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GeoCom sparkles in Warwick

Resilient futures at AGI's annual conference
Stuttgart debuts data capture technologies
Schutzberg: W3W needs cultural change
Capturing gullies the SMART way

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Front cover: GeoCom 2015 images. MC Rollo Home centre stage surrounded by, clockwise from the top, exhibitors, Peter Gibb, intensive networking, the conference team, Prof Iain Stewart and to his right, OS CEO Nigel Clifford, the happy AGI staff team and Anne Kemp sharing a moment with Simon Wheeler. **Full story begins page 14.**



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welcome. . .
to the December 2015 issue of *GIS Professional*. . .

Re-charged, we face new challenges

Did you attend GeoCom 2015 in November? If you didn't you missed a lively and truly informative event, which must surely have re-charged every delegate's verve for all things GI related. In these tough times, when company budgets for conferencing are often non-existent and time away from desks is in even shorter supply, the AGI managed to organise two (and a half if we include the Foresight 2020 report on the evening of 23 November) very attractive days, especially around plenaries and debates. We've reported on Day One in this issue (pages 14-17); in February we'll cover Day Two. In the meantime if anyone who attended sessions not covered by our small team and would like to pen a para or two please get in touch.

I cannot too strongly recommend that all readers download and study the **Foresight 2020 report**. There is plenty of wisdom there from the industry's thought leaders, cage rattlers and pundits. We will review it in more detail in the next issue. In the meantime, read it and tell us what you think; it was definitely another milestone achievement for the team led by **Anne Kemp**, which cajoled and chased contributions and then edited it into a readable document. Well done guys. It's available to anyone for free at <http://www.agi.org.uk/about/resources/category/100-foresight?download=160:agi-foresight-2020>.

I hope you enjoy our interview with **Nigel Clifford** (pages 18-21). His presentation at GeoCom demonstrated his analytical and presentational skills. His leadership and management ability are soon likely to be tested. He brings a very different skill-set to the job than his predecessor, but skills that will come into play in the coming years as Ordnance Survey faces very different challenges and changes, driven by government.

Elsewhere in this issue **James Brayshaw** (pages 10 & 11) makes a cogent case for government using location intelligence to drive down costs. He identifies three 'D's' – decentralisation, digital and data, against the challenges of retaining skilled staff, constantly driving down costs, changing demographics (think ageing population), new ways of working and wider collaboration with other agencies. What James did not mention but which can certainly help cash-strapped council, is open source software. To implement it requires enthusiasm, imaginative management and dedication. All these qualities seem to have been in abundance at Royal Borough of Windsor & Maidenhead, where **Simon Miles** and colleagues have managed to save £75k over three years by moving from proprietary GIS software to open source. Great work guys (more on page 17).

Just as we were going to press the chancellor published his autumn statement with more than a few surprises, some welcome others perhaps less so. Ominously, as we report in News, there are changes ahead for Land Registry (outright privatisation looms) and for Ordnance Survey, where there is a call to bring in private capital. What can it mean? Is the OS under capitalised? The last time I looked it was making steady profit for the Treasury. What else could it do without further upsetting its partners and commercial competitors? It can only mean a more commercially aggressive OS. Watch this space.

Lastly, my good wishes for the coming holiday. I hope it will be peaceful for you and those dear to you. We shall be back with the first issue for 2016 in February.

Stephen Booth, Editor

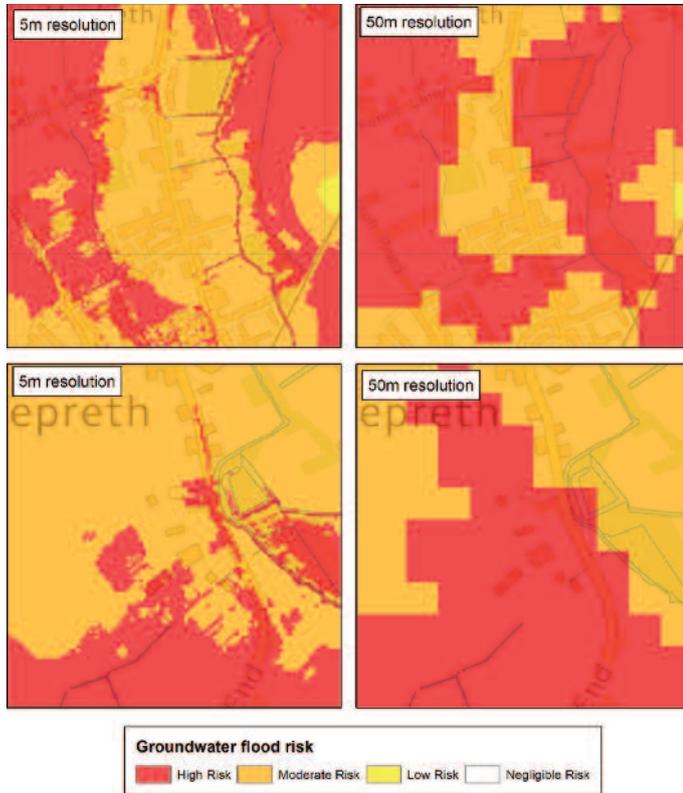
With this issue you will find our annual Year Planner. Please put it up somewhere prominent; it helps encourage new readers as well as underscoring your role as a "GIS Professional"



There is plenty of wisdom there from the industry's thought leaders, cage rattlers and pundits.



Five-metre flood risk map launched



The image compares pre-existing 50m and the new 5m dataset.

With groundwater flood damage in the UK costing an estimated £210 million a year, a new 5-metre groundwater flood risk map has been launched from independent environmental consultancy ESI. The developers claim this is the most sophisticated and accurate map currently available on the market, enabling groundwater flood risk information on individual properties.

The map, which also includes a digital terrain model (DTM) based on LiDAR data from the Environment Agency, is part of a development programme, that began in 2013 with a 50m resolution map and which has been used to screen more than 400,000 UK property transactions in the last year. Combining comprehensive data on geology, permeability and historic groundwater levels, the new map includes flooding from permeable superficial deposits which can have major implications in downstream river valleys and coastal areas. By offering a better granularity of risk boundaries, topography and integration with other 5m surface and fluvial flooding datasets, the map provides far more real world clarity than ever before. It will deliver address level insight with significant implications for insurance premium calculations, land and property resilience planning and conveyancing due diligence.

LR and OS for privatisation?

The UK Government's Autumn Statement & Spending Review revealed a couple of anticipated pieces of news regarding key

organisations in GI. Firstly the review contains the statement that the Government will "consult on options to move operations of the Land Registry to the private sector

from 2017". The second, and somewhat mysteriously relates to Ordnance Survey where they're saying they will "develop options to bring private capital into the Ordnance Survey before 2020". Watch this space, as they say.

Edinburgh's space lab

The University of Edinburgh has teamed up with sustainability software and data firm Ecometrica to establish a new Earth Observation Lab aimed at deriving maximum benefit from the vast amounts of spatial data produced by satellites. It will allow researchers around the world to share data and create customised applications to monitor environmental changes in forests, agriculture and coastal ecosystems.

The Lab, built on Ecometrica's cloud-based satellite data and mapping platform, will be hosted at the university's School of GeoSciences. The school's Professor **Mathew Williams** said: "Space is a big frontier for economic growth and job creation, and Ecometrica's platform allows scientists querying large spatial datasets to share their research findings with organisations around the world and make it available to a wide variety of users in developing countries."

Mega trends identified

Business analysts and forecasters Frost & Sullivan has identified the top five "mega trends" in the security industry (published before November's terrorist attacks in Paris). F&S say these trends will shape the way in which governments will protect their citizens and critical assets in the future. The analysis behind these trends is presented on a video by senior consultant Anthony Leather who argues that changing dynamics in security such as the rise of wearable devices and the Internet of Things will define public safety programmes. He also says that concerns over privacy laws will

eclipse the backlash over national security agencies and the protection of personal data. Key areas to watch, he says, will be:

- The rapid development of technologies that allow greater flexibility and security to end users, providing a more predictive and proactive approach of security procedures. Emerging trends will include unmanned aerial systems, the Internet of Things and wearable devices in public safety and intelligent security solutions.
- The emergence of Internet of Things programmes in public safety. There will be a rapid growth of IP-enabled devices used by law enforcement departments. 4G LTE connected devices used by officers, in vehicles and within surveillance systems, is expected growth at over 13% until 2024.
- The increased debate on intelligence and privacy, following the soaring terrorism threat levels across the globe. The rising concern about privacy laws and technologically sophisticated terrorism networks will also eclipse the backlash against the National Security Agency (NSA) and protection of personal data.
- The rising use of Web intelligence and Big Data analytics throughout law enforcement. Constraints on budgets and an increased focus on business efficiency will squeeze security provider prices with a focus on affordable security solutions that show a clear return on investment both for protection and operation. The cyber problem will continue with a call for greater collaboration between government and industry, focus in the boardroom, and better cyber security hygiene.
- The continuous growth of investments in critical

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infrastructure security, as legacy systems are replaced with newer technology. Highlights include the growth of airport and mass transport infrastructure in Asia Pacific, an expected investment growth of 8% into border security, and strong investment in cyber solutions in banking and finance over the coming years.

Ireland's GeoHive buzzes

GeoHive, a free platform which enables people to combine and layer location-based information from a range of public sector bodies has been launched by Ordnance Survey Ireland (OSi) to provide easy access to definitive, trusted and maintained spatial data services from a range of public sector bodies.

A report commissioned by OSi, estimates that the use of geospatial or location-based information accrues annual savings of 82m in the public sector, time savings with an economic value of 279m, and competition benefits of 104m. According to OSi chief executive **Colin Bray**, "Accurate information helps us all to make better decisions. GeoHive is designed to allow users to join or 'mash-up' information on a map, providing a deeper understanding of topics that impact our lives. For example, one of the stories we tell with GeoHive – called Buying a Property in Ireland – gathers together data from many different sources to enable people to view that information in a single site to assist with the evaluation of one location to another. The information presented includes property prices, transport, education and planning".

Welcoming the move Minister for Communications, Energy and Natural Resources, Alex White TD added, "GeoHive is going to help us modernise public service delivery by

providing a free and accessible portal where it's easy to find, share and use the State's location data." GeoHive replaces the existing map viewer on the OSi website which has attracted over 1.5m unique visitors a year. It represents the first time OSi has developed a collaborative service to meet the needs of its user community", added Bray.

GeoHive can be accessed on all platforms – PC, tablet and smart phone. Users will be able to create and share access to web maps that they have created via social platforms such as email, Facebook, Twitter, LinkedIn and more. GeoHive can be accessed at www.geohive.ie

Geovation topic will be water

The ninth Geovation Challenge launched in last month. The topic will be Water. Use your geospatial imagination to think of innovative solutions that globally recognise problems. The prize is funding and expertise to help realise the most promising ideas. Along the way there's a boot camp, which is great for personal development. See www.geovation.org

Recording threatened monuments

The BBC website reports that 3D cameras are being given out to record ancient monuments that may be at risk of destruction. Residents will be asked to capture images as part of a project by Oxford and Harvard archaeologists. The project intends to distribute up to 5,000 cameras in conflict zones across the world and capture about one million images of at-risk objects by the end of 2016. The initiative has renewed urgency following the destruction of a temple in Palmyra. See www.bbc.co.uk/news/uk-34085546

Galileo launch

Europe's satellite navigation system has come a step nearer to completion with the launch of Galileo 9 and 10, which lifted off together in September from Europe's Spaceport in French Guiana, atop a Soyuz launcher. Two further satellites are scheduled for launch by end of this year. "Production of the satellites has attained a regular rhythm," said **Didier Faivre**, ESA's director of Galileo and navigation-related activities.

Next year the deployment of the Galileo constellation will be boosted by the entry into operation of a specially customised Ariane 5 launcher that can double, from two to four, the number of satellites that can be inserted into orbit with a single launch.

Satellite imagery growth

DigitalGlobe has a geospatial industry report entitled Engage 2015. In it the company gives the results of a survey of 150 senior professionals. The report sees the availability of affordable cloud services and in particular 30cm resolution imagery as key factors in the growth in use of satellite imagery and forecasts rapid growth in the next few years. Visit: <http://go.digitalglobe.com/e30gBW03000BHS00500H80R>

Autonomous Vehicles

Jaguar Land Rover and EPSRC have announced a jointly funded £11 million autonomous vehicle research programme. The research will take place at ten UK universities and the Transport Research Laboratory.

