own digital processes by the time the Moving Map Displays were phased out in 2010. The mind now boggles at the idea of an opto-mechanical device in every aeroplane being loaded with a huge reel of microfilm strip maps. This had then to be wound backwards and forwards if the pilot (of a supersonic fighter) decides to fly across the film instead of straight along it!

### Sorting out the legacies of Imperial Powers

The final presentation of the day was entitled 'Boundary Battles – A Legacy of Empire?' given by **Alastair Macdonald** who is still advising international boundary commissions and visiting disputed borders more than fifteen years after retiring from Ordnance Survey. This is almost full circle as he started his career at the Directorate of Overseas Surveys in the 1950s in some of the colonies now disputing their borders. Alastair introduced us to some of the geographical conundrums that, through ill-written treaties and the lack of sound geographical knowledge at the time, the Imperial Powers left to their colonies for resolution after independence. Generally the disputes do not occur on well demarcated boundaries that have been surveyed but on watersheds or the

**Right:** Water supply map from World War I showing relative abundance of water during dry summer months, scale 1:250 000 (GSGS 2818) – part of Belgium and northern France.



**Above:** Key to water supply map.

beds of braided intermittently flowing rivers. The work usually requires the interpretation of historical documents and maps and an attempt to explain these to the high powered lawyers putting the countries' cases to the International Court of Justice at the Hague, or some similar arbitral body.

### The geographic discipline today

Most of the day was spent looking back on past glories and outstanding individuals. In complete contrast we heard from Major **Stuart Fairington** about the latest equipment programme for what is now known as the Royal Engineers (Geographic) 'discipline'. Future Deployable GEOINT (FDG) is an equipment programme, which aims to refresh or replace existing capability. It combines IT systems, bespoke new (vehicle-mounted) containers and the re-role of vehicles and is being delivered to RE(Geo) detachments in over thirty units/formations during July and August 2013. Team Socrates, an industry consortium led by Lockheed Martin, will deliver the equipment to provide data management and geospatial services (DATAMAN) as well as geospatial information exploitation capabilities. These will be tailored to different levels of the command structure including fixed, mobile, flyaway (laptops) and tactical container mounted systems. The two

**“The 'Heath Robinson' looking map rectification machines all depended on working from full size printed air charts...”**



**Figure 1.** The TIGAS on acceptance testing.

**Figure 2.** The TMDP on acceptance testing.



pictures show Tactical Intelligence and Geospatial Analysis System (TIGAS) and the Tactical Map Dissemination Point (TMDP)

FDG is also enhancing survey equipment holdings by providing a LiDAR and various ETS and GNSS equipment.

Also explained was the move of 42 Regiment to its new base at RAF Wyton in Cambridgeshire. This is already home to the Defence Geospatial Intelligence Fusion Centre (DGIFC), successor to the Joint Air Reconnaissance Intelligence Centre (JARIC), which has moved from RAF Brampton on the other side of Huntingdon.

Every presentation was informative and had obviously been meticulously prepared and represented a labour of love. The range of expertise and innovation shown by our predecessors, not to mention problems overcome, leaves us humbled. To reduce this all to what is now known as 'Geoint' seems very dismissive! Anyway, for those with a real taste for nostalgia, we are proposing to organize a GW visit to the Medmenham Collection in the autumn and you should also be aware that a Pathfinder collection will also open to the public at RAF Wyton next year.

- For more about DSA go to <http://www.defencesurveyors.org.uk/>

#### About the author

Robin Waters is Editor of our sister publication *GiS Professional* and is an independent consultant who has worked extensively in several European countries and has a keen interest in the EU's INSPIRE Directive and its implementation.



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**2 CONFERENCES  
1 REGISTRATION FEE**



We are in an era where for many of us our location can be easily tracked and recorded. Whether it should be and who has right of access to it are other matters. Our legal guide looks at three cases from the US that highlight the, at times, vagaries of US law yet can help inform other jurisdictions of where lines should be drawn.

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

# Location data – where is yours?

By Carl Calvert

**F**irstly I would like to thank **Michael Mable** for his email, which followed last edition's legal column. In it he concludes:

*'Incidentally, as well as dealing with these legal minutiae, we also have to grapple with interpreting the lines of rights of way which were originally plotted in the 1950s on 1:10,560 County Series maps and transferring them onto modern O.S. MasterMap and dealing with all the delights of PAI correction, and capturing new data with handheld GPS/GLONASS equipment. A Definitive Map Officer's life is rarely dull...'*

So, here we have at least one profession which has to interpret words and pictures. Another is that of GIS in its widest sense. At the Cambridge Conference (see also page 30), **Robin Waters** (Editor of *GIS Professional*) reported that:

*'If I were to pick out one paper that I would really like to have heard it was by Kevin Pomfret, executive director of the Centre for Spatial Law and Policy on 'Geospatial Innovation and Legal Implications' in which he suggests that although legislators are finally waking up to the immediate implications of geospatial data collection and use, they are way behind in understanding future 'location enabled' societies and may end up throttling innovation and use of that information for both commercial gain and the public good.'*

As this is the legal column I have focused on court cases cited in **Kevin Pomfret's** paper entitled 'Location Privacy: Legal and Policy Issues <http://www.spatiallaw.com/Uploads/Privacy>

The first case is that of *Pineda v Williams-Sonoma Stores, Inc* 51 Cal. 4th 5624 (Cal: Supreme Court 2011). The Song-Beverly Credit Card Act of 1971 is "designed to promote consumer protection." One of its provisions prohibits businesses from requesting that cardholders provide "personal identification information" during credit card transactions, and then recording that information.

So, that looks straightforward. The Plaintiff (P) claimed that the shop assistant asked for her ZIP code, recorded it and used P's name and ZIP code to find her address by reverse search of a database. The shop uses addresses for marketing and for passing onto third parties. The court's discussion on the case occupies more than half of the judgement and sees off the Defendant's case that a) the interpretation of the law is against the constitution; b) P's interpretation of the statute renders it vague. The court dismissed those arguments out of hand.

The next case is not about an individual's privacy against the marketing policy of a shop but hits further. In *US v Jones* 132 S. CT.945 (2012) the Supreme Court was asked to decide

about the legality of using a GPS device in a vehicle registered to Jones' wife. The warrant authorised installation within 10 days in DC, but the device was fitted on the 11th day in Maryland. Jones was tracked and indicted for drug offences. The District Court withheld GPS data obtained whilst it was at his home (I really do not see the point of this – if he was at home the GPS would have recorded the same information – his home co-ordinates) but elsewhere the data was admissible as it was on a public street and Jones had 'no reasonable expectation of privacy'. The Supreme Court held that the use of the GPS device was a 'search' under the Fourth Amendment and so a violation of Jones' privacy.

The third case is *US v Skinner* No.09-6497 (6th Cir. Aug. 14, 2012) and follows that of Jones above. The Court of Appeals upheld the conviction of Skinner for drug and money laundering and rejected his argument that the district court had obtained evidence by unlawful means. The court held that a warrant was not required to obtain 'ping' data ('pinging' is finding out which mobile phone mast a person can be located at. The mobile phone number needs to be known. The mobile phone company can provide this information). Skinner had 'no reasonable expectation of privacy in the data given off'. Contrast this with Jones where the police trespassed onto private property (the car) to obtain information whilst in Skinner the phone was purchased by Skinner himself and the phone emitted signals that revealed his location. Several groups have criticised the court's decision noting that pinging a cell phone is a request for the cell phone to return a signal, and therefore ping data is not "given off" in the way the court appears to conceive.

Clearly these last two cases show that there is a degree of indecision about the use and effect of technology, for if the location data is provided by the service provider it is not 'data given off'. Clearly in the case of Pineda what was done was unlawful and yet the shopper had voluntarily offered the information in the belief that it was needed to complete the purchase by credit card.

To my mind it seems that it is even more important to know what your rights and responsibilities are as well as a profound knowledge of the technology that you use and which can compromise your privacy granted by law. Either of these is an almost impossible task so we rely on our governments to safeguard us: then a mathematical expression springs into my mind: what is sufficient and necessary?



