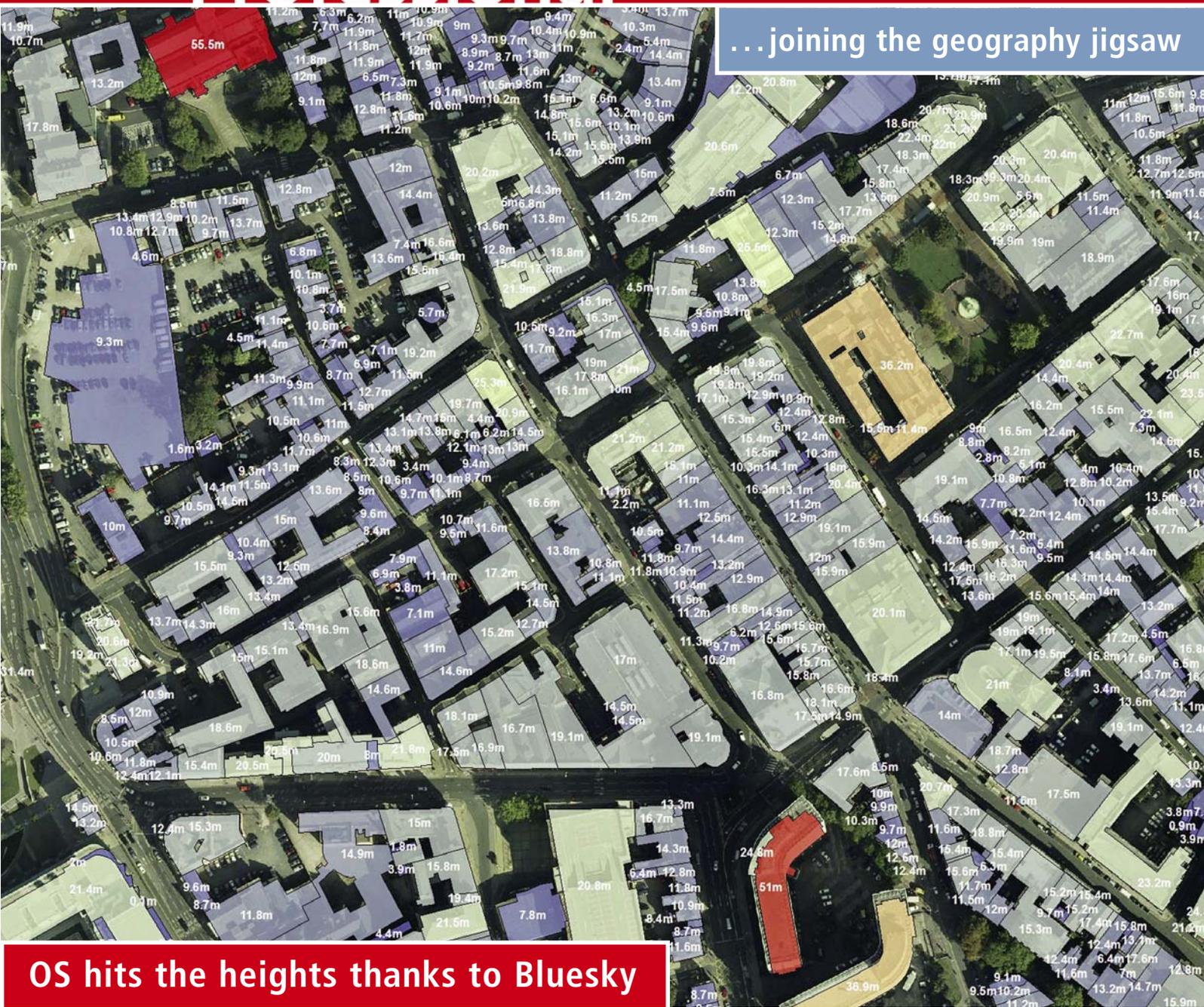


GIS

Professional

issue 50 : February 2013

...joining the geography jigsaw



OS hits the heights thanks to Bluesky

Automating Topo Mapping

UXBs & UXOs: acronyms that might go bang!

Into the cloud at Hertsmere

A map for England: what's your view?

Boundary portal transforms consultations

Just what is a GIS professional, anyway?

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GiSPro Interview: a gold medal for humanity

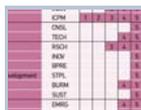
Jus Mackinnon, a founder of CrisisMappersUK and self-taught GI enthusiast, talks to *GiSPro* about humanitarian relief and crisis mapping.



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Digital by default

The authors explain how a cloud portal has improved the Local Government Boundary Commission for England's engagement with the public.



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What is a GI professional, anyway?

Everyone knows who to call with a health concern but why call us? Tim Wood seeks to define the skills and applications of our profession.



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A map for England

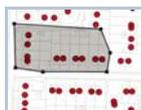
Peter Shand calls on GI professionals to contribute to the Royal Town Planning Institute's debate on a single data source for future development.



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Automating topographic mapping in Germany

In this case study, the authors argue that automation in map production can offer significant benefits without sacrificing on quality.



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Case study: adopting cloud GIS

Two organisations have recently turned to cloud and open-source based technology for different purposes, but found similar benefits.



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Acronyms that might go bang!

Two new websites are delivering information about London's Blitz – both have GI at their heart. The editor decided to take a closer look.

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Copy dates **Editorial:** 18 March

Advertising: 22 March

Front cover: cover image courtesy of Bluesky. Using their off-the-shelf Digital Surface Model (DSM) supplemented with LiDAR (Light Detection and Ranging) data Bluesky has added height data to OS MasterMap. Turn to page 30 for the full story.



to subscribe to GiSPro, turn to page 34.

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welcome
to the February issue of *GIS Professional* . . .

Crowd sourcing leads the way into the New Year

2013 – I HOPE IT has started well for you and you may judge whether it has started well for me as I take over the editing of *GIS Professional* from Stephen.

We start the year with a wide ranging issue. My interview with Jus Mackinnon is a 'must read'. I'll bet she is not regretting leaving the management of a snowy Heathrow airside but I am sure she will be just as busy with civil emergencies world wide. Watch out for more news and articles on 'crowd sourcing' through the year. If you have an interest in 20th C history – or you are involved with site surveys for development – you should also look at the article on UXOs and UXBs, which reviews two new websites that came online late last year.

Peter Capell's AGI column includes reference to the team's office move to the Royal Geographical Society near the Albert Hall. The move emphasises the common 'G' in both organisations' initials. Tim Wood, in the first of several thought provoking pieces, is emphasising the 'I' in GIS and, by association, in AGI. Tim is trying to provoke some discussion on the positioning of GIS in the context of current academic and professional disciplines. We really would like to get some practitioners' thoughts on this issue – why not go to www.location-source.com and have your say?

Local authority planners have often been in the forefront of GIS users and in many cases pioneered the use of the technology in their own organisations. It is interesting that it is only now that the Royal Town Planning Institute has decided to push for a Map for England. I have talked to Peter Shand about his article and pointed out that one of the main reasons why the Planning Portal failed to provide this map 10 years ago was the complete lack of standardisation across local and national government organisations and the perennial failure of the Department of Communities and Local Government to mandate any standards. Will data.gov.uk – now spatially enabled – fare any better? This is what open government, and also INSPIRE, should be all about.

We also have articles on a Scottish success story; an interactive website to aid consultations on local authority boundaries in England; a Dutch book on legal issues; and the generalisation of German maps.

For the rest of the year, we will strive to remain as eclectic as possible but will concentrate on particular sectors or technologies in each issue:

April – editorial deadline 18 March

BIM (Building Information Management), 3D, construction, planning & GI in Scotland, report on GEO-North.

June – deadline 17 May

Utilities, blue light services, underground technology, location services, planning and GI in Wales, report on GEO-South and Esri UK annual user conference.

August – deadline 15 July

Land & property, UAVs for mapping and data capture, remote sensing, Europe, report on INSPIRE conference. Preview: AGI & FOSS4G conferences.

October – deadline 9 September

Local and central government, open Government review, planning and GI in N. Ireland. Preview: Geoplace conference. Reports on AGI and FOSS4G conferences.

December – deadline 4 November

Education, professional institutions, open source.

I wish all our readers a prosperous year and hope that you will also contribute news, articles and discussions to editor@pvpubs.demon.co.uk. In particular, I would like to hear from anyone who would like to write a guest editorial or be interviewed on any topic of interest to our readers.

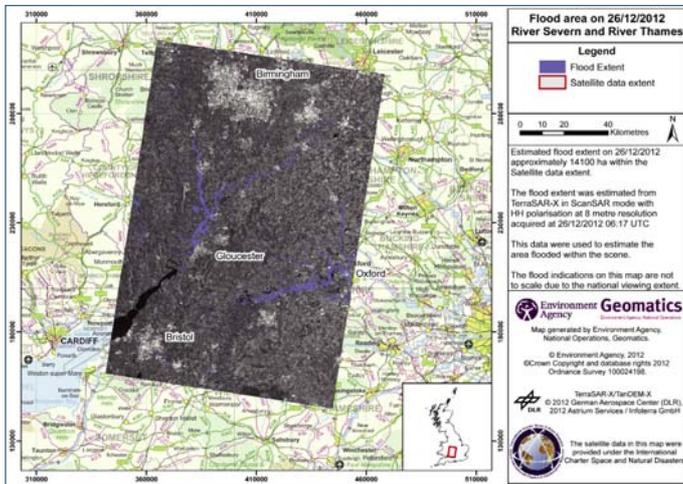
Robin Waters, Editor



. . . the main reasons why the Planning Portal failed to provide this map 10 years ago was the complete lack of standardisation across local and national government organisations. . .



UN charter helps British flood mapping



During November last year there was serious flooding in several areas of England and Wales for which the Environment Agency invoked the UN SPIDER charter to access remotely sensed information from various satellites. Among the affected areas were the Somerset Levels, Oxford, Tewkesbury, Darlington to York, Nene Washlands, and Nottingham.

Flood extent was estimated from the Canadian RADARSAT-2 and German TerraSAR-X data at 8 metre resolution. Further processing was carried out by Astrium Services and by the EA's own Geomatics section. The image shows the extent of flooding in the Severn valley on 30th November. Other images can be found and downloaded from www.un-spider.org. The International Charter Space and Natural Disasters dates from 2006 and has been used by many countries since then to assist in times of emergency. The UK National Space Agency is a charter signatory.

Local authorities join ePIMS

Local authorities will join the government's Electronic Property Information Mapping Service (ePIMS). The Chancellor has accepted a key recommendation made in Lord Heseltine's *No Stone Unturned* report earlier in 2012. The report urged local authorities to list all unused and derelict public land in ePIMS to encourage economic growth. The database is already mandatory for all government departments and executive agencies and is used by the devolved governments of Scotland, Wales and Northern Ireland. It records the precise location of property, along with key information such as the landlord, lease details and current usage. Users are able to find and view individual properties on an electronic map, amend their own

property details online and delve through the database to identify vacant space.

The Chancellor's autumn statement's "green book" included a commitment for the Government Property Unit (GPU) to work with local authorities to drive forward publication in ePIMS. The local authority transparency code, currently out to consultation, already includes a provision to require councils to publish their data on land and assets. The code has three key principles: respond to public demand; release data in open formats available for re-use; and release data in a timely way.

Guard your professional reputation

Ordnance Survey Great Britain is

reminding land and property professionals to ensure that they are risking their professional reputation by using unlicensed mapping data. Digital location-based information is now becoming an essential business decision-making tool. This increased reliance on digital mapping also results in customers demanding the most up-to-date information available. There are up to 10,000 changes to the master map database of Great Britain every day, reflecting rapid developments in the environment. To use this data, it is vital for organisations to have the appropriate licence to effectively use it. Older, unlicensed data not only has legal and cost implications but also risks damaging professional reputations.

'It is incredible how quickly the face of Britain changes, with even small adjustments to buildings and boundaries able to have far-reaching consequences,' says Dan Hughes, sector manager of land and property at Ordnance Survey. 'Never has it been more important to ensure that you are using the very latest licensed data, allowing you to rely on the fact that it will be accurate and consistent, but more importantly that your company's reputation is secure.'

Utility Mapping Association launches

The Utility Mapping Association (UMA) is a multi-agency, not-for-profit organisation that aims to promote best practice across the industry and provide guidance on suitable training companies for employers. A plenary meeting of the Association was held recently at Transport for London's Palestra office, followed by an open AGM and committee meeting. Current and potential members heard about progress in the field to date and contributed their views on the future direction of the industry.

The overall objectives of UMA are: development of competence measures; accreditation of training courses; accreditation of companies; promotion of awareness and understanding to both clients and the industry; and contribution to the overall process of protecting underground assets.

Membership is open to all stakeholders of utility mapping including civil engineering contractors and their supply chain, utility detection and mapping practitioners, consultants and their supply chain, professional institutions and bodies, trade associations and organisations, clients and asset owners, equipment manufacturers and suppliers, academia and other interested individuals. More information at: utilitymappingassociation.com

Glossary for open data

The government's Advisory Panel on Public Sector Information (APPSI) has released the first version of a new glossary containing definitions for some 70 terms related to open data and PSI. The aim is to encourage consistency of use of the vocabulary to avoid confusion in this developing area. The glossary and an introduction are at www.nationalarchives.gov.uk/appsi/. In collaboration with the Cabinet Office, APPSI will also conduct an open consultation on the glossary using a 'wiki' style approach. In the meantime, any comments and suggestions for additions to secretariat@appsi.gsi.gov.uk

China backs Nottingham's research status

The University of Nottingham's Geospatial Engineering Centre is one of only 20 research collaborations in the world to have been awarded International Joint Research Centre status by the Chinese

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To get your company featured on these pages call Sharon Robson on +44 (0)1438 352617

Ministry of Science and Technology. The centre is a joint Sino-UK operation between the university and the Chinese Academy of Surveying and Mapping, the research arm of China's National Administration of Surveying, Mapping and Geoinformation (NASG).

The Chinese arm of the Centre was launched towards the end of 2011 in Beijing and the Nottingham arm was opened in summer 2012 and integrates the resources of the university with those of the academy in China. It will also act as an incubation centre to realise the results of research and development, production and commercialisation, and will enable technology transfer to take place in businesses.

Dr **Xiaolin Meng**, associate professor of the University of Nottingham and UK director of the Sino-UK Centre, said: 'So far, over 120 Chinese executives have taken part in seminars here in Nottingham and we are also working closely with our partners in China on a number of ground-breaking research projects in the geospatial sector.'

Birmingham tackles obesity with maps!

Birmingham is considered the EU's fattest city! Now the Birmingham and Solihull NHS, in cooperation with Birmingham City Council, have mapped the number of fast-food outlets, particularly in deprived areas of the city. Using geographic data products including Ordnance Survey Street View and Boundary-Line, researchers plotted these outlets as well as the location of schools, youth and leisure facilities. The ability to visually present both sets of data on a map background enabled councillors, planners and public health officials to see the results clearly. It seems that 71 per cent of primary and secondary schools had a hot-

food takeaway within 400m.