OS Grad Scheme

Ordnance Survey's graduate recruitment scheme for 2016 has launched, offering graduates the opportunity to lead the way on developing innovative and inspirational solutions for digital

data. Working at Southampton, the recruits will join a structured two-year programme where they will get experience working with different teams across the business, delivering projects, and meeting our customers. The starting salary for each role is £27,000.

UKMap maps St Helena

The UKMap team within The Geoinformation Group has been commissioned by the St Helena Government to create a cartographic database for the island's new 1:25,000 and 1:10,000 scale mapping. The South Atlantic island currently relies on Ordnance Survey maps dating back to 1990. The development of an international airport, a major road and a wharf have rendered the existing maps out of date. The aim is to print the maps in time for the first flights in late February 2016.

Certification update for consultancy

Global management and digital transformation consultancy Informed Solutions has been awarded ISO/IEC 27001:2013 certification for Information Security Management. As Cyber Security threats have increased in profile, diversity and impact, the ISO27001 standard has evolved to address these challenges. In particular, the standard places greater emphasis on how organisations: (1) set strategic security objectives that are appropriate to the context they operate in; (2) measure their performance; and, (3) manage security throughout the supply chain, recognising that modern organisations are increasingly reliant on outsourced services, particularly with the advent of the Cloud.

OGC and point clouds

The Open Geospatial Consortium (OGC) is calling for public participation in its newly-

news & people

established Point Cloud Domain Working Group (Point Cloud DWG). The purpose of the Point Cloud DWG is to assess the current state of standards and best practices in the management of point cloud data and to guide OGC activities in working with or developing standards for point cloud data interoperability, discovery, and dissemination.

Details on the Point Cloud Domain Working Group can be found at: www.opengeo-spatial.org/projects/groups/pointcloud.dwg. Interested parties can join the e-mail list at: lists.opengeospatial.org/mailman/listinfo/pointcloud.dwg.

Intergraph re-brands

Intergraph's Security, Government & Infrastructure (SG&I) division has re-branded globally as Hexagon Safety & Infrastructure.

The new name more closely aligns the business and its solutions with parent company, Hexagon. The new company will continue to use the Intergraph name in product branding.

QE II conference centre dates

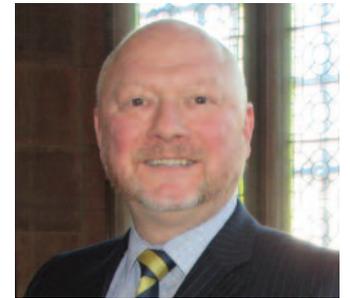
GeoPlace has announced that its 2016 annual conference and exhibition will take place on Thursday 28th April at the Queen Elizabeth II Conference Centre in central London. Now in its 11th year, the event brings the local authority addressing, streets and geographic information community together with industry suppliers, to share best practice and benefit from knowledge transfer. The conference, which usually attracts over 350 delegates, is open to local authority attendees across

Great Britain and is free of charge to attend. More at www.geoplace.co.uk

Another organisation using the popular and plush QEII centre is Esri UK. Registration is now open for the Esri UK Annual Conference 2016 which is scheduled for Tuesday 17 May. Registrations at <http://esriuk.com/events/annual-conference-2016/registration>

PEOPLE

Following a 25 year career in the geospatial sector working in a variety of high profile roles both in the UK and Japan, former AGI and Royal Meteorological Society CEO **Chris Holcroft** (right) has joined Informed Solutions as principal consultant. Chris was most recently director of strategic business development



for Ordnance Survey (OS) International.

Speaking of his new role, Chris said, "With my background in the geospatial sector both in the UK, Middle East, Far East and Pacific Rim, this is a perfect opportunity for me to continue to develop in the industry that I have been passionate about for all my working life." He will divide his time between Informed's Altrincham HQ and London Offices.

AGI 2015 Awards

GeoCom 2015 conference (see pages 14-17) ended with a dinner and annual Awards for Geospatial Excellence, presided over by popular BBC geologist Professor Iain Stewart (described as "geology's rock star"!). The aim of the awards is to recognise the very best of the UK geospatial industry and its professionals during 2015, as well as to celebrate and share new insights and foster creativity and growth.

This was a lively event with Iain Stewart in top form along side AGI Chair **David Henderson**. The conference award for best paper went to Liz Scott (emapsite) for: "Move over maps: Step out of your GI comfort zone and start tackling data visualisation". The next award was for the best paper presented at an AGI event during the year. This went to Dr Colin Roberts, Universities Police Science Institute (UPSI) for: "Future Cities: Security, London - Will Smarter Cities Be Safer Cities?"

The Award for Excellence in Education went to Ulster University's "iMap: delivering GIS in schools", a collaborative project partnering undergraduate GIS students with secondary school teachers throughout Northern Ireland to develop a GIS manual through modular assessment, which can subsequently be taught in schools.

The Award for Best Geospatial Data Visualisation went to "INRIX Population Analytics visualisation, ITO World", a population analytics platform, using anonymised and aggregated real-time mobile phone network data to show population density and movement.

Next came the AGI Award for Excellence in Research & Development, which went to WebCAT - Transport for London's Web-based Connectivity Assessment Toolkit, a service that improves the quality and clarity of the geo-spatial information used to make planning decisions in London.

The Award for Excellence with Impact went to "Ebola response" for MapAction's team of volunteers and staff deployed to Ebola-affected countries (Liberia, Sierra Leone and Mali) to help tackle the spread of the disease.

The Award for Best Use of Geospatial for Business Benefit was won by "ORBIS Geo-RINM Viewer", a geospatial viewer for Network Rail that integrates fragmented asset data and imagery from across NR's 16,000km of track.

The AGI Early Career

Professional award went to Paul Georgie and his "Grangemouth Thermal 3D Survey". The AGI Student of the Year was to Sharon Richardson, University College London for "Measuring Mobile Digital Footprints: A Modern Index of Urban Interaction".

The AGI Award for Exceptional Service went to **Andy Murdock** for his considerable input in the Awards and the ECN Group. The Chairperson's Award for Outstanding Service to the AGI went to **Jonathan Marshall**. The AGI Award for Career Achievement in GI went to **Les Rackham**.

Jonathan Marshall (centre) received the Chair's Outstanding Service to the AGI Award.





Adena Schutzberg has worked in geospatial technologies for 25 years and is principal of ABS Consulting Group, www.abs-cg.com, adena@abs-cg.com

AS I WRITE IN NOVEMBER, there's word that What3Words (W3W), the UK startup, has received new funding led by Intel Capital. That brings the company's funding since its 2013 founding to \$5m. W3W offers a solution for the confused state of world addresses by assigning three word codes to 3 x 3 metre grid squares across the globe. I'm writing this at "clash.surely.boss."

How it works There's nothing really magical about how W3W works. To find your three word location you identify its grid square on a map. How? Using good old fashioned geocoding!

W3W uses the Google Maps geocoder in its online tool. The user types in an address, city or postcode, then looks at the map to hone in on the exact grid square of interest. A user providing a location for the postman to deliver mail, might choose the box that includes the front door or the standalone box. One providing a location for a friend driving over might include the one with the driveway. The three word location is provided in the language of choice; W3W currently supports nine languages. The company worked hard to keep naughty and embarrassing words out of the system.

The problems W3W solves W3W's solution provides unique addresses for every 3 x 3 metre square of land and water on earth. Many countries do not currently have any sort of addresses and others have inconsistent, incomplete or complex-to-use solutions.

The solution offers addresses for much smaller areas than most addresses currently support. House numbers and baseball field identifiers don't detail where the mailbox is or where the home dugout is. W3W can do that.

The solution uses familiar terms rather than seemingly random numbers or letters to identify a location. This, the company suggests, makes addresses more memorable and less prone to miscommunication orally or in writing. This use of actual words is what makes W3W different from many solutions that came before it. A number of companies had solutions with word and number codes (US, NEW YORK, TIMES SQUARE or 8CNJ Q8ZG) or words created, and sometimes paid for, by those interested in the address (JohnsHouse).

The problems W3W faces W3W has made its case convincingly enough to win awards and garner

The future of addressing An interesting start-up has attracted new funding but will success need a cultural change?, asks **Adena Schutzberg**. Could Google help?

With the three term address in hand, the user can share the easy to remember triplet with whoever needs it. The recipient will use a W3W enabled tool to identify the location and most likely, if needed, use traditional routing tools to find a route.

In short, W3W offers a service that's a giant, multi-language mapping table for its very small area grid squares. The code converts triplets back and forth to more familiar address forms: streets addresses, latitude and longitude, building names, etc.

continued funding. Esri has implemented the system on its platform. W3W does not face a technology challenge; it faces a cultural one.

In areas of the world with no or challenging systems, W3W has a lot of promise. It also has promise on campuses with complex (sometimes unnamed) roads, building names and building entrances. I'm thinking in particular of universities and hospitals.

Where addresses are "pretty good" and entrances more obvious it's a harder sell. Consider a traditional US address (5514 S. University Ave, Chicago, IL 60637) and its W3W one (natively.zone.speak). The street address above has meaning to me and others including, I'll bet, President Obama. That street address in on the University of Chicago campus. The ZIP Code has meaning, too. And, while natively.zone.speak is unique and memorable it's not in any way related to the University or it's neighbour grid square, certified.waddle.ranch.

Conclusion While I applaud W3W's efforts and successful marketing thus far, I need to see one more piece of its marketing plan. How are they going to convince companies and individuals worldwide to actually implement and use it?

The best chance of that, I think, would be if Google (or its ilk) acquired the company and implemented the vision. But that means W3W would need to be "better" and "more accepted" than Google's own Open Location Code vision.

Below: W3W codes for two distant locations.



Three D's drive location intelligence



AS GOVERNMENT ORGANISATIONS are facing wider and more complex pressures than ever before, the 'three Ds' are tasked with driving its transformation: Decentralisation, Digital, and Data¹.

Decentralisation is pushing increasing power back into the hands of local government agencies,

many functions. In local government, there is a shifting focus onto achieving outcomes, which implies a more holistic approach to budget allocation and results, rather than pure service delivery and box ticking. Data is the key to achieving these outcomes.

Local governments are rolling out software platforms which enable them to:

- **Enrich traditional data with enhanced contextual information such as a location, including the name of a specific place, or demographics**
- **Analyse data more effectively with advanced spatial analysis that drives informed, insight-driven business decisions**
- **Visualise key data on maps to make deep analysis and insight-sharing easier and more effective than ever before**

Until fairly recently, geographic and related data has either been used in silos across an organisation or kept within a GIS department. Now it is being adopted across

Three 'D's' drive government

Government organisations are using location intelligence to drive digital engagement, argues **James Brayshaw**, to drive down costs and engage with citizens. But there is still room for more transparency and raising public awareness through a multi-channel approach.

who need to ensure they have the capacity and capabilities to deliver. Digital By Default means providing a multi-channel service to citizens with limited budgets. Data is the intelligence on which timely, accurate decision making and financial planning must depend. Further challenges faced by local government include:

- **Retaining skilled, motivated staff in the face of pay freezes and staff cuts**
- **The need to constantly drive down costs and generate savings, and managing public concerns about cutbacks**
- **Adopting new ways of working such as agile and mobile working**
- **Coping with changing demographics**
- **The need to improve collaboration with partners in public service agencies such as police, fire and health services**

Underpinning these challenges is a requirement for clear leadership with confident, relevant, informed decision-making at its heart. This is where data, the third of the three Ds comes into play, and has the capacity to make a success of decentralisation and digital.

Precise, accurate data drives decision-making and ensures strategies and plans are founded on facts as trends are analysed, accurate forecasts produced and budgets appropriately allocated. Contrary to this, inaccurate 'bad' data behaves like a virus, infecting and negatively impacting an organisation across

an organisation, moving into the mainstream with departments collaborating, sharing and analysing the data together. This kind of data addresses the 'Where?' element in the decision-making process, and is used across many local governments to drive transformation. It has quite literally, a far-reaching effect on enabling outcomes and improving citizen services. They are using this powerful insight to bring local information to fuel greater citizen services such as such as "Where's my nearest. . .?", to report a fault, infrastructure asset management, optimised vehicle use, maintaining a single customer view and crime location analysis. For example, rather than making decisions based on data from broad geographic regions, local governments are using location intelligence to help analyze crime statistics at street level, enabling accurate deployment of police resource.