Our US correspondent **Nick Day** reflects on the JASBeens, acronyms, RICS lectures and a time when computers had dog-eared log tables and sat at desks.

## Pilgrim's path leads, via Elstree and the Westminster Arms, back to San Francisco

**M**y annual pilgrimage to the UK this year was earlier than usual as I wanted to catch the two-day GEO-South conference and the JASBeens' reunion. Brilliantly conceived and organized by old friend **Malcolm Draper**, 24 surveyors came from far and wide. What an absolute delight it was to catch up. **Martin Dalrymple** I hadn't seen since our one-year stint together in Nigeria, back in the days of the Biafran War. When our tour of duty was over, we stopped off in Tunis, Rome and Amsterdam on the way home, after which we both disappeared off the face of the earth, only to pop up again in Elstree of all places.

The Editor entrusted me with moderating an afternoon session at GEO-South, with three papers right up my street: GPR (ground penetrating radar), GIS and BIM. All three seem to have finally come of age, the latter two often dubbed solutions/answers searching for a problem/question. Well, of course, that was never true! It was just that all the various technologies came together, like a jigsaw puzzle, and so many folks failed to see their potential, or the big picture. Let me spell it out here: A-s-s-e-t M-a-n-a-g-e-m-e-n-t! Assets cover a wide spectrum with diverse end users, many one might not even recognize yet.

Initial teething problems included a variety of acronyms – GIS and LIS (Land Information Systems confused the public, and I remember calling for LIS to be dropped in favour of GIS at a FIG meeting. Someone listened, because we never heard about LIS again. Now we seem to be having similar problems with the BIM acronym, which, to me, is Building Information Modelling. Of course, we could have SIM (Structure Info Man) or SIN (Survey It Now!). All joking apart, let's just KISS (Keep It Simple Stupid) and make up! Apart from your sponsor, perhaps the guy in your company/agency that

goes to bat for you and pushes the funding, the public and your clients need to know what you're doing, how it benefits them and adds value. Mumbo jumbo, high fallutin' jargon, and technical details won't cut it as a first sell.

### Nostalgia ain't what it used to be!

Naturally we all reminisced at the JASBeens "do". Well you have to when you have more past than future! After all, these guys were almost family, surveyors one shared the rain, snow, and intense heat/cold with. Folks one stayed up with 'til the wee small hours, computing the day's traverse to ensure it closed. No GPS, no laser scanners, no total stations, no hand-held or desktop computers/calculators. A computer back then was not an inanimate object that sat ON a desk, but a real person that sat AT a desk. At night one would bring out the two-volume Shortrede's tables, the first containing 7-figure logarithms of numbers, and antilogarithms, etc; the second, the trigonometrical canon to every second. If you were lucky you might be given a set of Peter's 8-figure natural tables and a hand-cranked mechanical Brunsviga or Facit calculator. Making one small mistake in a traverse meant almost starting from scratch. All that went out the door with the introduction of the HP-35 RPN (Reverse Polish Notation) log function calculator (I bought the first in the UK). Finally we could get to bed at a decent hour – or spend more time at the pub!

Believe it or not, I still have my Shortrede's & Peter's, and **Guy Bomford**'s "Geodesy" – the bible! This book almost single-handedly got me through my RICS Finals' exam. Guy Bomford was the only surveyor I knew, who when attending RICS Land Surveying lectures at 12 Great George Street, would get a standing ovation on entering the hall; more so than the evening's guest speaker. Which nicely segues to...

### English Heritage Geomatics Lecture

A week after GEO-South I caught the last of the 2012/2013 season's RICS lectures by **Paul Bryan** of English Heritage. Old friend, **Chris Gray**, once with EH, and the current RICS Americas' Geomatics rep, was over from Santa Monica, and we had a chance to bend Paul's ear on BIM afterwards at the Westminster Arms nearby, along with GW technical editor, **Richard Groom**, current Geomatics chair **Chris Preston**, and a few others. It might be my imagination, but over the past few years of attending one or two lectures during my visits, it seems the level of questions for the speaker, has become more



JASBeens all:  
**Martin Dalrymple**  
(left) with **Tony Fletcher** (right)  
and **John Lambert**.

bland, and the once playful level of debate virtually non-existent. Those who remember **Jack Weightman** and **John Wright** (both deceased), and the very much alive **Arthur Allan**, will recall many eccentric, yet erudite and magical moments during question time. Is there nothing to laugh about any more? Is everything too routine and push-button? Is it all about hype and marketing, and the lowest price? I'm not knocking progress – I pride myself on staying abreast of the latest – but has something been lost?

### The Nokia/earthmine marriage

In the Mar/Apr 2012 issue of *GW*, I reported on earthmine, a start-up near me that was carrying out high accuracy 3D street level imaging. At the time I realised it would not be too long to be bought out by a company that would see their potential. So, it came as no surprise to me when Nokia acquired them earlier this year. Not hard to see where this will be going in the way of new apps. **John Ristevski**, earthmine's co-founder, is now Head of Reality Capture and Processing at Nokia.

### Beach blanket Babylon

I think we all know that Google Street View cars have been photographing roads and highways for quite some time, but now they've made mapping more fun for surveyors. Florida will pay two beach bums (not really!) to walk all 825

miles of the state's beachfront carrying the Google Eye camera in a 40-lb backpack. Florida's tourism agency is shelling out \$126,000 for the project, chump change considering they brought in \$72 billion from tourists last year. Google aren't suffering either, they're only having to pay \$1,000 for all the photos. As for the photographers, they'll be paid \$27/mile. No news yet on whether the surveyors' benefits will include free suntan lotion, deckchairs for when they need a break, and a few Mai-Tais!

**“The amazingly useful and comprehensive Wikipedia works on the same principle of crowd sourcing to get the best data.”**

### Social Media

It's easy for people to dismiss Facebook, Twitter, and LinkedIn as being a waste of time, most content being rubbish. That is to be missing huge opportunities. Perhaps 90% of what one reads in newspapers is rubbish, echo that for TV; new social media are no different. Facebook, Twitter & LinkedIn are "crowd sourcing." For example, you post on Facebook (Twitter is limited to only 140 characters, so seldom enough) that you're having a particular virus problem on your PC, and ask if anyone has any ideas. Within no time, someone, somewhere – maybe several people – have posted some concrete ideas. The amazingly useful and comprehensive Wikipedia works on the same principle of crowd sourcing to get the best data. The limitations are only your imagination.

### About the author

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

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Hug a Triggy! A trip to Finland, St Petersburg and the Struve Arc, ahead of the unveiling of a memorial to Australia's mountain surveyors, who charted the first route through the Blue Mountains.

**Below left:** Wilhelm Struve's Observatory in Tartu Estonia. **Below right:** we couldn't possibly dare comment!



# Finland for mapping, Norfolk Island for Helen Reddy

By John Brock

Recent tours have taken us through the brilliantly appointed St Ignatius College at Riverview (of the Lane Cove River!) and historic Addington (1794) in Ryde, followed by an amazing visit to Fairground Follies at St Peters where we were spellbound by antique mechanical music machines from all over the world, which burst forth with a carnival of light and sound accompanied by moving figures bearing instruments. Prior to this extravaganza we were treated to a fascinating tale of disaster and suspicion when former NSW MP **Andrew Tink** revealed highlights from his recently released book *Air Disaster Canberra – the plane crash that destroyed a government.*\*

## In the footsteps of Charles Darwin

In June the precocious Brian Powyer transformed himself into **Charles Darwin** for a National Trust bus tour which retraced the path of the tour made by the evolutionary Englishman when he made a tour of inspection of the ancient Blue Mountains west of Sydney in the 1830s. A great day with lunch in a restaurant dedicated to rock and roll juke box music at Blackheath doesn't get much better.

## ICHC Finland and the Struve Arc

Without doubt the bi-annual International Conference on the History of Cartography (ICHC) is the best value and most eminent event of its kind anywhere in the world. En route I went to Tartu in Estonia to visit the historic observatory in which **Wilhelm Struve** made his precise astronomical determinations for latitude and longitude, being near the half way point of his monumental Earth Arc triangulation which took 39 awesome years to complete (1816-55).