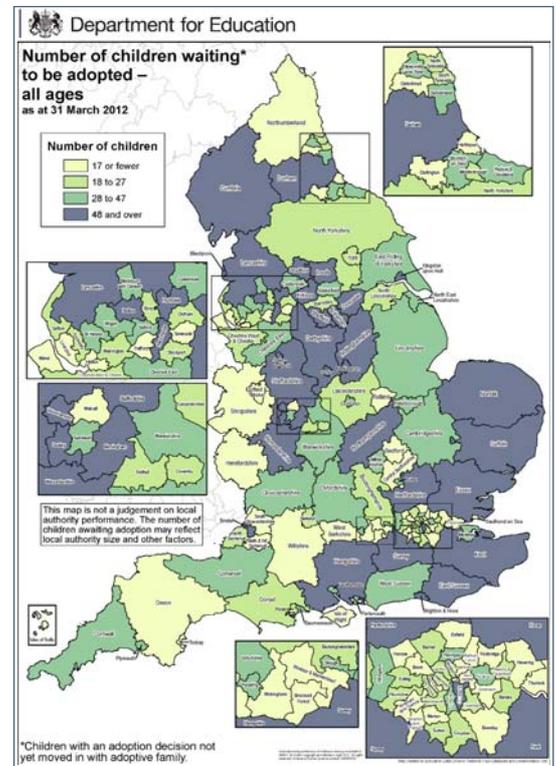
"The city has a large number of hot-food takeaways close to schools and local centres. The use of maps helps us to pinpoint where they are located and how to tackle the problem," said Dr **Iris Fermin**, Head of Public Health Information and Intelligence. As a result of this analysis, new rules were agreed to control the numbers of unhealthy food outlets clustered around schools and several planning applications have been refused. It is hoped that this will have a positive impact on the future health of the city's population, particularly the younger generation. The public health team in Birmingham has taken advantage of the public sector mapping agreement (PSMA) allowing access to accurate digital map products from Ordnance Survey to analyse problems.

Recommendations for public sector data

In November, the Open Data User Group (ODUG) submitted five strategic rationales recommending the release of data to the government's Data Strategy Board. These have now been published on data.gov.uk. They make the argument for the release of data as well as presenting the benefits this release could yield.

ODUG is pleased with the reception at DSB and will continue to improve the benefits cases until they are handed to ministers as part of a full business case. The group is seeking comments and information from the user community as to how the benefits cases could be strengthened to more robustly evidence the benefits of releasing the data. Specifically, ODUG is looking for links to existing research that evidences the benefits of open data and quantified assessments of the benefits. The following

Maps help adopters



The government has published a map showing the number of children waiting to be adopted in different parts of England as part of a shake-up aimed at increasing numbers of adoptions and speeding up the process. There are many more children waiting to be adopted than there are people coming forward to adopt and there are also wide regional variations. Ministers want to make it easier for those considering adoption to navigate the system. The information on the map has already been published on government "scorecards" that list adoption statistics for each council, but the map should make it easier for people to see where there is most "demand" close to them. It shows the numbers of children "approved for adoption" in each local authority. As of last March, there were 5,750 children waiting to be adopted.

Carol Iddon, from Action for Children, says: 'Although the map may raise awareness of the numbers of children waiting to be adopted, we must be careful to not unfairly raise expectations of potential adopters. The Association of Directors of Children's Services (ADCS) say the new map is a "crude measure. . . which cannot be used to judge 'good' or 'bad' authorities".

recommendations were made:

- support the release of a National Address Dataset as per ODUG paper of 1st November 2012;
- develop the rationale for the release of all historic Land Registry Price Paid information prior to April 2012 by the Land Registry;
- set out the rationale for the release of all UK Met Office hourly weather observations prior to November 2011;
- set out the rationale for the release of the UK VAT Register as open data by HMRC; and
- raise the issues relating to reduce the restriction of

third party IPR in the release of open data with particular reference to Ordnance Survey derived data. Two specific recommendations to the DSB are:

- to seek transparency from the PDG on costs of the OS Rights of Way (RoW) business case, for OS to release national RoW dataset and for local authorities to release RoW data under an open government licence (OGL)
- to ask the OS and the Environment Agency to create a generalised river network map as part of medium and small scale location infrastructure under OGL.

More information can be found at www.data.gov.uk where comments and evidence can also be submitted.

CONTRACTS & PROJECTS

OS opt for 1Spatial

1Spatial has been awarded a contract by Ordnance Survey GB to supply software and support services to their Geospatial Data Management System (GDMS). The contract will include provision of centralised planning and management of production activities in addition to managing

the large-scale data holdings that are used to generate products such as OS MasterMap.

This announcement follows 1Spatial's recent contract with Ordnance Survey Ireland (OSi). This will allow OSi to maintain their entire national spatial database and be confident in the quality of the data. Ireland will have an accurate national framework of spatial data, which will underpin efficient government and economic development.

US Census Bureau contract

1Spatial and US partner, LSI, have signed a contract to supply the US Census Bureau with licences and associated services in preparations for supporting their Geographic Support System (GSS). The partners have developed and designed an automated conflation process to bring together geospatial data from varied sources.

'This is a large, complex and mission critical spatial database that is growing at 10-15% annually,' explained Tim Trainor, geography division chief, US Census Bureau. 'There are huge demands from the user community for spatial and temporal accuracy and quality, together with stringent process-

ing deadlines. We believe that this solution will meet our expectations in contributing to an agile, service orientated architecture'.

The GSS initiative is an integrated programme of improved address coverage, continual spatial feature updates and enhanced assessment and measurement to support a targeted approach. The Address Canvassing operation is one of several operations that precedes the next national census in 2020.

BRIEFS

GeoPlace successfully passed its latest ISO27001 Information Security audit, performed by external auditor Lloyds Register Quality Assurance. In addition, GeoPlace has also maintained its ISO9001 Quality Management Standard since achieving certification at the beginning of January 2009.

The Northern Ireland Statistics and Research Agency (NISRA) has published new geographies for the 2011 Census data. Small area boundaries, including boundary files and look-up tables and the January 2013 Central Postcode

Directory, which includes a look-up between postcodes and the new small areas, can all be found at:

www.nisra.gov.uk/geography.

Nokia announced its "Here" map platform in November and at the same time bought Earthmine, which produces 3D street level imaging to compete with Google's Street View. Earthmine is based in Berkely, California and is joining the location and commerce business division.
www.here.com

Data management principles and processes to improve operational and business efficiencies were promoted by the marine data management specialist, OceanWise, at meetings in London and Rio de Janeiro recently. The London workshop for over fifty people was hosted by Cadcorp and OceanWise. Presentations included the UK's Ports Policy from the Department for Transport and 'Marine Spatial Planning Developments in England & Wales' from a Welsh Government expert. Both highlighted the importance of data and information being fit-for-purpose, robustly managed and easily accessible.



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DESPITE ALL THE WONDERS of mobile and social technologies, old and new research confirms that when it comes to relationships, especially long-term deep friendships, geography matters.

The local connection Let's start with the old research. Since the 1950s, sociologists have identified three criteria for the development of close friendships:

- **Proximity**
- **Repeated, unplanned interactions**
- **A setting that encourages people to let their guard down and confide in each other.**

When I read that list in the *New York Times*, I thought back to my childhood neighbourhood and

professor sat me down and told me about the world I was entering. He reminded me that over the past years of study, I learned that geography mattered. In the world I was entering, he suggested, that may not always be the case.

Like many readers, I'm sure, I marvel that in so many parts of my life, geography does not matter. My consulting company is based on the east coast of the United States. One client is based in Chicago, though my supervisor is in the south. This article is published in a magazine in the UK. I routinely order running gear from California, New Jersey and Colorado and it appears in two days.

On the other hand, I am humbled and re-humanised by the parts of my life where geography does matter. I can't help but smile when the teller at the bank calls me by name. She's been my teller since I started my company in 2000. My bank has mail in and now "cell phone

Confirmed: geography matters in friendship

Geography is more deeply ingrained in people's every day lives than they realise, argues **Adena Schutzberg** as new and old research alike suggests that while we are social creatures there may be a limit to how far friendship can travel.

my college campus. That may explain why so many of my close friendships hark back to the earliest parts of my life. My best friend (of 43 years, so far as we know) grew up across the street from me. My godson's parents are my college freshman dorm neighbour and my chemistry lab partner. I've made friends since then, but they are not the same kind.

The new research, from social media (where else?), confirms the importance of geography in personal relationships. Researchers at Rensselaer Polytechnic Institute in New York state drew on 400,000 users' data from Gowalla (acquired by Facebook and now defunct) and confirmed that, despite connections to individuals far and wide, participants are most likely to have friends that are local. Moreover, the most influential people in their lives are locals. Fully 80% of people's friends live within 600 miles of them.

Humanising geography Just before I left college in 1986, my very favourite geography

picture of cheque" deposit, but I like to walk to the bank.

I appreciate that on just about any given day I can find, within a mile or two of home, a group to join for a morning or evening run. I like that every few months we rearrange the 15 people in the clarinet section of my community band. I "get to" sit next to "new" people or since I've been in the band for seven years, "re-connect" with former seat mates.

Proximity Perhaps it's something in our human ancestral DNA that requires a high degree of proximity, unplanned connections and appropriate settings to develop and cement long-term friendships. In humankind's early days, there was no way to do a background check on a new potential mate or hunting team member. Our predecessors learned about their peers' characters, compatibility, honesty, work ethic, and sense of humour by simply "being around them" day after day. I for one hope that never changes.



**Fully 80%
of people's
friends live
within 600 miles
of them.**



the GiSPro interview



Jus Mackinnon is one of the founders of CrisisMappersUK, which is affiliated to Crisismappers.net and uses geographically referenced data with advanced visualisation, live simulation and modelling to provide early warning and rapid response to complex humanitarian emergencies. She started her career working in hotel management and computer consultancy but later joined BAA working at London Heathrow Airport. During her time at BAA, she became interested and involved in voluntary crisis management organisations. She currently runs a business consultancy from her home and office on Hayling Island.

ON THE JUSCOMMS.COM website, Jus Mackinnon describes her company as a full-service, multi-disciplinary business consultancy providing expert services to the private, public and third sectors. Maps, mapping and GIS creep into the site in the context of airfield management and humanitarian crisis mapping. But if you talk to Jus you will be rewarded with a passionate discussion of many of the issues that have exercised the GI industry since its inception. And if you are still sceptical of "crowd sourcing", Jus will provide the evidence to justify much more of it!

I don't think you could describe Jus as having a

manage them to provide a positive experience for customers and stakeholders while also ensuring that airside operations complied with BAA and regulatory requirements. That included meeting the requirements of the the Civil Aviation Authority Safety Regulations and Department for Transport.

During this time Terminal 5 became operational, there was a massive snow fall and also a Boeing 777 plane crash. At the same time, I became interested and involved in voluntary crisis management organisations after meeting several of the people involved.

You are currently developing some more airport related software – can you explain what this will do and for which customers?

Yes we are working on "Jus9", which is a new way to access information using GIS for decision-making on airfields – whether civil or military. This also builds on crowd-sourcing, which enables instant integration of real-time reporting from registered users all around an airfield. This is not only 'user friendly' but positively encourages accurate reporting with full feedback and behavioural changes.

A gold medal for humanity Our editor Robin Waters interviews Jus Mackinnon, a founder of CrisisMappersUK, who is a self-taught GI enthusiast with a background in aviation and a passion for humanitarian relief work and crisis mapping.

"day job". She lives and breathes for her humanitarian work while earning money from consulting – if you have never heard of LEAN Six Sigma then go to Wikipedia and check what it could do for your business. Jus talked to me from her home and office on Hayling Island where she looks out at the Isle of Wight. Crisis mapping was very much to the fore during the bad weather for last year's festival. But we are not just talking about southern England – you will see mention of many countries and Jus is very proud to have recently been awarded the US Presidential gold medal for humanity and volunteering services.

Jus, thank-you for agreeing to this interview, which was prompted by hearing about your work for the Olympics and humanitarian crisis mapping. But what is your background?

I started work in hotel management and computer consultancy. I then had a complete career change and joined BAA working at London Heathrow Airport. During my ten years in the company there was a very supportive environment in which I learnt many new skills. These enabled me to finish my time with the company as duty manager, airside, with responsibility for delivering the operational effectiveness of the aerodrome licence as laid down in aviation law.

In practise that meant I had to provide inspirational, proactive leadership to the airside operations team and

We heard about you from Joel Myhre at the UN Operational Satellite Operations Programme who mentioned that you were involved with the Olympics. Can you tell us how you were involved and what sort of data you were using?

I founded CrisisMappersUK with **Francesca De Florio** in June 2012. We are the UK affiliate to Crisismappers.net. We use all types of geographically referenced data with advanced visualisation, live simulation and modelling to provide early warning and rapid response to complex humanitarian emergencies. We collated and distributed relevant, real-time information to a broad range of stakeholders (general public and emergency services) to support situation awareness and facilitate rapid reaction in emergencies.

Our definition of 'emergency' included incidents (transport disruption, emergency services) and health events. We collated and distributed data using an open source platform for information collection, visualisation and interactive mapping created by CrisisMappersUK through social media and other available communication channels. The platform was an open source website generated from Ushahidi – which specialises in developing software for humanitarian projects.

We were fully involved throughout the Olympics 24/7 backed up by the New Zealand Virtual Operations Support Team (NZ VOST) operating in their daylight hours! This is a great team led by **Caz Milligan** with experience of the



We were fully involved throughout the Olympics 24/7 backed up by the New Zealand Virtual Operations Support Team (NZ VOST) operating in their daylight hours!





terrible Christchurch earthquake. We supplied much real time information with this deployment especially traffic and accidents. We monitored social media channels to be ready to respond immediately if an emergency occurred. As we now know the games went off remarkably smoothly and, luckily, there were no major incidents.

CrisisMappersUK requires volunteers to help with various tasks – all operating from their home/office bases. Can you explain how that happens and how our readers might get involved?

CrisisMappersUK is always looking for new members. We need volunteers to collate and organise data received from social media and other channels on different platforms to make it available to the general public, emergency services and other stakeholders involved in public security and safety. These stakeholders can freely access the data, which will facilitate and speed up situational awareness and rapid reaction in case of an incident or emergency.

We discussed the perennial issue of how to get geographical/location data better used and integrated into mainstream applications. You believe that this is often due to authorisation/approval to gain access to it. How have you dealt with this and how can the rest of us improve?

Authorising the use of data or making it more “open” can be a challenging step forward for any organisation. There are multiple reasons for this, including the fear of not understanding who is sharing the data and what they are doing with it. Although many of the emerging volunteer and technical communities (VTCs) articulate their aims and methods on websites or in response to queries, it can be challenging for a traditional organisation to understand the relationships between all of the actors in any particular situation. Individual websites can help, but can anyone keep track of them all? This problem is addressed by networks like the Digital Humanitarian Network – DHNetwork (digitalhumanitarians.com). The DHNetwork brings together many of the larger, international VTCs so that anyone can quickly learn what communities exist, what types of work they undertake, and what track record they have. The DHNetwork also provides an activation process to help traditional organisations find the right VTCs for a given situation.

In the future we hope that organisations could release their data to the DHNetwork directly, safe in the knowledge that the data will only be used by a “vetted” group of VTCs. They would therefore feel much safer about what will be done with the data and who will be doing the work.

In the ‘conventional’ GIS community, MapAction is well known for its volunteer work in emergency situations. Do you ever work on the same projects?

Standby Task Force and MapAction are both part of the Digital Humanitarian network. The purpose of the Digital Humanitarian Network is to exploit the potential

of digital networks in support of 21st century humanitarian response. More specifically, the aim of this network-of-networks is to form a consortium of volunteer and technical communities (V&TCs) and to provide an interface between formal, professional humanitarian organisations and informal yet skilled-and-agile volunteer and technical networks. Our different skills and areas of expertise work well together to enable us to respond to many different incidents. We feed each other with information as required. MapAction are a fantastic group of people doing amazing work.

What do you wish most for in 2013?

On my website you will see a reference to JusTech: a project “empowering women to use emerging technology and tools on the ground in under developed and crisis hit areas for emergency preparedness and incident, crisis and disaster reactive management”. I would really like to be able to fund and roll out JusTech in many countries so that the local first responders can collect the crowd sourced information that is so readily available and use it quickly to the benefit of their communities.

An example of this was the response to typhoon Bapho/Pablo in the Philippines in December 2012. We collated real-time situational awareness reports via social media with photographs and, on the ground, prioritised areas for responses. The integrated map is at <http://google.org/crisismap/2012-pablo> and many thanks to Google for their continuing support. I think it will be a great asset for GIS professionals to have people already on the ground with local knowledge who can work with them immediately.