Location Intelligence in practice Torfaen County Borough Council in Wales implemented a location intelligence and data management platform to help drive its transformation. The 'software-as-a-service', cloud-based approach generated significant cost savings. The data also enabled improved citizen services and citizen engagement across the borough through new web-mapping services. Local citizens can visit the council website and use the mapping system to find out information specific to their exact location on topics such as refuse collections, school catchment areas, local nature reserves and nearest



... 'bad' data behaves like a virus, infecting and negatively impacting an organisation across many functions.



Three D's drive location intelligence

leisure activities. It enriches the website, reduces pressure on the council's service support team and improves the citizen experience.

Barnsley Council in the North of England is using a location intelligence platform in a similar way, enabling it to generate savings whilst providing enhanced, interactive services to its citizens. The Council created MyProperty, an online tool in which local citizens can enter their postcode and access useful information about their area. Citizens can also access Barnsley Council Interactive Maps, a digital interactive mapping services which enables them to activate overlays on top of a detailed map on the area: for example, clicking on 'Car parks' highlights the relevant areas on the map. Other overlay options include 'waste recycling sites', 'police stations', 'highway closure diversions' and 'pedestrian areas'. Local residents can also access area photography and historical mapping of the region.

As well as delivering improved services to citizens, the Council uses software for mapping and geographic analysis and to build, maintain and manage centralised catalogues of spatial data. As it is a cloud-based service, it can share data within and outside the Council. The platform acts as a tool kit, providing flexibility by enabling the Council to select the data solutions it requires at a certain point in

time. Over five years, the software-as-a-service solution delivered a 38% saving over an in-house option as well as a 99.9% guaranteed availability over a secure and controlled network.

Transparency is key Councils are using geographic data to deliver an improved digital experience, but research shows they still have a way to go before their communities believe they are really maximising the digital revolution. Whilst 70% of council leaders believe their organisation is embracing the opportunities new technology has to offer, only 28% of the public agree².

Whilst the councils are using geographic data and advanced software platforms, citizens may be unaware of some of this activity, and could benefit from hearing more about transformation programmes. And whilst citizens are happily using interactive mapping services, they may not necessarily think of the power behind these platforms, nor consider them as being advanced digital services. Councils need to bridge this gap with transparency, sharing information on transformation programmes with their citizens. And they need to do this using physical and digital communications, offering a breadth of multi-channel options to their citizens.

1, 2 Price Waterhouse, "The Local State 2015"

Over five years, the software-as-a-service solution delivered a 38% saving over an in-house option...



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MOST OF YOU READING *GiSPro* are geospatial buffs. You understand the benefits digital mapping linked to databases of information can deliver. Some of you are even geospatial evangelists – constantly encouraging others and seeking new areas of human activity where our technology can bring benefit. Whilst only being a commentator in that latter category, I did promise readers in the last issue that I would tell you more about the UNCAP conference, an EU-backed event to promote location technologies for Europe’s ageing population.

This was not a vast conference, indeed in the confines of the Mercure hotel in the middle of Nottingham it was quite cozy. The Lord Mayor of Nottingham, councillor **Jane Morris**, was there to get proceedings underway. Alas she was several minutes into her speech before she realised it was the one she’d delivered the previous evening. The right one found in the depths of her handbag and we were off.

Dr **Giuseppe Conti** introduced the subject of Ubiquitous Interoperable Care for Ageing People –

‘The Internet is today’s primordial soup’.

He continued his theme that might be summed up as, where is the internet leading us, via **René Thom’s** catastrophe theory, whereby small changes in certain parameters of a nonlinear system can cause equilibria to appear or disappear, or to change from attracting to repelling and vice versa, leading to large and sudden changes of the behaviour of the system; to Dijkstra’s algorithm, which is all about finding the shortest paths between nodes. He finished on the book “Kahlog Albran – the Profit”, a business book spoof on a 1970s new age book, *The Prophet* by **Kahlil Gibran**.

Building for all ages I am always surprised when a conference is able to receive a speech or presentation successfully from someone thousands of miles away. It requires an awful lot of clever technology. Sadly for most of the time we’re not quite there yet. Nottingham was no exception as we gamely struggled to hear **Amruta Awachat** in India fighting a cold and who is a GIS

Geospatial and health care – we need to get the treatment right

A conference in Nottingham around emerging geospatial technologies offered some interesting solutions for supporting and caring for Europe’s ageing population. But we need to make sure we get the standards right as several speakers emphasised, reports **Stephen Booth**.

UNCAP – which is funded through the EU’s Horizon 2020 research and innovation programme. Conti certainly woke us up with a breathtaking ride through the opportunities ahead from smart tracking of medical devices to avoid over ordering, real-time location services (RTLS) to take advantage of the re-engineering of the internet and the networked society. The EC’s vision is of an even more complex network with a plug-and-play 27million euros project to use the internet for health issues. Conti envisions roles for geo-fencing, FIWARE (the Future Internet accelerator (another EU project backed by 80 million euros), robots in hospitals, the cloud and the internet of things.

researcher working for GI Standards, the conference organisers. This was a pity as I think Amruta would have said much of relevance about how as India enjoys greater prosperity they too have an ageing population. Their cultural and social values are differently slanted and more holistic than many of ours in Europe. For instance, they are developing residential projects that are built for a broad generic population so parents can leave their kids with grandparents living nearby during the day whilst they work. Just when you thought you were free of the kids. . . You can read more of Amruta’s presentation in the article in our Nottingham special edition of *GiSPro* at www.gisprofessional.co.uk or call 01438 352617 and we’ll send you a copy.

Eddy Oldfield is also from OGC, which has “a health domain working group” indeed there’s not much OGC doesn’t have a working group to cover. He spoke about health and interoperability where it is part of OGC’s EDM community – emergency and disaster management. This is an important aspect of OGC’s work and covers areas like open mapping standards for the tracking of diseases (epidemiology), sensor web enablement and SDIs – spatial data infrastructures.

Ignorance and standards The European Telecommunications Standards Institute (ETSI) was at the heart of **Scott Cadzow’s** presentation on Security and

John Herring of the Open Geospatial Consortium.



Primordial soup or bran? Calmer times came from **John Herring** of the Open Geospatial Consortium who was with us to talk about the future of services in an urban environment. Now planning and the environment is an area that OGC has only recently recognised as meriting its attention. Herring cited that parable of a number of blind men encountering an elephant for the first time. They each feel their way round different parts of the animal then compare notes on what they’ve found. There is no agreement. The internet is just like that in Herring’s view,



Source: Jones Lang LaSalle Education, Healthcare and Senior Living

India: a more holistic approach to housing solutions.

Dignity, which really means privacy. Taking as his guide Confucius' statement that "Real knowledge is to know the extent of one's ignorance", he told us that at the moment there are roughly 7 billion mobile phones and – guess what - they only work because of standards.

While we need to integrate wellness into health care, Cadzow's view is that health professionals are not responsible for delivering a healthy population. Individuals have to accept responsibility, an aspect highlighted by the shocking Ebola outbreak where many died through careless health care practices. He believes that health care of the elderly is still in its infancy and more needs to be done in training young doctors about being old. The aim should be to migrate self-care as part of an eHealth system. You can read more about markets, standards and security in a great article by Scott Cadzow in our Nottingham special issue.

An out-of-the-box solution Leonardo Plotegher is one of those who believes that location technologies are a real gamechanger. He introduced the UNCAP box, an Android-based device with an HDMI dongle that can connect to a host of medical sensors – glucometers, heart rate monitors, EEC's, fall detectors, etc. This is enabled by localisation technologies like GPS, Wi-Fi and Zigbee, an open, global wireless standard to provide the foundation for the Internet of Things by enabling simple and smart objects to work together. The UNCAP box, which may connect via your TV, is in beta test but is expected to be available by the end of the year along with a mobile version.

Involving SMEs in the health care market was the theme of **Wolfgang Kniejski's** presentation. He is the founder of INI-Novation GmbH, a company dedicated to delivering products and services to help the elderly and people with cognitive impairment; typical UNCAP beneficiaries. This is about commercial exploitation of the UNCAP ecosystem, he explained. Once again you can learn more about INI-Novation in our Nottingham special issue.

Exploring the great indoors Steve Fuller, who is titled Knowledge Exchange Fellow GRACE from Nottingham University's Geospatial Institute, is an indoor location specialist. He told us all about problems such as devising a location system for Nottingham's Queen's Medical Centre with its 27 miles of corridors and 10,000 doors (all in white or grey). Currently mobile phones can deliver around 8 metres precision from the current satellite constellations. That is expected to fall to 1 metre with the new constellations coming on stream like the EU's Galileo. But none of that is much good if you're inside a building! Instead, you have to rely on things like RFID tags, Bluetooth markers and ultrasonics. Tracking systems involving a mobile phone are best, he argues. 'They're good but you need some technical ability and of course they need re-charging'. He also says you shouldn't rely on just one tracking system; ultimately it will fail. You need more than one solution. He also told us about a new emerging comms technology: Li-Fi Light Fidelity, a bidirectional, high speed and fully networked wireless communication technology.

Riches will flow if we get the treatment right

I vaguely thought that for once we were going to get away without mentioning the ubiquitous INSPIRE Directive to harmonise European spatial data infrastructures. I had reckoned without the formidable **Kathi Schleidt** of the Austrian Environmental agency. She quotes Machiavelli's The Prince of 1518: "In the beginning of the malady, it is easy to cure but difficult to detect, but in the course of time, not having been either detected or treated in the beginning, it becomes easy to detect but difficult to cure." She thinks his prescription still holds for INSPIRE. If we get it right then riches will flow – the usage for this data are almost boundless. They range from flooding, biodiversity, dangerous species, soil toxicity, unstable geology (mudslides), air quality, avalanches, earthquakes to the personal such as trees or birdsong.

The final speaker for the day was **Anne Wilson**, a nurse practitioner, who gave a distinctly Scottish perspective to health care for an ageing population. She explained that 36 million people worldwide have a diagnosis of dementia while 28 million suffer without a diagnosis. People may live for up to ten years after a diagnosis and Scotland has improved its record for this. Patients now get one year's guaranteed post-diagnosis support and the country has a charter of rights to alleviate the stigma and discrimination of dementia.

This was a fascinating event that certainly gave your reporter new insight into the possibilities that location technologies offer. Our thanks to GI Standards for inviting us. We'll keep track of UNCAP's activities and update you from time to time. In the meantime, if you'd like to know more go to www.uncap.eu

Kathi Schleidt:
Machiavellian insight to INSPIRE.





The conference kicked off with a dinner and presentation by Nigel Clifford (above).

GeoCom 2015: AGI's conference called for resilience

The geospatial community gathered at Chesford Grange Hotel near Warwick in November for three days of conferencing, networking and social fun under the banner of "Resilient Futures", report **Stephen Booth** and **Richard Groom**.

EACH DAY'S EVENTS FELL BETWEEN opening and closing plenaries. In between there was a choice (often difficult for your team of reporters) of up to six different tracks. Let's start with the pre-conference dinner which saw the launch of the Foresight 2020 report and a presentation from **Nigel Clifford**, new CEO of Ordnance Survey.

Introducing Clifford **Anne Kemp** argued that never has geography been more important. Fortunately Clifford sees big opportunities for our skills across security, demography, economics, migration, environmental change etc. He showed a simple triangular graphic of four small triangles with geography at the centre and each triangle around it representing where our geo capabilities can be directed: Planned events like the Olympics, a project that brought together our smart city skills; Tipping Point events, like migration; Acute events, like the flooding last year in the Somerset Levels. An intriguing analysis.

The rising challenge facing OS in the geospatial community, says Clifford, is that 'geography touches everything you do' whether it's helping to eradicate polio in the Middle East or at home from flooding.

Helpfully for the latter the OS's GeoVation initiative, a springboard for a new generation of geospatial entrepreneurs, will focus on water for its next topic.