One day in St Petersburg is certainly not enough but we were very impressed with what we could squeeze in before we sped to Helsinki on the Allegro fast train for our first day at the ICHC. Apart from a series of superb lectures (all in English) the conference consisted of a tight programme of receptions and exhibition openings at eminent locations including the National Museum of Finland, Helsinki Town Hall, the National Archives of Finland and the John Nurminen Foundation as well as the farewell dinner on the historic island fortress of Suomenlinna.

Just when everyone thought that was enough we were treated to tours of Finn Arctic hero **A.E. Nordenskiöld**'s home in Mantsala and an epic trip to one of Finland's UNESCO World Heritage Struve Arc Trig points at the summit of Oravivuori placed in 1834.

Alas we found the congress hotel very rude, over priced and over rated (by themselves of course!). We found a brilliant hotel, which had previously been a prison called Katajanokka. We had three square meals a day with roll-call at 6am and we felt right at home!

## She was woman ... and she roared!

Two days after getting home I was off in a veritable coma to Norfolk Island for the weekend to catch **Helen Reddy** giving one of her very rare live concerts. At the age of 71 this mercurial Aussie talent belted out an incredible collection of her hits with a voice that sounds even better now than it did 40 years ago! Let me assure everyone that she is "Woman" and I heard her roar! Truly and exceptionally brilliant.

## More memorials to mountain men

With a 200th anniversary comes a flood of talks and monument dedications so two of the three men, **Blaxland**, **Lawson** and **Wentworth** who forged a route over the Blue Mountains from Sydney in 1813, were each given tributes. Descendant of John Blaxland (Gregory's brother) Richard gave an authoritative presentation on his ancestor's life at the Prospect Heritage Trust meeting while at St Bartholomew's Church the Senior's Group of the Institution of Surveyors NSW unveiled an information plaque on William Lawson within view of the family burial vault.

\*The crash was in 1940 when a plane carrying three members of the Australian Cabinet and chief of the military general staff went down with no survivors.

# Bringing geographic authority to Cambridge

CAMBRIDGE, ENGLAND, 22-26 JUNE 2013. HOTTEST DAY OF YEAR FOLLOWED BY RECORD BREAKING THUNDERSTORMS. PRINCE GEORGE ALEXANDER LOUIS OF CAMBRIDGE BORN. CHURCHILL COLLEGE HOSTS 'CAMBRIDGE CONFERENCE' OF '150 SENIOR LEADERS OF MAPPING AND CADASTRAL ORGANISATIONS FROM AROUND THE WORLD'. HELD BY ORDNANCE SURVEY. WRITER & BROADCASTER NICK CRANE GIVES HOTLINE LECTURE ON RE-TRIANGULATION OF GREAT BRITAIN AND ON GERARDUS MERCATOR. UN COMMITTEE OF EXPERTS ON GLOBAL GEOSPATIAL INFORMATION MANAGEMENT (UN-GGIM) HOLDS THIRD SESSION IN CORN EXCHANGE OVERLAPPING IN TIME AND DELEGATES WITH CAMBRIDGE CONFERENCE.



*Vanessa Lawrence CB addresses the third session of UN GGIM.*

Robin Waters, editor of our sister title *GIS Professional*, reports for *GW* on an event that has roots stretching back 85 years to the days of Empire.

Images © Ordnance Survey Great Britain.

**Below** It's all about knowledge exchange.

**P**overty will judge which of these events turns out to have been most significant. Suffice it to say that readers of this magazine would rather read about the Churchill College and Corn Exchange meetings with or without the associated games of croquet, punting parties or college garden jazz evenings!

The 2013 Cambridge Conference, which has been convened every four years since 1928, was billed as 'Bringing Geographic Authority to Information'. The conference certainly brought geographic authority to Cambridge and the message is clearly that governmental organisations should be delivering that geographic authority. At a time of austerity, not to mention much political animosity to government executive agencies per se, this is a 'hard sell'. On the other hand there is a growing realisation by both public and private sectors that geography matters, that geographic information is not a luxury, and that accurate mapping can help save lives, maintain security, inform environmental debate and also save money.

## Shush! We can't report this. . .

GW was invited to the first day of the conference and heard **Vanessa Lawrence** CB, director general and chief executive of Ordnance Survey welcome delegates and chair the two keynote speakers. She introduced **Janet Williams**, chair of Interpol's Protection and Security International Experts Group and

National Security Adviser for the Qatar World Cup 2022. Janet was a deputy assistant commissioner of the Metropolitan Police and is now a non-executive director of HM Revenue & Customs and of Torchlight Solutions (a commercial company providing 'a fresh and dynamic approach to countering the increasingly asymmetric threat from radical, terrorist and insurgent groups'). The press was advised not to report on her talk but I can repeat the OS blog on the subject: 'Janet's fascinating presentation looked at the need for detailed planning, diverse expert help, flexibility, creativity and humour when preparing for worldwide international events. Janet used a selection of great case studies from several high profile events including the Royal Wedding and 2012 Olympic Games.' In fact, I don't think there was anything she said that I have not heard or seen in various media so I am somewhat bemused by the request to remain silent.

## Up goes the temperature, down comes the rain

**Paul Davies**, executive head and chief meteorologist at the Met Office, was instrumental in creating the UK's first operational Flood Forecasting Centre with the Environment Agency. In his keynote, he emphasised the need for relevant geographic information – topographic, administrative and socio-economic – in handling natural and man-made disasters. Paul also talked about the very good global cooperation in the field of meteorology, including relevant standards, that might be a model for other disciplines. He suggested one figure that we should remember in the context of climate change: air that is one degree warmer can hold 6% more moisture. Appropriately, after the hottest day of the year,



*“... cadastral parcels and mailing/street addresses in the US is a horror story!”*

we had the biggest thunderstorms in Cambridge that anyone can remember!

The plenary session continued after coffee with key UN personnel talking on statistics, mapping for peace-keeping, maritime boundaries, outer space activities and cooperation in Africa. It was pointed out that 75% of African international boundaries are not demarcated; that very few countries have presented their definitive claims to maritime boundaries; and that contrary to its appearance on most world maps, Africa is actually bigger than the US, Europe and China put together! Questions from the floor included a plea for fewer impenetrable acronyms and for direct UN support for charitable mapping organisations.

### Geography supports decisions

In the afternoon we had a choice of two parallel sessions. I decided to go for ‘the economics of mapping and cadastral data’ and was not disappointed. **Abdul Karim Al Raeesi** showed us what had been achieved in Abu Dhabi with their advanced spatial data infrastructure, used by all public and private sector actors, as the foundation for planning, coordination, performance management and decision support.

**Chris Holcroft**, latterly of AGI and now with the Royal Meteorological Society reviewed the Public Service Mapping Agreement in Great Britain and the challenges faced by Ordnance Survey. While **Anne Cathrine Frostrup**, director general of Norway’s Kartverket, was very honest

about their continuing struggle to get the pricing model right – despite their worldwide reputation as an exemplar of spatial data infrastructures. They are now implementing a three tier model ‘calibrated for different players’ from major companies to small firms and personal use. But most interesting of all was **Tim Trainor** (chief of the Geography Division of the US Census Bureau) whose critique of the devolved situation for cadastral parcels and mailing/street addresses in the US is a horror story! He believes that there are enormous hidden costs due to duplicating the collection and management of the 150 million addresses in the US and the complete lack of consistency between and within states (each divided into many counties) for the management and dissemination of information on land parcels. There are clear impacts on the efficiency of healthcare, emergency services, the post office, and many others.