Thank you, Jus, for a very stimulating interview – if only a fraction of your enthusiasm reaches our readers they should be volunteering in droves. Is there anyone out there still not convinced at the power of social media in this context? Watch out for Jus’ paper on ‘Global command and control post disaster including volunteer and technical groups’, which she will publish later this year.

• If you are interested in volunteering with CrisisMappers UK, please contact jus@juscomms.com for further information.

Above: an example of crisis mapping in response to typhoon Bapho/Pablo in the Philippines in December 2012.

Organisations that Jus works for, or with, include:
JusComms (inc JusTech)
 – www.juscomms.com/
Standby Task Force
 – <http://blog.standbytaskforce.com/>
Ushahidi
 – www.ushahidi.com
CrisisMappersUK
 – www.crisismappersuk.com
Humanity Road
 – www.humanityroad.org
Digital Humanitarian Network
 – www.digitalhumanitarians.com
MapAction
 – www.mapaction.org

digital by default



Until recently, the LGBCE consulted with the public via paper maps. However, a new online Consultation Portal is helping to make more citizens aware of boundary changes being considered.

THE LOCAL GOVERNMENT Boundary Commission for England (LGBCE) is an independent public body, accountable directly to Parliament. Its purpose is to create the foundations for effective local government in

the establishment of the Commission in 2010, but the files were large and unwieldy (typically hundreds of megabytes in size) and many members of the public found them difficult to access and view. Consequently, the vast majority of participants in the boundary review process were interested parties, such as local political parties, councils, parishes and community bodies.

The Commission wanted to encourage greater numbers of voters and citizens to become more aware of the boundary changes being considered and to have their say on proposals affecting their area and community. In line with Government's new ICT Reform Strategy, which proposes that government's engagement with the public is 'digital by default', the Commission recognised the opportunity to deliver the front-line service through an on-line Consultation Portal. The new portal needed to 'lower the barriers' to public engagement throughout the consultation lifecycle, comply with Government ICT policy, and reduce the Commission's operating costs.

Government boundary consultations transformed by cloud portal

Spatial technology is at the heart of the Local Government Boundary Commission for England's new Consultation Portal, which provides greater public access to the Commission's proposals. It also has significant financial benefits, having reduced the time taken to publish and present proposals by 90% and reduced ongoing publishing costs by 30%. **Seth Finegan** and **David Lawton** of Informed Solutions, the company engaged to deliver the portal, explain how the LGBCE's on-line consultation has improved public engagement and user experience.

England, by providing fair boundary arrangements for local authority elections, and keeping the map of local government in good repair by regularly reviewing electoral boundaries. These reviews are vital for the fair, democratic representation of English citizens within the system of government. The Commission regularly re-examines whether the boundaries for electoral wards and divisions are appropriate and effective. This electoral boundary review process ensures balanced representation of communities at local government elections by reflecting any significant changes in the distribution and representation of voters. The commission undertakes around 25 electoral reviews per year, relating to the 7,700 ward and electoral divisions in England for which they are responsible.

Lowering the barriers to public engagement
Until recently, the Commission consulted with the public by distributing paper maps and proposal documents showing proposed boundaries, inviting the public to view these at council buildings and local libraries and to provide comments and feedback by post. Static maps have been published on the Commission's website (in PDF format) since

Alan Cogbill, chief executive of the LGBCE, explains:

'The Consultation Portal represents a breakthrough in the way we consult and manage public engagement. Councillors, parishes, community bodies and members of the public will all be able to make their case to the Commission in a way that's accessible and extremely easy to use. It allows the public to look at our proposals at a level of detail that suits them, and it presents information in ways that help respondents make the most effective case to the Commission if they want to challenge or support recommendations. This significantly increases the reach of the Commission's consultation process.'

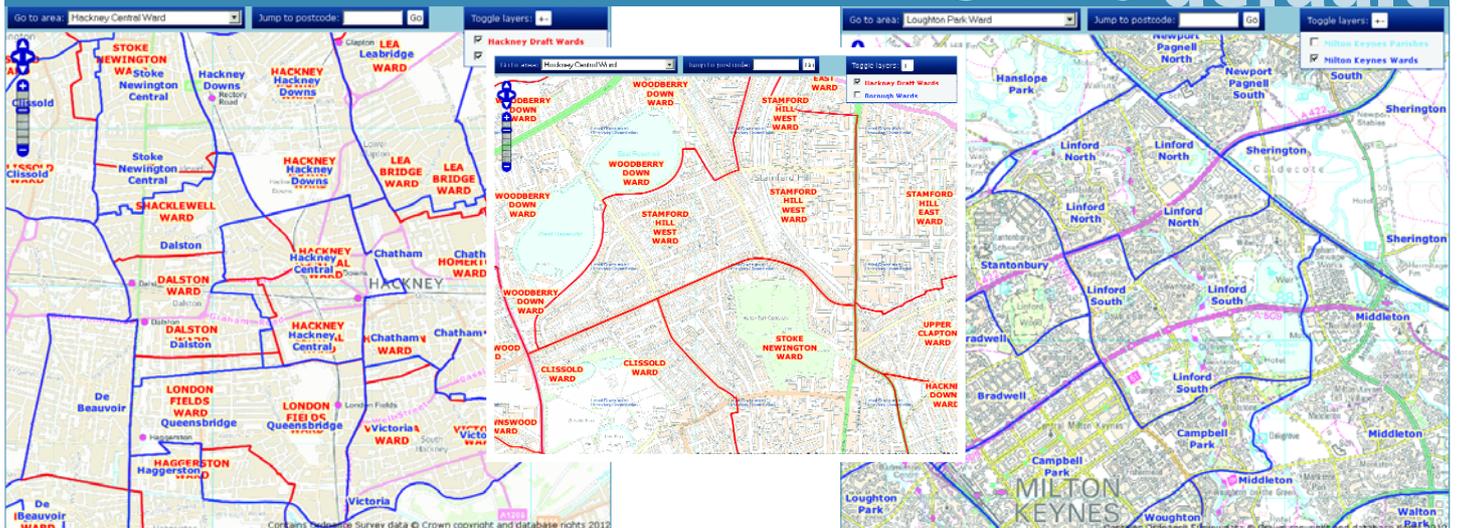
'The new Consultation Portal also measures up financially. We manage around 25 simultaneous boundary reviews each year and the reduced administrative burden and costs savings (of moving public consultations to a secure, cloud-based digital service) will be considerable.'

Putting interactive mapping at the heart
A major challenge for the new Consultation Portal was to offer an on-line user experience that presented complex geographic information in a way that is



... to encourage greater numbers of voters and citizens to become more aware of the boundary changes. . .





intuitive, easy to understand and interactive.

In June 2012, the Commission engaged Informed Solutions to deliver LGBCE's new Consultation Portal, basing it on the InformedCONSULT platform. This platform provides highly useable and friendly mapping integrated into a powerful consultation and collaboration management engine that assures compliance with statutory process. The platform is also used by numerous other national bodies to underpin their business and safety critical public services with intelligent, interactive mapping: including the Department of Energy and Climate Change, the Planning Inspectorate and the Boundary Commission for Scotland.

The Consultation Portal enables each of LGBCE's consultations to be easily and cost-effectively set-up to comply with the consultation process determined by Parliament. It also provides flexible administrator and configuration tools that accommodate any special controls or workflows that are specific to a particular consultation, period, stage in the lifecycle, area (e.g. councils, parishes) or other characteristics. InformedCONSULT is based on open source technologies such as GeoServer, OpenLayers, MySQL and Linux.

The solution is also available as a cloud-based subscription service, which was the option selected by LGBCE. These technology and service delivery innovations have helped LGBCE integrate a new generation interactive mapping service with a high performing public-facing portal, delivering an improved and more cost effective way of working. The Consultation Portal's mapping capabilities provide better and easily accessible information. More importantly, it also encourages and facilitates greater participation and a higher standard of feedback from members of the general public, including those with little or no experience of digital mapping.

Engagement with users through intuitive, friendly mapping, including key Public Sector Mapping Agreement (PSMA) datasets, and screen presentations, is at the heart of what has made the Portal a success. The proliferation of on-line mapping has opened GIS technology up to the ICT mainstream

and this market development has provided non-experts with the confidence to interact with mapping systems. The Consultation Portal provides members of the public with a 'familiar', instantly engaging user experience, shielding them from the complexity of the underlying technology and business processes.

Visitors are presented with a simple, well designed mapping interface that immediately attracts their interest. An integrated gazetteer and responsive, cached Ordnance Survey background mapping enables users to quickly find and view consultations near their home (or area of interest) at street level; see ward patterns across the whole county, borough or district; and pan and zoom anywhere in between.

Simple, streamlined tools help users to understand the context of the proposed boundary changes and explore proposals in greater detail, if they so wish. Users can interact with and compare a range of boundary layers, including parish, ward and electoral division boundaries. Arguably, the most useful feature is the ability to view the changing shape of the proposed boundaries as they move through the consultation life-cycle, providing a graphical history of proposed and confirmed boundary changes as they are progressively refined by the Commission.

Marcus Bowell, communications manager, LGBCE, comments: 'The flexibility of the platform, and the level of capability that was available 'out-of-the-box' with InformedCONSULT meant that we could focus on getting the user experience and the integration with our business processes just right. These two facets have been critical to the Portal's success from our perspective'.

A proven platform, tailored to needs Alongside LGBCE's requirement that the new Consultation Portal deliver an informative, engaging and positive experience as a front line public-facing service, it also needed to rigorously safeguard the integrity of the legislated consultation process as a back-office function. This required the solution to tightly integrate public feedback

The online Consultation Portal shows users complex geographic information but presented in a way that is intuitive and easy to understand.



... Portal provides members of the public with a 'familiar', instantly engaging user experience, shielding them from the complexity of the underlying technology...



into LGBCE's business process, workflows and assurance controls. Administrator and configuration tools enable the Commission to autonomously manage all facets of the consultation process. LGBCE's review team upload and manage the relevant boundary information and maps; manage, redact and publish all relevant content; and collate and analyse public feedback.

The Informed Solutions team worked closely with LGBCE to configure and tailor their platform to the Commission's needs. LGBCE's new Consultation Portal delivers:

- **Integrated digital mapping and gazetteer functionality to help members of the public search out, view and comment on relevant consultations and proposals in their area of interest.**
- **Robust and highly secure information management that safeguards feedback, comments and documents from unauthorised access.**
- **Collaboration and consultation workflow management that protects the integrity, transparency and auditability of the statutory process, enabling the Commission to confidently respond to any Parliamentary question or challenge where necessary.**
- **Content management dashboards that enable LGBCE's communications team to configure portal screens and administer content (e.g. update, redact and publish).**
- **Administration dashboards that enable LGBCE to create and administer work flows and controls throughout the full consultation life-cycle.**
- **Administrator tools that enable the GIS team to upload and manage mapping and boundary information.**
- **Reporting and advanced analysis tools to support LGBCE in efficiently collating and processing consultation feedback.**

'We knew what we wanted to achieve. Our new public Consultation Portal needed to be easily tailored to deliver a user-friendly public facing service for the Commission, configured to comply with statutory process and assurance controls, and it had to offer the cloud-based service options we wanted. This included strict security and assurance requirements and compliance with the Cabinet Office's ICT Reform Policy,' says **Tim Bowden**, review manager, LGBCE. 'InformedCONSULT met all of these needs. Our new Consultation Portal is secure, flexible and configurable. The general public are engaging very well with it; and we are achieving significant performance improvements and budgetary savings'.

So, what has LGBCE achieved? The LGBCE has delivered a new Consultation Portal that facilitates and encourages greater public participation in a key statutory function, which ensures that England has effective and appropriate local government representation. The Commission has achieved this using a cloud-based online service that complies with the government's 'digital by default' policy for public facing services as well as other Cabinet Office ICT requirements.

In the short time since the introduction of the Portal, the Commission has seen evidence of an increase in public participation in consultation on electoral reviews. In some cases, the Commission expects to receive well over 100% more submissions through its Portal from members of the public than in previous comparable reviews.

For the county council elections due to be held in May 2013, 6.7 million people will be able to access their new electoral division boundaries through the new Portal. As the Portal is updated more quickly than other sources of boundary information, it is likely to be the only source of detailed geographic information about their new electoral arrangements for many of those voters.

The consultation portal is on track to deliver considerable savings for the Commission's printing budget, which accounts for around 5% of its entire revenue budget and around 20% of the variable direct costs of each review. The Commission plans to make 30% savings to the printing budget in the first full year of the Portal's operation. As a key tool in the Commission's desire to become 'digital by default', further major savings are planned while simultaneously improving services to the public.

The Consultation Portal has reduced from two weeks to a single day the time taken to publish proposed electoral boundary changes. This means the information relevant to the consultation is immediately available to interested parties and members of the public so that they participate in the review from the first day of consultation rather than waiting for the arrival of paper based sources of information. Such delays can effectively shorten consultation periods by up to 20%.

Similarly, the Portal's administration tools, content management dashboards and integrated analysis, reporting and publishing capabilities, have significantly reduced the administrative burden of setting up, co-ordinating and assuring the full life-cycles of around 25 separate public consultations undertaken annually by the Commission.

- **To view the LGBCE consultation portal see: <https://consultation.lgbce.org.uk>.**
- **For more information about InformedCONSULT see: www.informed.com.**

About the authors



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the GI professional

Category	Skill	Code	Level										
			1	2	3	4	5	6	7				
Strategy and architecture													
Information strategy	IT governance	GOVN						5	6	7			
	Information management	IRMG						4	5	6	7		
	Information systems coordination	ISCO									7		
	Information security	SCTY			3	4	5	6					
	Information assurance	INAS							5	6	7		
	Information analysis	INAN			3	4	5	6	7				
Advice and guidance	Information content publishing	ICPM	1	2	3	4	5	6					
	Consultancy	CNSL							5	6	7		
Business strategy and planning	Technical specialism	TECH							4	5	6	7	
	Research	RSCH							3	4	5	6	
	Innovation	INDV										6	
	Business process improvement	BPRI										7	
	Enterprise and business architecture development	STPL										7	
	Business risk management	BURM								4	5	6	7
	Sustainable strategy	SUST										6	
Technical strategy and planning	Emerging technology monitoring	EMRG										6	
	Continuity management	COPL										6	
	Software development process improvement	SPIM										7	
	Sustainability management for IT	SUMI										6	
	Network planning	NTPL										6	
	Solution architecture	ARCH										6	
	Data management	DATM										6	
Methods and tools	METL										6		
Business change													
Business change implementation	Portfolio management	PMNG										6	7
	Programme management	PMNG											7
	Project management	PRMG											6

Above: A screen-shot example of the British Computer Society's SFIAPlus framework, which defines all the skill areas in the IT industry.

GI PEOPLE COME from all sorts of backgrounds but we have one thing in common. We're passionate about what we do. We are fascinated by it and we want to share that passion with others. But what makes a GI professional? Typically, professions are focused on applying training, qualifications and experience to solving problems, and demand for a professional commences with a problem to solve. If I want a house designing or building, if I have a health concern, have a legal

What is a GI professional, anyway?

Our profession needs to enter the mainstream or face the danger of GI skills being amorphous. After all, everyone knows who to call with a health concern or a legal challenge but why call us? **Tim Wood** takes a look at the skills, business applications, innovation and, finally, the world-view or 'ontology' of the GI professional.

challenge, need IT security or want a survey, I know who to go to. It's less clear when to call in a GI professional. Given the diverse origins of GI professionals and the almost boundless range of GI applications, we face the danger of being amorphous, jacks-of-all-trades. We also face the problem of being technology-led, where 'given a hammer, everything's a nail'.

The Zachman Framework 'Geography is about maps, but biography is about chaps' wrote **Edmund Clerihew Bentley**. Maps are, inter alia, a form of information and so make a good starting point in our quest to define the GI profession. Let's start with the premise that anyone using GI is attempting to solve a problem. What might the starting point be for bringing in the skills of the GI professional and at what point are they no longer needed?