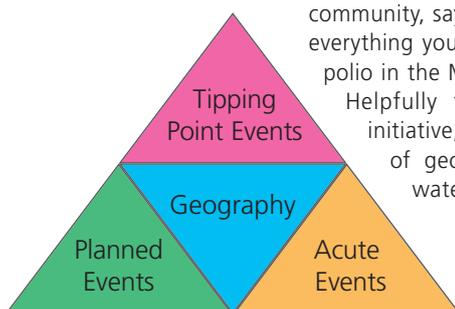
Crystal-ball gazing Announcing AGI's Foresight 2020 report Kemp emphasised the power of teamwork. She ably compèred a discussion between two of the editing team, **Simon Wheeler** (Land & Property Services, Northern Ireland) and **Graham Wallace** (Esri UK Ltd), with insightful questioning and gentle extraction of interesting answers that ranged from the need to improve the human/machine interface to ensuring that the work we do is valued through accreditation. Wallace reminded us of the need to focus on collaboration as 'the GI industry is butting up to a lot other industries'.

The report has been nearly a year in the making and comprises 60 invited papers on different aspects of GI. Totalling over 300 pages, a 30-page executive summary introduces the Big Five themes that AGI has

Below: Anne Kemp ably compèred a question session between the editors.



Left: Nigel Clifford's triangular graphic of events that surround geography.



been debating over the last year or more. A brief review by **Andy Coote** looks back to the 2010 Foresight report to see what we got right and what we didn't see coming. You can download it at <http://www.agi.org.uk/about/resources/category/100-foresight?download=160:agi-foresight-2020>

While it may be too easy to dismiss this mammoth study as epic crystal-ball gazing on topics which it is fairly easy to predict 80% of likely change, not all of the remaining 20% are likely to appear from nowhere and to have a major impact. Some are there already and may have been missed or given insufficient attention. Five years ago we failed to see the impact of UAVs, mini constellations of satellites or the rise of Big Data. Nevertheless, AGI's Foresight 2020 is to be recommended as an important key reference source over the coming years for all players in geospatial, whether they're interested in what's happening to technology, the role of professionals or the state of the global community.

Day 1, beginning with geology Kicking the day off conference chair **Rollo Home** enquired how many had been up at 7.30 am that morning for the GeoRun'. Seven brave souls put their hands up. May be more tomorrow. Home defined the conference's key word 'Resilience' as an ability to maintain programme through disruption (my Oxford Dictionary gives 'able to recover quickly from difficult conditions'). Perhaps more importantly he reminded us that change 'is the new constant'.

Two very different keynotes got delegates thinking, some not necessarily very positively. Dr **Helen Reeves** of British Geological Survey spoke on 'Exploiting the city's Subsurface' – a hidden world of geology and resources, like water and energy as well as minerals; and human activity ranging from utilities and tunnels to basement extensions in Kensington and Chelsea. There is therefore a lot of urban 'geo-capital' in the subterranean cityscape. She cited Glasgow where she believes some 40% of its energy needs could come from geothermal sources. It's all down to city spatial planning and modelling, and geology is a strong input. Ground risk contributes to 50% of project delays and insurance claims after completion. She recommends the ASK (Accessing Subsurface Knowledge) initiative, pioneered by Glasgow, as a means of reducing risk. The city's GSPEC data standard, is a knowledge exchange initiative for construction stakeholders to work through a BGS data portal to share ground data that aims to utilise the subsurface in a sustainable way. Later in the conference a presentation argued for a Ground Modelling BIM solution.

Turning to those wealthy home owners in Chelsea who have expanded their properties by digging downwards, Reeves said that some 450 properties had new basements last year. This is an expanding 3D world where regulation has not caught up with reality. And



because it is hidden, it is hazardous. We need subsurface policies for underground sites, she thought, where lack of data remains a problem. I wondered about the current legal regime, which is weak for such works, relying on good faith and relationships with stakeholders to ensure that contracts include requirements for ground investigation. Remember that the property you own is defined by a 2D plan from the Land Registry and does not usually include the mineral rights below. I wonder how many people realise that once upon a time the land occupied by our sprawling capital contained a great network of small rivers, streams and ditches, which became channelled into sewers and drains or were just lost as building spread.

I have a clever idea. . . **Charlie Davies** of iGeolise is an extremely lucid and even charismatic speaker (something that often characterises PPE graduates I've noticed). Now none of that means that what he had to say was of particular significance in advancing our knowledge of GI. He describes his company as one that 'accidentally became a GIS company' and has benefited from open data, albeit with a lot of cleansing.

The iGeolise platform looks at the world through time rather than geographic boundaries (created historically for taxation purposes); in other words it is human led through the metric of time. By taking feeds from road and rail sources with travel times, iGeolise is able to tell you within a second how many places are, for instance, within a half hour travel time of your possible home – a useful sales tool for estate agents.

Davies argues that by simply using isochrones you not only get 50% irrelevant data, you miss lots of opportunities. To date his clients have come from the sales side of property development. It boasts 200 million searches per month and growing. The service can be used to search for results at different times of day. One example cited was a recruitment company searching for staff to work antisocial hours. They used iGeolise to determine the best places to look based upon travel time to work using night buses.

One suspects that this is more Google maps than Mastermap. None of this is particularly unique in applying geospatial technology and upset one industry veteran who criticised it bluntly on the conference twitter feed.

Above (top): Charlie Davies of iGeolise.
Inset (left): Helen Reeves of the British Geological Survey.
Inset (below): Conference chair Rollo Home.



. . . it may be too easy to dismiss this mammoth study as epic crystal-ball gazing. . .





The exhibition area is always great for networking.

Exciting addresses We moved on to stronger meat for GIS professionals. Dr **Bob Barr** chaired a sessions on "Core Reference Geographies" and admits to 'getting excited about addressing'. Britain has come through what some have described as "the addressing wars". The winner, some say, was the Royal Mail, now in the private sector. Barr wondered who owns an address, is it like the subsurface? But derived data from OS data is still Crown Copyright.

A very big address database is going to be compiled for the next census, due in 2021 (possibly the last one). **Alistair Calder** of the Office for National Statistics (ONS) explained how excellence was not good enough where 3% of addresses in the 2011 census were inaccurate even though data was matched from PAF, NLPG, AL2 and the Valuation Office. As we shall see he had plenty of examples – some right howlers - from 2011.

For 2021 initial data will come from GeoPlace and the focus will be online and encouraged people to check their registration and details through an internet access card. Calder spoke of the 'need for brilliant classification and minimal over coverage'. Those who don't respond will be chased up, physically.

It's only through examples that you appreciate some of the challenges associated around an address database. He showed a photo of a front door, with "Flats 1-6" painted above it; closer examination revealed door bells for 7 flats. More confusingly, the address mentioned numbers 30-31 and a road name, which was round the corner!

Interestingly, ONS uses the power of GIS to find areas with multiple electricity metres, which suggests multiple occupancy (for 2011 one London borough needed 40% of addresses checking). Once you understand that the data came from the NLPG with its remit to identify all addresses – not just letterboxes - it's not too hard to see that some of the returned mail from the last census included addresses like "The Car Park Hut. . .". There was even one to a sundial and to "London Airport, Heathrow".

Calder's colleague, **Ian Coady** painted a rosier picture of the 2011 census. It went well. There were even awards. He

acknowledged however that there were areas for improvement and for 2021 there would be 'more agile delivery, a different profile of hard-to-count areas and mapping of household internal access'. For output data parishes, which account for 10% of Britain, remain a challenge.

For Ordnance Survey's **Chris Chambers** there was much to celebrate, yet 'we've only just started on how to remain the best addressed nation in the world'. Chambers acknowledges that addressing 'isn't sexy' (unless ladies, you count **Kevin Costner** in The Postman) yet is fundamental to so many things including the right to vote. To remain the world leader in geospatial addressing much effort is needed; currently there are some 62,000 changes daily to the NLPG (OS's national topographic database is only around 10,000).

I wondered whether it was really possible to do better than a 3% error yet currently there is a 99.41% match between NLPG and PAF. I was reassured to hear that more deskwork would be done this time (after all a visual scan through the database would surely have revealed sundials, huts and airports). Bob Barr was pleased to hear that the database would be subject to crowd sourcing and that the work already done by GeoPlace was probably good enough right now.

Leave GIS at the door Following lunch, two presentations focused on value for money and the use of open source software in local government. **Matt Pennells** of Harrow Council says that it's not really about data but joined-up thinking and communicating to the public. So far their communicating has managed to save £1.2 million from the grass cutting, flower planting and green spaces. But according to Pennells these savings are not easy to achieve when you have to work with technology companies who do not understand geo or UPRNs and 'people's ideas can run away with them'. Choosing suppliers is not always easy either when a competitive tender is involved. 'Don't expect 10/10 boxes to be ticked'. His conclusion was, 'leave GI/GIS at the door and use language that works for users'.

The community of open source software users and developers is growing rapidly. Faced with

Below: Chocolate and wine tasting to lighten the mood.



dwindling budgets after the financial crisis Royal Borough of Windsor & Maidenhead (RBWM) opted in 2012 not to renew their 12 Esri seats and instead go for open source architecture built around QGIS. **Simon Miles**, RBWM's GIS developer, spoke on how they worked with Astun Technology and Cadcorp's Map Modeller. He'd even found some open source software that converts QGIS into web mapping.

Today they are 100% open source; 'It's fun, it's reliable and does the job' was his judgement on QGIS. It had involved lots of learning but now management want more open source. With hindsight he acknowledged they would have benefited from a slower roll out of QGIS but he calculates that they've achieved savings of £75k over three years, so 'we now have the directors interested!'

In questioning someone asked if you had the money would you go back? 'No' said Miles, 'In the proprietary world you don't get the same level of support as you do in open source'. Initially there was a worry over the lack of support but today there is a growing commercial industry behind open source, which only charges for support – not intellectual property rights.

3D debate 3D visualisation was a topic for debate. **Caroline Steer** from Esri, **Kelvin Wong** and **Claire Ellud** from UCL followed the chairman's instructions and gave examples of good and bad 3D visualisation and striking examples of analysis using 3D data. Examples of poor visualisation were generally situations where it was felt that 2D visualisation would have been more appropriate and the 3D alternative was either misleading or obscured data. Of course static images are 2D views of a 3D model! Rollo Home turned the question on its head by giving good and bad examples of 2D visualisation. He

suggested that 2D is less suitable for situations where there are layers of data physically on top of each other, such as overpasses and overhangs.

There is also a question over ethics because it is easier to use 3D to misrepresent data. This problem is being addressed by a 3D ethics charter. A member of the audience turned this idea on its head by noting the eye's ability to focus on parts of an image in the same way that amateur landscape photography is often disappointing, as features that were so clear to the naked eye appear on the photograph as insignificant specks. Try to regulate that!

A new look at satellite imagery "The only constant in life is change" was the title of a talk by **Andy Wells** of Sterling Geo. He updated the audience on the latest in remote sensing. The technology has advanced greatly over the last decade, so he urged those who had tried it out and been disappointed to look again. Costs have plummeted whilst the number of satellites have multiplied and the resolution reduced to 35-40cm. Landsat 8 data and data from the new ESA Sentinel satellites is of much lower resolution but is free. It is also easier to order data. He introduced the concept of establishing routines to analyse satellite data and produce statistics automatically for monitoring of change. The technique is not 100% reliable but it can be a useful tool for identifying situations that warrant further investigation.

In the next issue of *GiSPro* we will cover Day 2's plenaries and sessions around Standards, Is open data working? And other topics. We invite readers who attended GeoCom 2015 to submit thoughts and reports of other sessions by Monday 18 January latest.

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GiSPro interview



Nigel Clifford, new man at the helm of OSGB.

I MET CLIFFORD IN OS'S GEOVATION HUB in the City, a buzzy building which also houses Catapult, a body promoting future and smart cities of which more anon. Tucked away at the end of a large open plan office full of young innovators, we had a wide-ranging discussion that included his views on whether geospatial is special, OS's strengths and weaknesses, where it needs to go next, its international activities, big data mining and mass data sensors and how far OS should be going with this, and about the 'fabric of the brand'.