### We're no longer special but...

The final session of the afternoon was a short presentation from each of the commercial firms exhibiting at the conference. These were 1Spatial, DigitalGlobe, Esri, Hexagon, Infotech Enterprises, Oracle and Trimble. In the Q & A session that followed there was a general consensus that ‘spatial was no longer special’, that digesting the ever increasing amounts of data being captured by different sensors was rapidly becoming an issue and that much

The advertisement features a large blue header with the text "INTERGEO®" in white, bold letters. Below it, in smaller white text, is "Conference and Trade Fair for Geodesy, Geoinformation and Land Management". To the right is a graphic of a globe with a red and blue grid. Below the header, the text "8 – 10 October 2013 Essen, Exhibition Grounds" is displayed. The main body of the ad is a collage of several smaller images: a quadcopter drone flying in front of a modern glass building; two men in business attire smiling; a person holding a smartphone displaying a map; a 3D topographic model of a landscape; and a person's hand holding a tablet with a map. At the bottom left, there is a logo for DVW (Deutsche Vereinigung für Wasserbau) consisting of the letters "DVW" in a stylized font. The bottom right contains QR codes and logos for sponsors: "esri Deutschland", "HEXAGON", and "Trimble". The bottom center features the text "Along with" above "2<sup>nd</sup> National INSPIRE Conference 2013". The background of the entire advertisement is a faint grayscale world map.

more openness would be beneficial.

The Hotine Lecture (pronounced Ho-teen) was given by **Nick Crane** – author and television geographer – who regaled us with stories from Hotine's work on the re-triangulation of Great Britain and some of the research that Nick has done for his biography of **Gerardus Mercator**. However, he did not mention Hotine's other claim to fame – the creation of the Directorate of Colonial (later Overseas) Surveys after WWII. In fact, from 1947 to 1983, the Cambridge Conference was run by DOS until the latter was incorporated into Ordnance Survey. As it happens your reporter was the only ex-DOS surveyor present at the conference this year – a sign of the times. There is no doubting Crane's enthusiasm for maps and for the Ordnance Survey, so perhaps we can forgive him for mispronouncing "Hotine" (think Ho ho), which he also did in his TV programme (*Martin Hotine : Mapmaker*) on the retriangulation of Great Britain.

Unfortunately we were not invited for the rest of the conference which included keynotes from Vanessa Lawrence and from **Sir Peter Hendy**, Commissioner of Transport for London who was talking about the challenges of last year's Olympics. On the Wednesday morning the vice chief of the defence staff, Air Vice Marshal Sir **Stuart Peach** on the authoritative power of geographic information. The final 'ministerial' session that morning featured government ministers from

the UK, Azerbaijan, Belgium, Fiji, Namibia, New Zealand and Canada.

If I were to pick out one paper that I would really like to have heard it was by **Kevin Pomfret**, executive director of the Centre for Spatial Law and Policy on 'Geospatial Innovation and Legal Implications' in which he suggests that although legislators are finally waking up to the immediate implications of geospatial data collection and use, they are way behind in understanding future 'location enabled' societies and may end up throttling innovation and use of that information for both commercial gain and the public good.

Most of the conference presentations are at <http://www.cambridgeconference.com>

#### UN body meets too

The concurrent UN Global Geospatial Information Management Committee's third session attracted 250 delegates and observers. It is said to have made considerable progress in fulfilling its mandate 'to enhance collaboration and support the use of geospatial information to promote sustainable development globally'. Although GW was not invited there were 172 representatives from 65 countries, one from Palestine, and the rest from a mixture of international organisations, the private sector, NGOs including the AGI and several UN bodies. Presentations and papers can be found at [http://ggim.un.org/ggim\\_committee.html](http://ggim.un.org/ggim_committee.html)



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## Leica's UAVs



**Leica Geosystems** has announced worldwide distribution rights for the Aibotix Aibot X6 hexacopter. The company also has the licence for worldwide distribution of the Dragon 35 synchropter from SwissDrones. The latter boasts a superior payload capacity and flying time endurance whilst integrating Leica's multispectral metric camera and imaging technologies.

## 3D Model for Oslo

Blom has completed production of a 3D model of the Norwegian capital Oslo, covering an area of 100 km<sup>2</sup> around the city centre. The 3D-buildings have been textured using oblique imagery captured in 2012. The imagery, at 8 cm GSD resolution, is draped onto each individual façade and roof structure.

## Lynx SG1 Mobile Mapper

Optech, has announced the imminent release of the Lynx SG1 Mobile Mapper (Survey

Grade), which replaces the Lynx M1 as the flagship model of Optech's mobile product line. Lynx SG1, a 600-kHz dual-sensor head system, raises the bar for mobile surveying by collecting up to 1.2 million measurements per second at survey-grade precision, spread over an unobstructed 360° field of view with industry-leading scanner speeds, for even point distribution. The ability to control several integrated cameras, including the Point Grey Ladybug, adds further value to a system.

## StreetMapper takes to the railway



**3D Laser Mapping's StreetMapper** has been used to collect design grade 3D data for a rail improvement project in New York. The system uses a series of vehicle-mounted laser scanners to collect data at speed and with minimal risk to survey personnel. Operated by service provider Terrametrix, the system was chosen as a rapid and cost effective alternative to a conventional track survey.

## New TruPulse Laser Rangefinders

Two new TruPulse laser rangefinders have been announced by Laser Technology, Inc. The 200X and 200L rangefinders measure slope distance and degree of inclination, enabling the unit to calculate horizontal and vertical distances, height and 2D missing line values. The 200L model has 1m range accuracy and 0.5° relative inclination accuracy whilst the 200X has a 4cm range accuracy and 0.1° inclination accuracy. The latter can also connect to a smartphone, tablet, Windows mobile device or almost any GPS handheld via Bluetooth (Windows/Android/iOS). To collect 3D data it integrates with an LTI TruAngle for measuring horizontal turned angles.

## iOne STKA Award

Visual Intelligence has earned the Geospatial World Technology Innovation Award for its iOne STKA (iOne Sensor Tool Kit Architecture).

The toolkit architecture provides the foundation to readily and economically develop high-performing geoimaging sensors for aerial, terrestrial and mobile applications, all while using a single software/hardware foundation. Mapping and remote sensing companies of all sizes can now select a 'buy-what-you-need and add-as-you-grow' approach by having access to field sensors that are reconfigurable in the field, ranging from engineering grade large area stereo sensors with 0.6 b/h ratio, to metric high resolution oblique/3D. The company is currently developing iOneSTKA for deployment on UAV/UAS and miniaturised mobile devices.

Visual Intelligence has also announced a iOne Infrastructure Metric Mapping System (iOneIMMS), which is based upon iONE STKA. Visit <http://visualintell.com>

## SketchUp Integrated

Trimble has integrated SketchUp file import and export capabilities into its Business Center (TBC) office software. The addition

allows surveyors to calculate points based on 3D SketchUp Pro models generated by engineers and architects and transfer those points into Trimble Access field software for field work. Trimble Business Center's exporter functionality routes survey data back into SketchUp and provides survey and engineering companies and architects with a timely and accurate portrayal of the land layout as they begin design work.

## Monitoring mining

Maptek PerfectDig software brings together 3D modelling, laser scanning and handheld communication devices, allowing operators to effectively monitor excavation progress by comparing actual surfaces against designs. PerfectDig automatically combines mine plans and design information from Maptek Vulcan with laser scans of working areas. Detailed 3D visual and spatial analysis information is provided in near real time, streamlining communication between surveyors, mining engineers, supervisors and equipment operators.

Pit or shift supervisors can access PerfectDig via smartphone, tablet or laptop, creating a real-time decision support and quality control system for mining. Adjustments can be made before problems arise to ensure efficient overburden removal and maximum mineral recovery.

## New GNSS from CHC

Chinese developer CHC has introduced the X91+ GNSS receiver featuring advanced network RTK positioning, internal UHF Transceiver for simplified base/rover operation, Carlson's SurvCE 3.0 field data collection software and optimised GNSS data Management with 4Gb internal Memory. Visit: [www.chcnav.com](http://www.chcnav.com)

## OS Terrain 5

OS Terrain is the new family name for height products from the Ordnance Survey. The data provides national coverage and is offered in both grid and contour formats. It will be updated

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OS began capturing height data in 2010 as part of its programme to develop 3D product technology. Height data is now captured every year as part of its large-scale capture programme.