The Zachman Framework is helpful in defining this journey. **John Zachman** was working for IBM when he developed the framework, and it was a breakthrough moment in realising that creating an IT-based solution (if we can include GI in that catch-all) is more like building a house than building a simple wall. The artefacts typically produced in problem-solving are actually addressing a matrix of *needs* (specifically why, what, how, where, who

and when) against different perspectives on how to meet those needs. And whilst different skills are needed to build a house, they should, ideally, work together in an integrated manner (see table right).

The Zachman framework is incredibly useful, if you can look beyond the artefacts to the skills needed to create them. It ensures that key issues are not overlooked (for example, addressing 'why' before 'what', and 'what' before 'how' – usually a good idea). It also gives some indication of the range of skills that are needed – for example, addressing business needs as opposed to detailing data or process. An enterprise architect, in the world of IT, will have extensive knowledge, training and experience of most if not all of these areas. A management consultant (depending on background) will tend to have greater depth of knowledge of needs, scope, concepts, processes and logic, focused on the business end. What new cells do we need to add, for the GI professional, to differentiate them in terms of skills?

Skills in the information age Continuing the theme of information management, it's worth looking at the British Computer Society's SFIAPlus (SFIAPlus stands for Skills Framework for the Information Age). This is a different

type of framework that defines all the skill areas in the IT industry. Assuming there is significant overlap between being a GI professional and information technology, can SFIAPlus help us in our quest? It is very wide-ranging and was developed to:

- identify and benchmark skills to the industry standard
- map current skills within an IT job role
- identify career paths
- plan training and development activities
- achieve the British Computer Society (BCS) professional development accreditation.

SFIAPlus also forms the basis of a range of online browser-based professional development products and services for both individuals and employers. Divided into six categories and 19 sub-categories, it details 96 skills on the vertical axis and seven levels at which those skills can be attained (tasks) on the other. Many tasks have a minimum seniority set against them so, in the example (see image top left), "IT governance" requires a minimum seniority of "5", meaning "ensure, advise" (see <http://scripts.bcs.org/sfiaplus/level.htm#level5>). For each of the 344 tasks you can view level and task descriptions, background, work activities, knowledge and

“

What might the starting point be for bringing in the skills of the GI professional and at what point are they no longer needed?

”

skills, training activities, professional development activities and qualifications.

SFIA has been developed for the IT industry and encompasses all aspects from strategy, through data, design, development, implementation, and training, to maintenance and support, and governance. With its central focus on information, SFIA covers many of the skill areas of our elusive GI professional. Could someone with a high SFIA score be able to perform as a GI professional? If not, what additional skills and training would they need? Conversely, would a GI professional necessarily score well on SFIA, and if so, what would be their strengths and weaknesses? If we need additional skills adding to SFIA, what would they be? More importantly, what combination of skills and seniority are needed to take the GI industry forward and differentiate it from other professions?

Innovation and training GI can play a central role in just about any application area, whether it's healthcare, transport, finance, utilities, marketing, agriculture, natural resources, climatology or exploring other planets. It's a lot easier for a dentist to explain what they do, than a GI professional. One can still encounter entire government departments (for example) engaged in what would appear to be a highly geographic subject area, making little or no use of GI and completely unaware of what it can do for them analytically as well as presentationally. In an ideal world, GI would be an essential part of core skills training such as statistics, so that its adoption became bottom-up rather than requiring a champion or evangelist GI professional having to re-educate and convince. It's possible to leave school with virtually no knowledge of geography or the principles of GI, and many of the application areas in which GI is used do not see it as a core skill. So at what point does someone in the transport industry, or planning, or working for a utility, describe themselves as a GI professional? Does the level of domain knowledge count?

Professions keep abreast of knowledge and innovation. SFIA defines the investment in training and competences that is expected of different levels of seniority. Should a GI professional not only be aware of innovation but also ensure that they invest in training and hands-on experience? For example, not only reading about crowd-sourcing, or the latest mobile apps, or new, better ways of using GI in different application areas, but setting aside the time and cost to train and practice? Should this be formalised and recorded in the same way as regulated professions do, such as the financial industry? That may sound extreme, but if GI professionals want to be taken seriously, then surely they must be able to set out, concisely and clearly, what level of skill they are offering. Part of that is having meaningful, standardised

	WHY	WHAT	HOW	WHERE	WHO	WHEN
Contextual	Business requirements	Things important to the business	Things the business does	Geographic context of the business	Roles and organisations	Significant event cycles
Conceptual	E.g. business plan	E.g. semantic model	Business process model	E.g. spatial model, logistics	E.g. workflow model	E.g. master schedule
Logical	E.g. business rules model	E.g. data model	E.g. Business process architecture	E.g. logical spatial architecture	E.g. human interface architecture	E.g. processing structure
Physical	E.g. rules design	E.g. physical data model	E.g. system design	E.g. technology architecture	E.g. presentation architecture	E.g. control structures
Implementing	E.g. rules implementation	E.g. data definition	E.g. Programs	E.g. system	E.g. security	E.g. timing definition
Functioning	Enabling	Processing	Maintaining	Locating	Performing	Interacting

qualifications rather than a plethora of training courses with unstandardised content and certification.

Finally, does the GI professional see the world in a different way from other mortals? Is there something special about understanding the "power of place" that sets us apart? Is that something we can scrutinise, measure and communicate to others? For me personally, the answer is yes, GI professionals do see the world in a different way, aware of the interplay of complex factors over space and time, able to provide unique insights into complex data that would be almost impossible any other way. In **John Wyndham's** *The Kraken Wakes*, only the scientist Bocker (a geographer) can interpret all the signs of an impending alien invasion from the ocean depths. He was without doubt, a GI professional. Only a passion for the subject would make a transport planner (for example) start to call themselves a GI professional. For me, that's still too informal. Passion for the subject doesn't permit doctors to call themselves dentists!

Are we any closer to defining a GI professional? We could, with some work, define the skills, based on SFIA. We could use and adapt tools such as Zachman to introduce more rigour and formality. At some point, GI/GIS might be seen as mainstream analytical skills and not to do with learning geography (not everyone loves it). We might also recognise that the achievement of taking GI and GIS into the mainstream, will mean that there is a little GI professional in everyone. That would be a great result – wouldn't it?



About the author

Tim Wood manages business change initiatives across information management, energy, transport and environmental sectors and clients include utilities, the private sector, Central and Local Government, most recently delivering a business case for £75m of energy efficiency and carbon savings across Sussex. Tim has also co-authored a new approach to business change – In-flight, the blueprint for successful business change. Tim has enjoyed senior roles in companies such as Atkins, Black & Veatch and the MVA Consultancy. Tim likes to think of himself as a GI professional.

Above: An example table from the Zachman Framework, which addresses a matrix of needs – why, what, how, where, who and when – against different perspectives on how to meet those needs.



In an ideal world, GI would be an essential part of core skills training such as statistics, so that its adoption became bottom-up rather than requiring a champion. . .



pursuing growth



Above: Map 1 – An example from the Map for England, showing the current availability of superfast broadband, overlain onto areas of highest predicted household growth 2008-33.

THE PAST 18 MONTHS have seen arguments raised from across the political spectrum as to how best to pursue growth nationwide, with a consensus

in the local economy – showing how vitally important it is to make sure that these developments are planned for across sectors. Importantly, a Map for England highlights how essential easily manageable GIS systems can be to all professions involved in planning for our future infrastructure developments.

Despite the generally recognised and accepted need to ensure such a joined up approach to planning infrastructure and services, there is remarkably still no single place or data source within government that makes all the relevant maps available to view. Good progress has been made in various areas, but with an overarching framework – a Map for England – policy makers could make better judgements about how individual policy proposals interact with and affect the development of the country as a whole. It would increase consistency in appraisal, improve security and resilience, and provide a better understanding of sectoral issues that may compliment or conflict with one another.

Research findings Our debate began by the release of research commissioned by the RTPI and

A map for England

The Royal Town Planning Institute has opened a debate about using GIS to map key information for planning development sustainably. The RTPI's solution is to create a "Map for England" to act as a single data source for planning new infrastructure and services. Project manager, **Peter Shand**, offers some background on this debate and explains why they need GIS professionals to contribute to it.

emerging that the route to growth was via pursuit across the country as a whole – spreading the relative success attained in London and the South East.

This was a viewpoint taken up by **Lord Heseltine** in his recent independent report on how to improve the UK's ability to create wealth (*No Stone Unturned in the Pursuit of Growth*), and echoed by comments from such organisations as the Confederation of British Industry (CBI) and the Institute for Public Policy Research (IPPR).

A joined up approach It is in the pursuit of growth that the Royal Town Planning Institute (RTPI), the largest professional institute for planners in Europe, representing some 23,000 spatial planners, initiated a debate about whether we need a "Map for England", to provide a manageable way of presenting datasets in an open and accessible fashion.

A Map for England would provide a truly joined up approach to planning infrastructure and services, helping to boost both growth and save time and money by encouraging quicker and better informed investment decisions. The CBI have estimated that even before new infrastructure becomes operational, the building of it is estimated to generate £2.84 to the economy for every £1 spent; 90% of which is retained

published by the Centre of Urban Policy Studies at the University of Manchester. The research shows that individual government departments now have more than 100 major maps for England relating to these policies and programmes, but when overlain onto one another they will have unintended consequences upon different parts of the country.

It was a major task in itself for the researchers to pull together almost 100 policy maps. In about one third of these documents, the implications for different places are made explicit but in fully two thirds they're not. The research focused on three key policies for growth (the *National Infrastructure Plan*, *Unlocking Growth in Cities* report and the draft *National Planning Policy Framework*) and analysed whether or not they were spatially aware documents.

By overlaying a number of these maps and diagrams together, the researchers demonstrated that some policies and programmes, when considered against each other in relation to different parts of the country, may have unintended consequences. The research highlighted many of the issues that the country faces in delivering future infrastructure for telecommunications, environmental issues, housing and transport.



... with an overarching framework... policy makers could make better judgements about how individual policy proposals... affect the development of the country as a whole.



The Map for England website In order to show what a future Map for England may look like, the RTPI, in conjunction with software specialists Idox, launched a pilot website in October 2012, which can be found at www.idoxgroup.com/mapforengland.

Results from the Map for England have recently been used by the Secretary of State for Business and Enterprise, the Rt Hon **Michael Fallon** MP, during the debates on the Growth and Infrastructure Bill and, in particular, the provision of superfast broadband in national parks. As the map (see Map 2) demonstrates, coverage is particularly poor in national parks in the north of England.

Since the launch of the debate in March 2012, the RTPI has been encouraged by the positive response from businesses, communities and the wider public alike with regards to the initiative. We have found that there is a great desire across all sectors for a mapping tool that would enable users to view the way in which a range of national data could affect their areas and plans for future development. The advantages of a streamlined, more cost-effective approach to developing plans and strategies was keenly felt across, and within, the levels of governing authorities, private and public sector respondents that took part in the consultation – with many replying to say that a “one-stop shop” for such vital information is a necessity. Such an initiative really helps to highlight the power of GIS to both the wider public and policy makers.

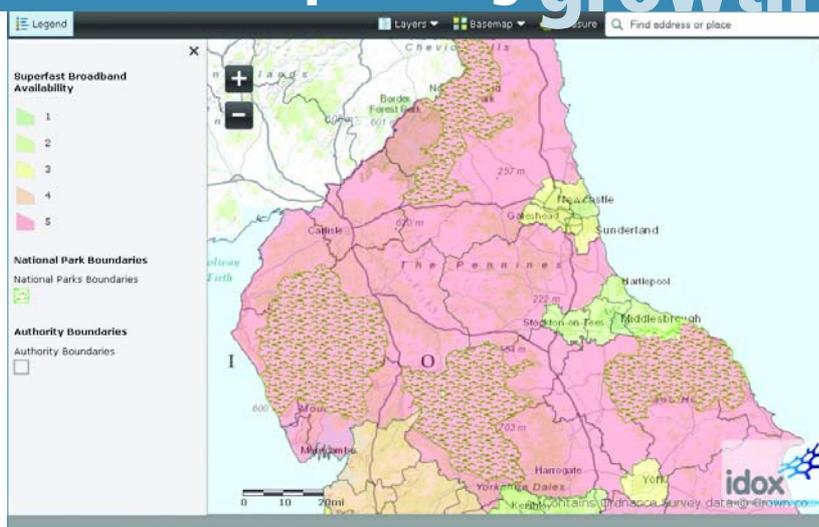
How does this fit with government policy?

The UK government is fully committed to its Open Data drive, with the minister in charge of reforming access to public information, **Francis Maude**, describing data as ‘the raw material of our age’. The Map for England is a way of harnessing this raw material and pushing forward the government’s current Open Data drive across departments. The Map for England is about using GIS and standardised data to foster collaboration and joint working across contrasting, and normally conflicting, sectors.

Various schemes and initiatives in the UK that have begun over the past few years have shown that the public has a great appetite for using data to make conclusions and challenge the information that they are given. In particular, mysociety.org runs pages such as theyworkforyou.com, dedicated to sharing public information.

Additional benefits of the Map include:

- **Helping to boost growth** – Housing, industry and business would be able to make quicker and better informed investment decisions, which are more closely aligned to public sector infrastructure funding plans.
- **Being more transparent** – Local communities would be able to find out about how government plans affect their areas and to influence them.
- **Saving time and money** – When writing new strategies, government departments could see



Above: Map 2 – This example from the Map for England shows that the provision and coverage of superfast broadband in national parks is particularly poor in the north of England.

the existing plans for different parts of the country and relate their new strategies to them.

- **Helping to coordinate infrastructure** – across borders with Scotland and Wales.

As well as the acknowledged recognition from a variety of sources that a new spatial vision for the country is needed if we are to grow, a number of programmes towards the end of 2012 highlighted the need for England to consider the ways in which the development of infrastructure will affect the country in the future – and to plan now, in a sustainable fashion, to improve the services that make Britain tick. One startling revelation was that without any developments to key infrastructure services in the next decade (water, telecoms, energy, housing and transport) the cost to the country would be £500bn. The stark message was that we cannot add 10 million people to our population and “make do” with the current level of services.

What can you do? The Map for England has received further coverage by the way of Radio 4’s *Today Programme* and has been picked up by numerous trade and local press articles.

You can log onto www.mapforengland.co.uk and contribute to the debate. We want to know if you agree with us that a Map for England is a good idea, and advise us on what further information should be included on future versions. We are also taking the debate to Twitter, via [#map4england](https://twitter.com/map4england). We are aware that, in its current form, the map is some way from the finished product – but this pilot period is about highlighting and developing how a future Map for England *could* function. We are particularly keen to hear from GIS professionals about their views on the project and how you think we can best develop the Map for England.