But first we discussed a situation that had arisen only a few days earlier around the launch of 77m's Matrix website which offers large-scale national mapping derived mainly from open data sources like Land Registry polygons, Valuation Office data, OS's UPRN's and background aerial imagery. OS is clearly not happy about this development but 77m's **Philip Highland** is confident they've covered every legal angle. Clifford was tight-lipped about this after first

Brand So what had he discovered about the OS's much vaunted brand and reputation, based too easily on the public's enthusiasm for printed Landranger maps (now with free digital access) but which account for barely 10% of OS's total sales. Was it time for a change? Does OS, like IBM or Google, have enough brand definition to continue in its present form?

'I think if you were an alien dropped into this you would find huge brand recognition which is almost universally benign. People may not be able to explain what Ordnance means but they'll probably know what survey means. That is a very, very valuable asset for us.'

Okay, so how do you think you can build on the existing strengths of OS, and what do you think those strengths are? There are several areas. 'One of the key strengths of the OS is its employees – they're really committed to the cause. That is a really valuable thing. Many companies and organisations would die for the kind of commitment and

Talking to Nigel Clifford

Since June last year Ordnance Survey GB has had a new CEO. *GiSPro* met him in London recently at the Geovation Hub, of which more anon. **Nigel Clifford** comes to the job via a career covering the NHS, e-commerce, British Telecom and other mobile players. He has a degree in geography from Cambridge and is a Fellow of the Royal Geographical Society.

feigning ignorance. He did however confirm that OS data is still Crown Copyright administered through the National Archives. An issue to watch.

A fascinating blend We began by talking about what had attracted him to the position. 'I'm a geographer so there's a natural affinity'. In discussions about the job it became clear to him, 'ah, I know you as a provider of maps but I understand now that you're a digital provider of content with a broad commercial footprint from the emergency services right the way through to helping SME's and start-ups – a fascinating blend of ingredients.'

Although he's a geographer and fellow of the RGS this is a rather general qualification to be heading up OS. Does he feel confident in fulfilling the statutory role as advisor to government on geospatial matters? He paused. 'There is a point in your career, fairly early usually, when you realise that you can't know more than everyone reporting to you. That's been present in my career since I was 26 or 27. At the age of 32 I was put in charge of six teaching hospitals so would I advise the Royal College of Surgeons on their practices? No, but did I know how to synchronise together a complicated set of functions, specialisms and vested interests? Yes. It's not like being the Poet Laureate where all you have to do is produce pieces of poetry, it's more of a team effort.'

engagement we've got from the team inside OS.'

'When we did our brand research last year it found a lot of positive feedback around authoritative information, part of the national fabric and trustworthy. When we spoke to international communities what comes back is more emphasis on the technology expertise, having been on the journey from analogue to digital, from small scale to very large-scale data and managing data.'

So what is to be improved upon? 'We need to be more thoughtful about how our data is consumed, how do we make it really accessible, which is why some changes to the licensing model are coming. From a perception perspective, ensuring that we are seen as a digital content data player'. OS's thinking on this is related to recruitment where they are looking to blend geography with data science. 'To be a really attractive employer I want us to be seen as a digital player in addition to the traditional cartographic role.'

Is it special? So, did he think geospatial is special? 'Yes, absolutely it is. When I ran six hospitals in Glasgow one of the first things I did was to get a map of the city and put it on the wall of my office. As people came through the door they said, 'Gosh, I never thought of it like that; so that's why people aren't going to that surgery because the M8 runs



We need to be more thoughtful about how our data is consumed, how do we make it really accessible, . . .



through the middle of the catchment area.'

He believes geospatial is special because of the way visualisation allows a different set of what he calls "smarts" to be deployed in someone's head. 'It's no longer mathematics or algebra; it engages with a whole lot of different synapses, Secondly, geospatial is true so you can use it as a golden thread to tie together lots of different datasets; and linking different sets together enables you to make more sense of activities that are focused on a location or a single person but which are served through many different agencies.'

He gave an example from the NHS. 'One of the things we've been looking at recently is bed-blocking and A&E, clearly an area which I experienced having worked through several winters in Scotland. So we sewed together social care data, waiting time data, beds blocked or extended stays in hospital and geography, so you can begin to look at commissioning areas, social work areas and where they might work more closely together.'

We discussed the app Esri showed at their user conference earlier this year. The app tracked individual journeys inside a hospital to discover the best location for regularly visited services such as the pharmacy. He was enthusiastic. 'That sort of micro planning becomes so important when you're trying to reduce waiting times for a prescription (and costs). It all contributes to the patient experience and that's what is so interesting about being able to make those connections. Geospatial enables people to make smarter decisions.'

The geospatial accelerator We moved on to the urban environment and the tax base of cities. 'It's becoming increasingly focused on attracting industry, commerce and people who will form a big stable tax base; it all becomes very interesting. The juxtaposing forces of migration, demography, security all contribute to urban planning and management which is underpinned by geospatial and segues into transport routing. Geospatial is an accelerator and can make a real difference.'

Clifford had been to the Citylabs session recently with **Michael Bloomberg** (ex mayor of NY) and **Boris Johnson**. 'Both of them were thoughtful about how you enact change in an urban environment without causing mayhem; how far should it be politician or citizen led? An answer in Singapore will be different to the one in Jakarta. There will be the equivalent of 400 new cities over the next 25 years, mostly through expansion of existing ones.'

International dimension Next we turned to OS's international role and relationships with other NMA's. Would he be continuing OS International's role, which has been such an important aspect of his predecessor's time at OS? 'Yes, for a couple of reasons. The first is that the support that we can

provide is particularly valued by NMA's due to the journey that we've been through, from military, to government to part commercial, moving from completely closed data served through 19th century methods to digital data served by 21st century means.'

He talked about the different licence regimes, how you manage open data and its reuse, which OS now has considerable experience of. 'Those experiences are seen as valuable. Plus our experience in running a very large database with a supply chain around Indian subcontractors for data processing of aerial imagery and our own home-grown suppliers means that a number of mapping agencies have asked us to come and have a look at them with a view to how they might improve what they do.'

Is there really an international market for this? So far OS International's only client has been the Bahraini NMA. 'We've done some research that shows that our brand recognition is high, respect for capabilities is high so we think there's a market place out there.' He is hopeful others will follow.

Research and a conjoint twin We turned to OS's involvement with academia. Would support continue for research into aspects of geospatial data at UK universities?

'Absolutely. In the last 14 or 15 years we've supported over 100 PhD's and MSc's. The interesting movement is that it's not just geospatial; we're looking at data science – the conjoint twin of geospatial. Because the scale of geospatial sensor data is going to be so significant in the next decade for big data and on a scale that hasn't been there before. The use of new techniques, the cloud, analytics are all part of it.'

I queried whether big data mining is the job of OS. Surely that's what your partners should be doing? 'Mining, absolutely but I think the collection and ordering of it is something we're having to take very seriously. By 2050, 100 billion sensors will be in place around the world; we currently have 7 billion.'

We turned to the policy of open data which may yet be the source of dispute with 77m. OS currently has 16 open datasets out there at the moment, 'so it's well received. The focus that we're putting into it at the moment is to understand who's using it and on the licence conditions. What is the purpose of open data? It's to allow experimentation, market testing and social development, which we can encourage through licensing conditions and put in place more data centric licensing conditions like software providers.'

'If you become a billionaire then probably the UK taxpayer should benefit from that. There's a tipping point where enough proven success means that a revenue stream begins to accrue so it's only fair that the taxpayer should benefit.' I wondered if there's



What is the purpose of open data? It's to allow experimentation, market testing and social development, . . .



anything in the OS's conditions that require their erstwhile partners to register their businesses in the UK. He didn't think so.

Reporting and oversight He reports to **Anna Soubry**, minister of state for small business, industry and enterprise. Clifford is very pleased with the board he reports to and the relationship into BIS (Department of Business Innovation and Skills) and the Shareholder Executive (ShEx), where board-member **Ron Craig** also sits on the OS board. 'He is someone who understands our business as well as the Whitehall machinery', says Clifford.

OS is run by an Executive Board that in addition to Clifford, includes **Neil Ackroyd**, **Katie Powell** and **Andrew Loveless**. Non-executive members include **Anne Jessopp**, director of business services at the Royal Mint, **Stephen Lake**, formerly with Reuters and QinetiQ, **Jaques Cadranel** from Which?, **Mike Carr** former chief science officer for BT and **Rob Margetts** CBE as chair.

Partners, fuzzyness and abrasiveness We turned to the thorny question of partner relationships and where he thought OS might be falling down in meeting the needs of today's users. 'We're living in a world where people are more and more used to being able buy whatever they want when they want it, in whatever form they want. We're still playing catch-up on that but we are catching up. We're very much driven by what the customer wants'. He told me about a recent conference of OS surveyors in Wales which he had addressed and where the focus had very much been on this. 'We're also doing some research with both large and small customers as well as our partners to understand what customers and end users need.'

It's no secret that there has been quite a lot of abrasion between OS and its partners and resellers. Some of it around the fuzzy boundaries between who sells what to which and to whom. For instance, why does OS capture aerial imagery which has either already been captured by the private sector or indeed can be easily contracted out. Another moan comes over business that partners thought was there's but suddenly is taken on by OS. One group of partners has complained formally to the European Commission.

'I can't speak about what happened before June (when he joined OS). We've set up a partner advisory council and we're doing some research into the partner community and what they want out of us. I think the abrasion - a good phrase - is something we can address by being clear about where we're going to play and where we are not going to play. We've asked our advisory council to get our products guys to do a comprehensive walk-through of our road map (the product direction of changes and improvements over the next 18 months or so). We've also been out on the road talking to partners and finding out about

the spaces we should inhabit for the greater good; and doing that with advance warning rather than just putting stuff into the market. Inevitably there will be some partners who feel as though we shouldn't exist. But we're here to make the overall community as successful as we can.'

A new direction? So does he have a new direction for OS? Are there other areas he feels OS needs to move into? Are there areas that OS should NOT be involved in? Has he identified the potential users of tomorrow?

'It's a good question which can be looked at from a GB or international perspective. For GB, the conversation around smart cities is becoming very interesting for new models of consumption and new ways of utilising geospatial where we can help with efficient uses of resources such as associating it with BIM, electronic vehicles and the new sensor arrays.' He quickly adds, 'Although it will be an OS with partner conversation to the city.'

I wondered whether there would really be a role for OS around autonomous vehicles, which require much higher accuracy levels than OS normally captures apart from issues like, if an accident is inevitable, does the vehicle run down a woman pushing a pram who is not paying attention or drive off the road into harm's way?

'At its base is simply the fabric of Britain. While such vehicles will exist within a bubble it will have to exist within a larger set of infrastructure, so understanding how that is changing is an area we want to stay in. The broader point is that there are going to be new data sources: how do we regard them - embrace, reject or stand off from them? Of course we should embrace them and bring their data into the market. Will it cause that abrasion we talked about earlier with partners? If we enter into it with "it's for the greater good for the greater number" and we maintain an open dialogue with advance warning and clarity of where we're going to position ourselves, then we would hope we can find some accommodations around that.'

Growing the pie So how does he plan to coordinate/collaborate/cooperate with the private sector regarding current and future mapping/geospatial issues? In a nutshell, how will he grow the pie? More open data?

'Part of that is making more data openly available. On a structural level providing more support to the advisory council. We need a good understanding of what our markets look like and then have good discussions with partners about where we're best positioned to participate in terms of the value chain, but we need the right products and the right licensing conditions.' Turning to the latter, Clifford's predecessor once told me she wanted to get the licence down to a single side of



... the conversation around smart cities is becoming very interesting for new models of consumption and new ways of utilising geospatial. . .



A4. 'We're not there yet' he confirms 'but the aspiration is there'.

Is there a clear view out there? Our final topic was whether government, industry, and the general public has a clear idea of the immense value of a good national mapping system in improving the country's infrastructure – the backbone of economic health and growth. If not, how was Clifford planning to raise awareness?

'I think we are somewhat spoilt in this country. Nearly everyone I talked in a country I visited recently complained that it didn't have the same level of mapping as we have. We are well served through various levels of infrastructure, mapping being one of them, but it's still important that we keep reminding policy formulators and opinion formers of the value of what we do. We're looking at doing a series of "a day in the life of. . . ." to illustrate this.'