### iCON update

Leica Geosystems has released an enhanced version of iCONstruct field software for its iCON portfolio of positioning and measuring solutions. With the new slope application for batter boards, easier data handling, and enhanced sketching capabilities, iCONstruct field v1.7 significantly improves and further optimises construction workflow efficiency

helping users to increase productivity and to complete their jobs more easily and in less time.

### Point Grey camera

Point Grey, manufacturer of high-performance digital cameras, has announced a new addition to the Grasshopper3 camera family, which features the highest resolution, global shutter CCD sensors currently available with a USB 3.0 interface. The new Grasshopper3 GS3-U3-91S6 camera models are based on colour and monochrome versions of Sony ICX814, a 1" CCD featuring 3.69 micron square pixels. The camera outputs 9.1Mpx, 3376 x 2704, images at 9 fps using monochrome, raw or colour interpolated pixel formats.

### Kongsberg Seaglider

Kongsberg has announced its first Seaglider, an AUV which is not propeller-driven and can carry out longer missions at lower energy consumption. Units will be shipped from December.

## New Trimble tablet



A new tablet PC from Trimble is billed as the "next generation" for surveying. The Trimble Tablet is a lightweight and rugged field computer that can operate with the company's suite of receivers and total stations. With Trimble Access field software on board (see inset), the Tablet streamlines the flow of information between the field and office whilst also allowing surveyors to run the applications they need to perform office work directly from the field. The Tablet offers a 7" capacitive multi-touch screen in an easy-to-hold form factor that measures 6.3" x 9.6" and weighs 3lbs. An extended battery set provides up to 16 hours of operation.

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PV Publications in association with Chris Little Training has launched a series of industry-related courses for surveying and geospatial personnel. Find out more on page 27.

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## Francis Michael Sharp FRICS, FRGS 1937 – 2013



The death of Mike Sharp marks the loss of another of the older generation of professional land surveyors, i.e. those who practised before the widespread use of GPS and the renaming of the profession to Geomatics. During his career he worked in 44 different countries!

Mike had an unusual and adventurous entry into Geomatics. He started his education at The Friends School, Saffron Walden, where he was very happy in its relaxed atmosphere but on the return of his father from service in WWII he was transferred to Westminster School. Here Mike rebelled against the formalities and at the age of 15 ran away to join the Army. He became a boy soldier at the Army Apprentice School at Arborfield, where he passed his A levels and specialised in electronic communications. He shone both at work and sports and became head boy soldier and was recommended for officer training at Sandhurst. However he blew it all when, as he says, 'he went off the rails' and was reduced to the ranks (for escapades outside the scope of this obituary!). After time with REME in 1959 he volunteered for secondment to the Trucial Oman Scouts. The lifestyle in the desert he enjoyed and revelled in, but it ended two years later when his truck hit a landmine (he was lucky to survive, being blown out of the truck's observation hatch). After recuperation he returned to REME in Germany. In 1964 he left the Army and was recruited by the Directorate of Overseas

Surveys (DOS) as an electronics specialist/assistant field surveyor.

### Field surveyor

His first posting was for three years to the Solomon Islands as a field surveyor, with short visits to New Hebrides, Sabah and Sarawak to maintain DOS field party EDM equipment. This was followed by a long period based in Kenya 1967-75, working as a field surveyor with the local DOS field party but with responsibility for maintenance of EDM equipment in 14 other countries in Africa and the Middle East. To DOS field surveyors Mike's regular visits and his electronic competence gave peace of mind for the effective operation of EDM in what were very harsh climatic and physical environments. By the end of this period Mike was determined that his main aim was to become a professional land surveyor and he took six months unpaid leave from DOS to study for the RICS Finals at the University of East London. If successful, he had been promised a posting back to Kenya as a professional land surveyor. However there were fireworks when the newly appointed Director of DOS vetoed this career change and proposed that Mike should be based at DOS HQ (Tolworth) with global responsibility for the new generation of EDM, plus Doppler positioning equipment. After a battle of wills over this, which Mike won, he successfully passed the RICS examinations in 1976. He became an Associate in 1978 and a Fellow in 1988, incidentally, winning an RICS

award for his thesis: "Instrumental Errors and Anomalies of Electromagnetic Distance Measurement".

### Land registration

After six years of field surveying on projects in Sudan, St Kitts/Nevis, Turks & Caicos, North Yemen and Botswana, Mike joined the ODA funded project for systematic cadastral survey/land registration in the Seychelles as deputy project manager. It was here that he gained his knowledge of the various processes of land administration. ODA secondments to similar land administration projects in St Lucia, the wider Caribbean area and Vanuatu followed. In Vanuatu he was the principal surveyor general and advisor to the Ministry of Lands.

After retirement from Government service Mike practised as a land administration consultant on various projects funded by the World Bank, ADB, UNDP, EU and SIDA, principally in the transitional economies following the break-up of the USSR and its associated economic partners. Mike continued to practise even into his seventies – he joked to me in an email in 2011 that he was being considered as team leader for a Finnish funded land administration project in the Palestinian West Bank (presumably as 'cannon fodder').

Mike never really retired, although he did spend more time fishing and playing tennis in Sweden, where he lived with his

second wife, Ingrid. He took a keen interest in the Geomatics profession, notably, taking issue in 2012 with the authors of an RICS Research paper on the potential use of 'crowd sourcing' for defining land ownership rights in developing countries – saying that the authors were 'blissfully naïve' about the process of adjudication of ownership claims. He also had a keen interest in exploration, through his membership of the RGS.

Mike died after a long struggle with malignant melanoma. He leaves two sons from his first marriage, Mark (born in the Solomon Islands) and Justin (born in Kenya), of whom he was very proud, and their respective grandchildren. He loved the area of Southern Sweden (Skåne) where he is survived by his second wife, Ingrid, and his ashes will be buried at his local church of Ravlunda, within sight of the Baltic Sea and the local river where he fished.

Mike will be remembered by friends and former colleagues for his spirit of adventure, his elegance, his good humour, his trustworthiness, his optimism, his ability as a 'raconteur par excellence' and his ability to relate to people of any background. He was also much admired for his professionalism, determination, high standards, resolve and above all his good humour, which helped to defuse many difficult situations in the remote areas where he worked.

*Obituary by John Price*



*Working with REME in the Trucial Oman, Mike Sharp was lucky to survive when he was blown out of his truck's observation hatch when the vehicle struck a land mine.*

# The cloud and independent software

The next step forward in the relentless advance of the internet is cloud working. How will it change the way surveyors work? Are there security issues? How will it affect small software developers? **Richard Groom** looks at recent development and talks to Dr **John Strodachs** of Applications for CADD about the effect on survey software.

**T**hink about developments in surveying and most surveyors would focus immediately on advances in field survey equipment. Almost all equipment is now electronic and all data is digital. There is virtually no need for paper in the field and abstracting errors have all but been consigned to history. Advances in computing hardware and software have also had a dramatic impact. But perhaps the most significant effect on the way that surveyors work has come from advances in communications technology. It is not so long ago that the only form of field communication was a flashing helio and a loud voice. We had radios, but they were inevitably unreliable. Synchronisation was, in most situations, the only way to get things together, but then what if you had a puncture on the way to the appointed place and missed the appointed time? It was very easy to lose a day's work and recovering from the situation would at best need a back-up plan or at worst second-guessing what the rest of the dispersed team would do in the circumstances.

The mobile phone put an end to communication by helio and radio. Bluetooth firstly disposed of all the cables connecting antennae and receivers and then enabled better links between the total station and the pole. Email put an end to 'it's in the post!'.

Now we are seeing the development of 'the cloud', software as a service and batch on-line processing such as is offered for static GNSS baselines or for UAV photogrammetry by Pix4D. And the cloud is essential for the real-time collaboration that is central to the BIM concept.

There is usually a trade-off, particularly when a technology is in its infancy, between the cost of the service and the value derived from it. There are also concerns about weakened security that the cloud inevitably implies. But cloud technology is already embedded within many GI applications and it is only a matter of time before surveyors have to embrace it.