About the author



Peter Shand is the RTPI project officer for the Map for England and can be contacted by emailing to: peter.shand@rtpi.org.uk

cartography generalisation

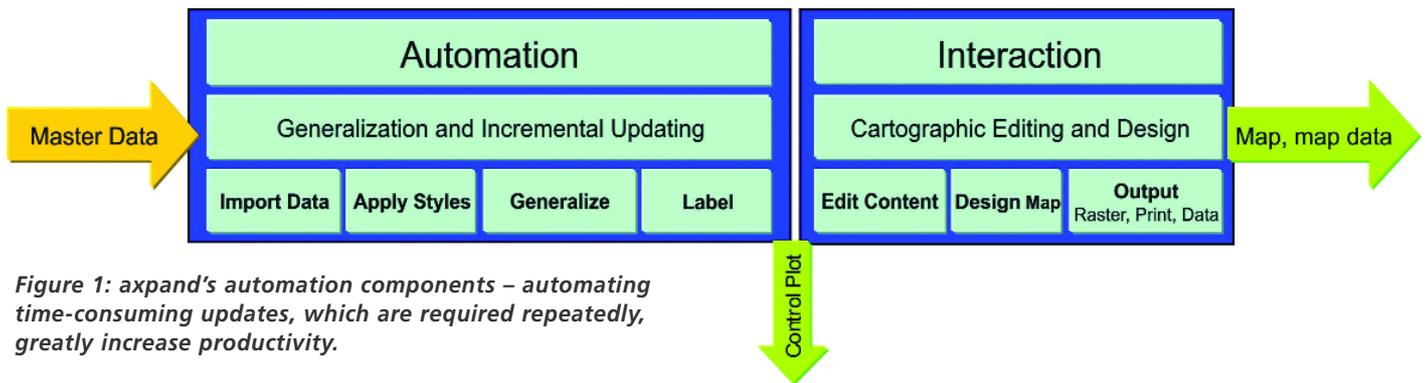


Figure 1: *axpand's automation components – automating time-consuming updates, which are required repeatedly, greatly increase productivity.*

VARIOUS ATTEMPTS AT automating generalisation have been made since the mid 1970s and your editor was involved in some of these at Ordnance Survey where the original large scale digital mapping even had specific feature attributes for the purpose. But it has been a long hard struggle! German cartographers were always in the forefront – on both sides of the iron curtain. Now we have the system described below from Axes Systems in Switzerland being used in a united Germany to handle

the most part, need to take neighbouring map elements into consideration.

The technology discussed here has been developed by Axes Systems in Switzerland. It is based on their core technology 'axpand', which is a database-driven GIS for cartography. Recently, it has been configured for the German land survey AAA model (AAA stands for AFIS-ALKIS-ATKIS, which are acronyms for geodetic, cadastral and

Automating Topo Mapping in Germany

In recent years, there has been a lot of discussion about whether it is possible to automate the critical, repetitive tasks in map production and updating. In this case study based on the German land survey AAA data model, **Mary Lou von Wyl** and **Ajay Mathur**, Axes Systems AG, argue that automation in map production can offer efficient, up-to-date and consistent production cycles without sacrificing on quality.

topographic map production from larger scale cadastral mapping from each Lande.

In order to assure efficient, up-to-date and consistent production cycles without compromising on quality, map production needs to be automated. Cartography involves many repetitious production and revision tasks many of which can be automated. These include the application of relevant styles, generalisation from detailed inputs and labelling, all of which are critical in map production. Automating time-consuming updates, which are required repeatedly, greatly increase productivity and shorten update cycles (see figure 1).

Generalisation is part of the "core business" of cartography. This involves making maps readable despite the limited space available at any particular scale. Important elements are emphasised and less important ones are eliminated. This is a complex process during which a multitude of contextual, geometric and topological rules need to be taken into account. For a long time generalisation was considered too complex for automation. The challenge is to define contextual and geometric rules that can be read by a computer and implemented in an automatic process. The operations that use these rules need to work consistently and, for

topographic databases, respectively) and cadastral and surveying authorities' style sheet regulations. Configurations are available for the automatic production and update of topo maps at scales from 1:10,000 to 1:100,000. The data for each target scale is derived and updated directly from the master data (digital landscape model, buildings, digital elevation model) where the creation of relationships between source and target data enables the derivation of various scales solely from the updated AAA master data (see figure 2).

Automated generalisation Good, automated generalisation mirrors the order of the steps that are taken by a human cartographer. The logical design needs to consider:

- How does a map look at a certain scale after the data has been manually generalised?
- Which steps does a cartographer take to obtain these results?
- In what order are these steps carried out during the manual process?



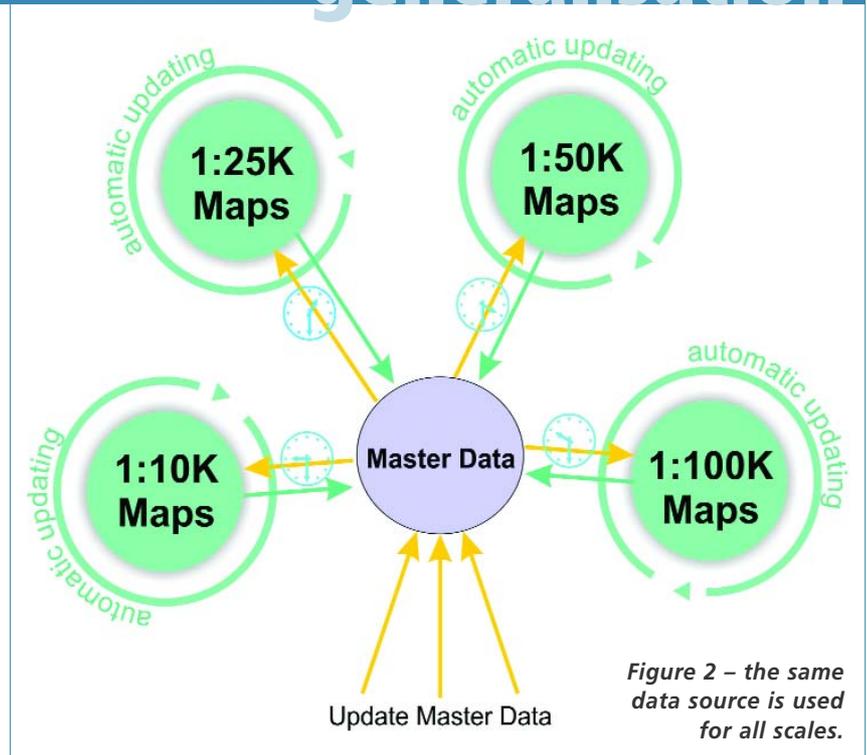
Good, automated generalisation mirrors the order of the steps that are taken by a human cartographer.



The answers to these questions will determine the order of steps in an automated workflow.

Alongside the logic, constraints or rules are critical. These rules are determined by the map scale, the map theme (context) and the density of data. Constraints mirror the knowledge of a cartographer and must be translated into terms that are computer readable. Tasks such as displacement, aggregation, selection and enhancement are driven by the constraints that are applied to each step. The constraints help to identify potential conflicts, decide which solution is most plausible and once the operation is complete, carry out quality assurance checks. When a conflict is detected, the system carries out the appropriate steps potentially going through several iterations until the constraint is fully applied and conflict is resolved as completely as possible. If a conflict cannot be resolved without introducing new conflicts or creating topological errors, the system searches for the best possible geometric solution for the object in question. QA checks ensure adherence to the rules and that no further editing is required for elements that fulfil the constraints. In cases where a conflict cannot be solved automatically, 'expand' flags the object to assist a human cartographer in quickly finding those elements that may need examination and/or manual intervention.

Building a workflow Workflows in 'expand' consist of tasks – each containing generalisation operators or sub-workflows. Operators are logical combinations of algorithms that carry out specific steps according to the constraints for the appropriate scale. Both implicit and explicit topology is maintained. The workflow can be set up so that steps can follow in succession, be embedded, or be carried out in parallel where necessary. The constraints or rules are entered as parameters for the



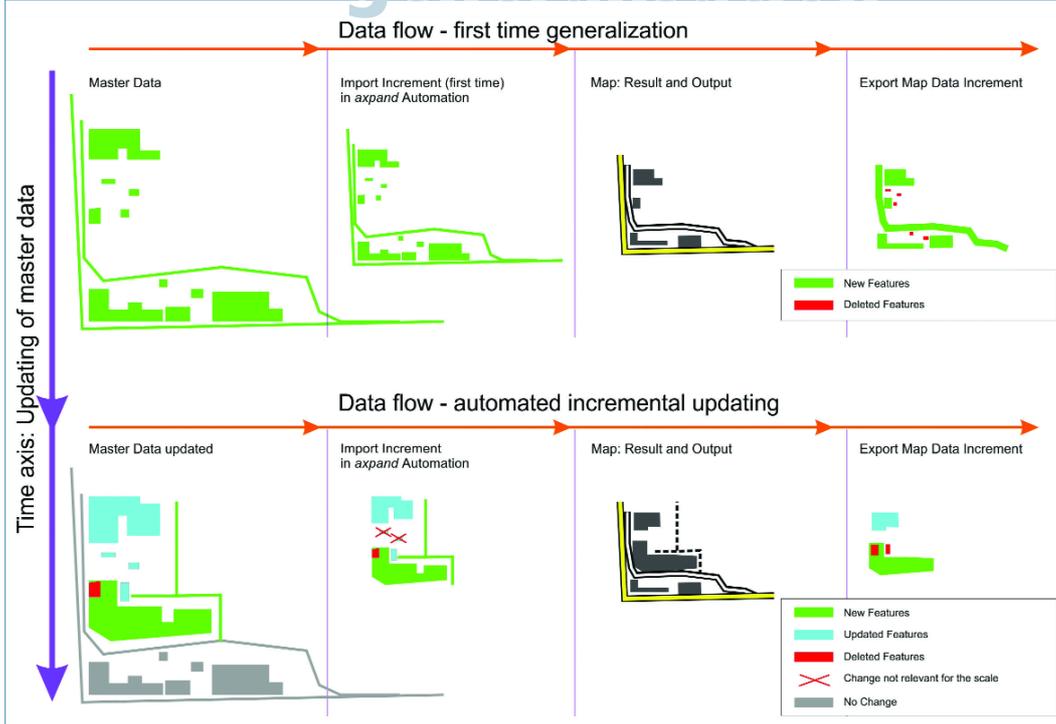
operators. Line displacement, for example, has parameters including minimum distance between specific object pairs. These values are entered directly into the operator or collectively into a 'data dictionary'. When using the latter, the constraints are managed in a spreadsheet and converted to a data dictionary for the system to process.

German DTK data Generalisation workflows for production of DTK (Digital Topographic Mapping) at 10k, 25k, 50k, and 100k scales are divided into two main groups of tasks. In the first, objects are generalised within their own classes. These preparatory steps include aggregation, thinning, smoothing, typification, geometry changes, simplification and orthogonal correction (see figure 3).

Below: Figure 3 – a generalisation workflow on buildings.



cartography generalisation



Above: Figure 4 – a data flow during an update.

These are followed by 'movement steps' where objects move in relationship to other objects – including displacement, parallel adjustment and extension and reduction of lines against area limits.

Finally, the map is automatically labelled using 'GeoInfoDok' specifications, which define the standards for German maps. The system's labelling is a non-destructive process in contrast to other labelling engines. During an update, re-labelling is done only where new labels are required. This ensures consistent label quality over time and guarantees the automatic incremental updating of derived maps and map data. This automation of text placement plays a crucial role in the reduction of manual editing (see figure 4).

Information about the relationship between source and target objects is maintained during generalisation and recorded in the database. This includes the history of an object over several updating cycles and is used for the automatic, incremental updating of map data. Information about every change that an object undergoes in either the source or the target is available to the user. As an important enhancement to the workflow, the system supports the definition of 'zones'. This makes it possible to generalise different areas of a map – e.g. city centres, rural areas, mountainous areas – using zone specific constraints. The entire process is carried out using iterations (loops) for different types of zones.

Change only update Within 'expand' there is no difference between the first generalisation and the continuing and incremental update process. The 'state' of an object is decisive for the update. During initial generalisation all objects are "new".

Subsequent updated source data may include new, changed or deleted objects and generalisation takes place only in the areas affected by these objects. This data can be fed into the system for any region, at any time. Where source data has changed, it is automatically assessed for relevance to determine whether or not the change is sufficient to require re-processing. For each instance of generalisation, surrounding objects in the target model are also included and processed with the modified source object thereby maintaining the edits and the consistency of the map. The relationship between the target and source objects or predecessors is maintained over time and through the update

cycles. A generalised object can be manually returned to its source state or to its prior 'target' state. In Germany source data from the AAA model is imported using NAS, a GML format, but there are several other interfaces available for import and export. The system generates and maintains stable object identifiers (UUIDs) for the derived data during the entire process and through multiple update cycles. As soon as the target model has been updated, the data is visualised and where necessary, manually edited. The results can be output in the form of ready-for-print PDFs and raster images. Vector data can be exported as increments to an external system.

Results In Germany, during tests using the AAA-DLM data for the generalisation of the four scales of DTK mapping, an average of 80% of all conflict situations were correctly generalised and met the national quality standards with no requirement for any subsequent manual editing. The use of the editor and additional tools in the 'expand' system for the creation of map sheets and plots enables the seamless completion of map series significantly faster than the normal timeframe. Maintaining tight production schedules, accuracy and high quality maps requires a minimum of manual effort and is therefore faster than ever with consequent cost savings.

About the authors:

Mrs Mary Lou von Wyl is the head of operations and technical projects and Mr Ajay Mathur is the CEO of Axes Systems AG (media@axes-systems.com).

• Axes Systems website: www.axes-systems.com.

The system's labelling is a non-destructive process in contrast to other labelling engines. During an update, re-labelling is done only where new labels are required.



• **Robin Waters is an independent consultant who has worked extensively in several European countries and who has a keen interest in EU's INSPIRE Directive and its implementation.**

AS I WRITE THIS COLUMN, the pressure on David Cameron prior to his European policy pronouncements is almost tangible! It seems that he is unlikely to recommend a referendum before 2018. Whatever the renegotiations turn up in the way of treaty changes, opt-outs (or cop-outs) we can be sure that the physical geography of our continent will not change. If there is one thing that the plethora of images from orbiting satellites has shown us in the last 50 years, it is that so many natural phenomena – and many anthropogenic effects as well – respect no political or cultural boundaries. Even within our own islands we can see how attempts to devolve power or push 'localism' often lead to unintended consequences when different polities hold different views on the environment, planning or cultural issues.

Our current moves toward a more 'federal' constitution for the UK are often seen as being completely separate from our struggles to come to terms with Europe – whether with a small 'e' or a large 'EU'. But look at the automatic assumption by some of our friends north of the border that leaving the UK would be much easier if the EU immediately

embraced an independent Scotland. Cans of worms come to mind if we look across the whole of Europe in that context! I guess the only certainty is that any changes of boundaries and names will be more easily made with on-line maps than they were when only paper maps were available.

Iceland embraces open source No doubt Iceland's Soil Conservation Service will accept any data that they can get from any earth observation programme as they battle to overcome centuries of human exploitation of that island's resources. Apparently, the island was not as barren as it is today when the Vikings arrived over 1000 years ago and the agency has a remit to combat desertification as well as to promote sustainable land use and help to restore degraded areas. But perhaps prompted by today's austerity they are embracing open source software to save 'millions of kronas per year'. They are moving from proprietary systems to Postgresql for geographic databases and trying Quantum GIS despite immediate compatibility issues. However, IT manager **Óðinn Burkni Helgason** says: 'So we use the proprietary software to create special files that we

Transcending boundaries? We undoubtedly live in an age of globalisation – including the provision of spatial information and systems. At the same time, at least in the UK, the government pushes for localisation as distinct from centralisation. In the UK and Europe we can see the tensions affecting our own industry. Examples from Iceland, the UK and the EU show how we are pulled in different directions.

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Copernicus One of the EU programmes that transcends boundaries was known as the European Commission's Earth Observation Programme GMES – Global Monitoring for Environment and Security. Since December 2012, it has been renamed Copernicus after the Polish scientist of that name from the 16thC. It is hoped that this will raise the programme's profile as many of its services come into operation and users begin to receive and exploit the data that it is providing. The Commission promises a 'special focus on regional and local actors, be they public authorities, private businesses or citizens'. In the Commission's words 'Copernicus consists of a set of services which collect data and provide information using satellites and terrestrial sensors to observe the environment and the natural phenomena occurring on the planet. It thereby enhances our safety in numerous ways. . . helps to improve the management of our natural resources. . . and enables better planning of our cities by monitoring urban sprawl and easing the flow of transportation.' An eclectic mix of both the natural and anthropogenic environments indeed!

The new Copernicus should not be confused with

can use in Qgis. We're also planning to use Postgis which will increase our use of Qgis even more.' The small IT department already uses Linux for a multitude of servers running Mysql in combination with Joomla for the agency's website (www.land.is/english/). There is more to Iceland than fish and hot springs!