An interesting idea. 'It would be about how you get up in the morning, switch on the light from electricity that comes to you in a trench positioned

by OS data. You catch the school bus which has been routed through data provided by OS, your internet shopping arrives using a UPRN provided by OS or a partner, etc. So how do you make this come alive and hold it up to the public?'

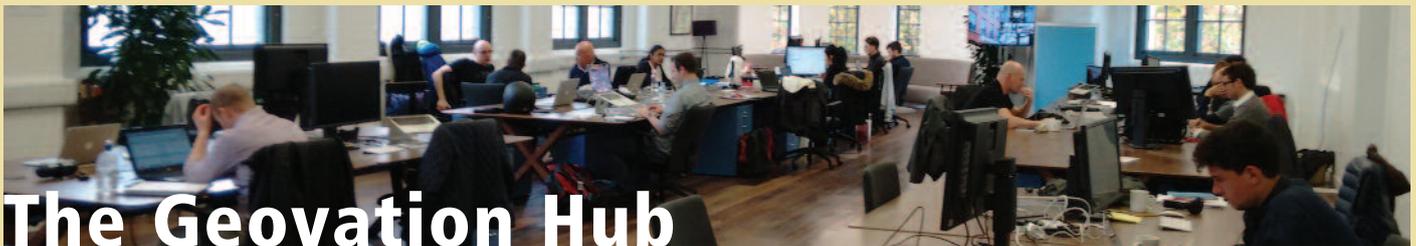
He explained. 'We are fortunate in that there are a number of government departments where the significance of what we do is baked into their world, like the Rural Payments Agency, MoD, COBRA. We need to showcase the value of geospatial to the public sector.'

I mentioned Sir **Mark Walport's** address last year at AGI's GeoCom when he said that 'geospatial underpins everything' he did. Clifford gave an interesting anecdote about how a government department's scientific adviser had recently visited OS and was amazed at what he saw: 'Crikey, you're nothing like what I was expecting; you are big data, you have a complex supply chain, complex delivery to a high standard'.

There is clearly work to be done in showcasing to the public sector what OS does for others to take advantage of. *GISPro* wishes Nigel Clifford well in his mission.



**. . . you're
nothing like
what I was
expecting; you
are big data, . . .**



Developed from OS's Geovation initiative to promote interesting ideas that exploit geospatial technology, the Hub is located in Clerkenwell, an area which some regard along with neighbouring Shoreditch, as London's digital district. The unit is accommodated within a building that houses Catapult, an initiative aimed at developing ideas for future cities. It buzzes with technology, not all of it very sensible.

When I arrived I had to sign in via an iPad which didn't recognise the name of the person I was seeing or me. Much consulting of databases, requests for additional information, etc. and I was eventually in. An example of society's growing belief that digital is the way for everything, meanwhile losing the human connection. For digital first-wavers like me we foolishly thought it was about saving time and money.

The Hub is an experimental lab or drop-in centre for would-be innovators and entrepreneurs where they can play with ideas around location and information technology. They can get a desk, network with peers, seek help from OS's tech team or

talk to industry experts at OS events. There is also an event auditorium and private meeting rooms. The Hub can also provide opportunities for seeking funding from potential investors.

The facility is under the management of **Alex Wrottesley** and a small team. It consists of a large open-plan office that can accommodate around 30 people giving them desk space and internet connection. On the day I visited about 20 people were hard at work at their laptops. Alex explained some of the diverse projects they were engaged on.

An app to help farmers negotiate the complexities of the EC subsidies regime enabled them to get their field sizes correct (getting them wrong can incur penalties from the Rural Payments Agency, which handles claims on behalf of the EC). Another, which readers may already be aware of, is aimed at lone workers and keeping them safe, especially people like surveyors, who often visit unoccupied sites by themselves. Their employers have a duty of care under such circumstances.

There is even one under development for journalists that aims to link all the threads of a story into one point, reducing the amount of endlessly repeated information on news-feeds.

Got a bright idea that relies on geospatial? Go to: <https://geovation.uk/hub/>

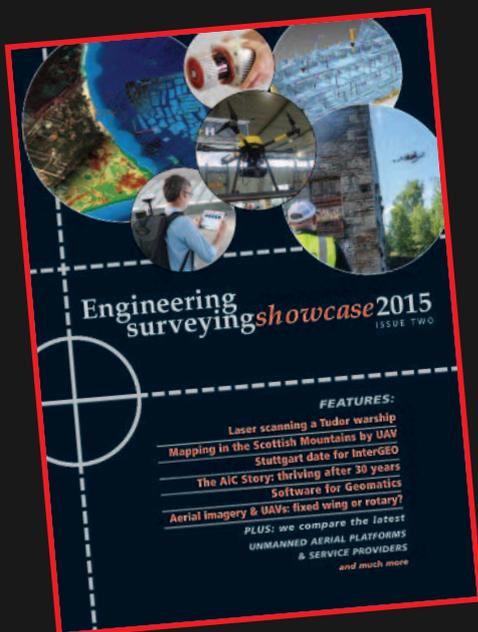
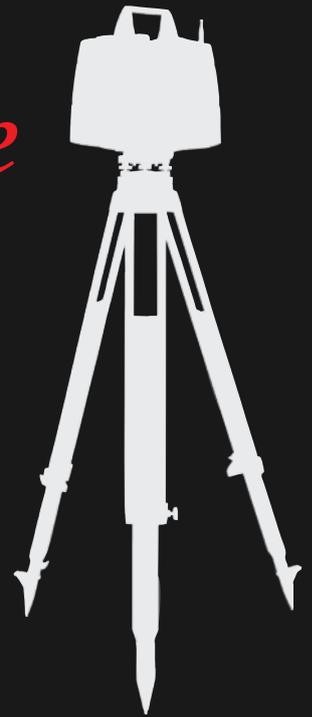
Below: Lost in a world of Geovation.



Engineering surveying *showcase*

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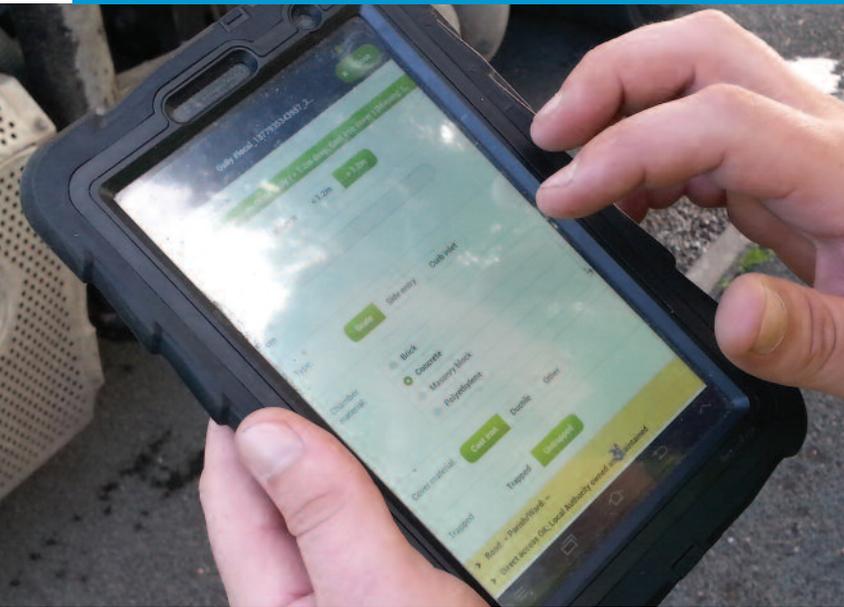
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dependent upon the ability to collect and use data more effectively.

Intelligent use of data The 'Gully SMART' software uses Ordnance Survey geographical data sets to map and monitor drainage networks and other local authority assets and can be used on handheld Android and iOS devices.

Dorset based company KaarbonTech designed the software specifically to enable highways staff to combine the use of geographic location data with environmental data sets such as flood zones. This approach has enabled local authority highways teams to put in place proactive management strategies based on clear data.

The AGI award judges recognised the results achieved by a joint project with Walsall Council and their contractors Lafarge Tarmac. The three objectives of the project were to reduce localised

Caught in the gully! Last November KaarbonTech won the 2014 Association of Geographic Information (AGI) award for Best Use of Geospatial for Business Benefit with their Gully SMART highways asset management software package. Their managing director, **Mark Entwistle**, explains how proactive drain cleaning can improve highways departments' performance while saving time and money.

MANAGING DRAINAGE AND WATER FLOW into roadside gullies may seem one of the more traditional and perhaps low tech roles carried out by local government. In fact, the reverse is true: twenty first century highways asset management is high tech, digital and mobile.

The award recognised the results achieved by a project KaarbonTech undertook with Walsall Council and their contractors, Lafarge Tarmac. The objective was to deliver a project that would combine innovative use of geographical data with digital information management to:

1. Reduce localised flooding
2. Improve maintenance of the gully network
3. Achieve financial savings given the challenging context of reduced local authority budgets

Walsall Council and their contractor Lafarge Tarmac are responsible for a network of 33,000 gullies. Analysis by the council in 2013 found that reactive gully cleaning costs more than ten times the amount of a planned clean. Evidence showed that whilst costs had remained broadly the same over recent years the gully network in Walsall had actually been cleaned less.

A change in focus from the costly and reactive approach of emergency gully cleaning to a more targeted and intelligence led proactive regime was needed. The delivery of a proactive programme was

flooding, improve maintenance of the gully network and achieve financial savings for Walsall Council.

Mapping innovation The council has a workforce deployed across its network both managing and responding to issues. 'Gully SMART' was specifically designed with this kind of workforce profile in mind and was always intended to be used on handheld Android and iOS devices as well as on the desktop.

Users are able to access, update and harvest data and create targeted work programmes that respond to the identified priorities. This marks a move away from reactive asset management.

Features of the software include:

- Data capture for teams in the field using voice, video and photo with GPS being used to ensure accuracy of location against Ordnance Survey mapping.
- A complete inspection history of assets across the authority's network can be downloaded within 15-30 seconds, enabling the user to work offline for the rest of the day whilst being easily updated once reconnected.
- Flood zones, road names and ward boundaries automatically populated. Gullies identified for attention are clearly visible on the robust handheld devices.
- Collected data overlaid on OS MasterMap and/or aerial imaging to provide perspective and aid analysis.



... twenty first century highways asset management is high tech, digital and mobile.



Drainage networks

About the author

Mark Entwistle, managing director, founded KaarbonTech in 2012. Mark brought to the business extensive experience in the field of utilities asset management and innovation. The vision behind the products and services is the understanding that the collection of data is only half the picture – it is how that data is used that makes the difference.

Customer focus “We were mindful of these risks and invested time in the preparation phase, putting in place a number of measures to successfully manage the challenges,” said managing director **Mark Entwistle**.

The implementation of new technology is not necessarily a smooth process and unless well managed there is real potential for impact on productivity during the transition. In this instance there was also the need to populate the new system with accurate location and condition data. ‘Gully SMART’ runs on handhelds so that the majority of users were familiar with the operating systems. Both technicians in the field and office users required only a two hour training session prior to using the system.

The new software uses terminology familiar to staff, which aided the transition and delivered consistent recording of condition and location data. This consistency aided management when setting effective performance targets.

Understanding that the data collection would be very repetitive, the software was streamlined to avoid needlessly answering the same questions over and over. By minimising button pressing and harnessing the smart devices to offer predicted answers, it emerged that the data being entered was giving accurate condition and silt level measurement. Technicians were more likely to answer accurately if there was less repetition for them.

The pre-rollout preparation paid off with improved performance and productivity from the technicians actually increasing as teams were able to plan their days more effectively.

‘Gully SMART’ was introduced in 2013 and within the first nine months of using the new system 66% of gullies across Walsall had been cleaned.

John Roseblade, Group Manager, Highways & Environment, Walsall Council said, “This is exactly the type of innovation we have needed. The intelligence that is being gained enables us to objectively reduce the frequency of cleaning where it is not needed and to prioritise problem areas.”

Sharing innovation The ability to share information with other council departments and also

with relevant external organisations is clearly a key benefit to any modern asset management system. In this instance the accurate geographical information captured by ‘Gully SMART’ facilitated innovative ways of working with other agencies/stakeholders with a role in asset management. For example, teams in the field recorded gullies unable to be cleared due to collapsed pipework or blocked sewers. The accuracy of the location information made it possible for other agencies – such as Severn Trent Water – to be alerted and problems to be addressed more quickly.