We asked John Strodachs from Applications in CADD for his view on how survey software would be affected by the cloud and related developments. He writes:

## Are you well connected?

In the short term there will be issues working with the cloud because it assumes you have good internet connections; something that

can't be guaranteed on site. I can see people using the cloud to share data either within the same organisation or with clients. As data files become larger this may become the way people look at and transfer data, especially when working within a multi-disciplined environment. I can't see programs running directly on the cloud but I expect potential users to download programs onto host machines and then access keys from the cloud on a 'pay for use' basis.

I also see further standardisation on data formats like LandXML, DWG etc. Software vendors have a vested interest in creating a file format that everyone "should" use and this will be driven by the major players in the marketplace.

## Don't just chase technology: have a plan

As an independent software developer we have to make a profit. There is a realistic "minimum" price we can charge for our services, which is quite low already. We can't chase technology without a good business plan even though it may look like a good idea at the time. Research and development can be very expensive, as we've experienced on projects that didn't result in commercial success. Good sales and marketing should follow any new product. If you develop a product which is unique then there is a good possibility of making a profit. It's a fine balance!

## Platform independent?

Our software is developed with the future in mind. I would like to go platform independent so we can run on Apple OS and Android systems, with their ease of access to the Internet.

In terms of surveying, traditional techniques will not change that much, but will be supplemented with better GNSS solutions and point clouds. GIS will take on greater importance as a means of recording more descriptive data at the same time as spatial data. Whilst we're trying to create 'universal' packages it may be necessary to hive off certain parts of our software for specialist applications, like roads, river and rail surveys. Our 4Site data capture software is going in this direction already with applications for Rail, Sonar, Building (3D Disto) and Dimensional Control.



## Cloud solution reduces turnaround, journeys and fuel

Using the latest cloud based technology a supplier to contractors is reaping the benefits of Topcon's Magnet Enterprise, explains technical support manager **Peter Roberts**.

The Industrial Water Jetting Systems group (IWJS) is a supplier to multi-disciplined contractors, providing topographic, underground pipeline, utility and asset mapping services using mobile survey teams.

The company has embraced cloud technology to improve the efficiency of its field crews and the turn-round time for surveys. They purchased a number of Topcon network RTK receivers and tablet style 3G-enabled Tesla data collectors and utilised Topcon's Magnet Enterprise cloud-based project management software. Magnet Enterprise controls the movement of data between office and field and allows a nominated administrator to assign a level of access to each member of the project group. Each company account comes with 5Gb cloud storage as standard, more space can be purchased if necessary.

"Prior to using Magnet Enterprise we had to drive to an office and hook up to a PC to send data back to our head office" says CCTV Engineer Paul Stanbra. "This was both time-consuming and inefficient, a lot of our work is in remote locations and undertaken at night as part of the Highways Agency's Managing Agent Contractor (MAC) contracts. We wanted to get the information back to the office as quickly as possible so that the night's work could be processed by the office team and we could go to bed!"

### Typical workflow

The office team receive the work-scope from the

client and prepare the programme in advance by outlining the work area on sections of OS tiles. The data is copied to the cloud and a chat message sent to the field surveyor indicating that there is data to download. The field crew download the data directly to the Tesla via Magnet Field and if necessary overlay the survey area onto Bing maps to assist with location.

Once the survey is completed it is converted to dxf and csv format and sent direct from the field controller to the cloud. The office staff can then download the survey and view it immediately within Magnet Enterprise, utilising Google maps to ensure that it is complete. If necessary they can 'chat' with the field crew to identify omissions. The chat message appears in the survey screen which is advantageous when working in noisy or hazardous environments.

The final deliverable is an AutoCAD OS tile overlaid with the surveyed utility information. IWJS use Dropbox to send CCTV video footage, which is included with the end deliverable to client.

### Significant savings

Cloud-based services have provided significant savings for IWJS. Journey time and fuel costs (and emissions) have been reduced along with the need for costly return site visits and lane closures. The system has reduced survey turn-round times and provided clients with accurate updates on progress.

- More from [peter.roberts@topconsokkia.co.uk](mailto:peter.roberts@topconsokkia.co.uk)



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# BIM meets Geospatial – and Survey is included!!

BIM conferences are usually a depressing affair. The heart sinks almost before the introductory coffee has gone down, as your reporter realises that he is the only surveyor in attendance. Depression sets in as the speakers demonstrate ignorance of basic surveying knowledge. Then, when a straightforward question is met by an uncomprehending look, the pointlessness of life is complete! Fortunately aspects of this event were different, says

**Richard Groom.**

*“Did they not realise that spatial data is spatial data, whether it is stored in CAD, GIS or BIM?”*

The AGI's BIM meets Geospatial conference seemed to be following the inevitable path. Despite having been plugged relentlessly in GW and at GEO's North and South events, there was only one surveyor, one survey equipment manufacturer and an amateur hack sipping that introductory coffee. The talks were good but the speakers did seem to get hung up on some fairly elementary stuff.

### Fundamental questions

Things continued on their downward spiral. Why could one of the speakers not see that location of features with respect to an alignment centreline using chainage and offset is a straightforward co-ordinate transformation from a good old Cartesian grid? Did they not realise that spatial data is spatial data, whether it is stored in CAD, GIS or BIM? And why get hung up about accuracy and data quality? Can't that just be an attribute for the feature concerned?

Don't get me wrong. This was a valuable day in which, as is always the case, you learn a bit more and consolidate knowledge gained elsewhere. On their home ground, the speakers clearly knew their stuff and there is generally greater clarity about what BIM is. Although, the more conferences I attend, the more I feel that BIM is actually nothing new. Over ten years ago, Heathrow Airport owner, BAA was running collaborative projects for which they gathered together the disciplines they needed into a single environment (a room), where they worked together in a collaborative way.

But why are surveyors not involved? In fact this was an occasion when some were. Plowman Craven and the Severn Partnership have joined a new group – BIM4IUK (BIM for Infrastructure UK) – a forum set up in December 2012 and promoted by the AGI and the ICE.

### A common language

The spirits did not follow an entirely downwards path during the day either. **Ian Bush** and **Tim Wood** gave an excellent talk on the need for a common language for data in order to develop true inter-operability. But did the audience get it? Unfortunately the answer seemed to be 'no'. Indeed one speaker said that it was good to have different formats, to reflect cultural differences, as if this was part of the 'diversity agenda'!

When it was looking as though all hope might be lost, **Anne Kemp**, conference champion, introduced another group – Survey for BIM. The group is led by Ian Bush, current chairman of CICES, which aims to convince the rest of the BIM community that surveyors do have something useful to contribute. Ian is in the process of establishing a core team of experts and GW will follow the group's progress.

### OS for context

The Ordnance Survey's **David Henderson** spoke on the move from 2D to 3D modelling. He emphasised that data must be consistent and authoritative, model the real world and must be maintained. In a crowd-sourced world in which there are plenty of products that provide context in a rough and ready, and cheap way, one can't help feeling that he has his work cut out to convince frugal architects that context is not a corner to be cut. 2D data has up to now been acceptable, but will not be in the future and BIM will be one of the drivers towards 3D. He sees the role of national mapping as providing context for projects.

### Buildings v infrastructure

**Malcolm Taylor**, head of technical information for Crossrail made the point that his project started before the invention of the iPhone, which poses a question over how large projects can keep up with technology. Interoperability of data has to be the key and he sees specifications and standards as the way forward. Taylor focused on the concept of building a digital railway before constructing the real one and pointed out that some records from the BIM would not be required for railway operation. What should happen to this information? Crossrail is using UNICLASS to classify features and is bar-coding physical objects to link them with the model. He also considered the differences between BIM for buildings and BIM for infrastructure. There are obvious differences, such as scale, but in principle he concluded that they are the same.

The Koreans are leading in the development of an ISO standard for BIM. Tim Chilton from BSI is leading the British input and gave a summary of progress. He is looking for input from practitioners.

### COBie for infrastructure

The current hot topic for BIM people is COBie (Construction Operations Building Information Exchange) and several speakers delved into it including **Paul Scarpocnini**. COBie is the standard data format for 'data drops'. Data drops are essentially sets of data derived from the BIM at critical points in the building (or infrastructure) development. COBie is basically a spreadsheet produced from an interrogation of the 3D model that lists the contents of rooms in the building. It is only geospatial in the loosest sense.