Don't forget our farmers Elsewhere in this issue is an article on the raid south of the border by Forth Valley GIS – a local authority company that has won European plaudits before and which is now selling open source services to English local authorities. They are about to be joined by another company from Edinburgh called Trackplot who have developed very useful services for monitoring lone workers and for farmers trying to cope with the EU's agricultural subsidies. Although England and Scotland (and for that matter Wales and Northern Ireland) have completely separate agencies for managing the EU subsidies, the company believes that it can assist farmers anywhere in UK (or even further afield) to cope with this vital source of income.

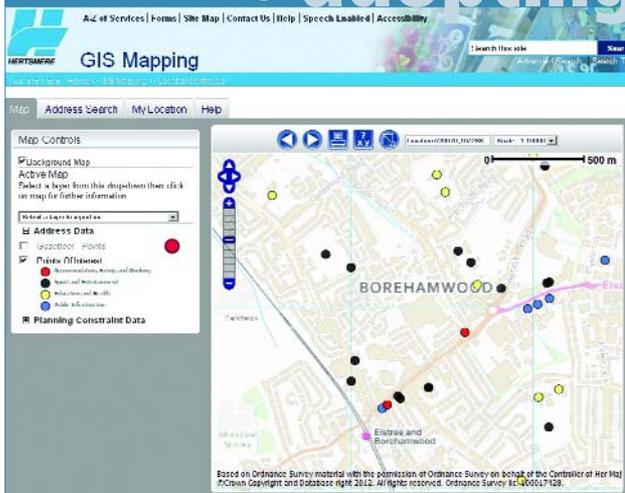
I hope that our devolved administrations are considering how best to subsidise our farmers if we leave the EU. I am sure that there would be many arguments and that it would be a long time before the blame for expensive food, environmental degradation or farmer suicides was shifted from Brussels to London, Edinburgh, Cardiff and Belfast!

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. . . so many natural phenomena – and many anthropogenic effects as well – respect no political or cultural boundaries.

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case study adopting cloud GIS



Left: HertsMERE adopted the Location Centre software-as-a-service to improve sharing and communication of their geographic information.

HERTSMERE BOROUGH COUNCIL (HBC) own the legendary Elstree Studios where Star Wars, Indiana Jones, Superman and the King's Speech were made. It is also the first English borough council to adopt Forth Valley GIS's "Location Centre" software-as-a-service product. This move to a cloud-based service was aimed at improving the communication of information between

- An intranet GIS and mapping application for sharing data within the council
- An internet GIS and mapping application for publishing data to the community
- A fully hosted, secure, centrally-accessible data store with multiple levels of access
- Configurable, customer-focused maps that can be inserted into existing council web pages
- A reduction of operational GIS costs and increased staff productivity
- A metadata register to keep track of council data holdings
- Speedy and trouble-free installation

Cutting costs Location Centre is a complete online geographic information solution. It combines intranet, internet and web mapping and data management in one integrated system that gives access to a broad range of GIS functionality. Cutting out the need for costly desktop GIS or system licences has revolutionised the way HertsMERE carries out GIS-related work.

The new service enables council staff to combine

Lights, camera, action! Putting GIS in the spotlight

Two organisations have recently benefited from adopting cloud and open source-based technology. Though used for different purposes, this case study details how both achieved benefits including reduced costs, better informed decision-making and improved productivity and communication of information.

the 350 employees, via an intranet GIS, and to external users, via a functionality rich internet GIS solution.

HBC delivers a range of high-quality public services to approximately 95,000 residents, and contributes to the development and growth of local businesses, community programmes and other local initiatives (and by coincidence HertsMERE – or at least the Holiday Inn at Elstree – will also be hosting GEO-South in May this year. See www.pvpubs.com/events.php).

Challenges As a public sector organisation, the council faces many operational challenges in delivering cost-effective, improved and efficient citizen-centric services. The use of geographic information plays a significant role in the delivery of these services to the employees, taxpayers and other key stakeholders. But there are also several challenges including:

- The need to reduce costs;
- The requirement to increase productivity; and
- The need to improve stakeholder communication and engagement.

The council realised they could help address these issues through improved sharing and communication of their own geographic information through adoption of a hosted, on-line GIS platform based on open source software. Requirements included:

their existing data with mapping elements to create datasets that are enhanced in a geographic context. This integration helps council users to visualise, analyse and communicate their data in new and easily understood ways. As an open source web GIS platform, the service provides data sharing, customer communication, workflow management and operational flexibility.

Specialised training, provided before the system went live, ensured that the transition from the existing systems went smoothly. "Train the Trainer" courses also gave council staff the tools and knowledge necessary to train others within their teams; reducing the reliance on, and the costs associated with, external agencies. In addition to training, Forth Valley GIS has also provided a fully managed support service, giving council staff access to technical and project-specific support via the web and telephone.

Benefits of a different approach The impact of Location Centre has dramatically changed the way that HertsMERE approaches, tackles and communicates geography related challenges. The swift implementation has enabled the council to:

- Easily share geographic information internally and externally
- Quickly create interactive online maps with minimal effort



... service enables council staff to combine their existing data with mapping elements to create datasets that are enhanced in a geographic context.





- **Save resources and time by publishing and sharing information online**
- **Find efficiencies and savings through the use of new business processes**

The design ensures that both council staff and those living and working in Hertsmere can easily access and use the system. The new approach and implementation gives council staff access to a whole host of information in one central repository. The system's hosted nature ensures that access is simple and requires only an internet connection to get started.

As a monthly subscriber to Location Centre, Hertsmere benefits from software developments and updates, receiving these automatically with no additional expense. The scalable business model means that as the council develops, it is easy to add or remove new users when necessary.

Location Centre fits seamlessly into the council's existing systems, enhancing their infrastructure and aiding them in their primary goal – serving the people of Hertsmere.

Improving Scotland's railways Closer to home, FVGIS have been working in partnership with Miller and Bryce, a land referencing company, on the Edinburgh Glasgow Improvement Project (EGIP) to improve the railway infrastructure in Central Scotland. For this project, FVGIS developed Notification Manager: an on-line system that brings together land and property ownership information, environmental data, background mapping and other location-based information from a wide range of stakeholders.

EGIP is a comprehensive programme of improvements to Scotland's railway infrastructure, rolling stock and service provision. The complex, multi-agency, £650m project covers 300km of track and associated infrastructure and is fundamentally dependent on efficiently managed location-based information throughout its five-year term.

One of the most critical aspects is the land referencing work, which investigates land and property ownership, analyses these interests and organises a rich suite of data to support work on public consultation, design options, engineering activity, logistics, land purchase and notice management.

Traditionally, this work involves manually intensive

processes and the use of multiple discrete business systems leading to considerable data duplication, inefficient data exchange and the risk of inaccurate or out-of-date information being used.

The system was built on the Location Centre open source GIS platform. It acts as the central interface to all project stakeholders. All EGIP-related land referencing data, associated documents and reports are held centrally on a secure hosted platform, underpinned by a datastore of national mapping. Users can log in to the system using an internet connection. The strong digital rights management capabilities also ensure that security is always considered – suitable permission and levels of access are controlled by users.

The system revolutionises the way in which data is collected and shared, providing a platform that improves project collaboration, streamlines land referencing and site assembly business processes, and improves the speed of decision-making.

Better business The use of a web-based solution removes the need for DVDs and other portable devices and enables complete data sharing across the whole project team. Communication and reporting are much more efficient with concurrent access to all of the information available to all users. This has accelerated the rate of information exchange and improved decision-making. The system provides for online data sharing, improved information governance and data management as well as a robust, secure environment that underpins and enables efficient workflow and business processes.

There are now over 60 users and it is estimated that the new system has saved c. £250k across the project teams and also several months of effort when compared to traditional business processes.

The EGIP work has led to an on-going partnership between Forth Valley GIS and Millar & Bryce and also to winning the Association for Geographic Information's *Innovation and Achievement (Private Sector) 2012* award, which was presented in November 2012 at the awards meeting in Southampton.

• *Forth Valley GIS is one of the UK's leading providers of location-based information services. For more information, visit www.forthvalleygis.co.uk.*

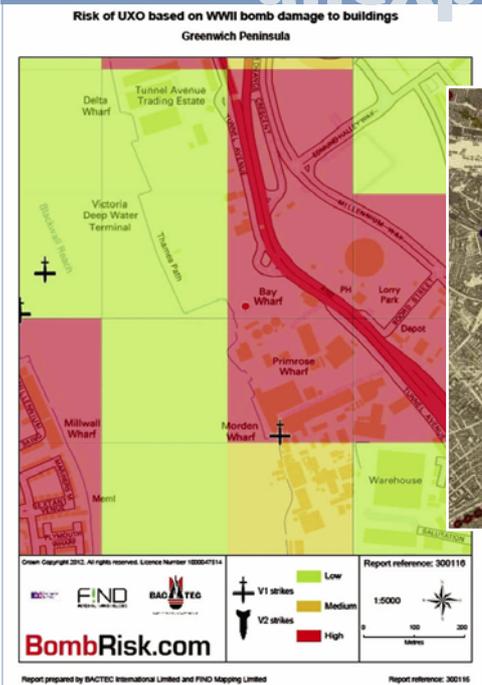
Above: Location Centre was used to develop Notification Manager to help collect and share data for the EGIP project.



... it is estimated that the new system has saved c. £250k across the project teams and also several months of effort...



mapping unexploded ordnance



Above: Figure 1 – Bomb Census Map sample from The National Archives.
Left: Figure 2 – UXO risk-based on bomb damage maps.

BOMBRISK IS AN INSTANT online UXO (unexploded ordnance) risk assessment for developers and asset managers anywhere in the UK. FIND Maps in partnership with BACTEC, specialists in explosive ordnance disposal, are behind this fully commercial service, which uses many sources of information

of Defence activities that could have left UXOs include munitions left by training exercises, ineffectively cleared dumps and defensive installations. The latter include decoy sites, anti-aircraft batteries, airfields (possibly with pipe mines laid under their runways) and other military installations. The locations can be determined from various historical maps and records.

Bombing during WWI was relatively light but during the Blitz (1940/41) and the rest of WWII there were many thousands of bombs dropped on London alone as well as later strikes by V1 flying bombs and V2 ballistic missiles. Local authorities were responsible for recording bomb hits within their boundaries and also for recording the damage to buildings so caused. Although many unexploded bombs (UXBs) were recorded and dealt with at the time, it is assumed for the BombRisk service that the likely density of UXBs is directly related to the density of recorded bomb hits and damage.

There are detailed Bomb Census Maps compiled for London now held in the National Archives (www.nationalarchives.gov.uk), see figure 1. There are also very detailed 1:2500 Bomb Damage Maps covering the London County Council (LCC) area that record damage throughout the war and include the specific locations of all V1 and V2 impacts. Unfortunately, these very detailed maps can only be viewed by visiting the London Metropolitan Archives and are not available on the web.

UXBs and UXOs: acronyms that might go bang!

Two new websites are delivering information about the Blitz from archived mapping. One aims to provide risk assessment on unexploded ordnance and bombs at UK sites for commercial use, the other aims to educate the general public – both share the use of geographic information at the heart of the service. Our editor, **Robin Waters**, decided to take a closer look.

together with spatial analysis techniques to provide a preliminary unexploded ordnance risk assessment. Bomb Sight, on the other hand, is a free access website aimed at the general public and has been created by the University of Portsmouth and funded by JISC, which provides higher education and research funding for digital technology.

Our publisher has also lent me a copy of *'The London County Council Bomb Damage Maps 1939-1945'*, which was published in 2005 by the London Topographical Society. Taken together these tell a fascinating story about the Blitz and about other attacks on London as well as the enemy or friendly munitions that might be found elsewhere in the UK.

Friends and foes There are two main sources of UXO risk in the UK – 'friendly' activity by our own military (and our allies) and bombs and other projectiles dropped during both world wars. Ministry

However, they have been compiled at a scale of 1:5500 into a large book by the London Topographical Society with a very detailed description of how they were created and of the derived statistics, although this book is now out of print. The "Blitz" is generally recognised as the period from September 1940 – when the Luftwaffe switched from attacking airfields during the Battle of Britain – to May 1941 when Hitler ordered his air force to the Eastern Front for the attack on the Soviet Union. There was a second "baby blitz" in early 1944 with conventional bombing before the V1 offensive between June and September 1944 and the barrage of V2s, which continued from September 1944 to March 1945.

BombRisk According to the Construction Industry Research and Information Association (CIRIA) over 15,000 items of ordnance were found on construction sites in the UK between 2006 and 2009. Current CIRIA

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guidelines recommend a review of potential sources of UXO as part of the planning process (www.ciria.org).

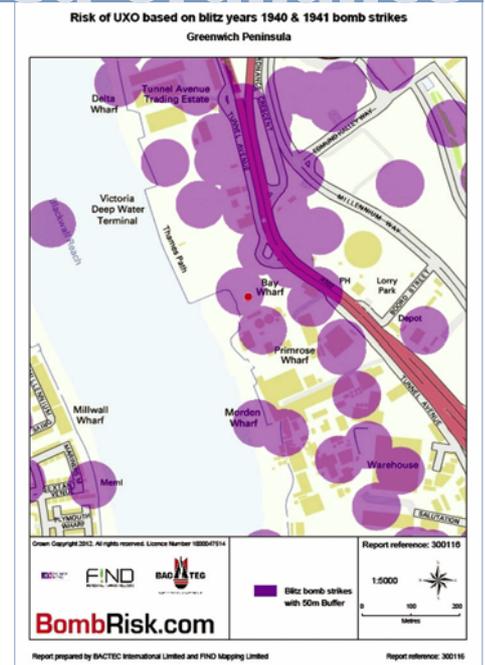
'Unexpected UXO encounter on a project not only exposes personnel to risk but it can also lead to delays and increased project costs. Such a UXO discovery can lead to a knee-jerk reaction to UXO risk, potentially incurring unnecessary cost or in some cases inappropriate UXO risk mitigation measures,' says Phil Baptie, senior project researcher at BACTEC.

BombRisk.com was developed by FIND and BACTEC to provide preliminary risk assessment satisfying phase one of CIRIA's "best practice" recommendations. It is designed to enable a non-UXO specialist to identify a site, get an on-line assessment of exposure to the potential risk from UXO and to identify whether or not a more detailed study is required.

Creating an online, easy-to-use website to deliver on these goals was no easy task. It involved collating the best available data on UXO in the UK; digitising these disparate data sources into one fully geo-referenced database; creating an algorithm to determine risk factors; creating an automated report populated with risk maps, distances from potential UXO sources; and publishing this information as a PDF document that could be ordered from an e-commerce website.

directly related to the proximity of the site to identified and located risk factors, the risk decreasing with distance. To calculate the complex and overlapping risk 'surfaces' from the individual data points and areas, GIS technology was employed.

The system looks at the risk scores from both air-delivered UXBs and from British/Allied UXO. For UXO, risk rating "contours" were placed around potential sources or indicators, which reflect the potential risk from that source. For example, a historic military airfield site would be given a higher score than the location of a WWII pillbox, and would cover a larger geographic area. BombRisk takes multiple risk "landscapes" and assigns a combined potential risk value from UXO for a particular site that ranges from "negligible" to "high" (see figure 2). In the same way, the system also produces a risk score that relates to an assessed level of risk from air-delivered UXBs (see figure 3).



Above: Figure 3 – UXO risk-based on bomb census maps.