Areas of excessive leaf fall have been recorded and the intelligence shared with colleagues in the council ‘Clean and Green Team.’ This is enabling these areas to receive prioritised road sweeping during the autumn months and before predicted heavy rain. Mark Entwistle explains, “Automatically associating plotted drainage assets with their geographic setting and other datasets enables better decision making and a more refined understanding of the network.”

Financial efficiency Local government continues to be challenged by tight budgets and investment in new technology needs to be able to demonstrate value for money. In this case cost reductions were achieved as a result of streamlining work programmes to prioritise cleaning of vulnerable gullies before heavy rain rather than afterwards when they were blocked.

Figures from the council showed that, within an average 8 hour working day, teams can complete nine emergency gully clean outs. However, proactive planned cyclical cleaning using the ‘Gully SMART’ system enables 145 clean outs to be completed within the same working day. Savings are also being made by reduced fuel usage and planned gully cleaning and maintenance programmes were also seen to be reducing both fuel and time wastage.

Community benefits The general public have high expectations of their local authorities and being able to demonstrate evidence of wider community benefits of new technology is important.

The cyclical maintenance programmes in Walsall are reducing the risk of properties flooding in periods of heavy rainfall. Improved highways drainage is increasing safety of all road users and reducing risk of accidents caused by water on the road.

Elected members enquiring about maintenance work in their wards can now get accurate and geographic specific information from officers, thereby improving wider public perception.

Mark Entwistle says, “Our work with Walsall Council and Lafarge Tarmac has delivered real tangible results. Our technology is robust, proven and now being used across highways networks in Surrey, Croydon, Norfolk and Suffolk.” There is a growing role for geospatial data in managing assets within both the public and private sectors.

Below: Drains being managed by Walsall Council with the help of geographical data.





Above: UAV's and portable mapping systems were centre stage at Stuttgart's Intergeo.

EARLY AUTUMN MEANS A TRIP to Germany for the Intergeo event. This year it fell in Stuttgart (2016 is Hamburg then Berlin for 2017). As RICS's James Kavanagh observes, "The event is always a hothouse of new ideas, geo technology and a great indicator of how... global geomatics is evolving."

The three-day show attracted a record 549 exhibitors occupying some 15,000 square metres and some 16,500 visitors of which over 30% were first timers with half from beyond Germany. The new Stuttgart Messe could not have been better located: right next to the airport.

first with a LiDAR sensor, now has a bathymetric companion, the BathyCopter, which incorporates a green laser rangefinder developed by Riegl. The latest Aibotix multicopter UAV can now carry a multi-spectral sensor as well as enabled by RTK corrections via sister company Leica Geosystems' SmartNET service. Trimble meanwhile, has launched its first multi-rotor UAV, the ZX5 with a 16 Mpx camera. Topcon too were showing their first step into this type of platform with the Falcon 8 Octocopter with a 36 Mpx camera and the ability to be "back-packed".

Mobile mapping Mobile mapping has also been moving ahead, helped by miniaturisation of sensors and more compact solutions. 3D Lasermapping, an early pioneer in this field, launched the compact StreetMapper IV system with just one connecting cable between the vehicle platform and sensor unit. The sensor package includes a high-resolution panoramic camera, laser scanner, MEMS inertial unit, GNSS and control unit, all of which fit neatly into a protective pod.

Leica Geosystems were showing the latest

Stuttgart showcases data capture technologies

Data is essential for any GIS. Fortunately today there is a vast array of rapid data capture technologies. *GiSPro's* sister publication *Geomatics World* reports from the world's biggest exhibition of geospatial technologies.

At the organisers press conference there was much talk of "Geospatial 4.0" which seems to be about intelligent networking. I must confess to having missed Geospatis 1, 2 and 3, although Esri in a press release defined 4.0 as "to integrate and link any information to space." Whatever attempt you make to define and categorise our business it is probably best to focus on the technology and more importantly, what it can do for users.

The following is little more than a snapshot of what was on offer at Intergeo. We will have missed plenty but we think we've captured some of the more significant developments from companies who are also players in the UK market.



...
Simultaneous Localisation and Mapping, or SLAM, technology.



Droning again. . . . If it is possible to discern particular technology themes this year then one has to be drones and shrinking mobile mapping systems. The flying things certainly created a buzz. Drones, UAVs, call them what you will, enjoyed their own hot spot at Intergeo: the 'flight zone' where manufacturers were able to demo their craft in the air. It is extraordinary how these devices, both fixed-wing and multi-copter, have developed rapidly as data gathering platforms, encouraging an equally impressive evolution of lightweight sensors.

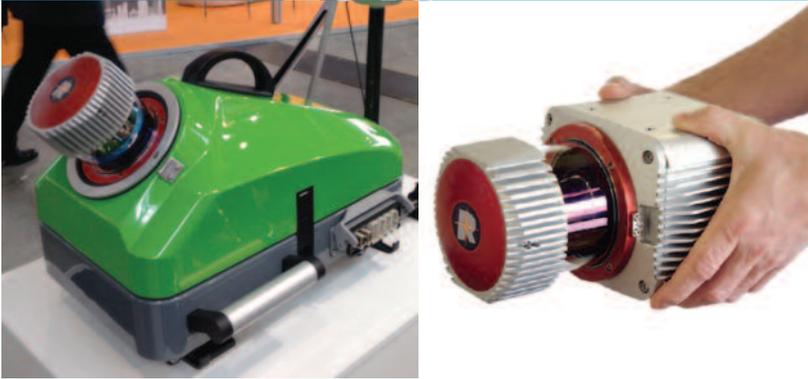
Some have focused on developing UAVs for dedicated applications. Riegl's RiCopter, one of the

incarnation of their Pegasus mobile mapping system: a backpack version. Applications include BIM as well as 2D mapping; accurate positioning is achieved in GNSS-restricted areas using Simultaneous Localisation and Mapping, or SLAM, technology. Together with a high precision inertial measurement unit, Leica describe this as a "position-agnostic solution". Sensors log position and time with full 360° views and LiDAR plus a hardware light sensor, ensure that images are usable while other functions are verifiable and adjustable through the operator's tablet device.

The Trimble MX7 system mounts easily on a variety of vehicles. Controlled by a touch-screen tablet using Wi-Fi technology, the system captures 360° fully-direct georeferenced imagery using a spherical camera and GNSS/INS technology. Imagery is calibrated for high-accuracy photogrammetry, allowing users to position, measure, annotate and extract information.

GNSS Designed for GIS and survey professionals, Trimble's latest GNSS receiver works with their handheld devices and iOS, Android or Windows mobile handhelds, smart phones and tablets using Bluetooth or via USB. When paired with a mobile device, the Trimble R2 receiver adds professional-grade GNSS capabilities to enable high-accuracy data collection.

INTERGEO 2015



Above: left, 3D Laser mapping's compact StreetMapper IV. Right, Riegl's lightweight LiDAR sensor.

Totally total stations Counting the many Chinese manufacturers, there must now be more than 20 different total station brands. Big players like Leica and Trimble even have two (GeoMax and Spectra Precision respectively).

Topcon's DS-200i direct-aiming motorised imaging station is compatible with Autodesk BIM 360 Layout app for the Apple iPad and is the second total station that Autodesk and Topcon have collaborated on. The DS-200i offers non-contact reflectorless measurement up to 1000 metres and built-in wireless WLAN connects the iPad with the BIM 360 Layout app. But no Android yet.

A new range of motorized total stations was announced for Trimble's Spectra Precision brand. The Focus 35 RX robotic instruments move the user from the instrument to the detail pole. Speed of observation and precise positioning is provided by patented StepDrive motion technology controlling horizontal and vertical motion.

Laser scanners Driven by Building Information Modelling (BIM), 3D laser scanning and imaging software are behind many geospatial applications as well as construction planning and design. Trimble's latest scanner, the TX8 3D offers greater accuracy (down to 1 mm) and streamlined onboard operation in measuring to longer ranges, decreasing field time for capturing high-accuracy data.

Topcon has refreshed its laser scanner range with the announcement of three new models. Using Topcon's Precise Scan Technology II, the GLS-2000 models are designed to emit pulse signals three times faster than their earlier scanners. The scanners feature dual 5Mpx cameras, including one with a 170-degree wide-angle lens for high-speed imaging, as well as an 8.9-degree telephoto camera coaxial with the measuring axis.

Austrian company Riegl has five decades experience of developing lasers. Their latest terrestrial scanner, the VZ-400i offers scan rates up to 1.2 mHz with 5mm accuracy. Range is 800 metres and operation is via a touch-screen. An integrated gyroscope, accelerometer, compass and barometer help re-assure users that conditions are right for data collection.

But perhaps, whilst the VZ-400i is an evolutionary product, the most interesting development from Riegl is the VUX-1UAV, an ultra lightweight laser scanner designed for use with a UAV. Described as a "survey

grade scanner" and operating at 200 swathe scans a second, it captures data at 500k points a second. Impressive from a unit that weighs just 3.5 kgs and is sized at only 227 x 180 x 125mm. Accuracy is quoted at 10mm and precision 5mm. Data is stored in a 240Gb memory and power consumption is typically 60W from an 11-32V DC supply. More powerful versions offering higher scan rates and designed for use with light aircraft and helicopters or terrestrial mobile platforms are also available using the same lightweight sensor.

FARO Technologies updated its laser-scanning software PointSense. This is a surveying and as-built documentation software suite. With the release of Version 16.5, PointSense now includes additional tools and functionality for efficiently processing of 3D laser-scan data in AutoCAD and Revit packages. The functionality for AutoCAD includes simultaneous fit of multiple polygon cross-sections, single click plane extraction, and auto-boundary detection.

We've already mentioned SLAM technology, which is helping mobile systems stay on track when GNSS is weak or unavailable. Readers may also be familiar with the ZEB1 handheld laser scanner, which has featured in past issues of *GiSPro's* sister titles *Showcase* and *Geomatics World*. The SLAM technology behind ZEB1 was developed through a joint venture between CSIRO (Australia's National Science Agency) and 3D Laser Mapping from Nottingham (now marketed through Geoslam Ltd). The same technology has also been built into a tiny laser scanner weighing only 1.2 kg: the GeoSLAM ZEB-REVO, which can be mounted on a variety of platforms to capture up to 40k points per second. Once the data is captured users have to upload it to Geoslam's cloud for processing into a 3D model. The potential applications and integration into mobile and aerial systems are exciting but will users want to be limited by the vendor's cloud only processing?

Airborne mapping CMOS (Complementary Metal Oxide Semiconductor) sensors have been around for awhile in consumer cameras. Now Leica Geosystems has introduced the DMC III with the industry's first large format CMOS airborne sensor. Based on new CMOS, imaging sensor technology, the DMC III offers the world's most efficient coverage in a single frame sensor at 25,000 pixels – 25 per cent more than any other camera on the market say Leica. The camera uses a single monolithic sensor providing 391 Mpx. The new technology also includes benefits like 78dB dynamic range and extremely low image noise level, allowing customers to fly more hours per day. The design of the DMC III supports Leica's common sensor platform with LiDAR and oblique sensors to minimise operating and training costs.

• You can read more about the current market for UAVs and other geospatial technologies in our twice-yearly *Engineering Surveying Showcase* publication. Full details on page 22.



**CMOS
(Complementary
Metal Oxide
Semiconductor)
sensors have
been around for
awhile . . .**





David Henderson is a geospatial professional with a geographer's heart. He is the Head of Product Management & Development at Ordnance Survey and is serving as AGI's Chair in 2015.



AS THE FESTIVE PERIOD DRAWS EVER CLOSER it's customary to look back and wonder where the last year has gone (doesn't time fly!), however the general sentiment across the AGI membership is to look forward with an ever growing sense of enthusiasm for the opportunities that are being afforded to us in these changing times.

It is no secret that times are also hard. At this year's annual general meeting, AGI Council shared some of the organisation's issues with gathered members and asked for their support in plotting a different course for the future. Such changes will necessarily impact on the funding structures on which AGI depends, but has to start with a renewal of our commitment to champion the value of geographic information – both in traditional, but more importantly in non-traditional quarters. I challenged the audience at this year's AGI GeoCom conference to ask themselves not "what 'AGI' is doing" (note the use of the third person) but rather more to consider what "we could do" (together) and to consider what "I will do" (as an individual). A simple but important call to arms. Together, the AGI membership must consider what it would like to

proposals over the next few months and this will start with the next council meeting in December from which we will share some high level thoughts and an important timeline for these conversations.