There is still the lingering fear that COBie data will be treated as the only digital deliverable from BIM. A thought reinforced by the fact that there is no agreed format for model data. Perhaps this is where surveyors and GIS professionals should be exerting most influence. It is clearly nonsense to throw away the model data when a

construction project is handed over to the client. But if it is to be retained and managed, there have to be processes in place to carry out the management. I was also left with the uneasy feeling that the BIM community were ticking boxes. The government says that COBie is required, so it will be produced – even for ‘infrastructure’ projects. This seems completely nonsensical. Surely GIS exists for this very reason and attributed spatial data fulfills this purpose far more competently than a non-spatial database.

## Get involved

BIM has been pushed by government, aided by architects and software vendors but data management has not been given sufficient attention. Hopefully this conference will have highlighted what needs to be done and ways in which this can happen. BIM4UK and the CICES Survey for BIM initiatives should do just that. The message to the professional institutions and the wider surveying community remains: get involved.

# A BIM/GIS Roadmap

To create a national digital archive about the built environment of equal value to all, we need a common language that can provide an effective foundation for wide range of uses. OGC (Open Geospatial Consortium) points out that BIM “includes data of interest to buyers, owners, lenders, realtors, first responders, repairers, occupants, safety inspectors, lawyers, emergency planners, and people working on neighboring facilities”.

A common and consistent language will cross our institutional divides, save money, enable innovation, create new markets and support the many disciplines needing to share information and knowledge about our buildings and infrastructure. It’s also a crucial step towards smart cities where we can integrate the Internet of Things, People, Services and Data.

The starting point for our lingua franca is to understand the roadmap from first defining business requirements for information, to the end-point of physically exchanging data – about anything. Table 1 shows the steps that will also form the golden rules of our own roadmap for BIM. **G-1**, the business level is concerned with purpose, stakeholders, enablers and obstacles and a long-term as well as a short-term view. Ultimately, we cannot escape ‘purpose’ in how we see the world and institutional bias at the business level will have a profound influence over everything below it.

**G-2**, the ‘conceptual level’ comprises a

‘semantic model’ of the real world (put simply, things with names and types of things), and the logical models we construct of the real world when we define relationships between these things, using additional concepts – ‘is part of’, ‘within’, ‘belongs to’, ‘along’, ‘contains’. Quite often, we are content to leave these concepts quite fuzzy, or have surprisingly different ideas of what the real world is, depending on viewpoint and context. For example, the concept of a building is very different when invoked for taxation, energy efficiency, construction, socio-economics, mapping or maintenance.

**G-3**, the data representation level is to do with ‘representation and process rules’, and ‘quality rules’. These define the ways we choose to represent the human or semantic understanding of the real world using data, a very simple geospatial example being whether to represent a building as a point or in two, three or four dimensions. Different conceptualisations result in different data representations, which is why information often fails to fit, other than (or sometimes even) in a spatial sense.

**G-4**, the exchange level concerns conventions for how we exchange information, specifically the logical way we construct messages, and the physical syntax, formats and so on.

A key principle is that each layer only knows what lies above. In other words, our conceptual understanding and ‘semantic

view’ of reality should not be conditioned by how we want to represent it using data, and the way information is exchanged should not influence how we use data to represent reality. ‘Common data referencing’ of information about buildings and infrastructure doesn’t mean the same real-world things are being measured, unless accompanied by conceptual information in some form – or simply assumed to be so.

## The situation now

Table 2 shows the space occupied by some of the standards, conventions and other approaches that currently address the built environment. Almost all of them have their own view of the world, comprising vertical slices through the table. Some are business-led, but most are driven by the need to exchange data.

All of the approaches in Table 2 deal with the same subject matter in different ways alongside numerous proprietary and national methods. Some have withered on the vine by being over-ambitious or failing to sustain endorsement but it is clear that most continue to think vertically, speaking their own languages. The goal of a common language is for the vertical pattern in Table 2 to become horizontal.

- Based upon an article by Tim Wood published in the May / June issue of *GIS Professional*, which also includes Tim’s proposed plan of action. For a free digital subscription to *GISPro* turn to page XXXXX.

Roadmap for integrating and managing information about buildings, infrastructure and geography		
INFORMATION THEME	Gov.	CONTENT – buildings, infrastructure, environment
 <b>1. BUSINESS MODEL</b>	G-1	Purpose, scope, goals/benefits, principles, action-lines, measures, governance and authority, sponsorship. Institutional alignment and collaboration (FICE, RIBA, IAVI, OGC, BSC, AGI, BIM4UK, etc.)
 <b>2. SEMANTIC MODEL</b>	G-2	Real-world object taxonomies, typologies, synonyms (road, building, room, wall, airport, workforce, asset, asset hierarchy, energy concepts, etc.). Tangible and intangible. Real-world attribute catalogue (has/may have properties x, y, z). Physical form descriptors, energy characteristics, other.
 <b>3. LOGICAL MODELS</b>		Logical model of objects and their defining relationships, generic state change and process representations, generic lifecycles, generic spatial, linear and topological models, RDF, location referencing methods.
 <b>4. REPRESENTATION &amp; PROCESS RULES</b>	G-3	Conditional constraints, code-lets, mandates, options, application-specific logical representations, standard procedures and processes, rules about spatial references and other unique identifiers, identity, trust. Application or institution-specific.
 <b>5. QUALITY RULES</b>		Quality criteria, e.g. minimum resolution, projection, datum, completeness, scheduling and costing rules, etc. Application or institution-specific.
 <b>6. LOGICAL EXCHANGE (format independent)</b>	G-4	Bundling of information for different applications, logical exchange methods (e.g., semantic web, application-specific data ‘views’, interoperability methods and protocols, metadata, application-specific data ‘views’, interoperability methods and protocols, metadata, geobIM, OWS, RDF, SPARQL, XML, HTTP, FTP)
<i>Web resources (e.g. standards, training, research, technical documentation, etc.)</i>		

**Right:**  
Table 2,  
spatial  
data  
silos.

THEME	Initiatives and standard examples		
<b>1. BUSINESS MODEL</b>	US DoE Buildings Energy Performance	Proprietary	
<b>2. SEMANTIC MODEL</b>	UK National BIM Library	COBie	
<b>3. LOGICAL MODELS</b>	BuildingSMART Data Dictionary	BS 6500 vocabulary	
<b>4. REPRESENTATION &amp; PROCESS RULES</b>	ISO 12006-3:2007 (IFD) construction dictionary standard	ISO 21117:2006 (CDOC) cultural heritage ontology	BS/PAS 1192
<b>5. QUALITY RULES</b>	INSPIRE	OgcCity GML	
<b>6. LOGICAL EXCHANGE (format independent)</b>	ISO 15926 Ontology for industrial plant and structures	UK National Gazetteer	BuildingSMART IDM
<b>7. PHYSICAL EXCHANGE (bindings + formats)</b>	Green Buildings XML	LandXML	

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# Evidence: managing it at sea

By Richard Groom

A lively group of largely environmental folk convened at the School of Oriental and African Studies in Central London on 2nd July to discuss the collection of 'evidence' in the marine environment.

**Richard Groom**  
was there.

*".. there is potentially never enough evidence to satisfy the environmental regulators."*

**E**vidence is the buzz-word for information required to support the decision-making process. In this context it is needed primarily for two purposes; to support development of offshore infrastructure and to select suitable locations for marine environmental management.

## Science v Policy

The day started in philosophical mood with discussion of the nature of evidence in the scientific process. The government promotes science-led policy and yet there were grumblings that the reality is often that policy leads science. The problem seems to be gauging the right amount of investigation to produce sufficient reliable evidence for balanced and reliable decision-making. A common problem for the evidence supplier is that there is potentially never enough to satisfy the environmental regulators. One way to avoid this situation is to use 'evidence plans', in which the scientists agree what evidence is needed in advance.