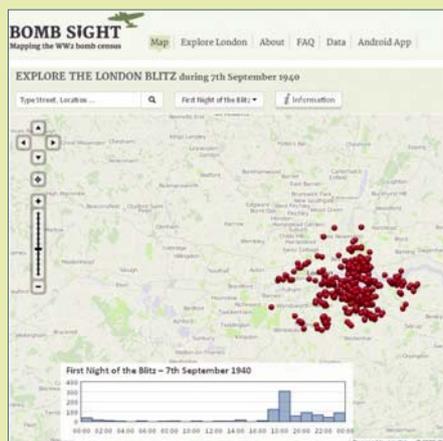
Assessing UK UXO risk The primary function of BombRisk is to determine whether or not a detailed risk assessment is required for a site. This risk is

Report generation and assessment While the calculation of the overall "BombRisk" for a site uses some sophisticated software, it is important that the

BombSight: The Public Interest

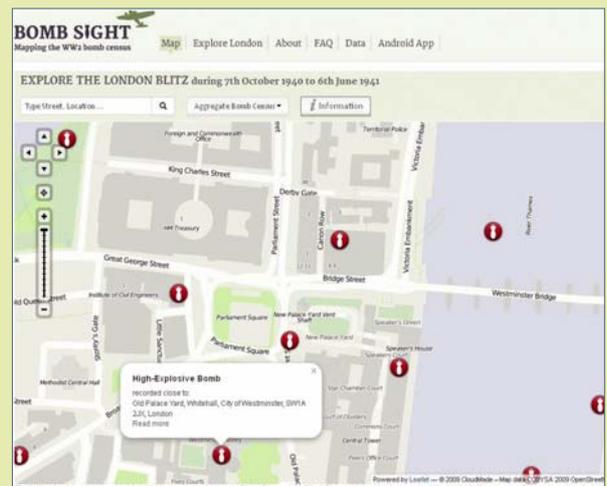
Bomb Sight does not claim to be as comprehensive as BombRisk but uses maps of the London WWII bomb census, taken between October 1940 and June 1941 and until now only available to view in the Reading Room at The National Archives. The locations of the bombs have been combined with geo-located photographs from the Imperial War Museum and geo-located memories from the BBC's WW2 People's War Archive.

Zooming on this map gradually resolves the red dots into individual bomb impacts that can then be clicked for further details, pictures and news including first-person stories from survivors at the specific site, collated by the BBC. The examples show an overview for the first night of the Blitz with the time that the bombs dropped and a close up of Westminster for the entire period with the detail for one bomb near Parliament.



There is also an associated Android app that gives users an augmented reality view. When pointing their phone at a street scene, it uses the phone's camera and GPS to display the bombs that fell nearby.

Left: Figure 4 – Bomb Sight showing First Night of the Blitz - 7th September 1940.



Above: Figure 5 – Bomb Sight showing bombs on Westminster during the whole of the Blitz.

mapping unexploded ordnance

The London Topographical Society

The London Topographical Society, founded in 1880, is a publishing society which concentrates exclusively on books and sheet material illustrating the history, growth and topography of London. In 2012 we published a fully illustrated catalogue of the 2007 British Library exhibition of London maps and in 2013 we shall be publishing the A to Z of London in 1682 based on William Morgan's map, complete with index and references (www.topsoc.org).

delivery of the report is in a format that does not require the recipient to acquire or use such complex tools themselves. The report contains explanatory text, bespoke mapping, data tables and recommendations all of which are derived from online spatial databases using the bespoke software tools enabling real-time analysis.

Once the risk profile has been generated for a site, the highest risk rating from either the WWII UXB or Allied and British UXO risk assessments is used to recommend more detailed investigation. Thankfully, most UK sites can be screened out by the report, with no further UXO related research or work required.

Many thanks to:

- Roger Cline, London Topographical Society, www.topsoc.org
- Thomas Skinner at FIND Maps, www.findmaps.com

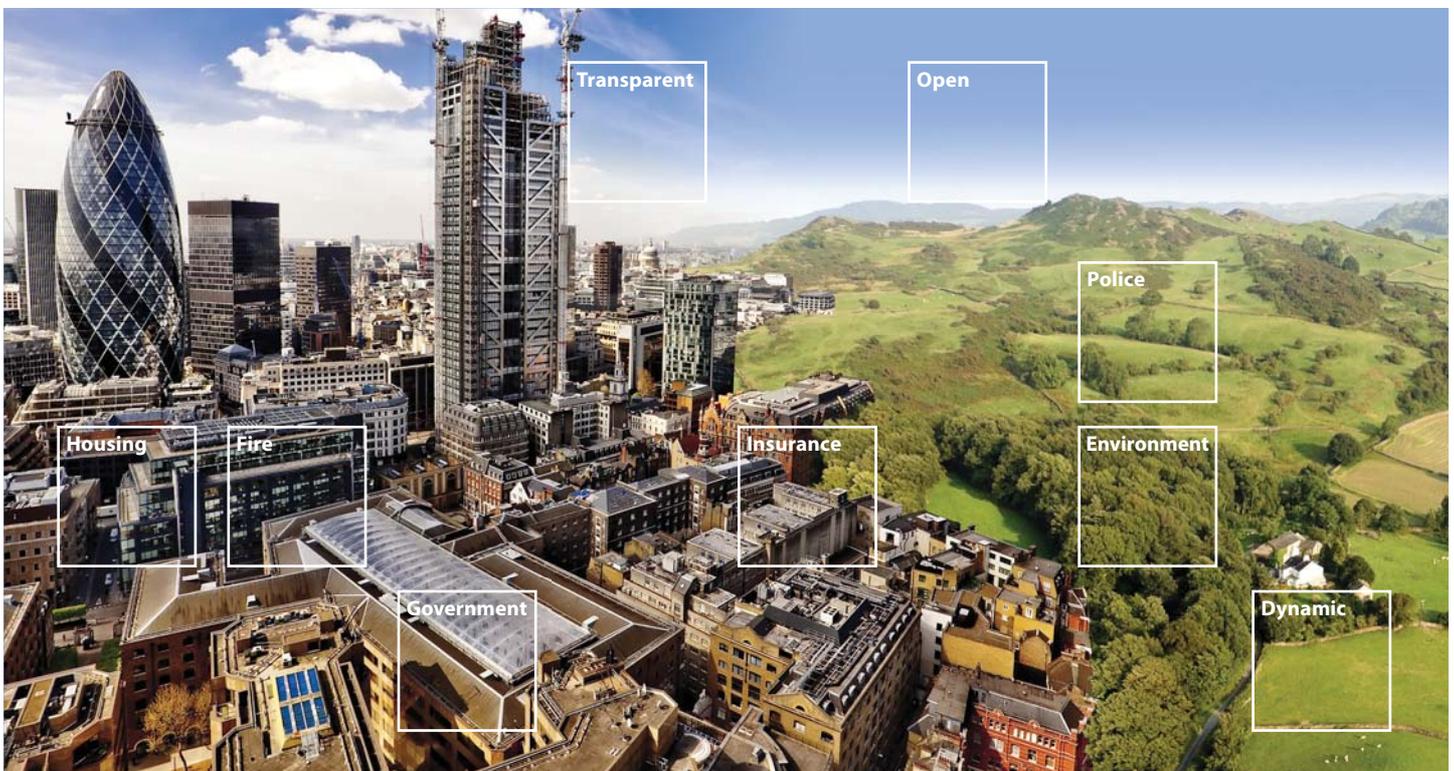
- Philip Baptie at BacTec, www.bactec.com
- Dr Kate Jones and Kate Daniell at the University of Portsmouth, www.bombsight.org

Company Background: FIND

FIND is an advanced online mapping tool for businesses claiming to hold the largest instantly accessible map and data library available. Ordnance Survey maps and aerial photography can be viewed, annotated and printed or exported to GIS or CAD formats for technical uses.

Company Background: BACTEC

The BACTEC (Battle Area Clearance, Training, Equipment and Consultancy) Group of companies is comprised of a number of leading Explosive Ordnance Disposal, (EOD (Bomb Disposal)), Mine Action companies operating worldwide from strategically located offices. The Group Head Quarters is located with BACTEC International Limited in the UK, with offices/branches located in Australia, Cambodia, Iraq, Lao PDR and Mozambique. BACTEC has been providing unexploded ordnance (UXO), landmine clearance and bomb disposal services globally since 1991 and to date has carried out Unexploded Ordnance disposal contracts in over 45 countries.

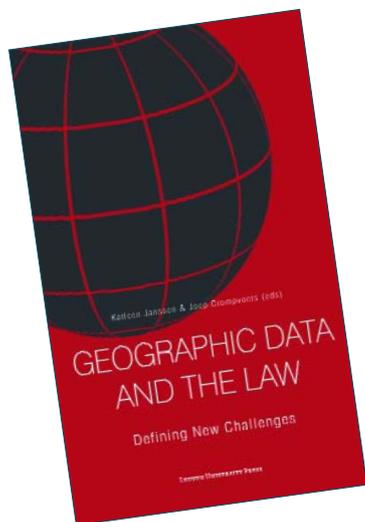


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Geographic Data and the Law – Defining New Challenges

Kathleen Janssen and Joep Crompvoets (eds).
Published in 2012 by Leuven University Press, Leuven, Belgium, pp199.
ISBN 978 90 5867 9246
€39.50

THE INTRODUCTION by the editors is succinct and eminently readable; starting from a definition of GIS, where they are used, the need for legal research, the regulatory framework and the contribution of this book. Omit the introduction at your peril, even if you get no further when you first pick up this book, please read the introduction.

Including the editors there are 17 authors. Apart from the introduction and conclusions, there are three main sections: Policies Promoting Availability; Policies Restricting Availability; and Relationship between the Public and Private Sectors. There are 13 pages of main references of which the European Commission and

A valuable book to anyone interested in how geographic information technology is being embraced by organisations and a rewarding read as it sets out where the dragons are, even if it does not slay them.

Parliament occupy the whole of one page.

So, what are the conclusions and how does one get there? 'Getting there' was by way of two workshops organised by the University of Leuven's Interdisciplinary Centre for Law and ICT and also the 'Spatialist' Project funded by the Flemish Government Agency for Innovation by Science and Technology. The conclusions, as with any academic text, start with what do we have to do next?

In respect of the Policies Promoting Availability (Part 1), these relate to interoperability of licensing, standard licensing frameworks and the interaction between legal requirements and technical requirements of spatial data infrastructures (SDI). Many governments are providing portals to obtain data, including geographic data; however, there is no standard licence for interoperability. These three chapters promoting availability are quite disparate at the initial read.

The first one looks towards a standard interoperable geographic data service and developing standard geo-data licences. The table (page 32) of different licensing terms with 11 different jurisdictions (including two due to INSPIRE) shows only three common components for all 11. These are: the grant of a licence, restrictions on use and, of course, disclaimers. Is this a surprise? Probably not!

The second chapter is on the Greek experience post implantation of INSPIRE. In 2010, the Greek Parliament passed law 3882/2010, occasioned by the INSPIRE Directive. It is

deemed important because it addresses open data in general not just public sector information. The point I picked up is that the law sets out that virtually gratis licensing of geo data for sharing between national public authorities is a minimum.

The third chapter is on the Australian experience of balancing intellectual property rights with access and reusability of geo-data. Importantly, the acceptance by the government of Creative Commons Attribution as the default copyright licence for government materials reflects the importance of such data for a nation state.

The next section (Part 2) is entitled Policies Restricting Availability. The first chapter relates to location privacy in the USA covering a number of considerations. These are: the embryonic development of the idea of location privacy; the collection of location information by many organisations with a variety of sensors; the continuing development of technology but with a threat that over-regulation will stifle innovation; and finally that geo-information has already been collected over many years and in many forms including ZIP codes and addresses. All these methods of collection and storage by various groups may make it quite impossible to harmonise the legislation required for each type of user.

The second chapter in this section looks at the processing of location data under the European Data Protection Laws. Article 9 of the ePrivacy Directive could have its scope extended or, alternatively, location data could be removed

from its scope and be governed by the Data Protection Directive.

The third chapter also considers legal liability issues and geo-data including laws of contract and tort as well as the breaching of statutory duties. The question asked is: 'what is the requisite standard of care for geographic data and GIS, whether they should be considered as systems, products or combinations?' This is not an easy question to answer and as new technologies evolve, so new answers will be needed.

Finally, issues around the dissemination of high resolution data and national security in India are considered, with a conclusion that the data should be available but with severe penalties for infringement of conditions.

The Relationship between Public and Private Sectors (Part 3) has only two chapters. The first looks at their respective roles whilst the second considers the use of a 'public value test' for geo-data.

Is this book of value and if so to whom? It is certainly of value to anyone who believes that geographic information technology is embracing, and being embraced by, a growing number of organisations – both providers and users. They will find this book a rewarding read as it sets out where the dragons are, even if it does not slay them.

Review by Carl Calvert

Calvert Consulting and Visiting Lecturer UCL & L'ESGT.

products

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Handheld updates notebook



Handheld Group has launched a new version of its Algiz XRW rugged notebook. The updated notebook is faster than its predecessor and has twice the amount of RAM. The 10.1" touch-screen display features MaxView technology, providing screen clarity and brightness in any outdoor condition, even direct sunlight. Weighing 1.5kgs, features include: a N2600 1.6GHz dual-core Intel ATOM processor; a 128Gb solid-state disk; 4 GB of DDR2 RAM; and optimised integrated u-blox GPS for better field performance. The Algiz XRW also comes standard with Bluetooth, WLAN and GPS and it passes MIL-STD-810G ruggedness testing, including drop tests from 1.2 metres and extreme temperatures from -20 to 55°C.

Heading for the heights: Bluesky heights 50 million buildings

Bluesky has taken national mapping to the next level by adding height information to Ordnance Survey's digital maps. Using detailed 3D models, Bluesky has added height attributes to more than 50 million buildings. 'Users from a wide range of markets are calling out for detailed, off-the-shelf height mapping with cost effective and user-friendly licensing,' says Rachel Tidmarsh, managing director of Bluesky. 'By combining the best mapping with detailed height measurements in a customer orientated package we are now able to satisfy this demand. We have already seen interest from customers in local government, utilities, insurance, telecommunication, environment and the emergency services.'

Using its own off-the-shelf Digital Surface Model (DSM)

supplemented with LiDAR data, the company has developed a range of automated processes and routines to attribute height values to building polygons extracted from either OS MasterMap or VectorMap Local. From this it is possible to accurately determine building heights in relation to the underlying terrain. Bluesky will be following its launch of a heightened building layer with other heightened feature layers such as roads, railways and rivers.

Height data from Bluesky has added 3D to OS MasterMap.



OpenData upgraded

Following Blue Sky's work, Ordnance Survey's free data portal, OS OpenData, is being upgraded to include a fully maintained height dataset, a new version of OS VectorMap District and a new cartographic styling package. The height product is OS Terrain 50 and has a similar resolution to Land-Form Panorama, which was last updated in the 1990s. It will give users more confidence in the currency of the data and will be supplied in additional formats.

A fully maintained release of VectorMap District will replace the current beta version and will include product updates every six months. There is an improved cartographic style and "look and feel", plus additional data formats. Both Strategi and Meridian 2 will also have new cartographic styles. The aim is to enhance the usability of the products and deliver a consistent style across a series of scales.

Streetworks Signposting

GeoPlace has launched the Streetworks Signposting Service (SSS), designed to help the Department for Transport (DfT) fulfil a requirement to make streetworks information more accessible for the general public and other interested parties. The service is available through the National Street Gazetteer website (www.thensg.org.uk) and enables users to search for streetworks via a map or text search and then link

directly to the relevant highway authority streetworks register.

Under the New Roads and Streetworks Act 1991, English local authorities are required to make their streetworks register available to the general public. Accessing this information across the country from different highway authorities is a time-consuming and unwieldy exercise. So the DfT approached GeoPlace to deliver the SSS service, which now provides a portal to access this information from one place.

Local transport minister, Norman Baker, says: 'Streetworks are necessary but understandably can be incredibly frustrating for motorists. This new online checking service will allow drivers to see where road works are taking place throughout England before they set off, helping to reduce congestion and improve journey times'.