Quality as high as ever This year's annual GeoCom conference was fantastic and reported heavily elsewhere in this issue of *GiSPro*. Volunteer driven with the support of the AGI Team, the quality of presentations, workshops, sponsor demonstrations and networking was as high as ever. The conference remains an important showcase for the value our industry delivers.

Our Awards Dinner was particularly well supported this year. A very high number of entries across all categories ensured some very worthy winners were recognised by their peers and a deservingly high number of entries were short-listed and praised during the evening. Two very special awards were made that evening. First to **Jonathan Marshall** in recognition for his significant input to AGI as a council member for the last nine years – of course, his commitment to AGI goes back much longer! And, to **Les Rackham**, deservedly being awarded with AGI's Career Achievement Award in

What can we do together and what you can do

AGI Chair **David Henderson** looks back at the year, November's GeoCom and AGM and the launch of Foresight 2020. Now it's time for members to step up and say what they like achieved.

Les Rackham (centre) received AGI's Career Achievement Award with Prof Iain Stewart (left) and Andy Coote.

have achieved when looking back from the future and to consider how we might best individually contribute to those outcomes.

AGI Council has committed to outline some

recognition of the very many contributions he has made to our industry. All of our award winners should be very proud of their achievements.

A document to show how we can make a difference As we end 2015 we do so armed with the insight and foresight offered by many of our members and industry leaders in the AGI Foresight Report 2020. In the first few days of its launch, the report had been downloaded more than 500 times demonstrating its appeal, relevance and interest to many – both within our industry and from those who seek greater understanding of the role of GI in helping them and their business challenges. The Foresight Report endeavours to address how the GI industry can make a difference during a period of massive change and incredible need. If you've not had a chance to review yet, you can download it from www.agi.org.uk/news/foresight-report

Finally, I'll finish this year by thanking our volunteers and all those who have supported and participated in AGI's activities during 2015. Buoyed by the enthusiasm expressed at the GeoCom conference, I look forward to working with you to develop our plans for the future.

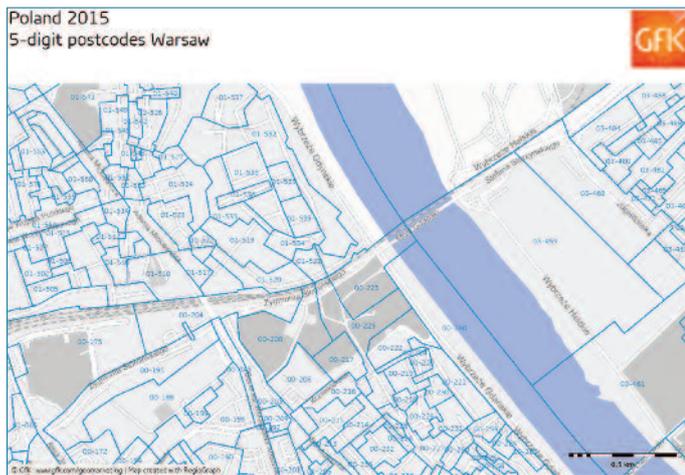


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New maps for Poland and all of Europe for GIS use



To mark last November's GIS Day, GfK released an extract of ultra-precise digital mapping of Poland from its newly released GfK Europe Edition 2015. Precise, up-to-date maps are prerequisites for error-free, geographic analysis and geomarketing applications. GfK offers what is claimed to be the largest collection of worldwide postcode and administrative maps as well as other geodata for use in GIS environments.

Common language of geography helps IoT

The Internet of Things (IoT) is claimed to help new ways of thinking about how we work with and share information. Esri is working with Microsoft to integrate location services and spatial analytics to Microsoft's Azure IoT Suite. "Location is fundamental to realizing value in being connected," says **Chris Cappelli**, global business development, Esri. "There can be no IoT without understanding the physical and spatial context of the machines it consists of. The common language of geography unlocks the value in IoT data streams." Microsoft's **Sam George** adds, "Our collaboration with Esri will extend the Azure IoT Suite to include rich location and geospatial services, which are critical in the world of IoT."

Add-ons for Nautiz

Handheld Group has announced expansion pack features for its

NAUTIZ X8 rugged PDA. New functions make the handheld more versatile for field workers in market segments like forestry, surveying and construction. A Bluetooth (LRBT) Expansion Pack allows long-range communication up to 300 metres. An empty add-on cap allows users to install custom accessories using the proprietary interface.

Remote sensing suite

Trimble's latest Remote Sensing Suite combines the capabilities of the new Inpho SATMaster module with its eCognition software, to generate high quality data, models and analytics from satellite imagery. SATMaster provides streamlined workflows to generate DTM's and DSM's from overlapping satellite imagery. eCognition Essentials, included with SATMaster, provides a guided workflow to easily generate land cover maps.

Meanwhile, recent enhancements to the Inpho

suite v7.0 and UASMaster v7.0 are aimed to improve data quality and reduce production time. Updates include more robust processing of UAS data generated to cope with challenging flight conditions, support for highly accurate GNSS data in UASMaster as well as streamlined support for the new ZX5 rotary UAS platform and performance improvements. PDF quality reporting is now supported and ortho images are generated directly from colour pointclouds within seconds. UASMaster Lite now supports up to 800 images.

Esri offers Trimble device

In a surprise move GIS software giant Esri has endorsed the launch of the Trimble R1 GNSS receiver as suitable for collecting professional-grade data with Collector for ArcGIS. The GNSS receiver is a rugged certified MIL-STD-810, IP65 rated device which is compact, lightweight and provides positioning data to iOS, Android, or Windows mobile handhelds, smartphones, and tablets using Bluetooth connectivity.

Maritime monitoring

MDA has announced the commercial release of two new modes on RADARSAT-2 that were developed specifically for ship detection and other maritime monitoring activities. With swath widths of up to 500 km, the data provides a cost-effective way to monitor large areas ocean for applications such as ship detection, ice monitoring and oil on water.

Sitelink3D app for Android

Topcon's Sitelink3D real-time 3D management service is now cross-platform compatible for mobile devices. Regardless of platform, when field operators or managers are away from their desks, the app is designed

to provide instant access to project data and ongoing activities for any job site. The Android app is currently available from Google Play.

OS revolution continues

The latest phase in Ordnance Survey's rejuvenation of its paper maps is the release of Explorer maps with an exclusive mobile download. The Explorers follow the successful launch of OS's 62 Outdoor Leisure (OL) map titles. Landranger maps will be released in February next year.

StreetMapperIV

Launched at the Stuttgart IntergEO, 3D Laser Mapping's StreetMapperIV mobile mapping system is portable, automated and easy to use, yet retains survey grade accuracy. With a single cable connection attaching the system to the vehicle, it is the simplest StreetMapper design yet. Each system comes with a high-accuracy laser scanner and market leading navigation system, with optional sensor additions of panoramic cameras and navigation upgrades.

Emapsite launches subsidence peril model

Data services provider emapsite has launched a geocoded perils model enabling insurers and underwriters to assess the subsidence risk for every property in the UK. Subsitree, available as a discrete dataset and through an on-tap location content platform, gives a detailed perspective into the distribution of risk, based on the latest soil type and tree data as shown in National Tree Map data.

Historic maps for schools

Digimap for Schools has added the OS 1-inch Seventh Series to its portfolio of historic maps. Their current range includes data from the 1890s, the 1950s-60s and the present day. The historic

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OS maps have been scanned and geo-referenced by the National Library of Scotland (NLS). The annual cost is £69 for primary and £144 for secondary schools.

Let the work flow

miso (sic) has adopted a new approach to data apps that allow simple solutions to common business problems to come together in the form of 'apps', known as Workflows. Available from the DataFlow store, they are available to browse, purchase and download. Once downloaded, each of the Workflows can be launched in the DataFlow Player, enabling users to begin processing their data in minutes. The service is community-led, with users coming together to share their experiences and discuss their challenges to identify common problems

suitable for development into new workflows by miso and the community.

The first released workflow is the AddressBase Premium Optimiser, which automates the conversion of AddressBase Premium data into more useable formats. Both DataFlow and the AddressBase Premium Optimiser have been launched to current users of miso's InterPOSe software. Further releases will follow.

New website for Allmapdata

Mapechanics "allmapdata" team has released a new website (allmapdata.com) that offers fully responsive and intelligent scaling on desktops, tablets and smartphones, while maintaining a clear and logical navigation hierarchy on all platforms. The

design brief was to make it easier than ever before to navigate the range and depth of map data on offer. Products are presented under easily-understood headings with separate tabs for introductory information, features, attributes, case studies screenshots and videos for individual products. Data is available via CD, DVD, cloud platforms or as immediate downloads from the Microsoft Azure cloud computing platform.

Three words help addressing

Poor addressing is frustrating and costly in developed countries; it can be a nightmare within informal settlements and unregulated neighbourhood in developing countries. Even in developed nations street addressing can be irregular and

incomplete; finding an address and communicating it to others can still be a very imperfect science. Whilst coordinates work for GIS professionals, they are error-prone and poorly understood by non-GIS users, prohibiting their more widespread use.

Esri has therefore announced that what3words will be providing its three-word address and location reference system to the ArcGIS platform. This is an addressing and location reference system based on a global grid of 57 trillion squares of 3m×3m; each square has a unique pre-assigned three-word address. For example, crayon.giants.liking is a perfect spot in the Grand Canyon to take a picture of the Kaibab Suspension Bridge across the Colorado River.

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DECEMBER 2015

GeoBIM Europe
 10-11th December 2015, Novotel, Amsterdam, Holland
www.geo-bim.org/Europe/index.html

USI 2015 Conference
 14-16th December 2015, Sheraton Hotel and Marina, San Diego, USA
<http://unmannedsystemsinsitute.com/>

JANUARY 2016

Maps, Charts, and Intelligence
 16th January 2016, Geospatial Building, University of Nottingham, UK
www.rin.org.uk/Events/4117/

SkyTech 2016
 27-28th January 2016, Building Design Centre, London, UK
www.skytechevent.com

FEBRUARY 2016

TUSEXPO 2016
 2-4th February 2016, The World Forum, The Hague, The Netherlands
<http://tusexpo.com/>

FEBRUARY 2016

International LiDAR Mapping Forum 2016
 22-24th February 2016, Hyatt Regency, Denver, USA
www.lidarmap.org/international/

APRIL 2016

Geoplace: Everything Happens Somewhere
 28th April 2016, QEII Centre, Westminster, London
www.geoplace.co.uk/news-events/annual-conference

MAY 2016

Esri UK Annual Conference
 17th May 2016, QEII Conference Centre, London
www.esriuk.com/events/annual-conference-2016/

GEO Business 2016
 24-25th May 2016, Business Design Centre, London, UK
www.geobusinessshow.com

Geospatial World Forum
 23-26th May 2016, Rotterdam, The Netherlands
info@geospatialworldforum.org

AGI Foresight Report 2020



THE ASSOCIATION
 FOR GEOGRAPHIC
 INFORMATION

The AGI Foresight Report 2020 gives insight into the issues we believe will have a significant impact on our economy, environment and society over the next five years. The purpose of the Report is to both observe and challenge the current role of Geographic Information (GI) in relation to these issues.

The Report highlights five key themes that are of relevance, not only to the GI industry, but to anyone with a vested interest in how technology and information will change our world and businesses in the next five years. These five themes - Open, Big Data, BIM and Future Cities, Innovative Technologies and Policy - form the backbone of our Report, bringing together papers from experts across industries and disciplines.

They show that the GI community can, and must, play a big part in helping us to understand and maximise benefits from these areas, and meet head on the challenges and opportunities the next five years will bring.

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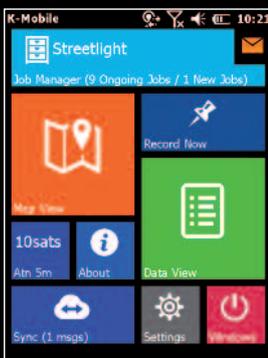
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