Surveys are the way to gather evidence and **Jamie Moore** from The Crown Estate (TCE), 'owners' of the UK seabed out to 12 nautical miles, reckons that for a 500 megawatt wind farm development, £30 million is spent on surveys to support the planning process. He knows, because all the data submitted ends up on the Marine Data Exchange

([www.marinedataexchange.co.uk](http://www.marinedataexchange.co.uk)). The data is made freely available following the expiration of confidentiality periods (typically two years). If £30 million seems to be a large figure, it is, because most of the expense goes on geotechnical and habitat surveys. A combined figure of 8% is spent on geophysical and bathymetric surveys. Moore stresses that the Marine Data Exchange is a valuable resource containing 50 terabytes of data and he challenged the industry to synthesize it with other data to increase its value.

To obtain consent to develop offshore infrastructure requires the developers to demonstrate that they will satisfy the requirements of several EU directives. **Sian John** from Royal Haskoning/DHV has been working in this area for some years and put the case for replacing the many reports that are currently demanded with just one, to cover the requirements of all the legislation. A member of the audience even suggested that the report should be digital and use links to the supporting evidence.

## Rational decision making

The conference focused on the relationship

between evidence collected, facts inferred from evidence and expert judgement. If there is less evidence available, there will be more reliance upon expert judgement and opinion in making decisions. With more evidence, expert judgement will be based upon stronger foundations with less opinion.

**Tom Appleby**, senior lecturer in law at the University of the West of England, gave a revealing insight into the different ways in which the law and science view the decision-making process. Science seeks to test data to find trends that can inform decision-making. The process is data hungry and quantitative rather than qualitative. The law on the other hand acknowledges that decisions have to be taken without all the information to hand and only demands that the decision is rational. Judicial reviews are usually carried out as a challenge of the process rather than the substance of the decision.

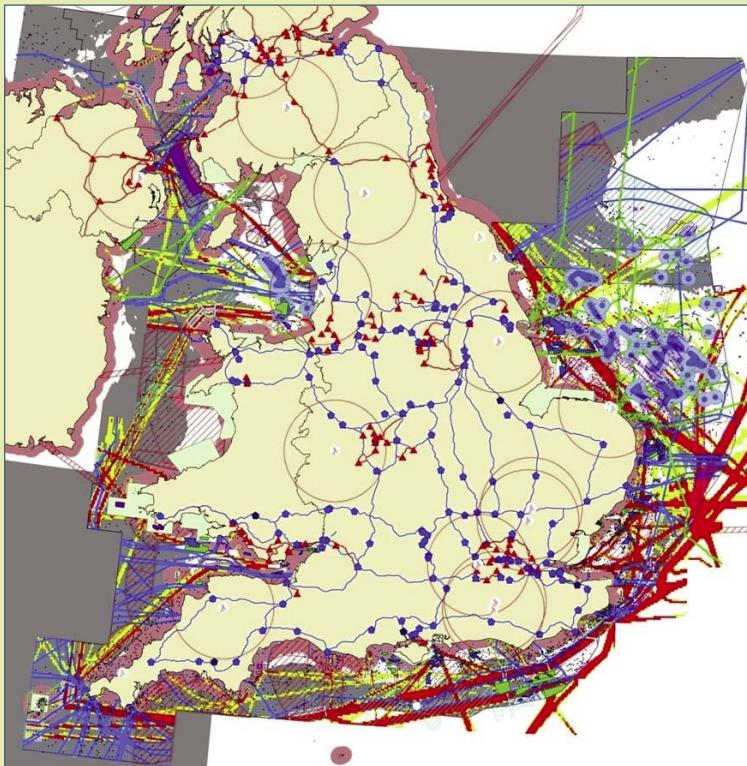
Consents may also carry an obligation to monitor environmental factors after the development goes into operation - for example, to survey seabed scour around wind turbines. The idea is to assess the effectiveness of mitigation measures, check that the environment is behaving as was predicted in the developer's planning submissions and look for any unforeseen impacts.

## Ministerial bumbling

Evidence is also needed to support the establishment of marine conservation zones (MCZs). **Louise Lieberknecht** from UCL told a sorry tale of ministerial bumbling. The Marine and Coastal Access Act 2009 required the establishment of MCZs. These are intended to form a network covering territorial and offshore waters of England and Wales and be established on the basis of the 'best available evidence'. As a result, 127 MCZs were recommended in 2010. But in 2011 the goal posts moved, so that each stage of MCZ development demanded a higher level of evidence, which in turn meant more data gathering. Today the situation is that only 31 of the 127 proposed MCZs have been put forward for potential designation – six months after the target date.

This was a conference which looked as though it would be on the margins of geomatics interest. Indeed it was, but it would almost certainly have benefited through input from a high profile hydrographic surveyor, and the profession would have gained from exposure to this influential group of people.

# The wind farm surveyor's viewpoint



*Map showing some of the development constraints, with buffers, around the coastline of Britain. (Image courtesy of RES <http://www.res-group.com/>)*

MENTION OFFSHORE development in Britain these days and most people are likely to assume that the conversation is about wind farms. Clearly surveying must be needed in order to develop a wind farm, but try finding a wind-farm surveyor.

They are very rare. Perhaps because the concept of a surveyor with an overview of the whole project does not suit engineering thinking, which separates planning, design, construction and operations and maintenance into vertical silos and sees engineering surveying as a technician-level exercise within those silos. Yet Geomatics expertise is needed at every stage, from planning where turbines, on and offshore cable routes and onshore facilities can be sited, through to design and construction and then monitoring of the development. If considered in this way, projects can more easily justify the cost of employing a professional surveyor.

So who is looking after the big picture? The answer, more often than not, is 'not a surveyor'. GW has however found one who is. **Jo Dutta** is well known in the industry and has

been in the offshore wind-farm business for the past 18 months.

He has found that survey and surveyor are terms bandied about by developers, environmentalists and engineers alike in the same way that the layman applies the term engineer to refer to people who design nuclear power stations, clear drains or fix the fridge. The lack of geomatics expertise means that lessons learnt by the oil and gas industry in the early days of North Sea exploration are being re-learnt by the wind farm industry in 2013. Regarding the appetite for data, it extends to geospatial data too; of which there is never enough to satisfy the needs for key documents such as Environmental Impact Assessments, Zonal Appraisal and Planning reports, Scoping documents, consents application requirements, public consultations and so on.

## When offshore meets onshore... and doesn't

Ignorance of geomatics starts, as ever, with horizontal datum and projection systems, such as puzzlement when export cable routes pass from the offshore onto the onshore coordinate

system. A further question arises because the development consent will constrain the turbine blade tip to be a minimum height above Highest Astronomical Tide (HAT), whilst the hydrographic surveys are based on Chart Datum or Lowest Astronomical Tide(LAT). More generally, confusion of vertical reference datums is a concern with few non-surveyors having an understanding of the VORF model and what it represents. The precision of geospatial data when represented in degrees, minutes and seconds or decimal degrees is also often overlooked by those working in the wind farm industry.

## Constraints and a common reference frame

Most of the geospatial work involves gathering and managing data from various sources on the many constraints that affect wind farm development and presenting it on a common reference frame so that the area left for development can be ascertained and optimised with the most advantageous turbine layout. The constraints include MoD practice areas, shipping lanes, wrecks, submarine pipelines and cables, as well as ecologically sensitive areas. Much of this base reference data is available from Seazone. New bathymetric, geophysical and geotechnical surveys and the many habitat surveys, including bird, fish and mammal surveys have to be procured and the data analysed, catalogued and metadata maintained.

Geospatial analysis is required to determine the zones of theoretical visibility (ZTV) to show the visibility of the development from its surroundings using onshore terrain models and visualisations as well as the effect of 200m high turbines on civil aviation radar. Repeat surveys are often carried out in order to understand trends and anomalies of the gathered evidence.

The geomatics surveyor has a key role in assimilating varying datasets often on differing spatial reference systems to provide evidence for all sorts of disciplines which all combine towards the successful development of an offshore wind farm.

- Any views expressed here are not those of RES.