First official OS app

Ordnance Survey GB has launched the organisation's first official mobile app for iPhone, iPad and iPod Touch. The OS MapFinder app is designed for outdoor enthusiasts and is free to download with overview mapping for the whole of Great Britain. Once downloaded, users can purchase and download more detailed map data. The app provides users with the freedom to choose any 10km x 10km section of OS Landranger (1:50k) or Explorer (1:25k) maps. Pricing is 'from 69p' though initial user reaction on the iTunes website is that this is more expensive than the paper version. The vendor is Ordnance Survey Ltd – a subsidiary of the mapping agency.

All maps are cached after downloading so that they can be used without a wifi or mobile signal. Users can search for locations by place name, postcode or grid reference. The app also enables users to record

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their walking, cycling or running routes to be reviewed or repeated at a later date and can be personalised with photographs. The app is free to download at: <https://itunes.apple.com/gb>

Out of sight but seen

Edinburgh-based Trackplot Ltd has developed a portal that will assist those working in the local authority sectors in safeguarding their lone workers and comply with Health and

Safety Executive (HSE) regulations. Backed by Scottish Enterprise, the Trackplot Portal provides a company with the means to track lone workers even beyond mobile phone network coverage by using GPS positioning and a satellite communication service. Regular or emergency messages are sent from the lone worker by SMS or email and monitored by the portal with access for as many office-based users as required.

BRIEFS

GIS247 has extended its linked licence training scheme, until now only available to government and their partners. The scheme will now allow an associated or partner organisation to have a linked licence at a reduced rate enabling

access to training material in ArcGIS or MapInfo formats.

Envitia has announced a solution provider partnership to deliver and support the OpenGeo Suite including GeoServer, PostGIS and OpenLayers in the UK market. The suite aims to combine open source and the reliability and support of a single, stable vendor behind a full stack of software.

Readers may be interested in a useful crowd-sourced service available at #uksnow. Tweet your location and how much it is snowing (on a scale of zero to ten for a blizzard) and watch it all on <http://uksnowmap.com/>. Tune in to the last hour or the last 24!

The Mapumental Property service (<http://property.mapumental.com/>) went live in November offering

public transport travel time maps for Great Britain. These show you where you might live to be able to commute to your office, within say 30 minutes. The service is a spin-off from mySociety (www.mysociety.org). Also from the same stable are MapIt (find your administrative areas and boundaries), FixMyStreet (reporting potholes, etc.) and several other useful websites.

Skobbler, a Berlin-based company that uses OpenStreetMap to create location-aware apps, has announced that its ForeverMap 2 app is available for Amazon's Kindle Fire. This is also free for Kindle Fire HD with full use of online worldwide maps included as standard. Offline maps can be purchased at various levels from individual cities to a global map.

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AGI column



Peter Capell is the interim Director and CEO of the AGI.

THE AGI TEAM has started the year with a new geographic outlook. We have moved offices from the tumult of the banking world in the City to the quieter and leafier heart of Kensington where our neighbours are musicians and scientists – in addition to geographers and explorers. Our new address – AGI, 1 Kensington Gore, SW7 2AR – is better known as the location of the Royal Geographical Society (with Institute of British Geographers), RGS-IBG.

Still reaching for the holy grail We were extremely pleased when an opportunity to take up residence in this attractive and historic building arose last autumn. While the rest of the country was winding down in the week before Christmas, the AGI team were in a flurry of activity packing and unpacking as we moved in two days before the Christmas break and we are now well ensconced. Our near neighbours on the second floor are also organisations with geographical themes – the

what the online maps show: Kensington Gore being two different sections of minor road running either side of the Albert Hall and not along the main Kensington Road. Despite the considerable advances made over recent years, the holy grail of a consistent single national address database is not yet quite fully in our grasp, at least for this part of SW7!

Recent AGI activity The annual Awards Ceremony, this year in the form of a splendid lunch and series of presentations at Ordnance Survey's impressive building in Southampton, was very well attended and led to much favourable feedback. Apart from stimulating presentations and the awards themselves, the event included a lively workshop on the future strategy of the AGI. Lots of ideas arose and these will go forward to a practical plan, which will be discussed at the first council meeting in January (and which I shall be describing in the next

Move to the home of British geography The AGI is now happily ensconced in new offices, says **Peter Capell**. The AGI team, along with new council members, are busy planning opportunities and events for 2013, including the GeoCommunity conference and a series of Showcase events around the UK.

Institute of Navigation, The Standing Committee on Geographic Names, and the Conservation Foundation. The whole building, apart from being historic, beautiful and wonderfully labyrinthine, embodies mankind's fascination with geography both past and present.

The AGI and the RGS-IBG have had close connections for many years, most recently with the Chartered Geographer (GIS) scheme. Both organisations have wanted for some time to explore further opportunities for working together to exploit the combination of interests and skills across our memberships. Our move will facilitate this and we look forward to keeping our members updated on these discussions during 2013.

Of course, a number of our members are also members of RGS-IBG and many have already commented positively on the move. Interestingly, for those (many?) members who take a particular interest in the arcane subject of addressing – we have come across one issue that may amuse.

Our correct postal address is now 1, Kensington Gore. This designates a fairly short strip of road running between the Albert Hall and Kensington Gardens. This strip (like its neighbour 'Hyde Park Gate') interrupts the main 'Kensington Road'. The old road sign on the RGS-IBG building confirms this by showing 'Kensington Gore'. So why did the poor man trying to deliver our new fridge have so much difficulty finding us? Because his satnav showed

issue). The list of award winners can be found at <http://www.agi.org.uk/agi-awards/>.

Early in December, I had the pleasure of attending the AGI-Cymru conference in Cardiff organised by the very active and enthusiastic AGI-Cymru committee. I had the added pleasure of presenting one of their long serving members, **Sue Beetlestone**, with the AGI team's 'Volunteer of the Year' award during the conference. I would like to take this opportunity to particularly thank her for her efforts on our collective behalf, but also to thank all of our trusty band of volunteers who make the AGI what it is and who have, obviously, been the inspiration for the much lauded 'Games Makers' during 2012!

Moving to the future I should introduce the new members of AGI Council, starting their three-year term in January. These are **Nick Austin**, Deloitte; **Emma Bee**, British Geological Survey (BGS); **Mike Cooper**, Leica Geosystems; **Chris Holcroft**, Royal Meteorological Society; **Abigail Page**, Central Scotland Forest Trust and **Angharad Stone**, Environment Agency. They replace the familiar names of **Angela Baker**, Esri UK; Dr **Robert Barr**, Manchester Geomatics; **Lars Calvert**, PA Consulting; **John Pepper**, John Pepper Consultancy; **Gesche Schmid**, Local Government Association; and **Andrew Trigg** HMLR – all of whom have made a much valued contribution as council members.

“
So why did the poor man trying to deliver our new fridge have so much difficulty finding us?
”

GeoCommunity updates The GeoCommunity '13 conference title is 'Open for Business' and the newly-formed conference action working group is making rapid progress on the programme. Booking has opened for both delegates and for sponsorship and I am pleased to say that a number of bookings have already been received. The call for papers will almost certainly have been issued by the time this column goes to print.

The conference will again be located at the East Midlands Conference Centre on the Nottingham University campus. A new development is that the conference is being organised back to back with the FOSS4G international conference entitled 'Geo for All'. The AGI is working closely with FOSS4G and the two conferences are being designed to complement each other. We hope that many delegates will take advantage of the discounts available to those staying on for FOSS4G over the latter part of the week beginning 16th September. The wider community of delegates should make for a very broad-ranging and stimulating experience for everyone. More information at www.agi.org.uk/geocommunity/.

In addition, we are offering a new series of Showcase events around the UK in 2013. Planning for these events is well under way now, particularly for the first two in Glasgow and Bristol. Registration is open for all six events (see www.agi.org.uk). The Glasgow event, titled 'New Directions in Geo', is on 27 February at Glasgow University and is the ideal opportunity to see how geographic data and applications are flourishing in Scotland. The South West Showcase is on Thursday 21 March in Bristol's famous Colston Hall. A key feature will be titled 'Opening up environmental GI – Opportunities and challenges' and will be hosted by the AGI Environmental Special Interest Group.

In addition, we are teaming up with GeoMob and promoting their innovative events. The first of these is on 7 February at 6.30pm at the British Computing Society's excellent facilities near Covent Garden (The Davidson Building, 5 Southampton Street, WC2E 7HA to be precise). For more information on these events keep an eye on the AGI website. You may already have noticed our new and, we think, much improved front page for which the credit goes to **Claire Gilmour** in the AGI team.

Harmonised maps Finally, a personal reflection. As everyone in the AGI community will be very aware, a key policy area is the delivery of INSPIRE. A number of recent events have acted as a reminder of the importance and relevance of taking a cross national boundary approach to environmental issues and hence for the need for available and consistent spatial data presented in the form of mapping. The continuing and apparently growing impact of global warming, whether man-made or not, in the form of



Above: The Gallery of Maps at the Vatican Museum was commissioned in 1580 and contains a series of painted topographical maps of Italy based on drawings by friar and geographer Ignazio Danti.

more extreme weather patterns, makes the case for harmonisation as a necessary input to analysis and policy development. Is this an entirely new concept?

While on a city break in Rome last year, I found an incredibly powerful example of a similar concept dating back more than four centuries. To see the famous Sistine Chapel, one must visit the Vatican Museum. This involves a lengthy walk, with no short cuts, through many extraordinary rooms before finishing at the Sistine Chapel, by which time many people are sadly so exhausted that they hurry for the exit. One of the rooms en route is the 'Gallery of Maps'.

The 120m long gallery was commissioned in 1580 by Pope Gregory XIII who is perhaps best known for the Gregorian calendar that we use to this day. The gallery contains a series of painted topographical maps of Italy based on drawings by friar and geographer **Ignazio Danti**. It took Danti three years (1580–1583) to complete the 40 panels, which map the whole of the Italian peninsula in large-scale frescoes. Each depicts a region as well as a perspective view of its most prominent city. To anyone with an interest in maps, it is truly an awesome experience. However, it is the political motivation behind the commissioning that is really significant. Even then it was trying to create a vision of a united Italian national identity. Harmonised maps were seen as an essential input to promote harmonised policies. *Niente di Nuovo*.

- **The AGI has moved offices. Our new address is:**
1 Kensington Gore, SW7 2AR
Tel: 0207 591 3190



The AGI exists to "maximise the use of geographic information (GI) for the benefit of the citizen, good governance and commerce". Membership details are available from info@agi.org.uk or by calling: +44 (0)207 591 3190



. . . growing impact of global warming. . . in the form of more extreme weather patterns, makes the case for harmonisation as a necessary input to analysis and policy development.



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We welcome advance details of conferences, seminars, exhibitions and other events which are likely to be of interest to the GIS community. Please mention the name of the event, venue, date and point of contact for further information and send to Hayley Tear, *GISPro*, 2B North Road, Stevenage, Herts SG1 4AT or e-mail: hayley@pvpubs.demon.co.uk.

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Workshop: Better asset management for an uncertain future
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 More information: www.bgs.ac.uk

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Wavelength Conference 2013
 11-13 March 2013, Glasgow, UK
 More information:
www.rspsoc-wavelength.org.uk/wavelength2013
SPAR International 2013

APRIL

15-18 April 2013, Colorado Springs, Colorado, USA.
 More information:
www.sparpointgroup.com/international/

MAY

GEO-South
 – a world of Geomatics and GIS innovations
 1-2 May 2013, Holiday Inn, Elstree, UK
 More information: Contact Sharon Robson – sharon@pvpubs.demon.co.uk
 or www.pvpubs.com/events.php

Geospatial World Forum 2013
 13-16 May, Beurs-World Trade Center, Rotterdam, The Netherlands.
 More information: www.geospatialworldforum.org

JUNE

INSPIRE Conference 2013: The Green Renaissance
 23-27 June 2013, Florence, Italy
 More information:
http://inspire.jrc.ec.europa.eu/events/conferences/inspire_2013

JULY

Esri International User Conference 2013
 8-12 July 2013, San Diego Convention Center, USA.
 More information:
www.esri.com/events/user-conference/index.html



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Ref: 5485/97/0006/RA/OS

Applications are invited for the post of Mapping Officer in the Department of Land Surveys and Registration within the Ministry of Environment, Planning and Infrastructure Strategy.

Working under the direction of the Senior Land Surveyor, the successful applicant will be responsible for managing supervising, and controlling all aspects of directing the Survey Section's mapping and GIS activities to provide service and advice to the whole of Government, advising and selling maps to the public in hardcopy and digital formats. The post holder will also be responsible for providing technical and administrative support to the Senior Land Surveyor on the Section's work programme and support to other Departments.

Duties and responsibilities will include, but are not limited to:

- Supervising and managing all Government map data. Maintaining base mapping in digital format as the Bermuda Topographic Map Database (TMD). Assessing user needs, specifying, developing, maintaining and supporting policy for the publication of the TMD. Customizing the TMD for individual Government Departments (such as Architects and Structural Engineers) and the general public (such as private sector architects and real estate agents) with contracts and service agreements.
- Designing GIS applications and coordinating a wide range of tasks throughout Government, collaborating with the Land Surveyor to collect, analyze and publish data using real-time DGPS. Coordinating government and private sector GIS initiatives and representing the Ministry at the Geospatial Information Committee.
- Acting as project manager for specialized Government mapping and GIS contracts. Managing risks to ensure that projects are completed on time, within financial constraints and to specification, to the satisfaction of the Senior Land Surveyor. Providing advice, information and guidance to other project management teams when planning projects and feasibility studies.
- Supporting the Senior Land Surveyor in the preparation of the Section's annual budget and in the management of the allocated budget.
- Developing, documenting and implementing of technical specifications and procedures.

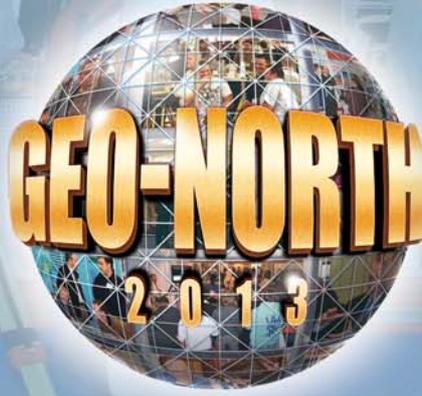
The postholder will be required to train and develop a trainee to occupy this post in the future.

Applicants must possess a Bachelor's degree in Land Surveying, or equivalent, be a Chartered Land Surveyor, Member of the Royal Institution of Chartered Surveyors, or equivalent, and be qualified for registration as a Professional Surveyor in Bermuda.

A minimum of four (4) years' post-academic qualification (MRICS) experience is required. The successful applicant must be competent with computers and computer systems and possess a thorough knowledge of Digital Mapping and GIS software. Also, the successful candidate must be able to secure a valid driver's license and be capable of lifting weight of moderate size.

This position will be offered on a three (3) year contract term. Any persons wishing to be considered for the position advertised may apply by submitting a completed Government of Bermuda application form (which can be downloaded from www.gov.bm) quoting the appropriate reference number, to: **The Secretary of the Public Service Commission, 3rd Floor, Ingham and Wilkinson Building, 129 Front Street, Hamilton HM 12, BERMUDA.** email: hr@gov.bm or by fax: 441-295-2858.

Closing date: March 28th, 2013.



7 MARCH 2013 @ REEBOK STADIUM, BOLTON

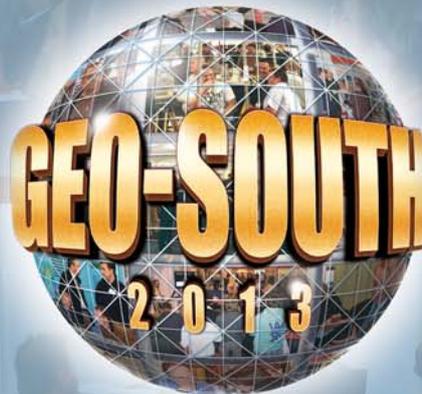
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THERE WILL BE A GALA DINNER ON THE EVENING OF 1 MAY.

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