



ICT-enabled Innovation and Land Administration

Technological Developments and
Game-changing Ideas



GIM International Interviews

Tony Burns

**Fit-for-purpose
Land
Administration**

See page 26

**The Global
Cadaastre**

Improving Transparency in
International Property Markets

S320™

GNSS Survey Receiver Solution

**Built
Surveyor
Tough**



Includes:



XF2™ Data Collector



Carlson SurvCE Data
Collection Software

Whether you are doing GIS, Construction, Mapping, Land or Marine Surveying, **Hemisphere GPS®** (now **Hemisphere GNSS Inc.**) **S320™** can be tailored to your exact requirements.

SMS RTK & Texting • GNSS Configurable • SureTrack™ Intelligence • GSM Auto Corrections • 10-Hours Hot Swappable Battery Life • Includes XF2™ Data Collector and Carlson SurvCE Data Collection Software

www.S320Surveyor.com • Precision@HemisphereGPS.com



Hemisphere
GPS®

GIM

INTERNATIONAL

PUBLISHING DIRECTOR

Durk Haarsma

FINANCIAL DIRECTOR

Meine van der Bijl

TECHNICAL EDITOR

Mark Pronk, BSc

SENIOR EDITOR

Dr Ir. Mathias Lemmens

CONTRIBUTING EDITORS

Dr Ir. Christiaan Lemmen, Dr Ir. Bastiaan

van Loenen, Dr Rohan Bennett,

Dr Mike Barry

EDITORIAL MANAGER

Wim van Wegen

COPY-EDITOR

Lynn Radford, Englishproof.nl

EDITORIAL BOARD

Ir. Paul van Asperen, Dr Bharat Lohani

ACCOUNT MANAGER

Gert-Jan Liefers

MARKETING ASSISTANT

Trea Fledderus

CIRCULATION MANAGER

Adrian Holland

DESIGN

Verheul Media Supporters BV,

Alphen aan den Rijn

www.vrhl.nl

REGIONAL CORRESPONDENTS

Ulrich Boes (Bulgaria), Assoc. Prof.

Dr Alper Çabuk (Turkey), Papa Oumar

Dieye (Niger), Dr Olajide Kufoniya

(Nigeria), Dr Dmitry Kurtener (Russia),

Dr Jonathan Li (Canada), Dr Carlos Lopez

(Uruguay), Dr B. Babu Madhavan

(Japan), Dr Wilber Ottichilo (Kenya),

Dr Carl Reed (USA), Dr Aniruddha Roy

(India), Prof. Dr Heinz Rüter (South

Africa), Dr Tania Maria Sausen (Brazil)



Geomares Publishing
P.O. Box 112, 8530 AC Lemmer,
The Netherlands
T: +31 (0) 514-56 18 54
F: +31 (0) 514-56 38 98
gim-international@geomares.nl
www.gim-international.com



No material may be reproduced in whole or in part without written permission of Geomares Publishing.
Copyright © 2013, Geomares Publishing, The Netherlands
All rights reserved. ISSN 1566-9076

Your work matters!

Land issues play a prominent role in the array of factors leading to poverty: due to a lack of tenure rights, millions of people in the world's developing regions live in uncertainty – from farmers in Africa to urban dwellers in Asia and South America. Permanent political institutes like the United Nations and semi-permanent political gatherings like the G8 and G20 have called upon the geomatics sector as a whole to take up the challenge and solve land issues faster in order to make the world a better place (UN), and to drive technology and economies (G8 and G20). Several high-level initiatives are already underway to spur geomatics into action, such as UN-GGIM and others. But one of the most high-profile institutions playing a major part in 'putting land administration on the map' is the World Bank. Established in 1944, headquartered in Washington DC, USA, and managed by 188 member countries, the World Bank is solely dedicated to reducing poverty in the world's poorest countries and is therefore one of the most natural environments

for linking geomatics to decreasing poverty in a positive way.



DURK HAARSMa
Publishing director
durk.haarsma@geomares.nl

Photography: Arie Bruinsma

The World Bank organises an Annual Conference on Land and Poverty where economists, social scientists, legal specialists and geospatial experts exchange ideas and discuss developments within the international land sector. *GIM International* has teamed up with the World Bank as one of its media partners to ensure that ideas brought forward at the annual conference are shared with the global readership – in more than 160 countries – of *GIM International*.

Even if you were not able to travel to Washington DC for the most recent conference held from 8 to 11 April this year, you can still rely on being updated on all current discussions and debates; moreover, you can put the ideas from the discussions and debates into practice.

I've said it before in this column over the years: we should view it as a privilege that we can put techniques to work for the betterment of humankind. It gives geomatics an extra 'glow', a silver lining, if you wish. It would be strange, not to mention time-consuming, to constantly feel that glow in your everyday work, but every now and then it is good to pause and take the time to reflect: your work matters!

It makes me proud to present you with this issue of *GIM International* which has been put together jointly by the World Bank and the editorial board of this magazine. Our aim is to sharpen your ideas and to update your knowledge on cadastres and land administration as a tool for eradicating poverty in the coming years and for securing tenure for millions of people in regions of the world where, today, the situation is still very uncertain.

PENTAX

STATE OF THE ART MEASURING TECHNOLOGY

TOTAL STATIONS
W-800 SERIES

R-400N SERIES

R-400VDN SERIES

R-400VN SERIES

POSITIONING SYSTEM
GNSS G3100-R1

CONSTRUCTION
LEVELS
AP SERIES

ENGINEERING
LEVELS
AFL SERIES
AL SERIES

TI Asahi Co., Ltd.
International Sales Department
Tel.: +81-48-793-0118
Fax: +81-48-793-0128
e-mail: international@tiasahi.com
www.pentaxsurveying.com/en/





Geodetic linking to a reference system is relevant to produce georeferenced imagery and to combine drawn cadastral boundaries (on top of images) with GPS-based surveys. Dr. Nkurunziza – DG and Registrar of Land Titles at Rwanda Natural Resources Authority – performs GPS measurements to complete the reference system.

GIM INTERNATIONAL
GIM International, the global magazine for geomatics, is published each month by Geomares Publishing. The magazine and related e-newsletter provide topical overviews and accurately presents the latest news in geomatics, all around the world. *GIM International* is orientated towards a professional and managerial readership, those leading decision making, and has a worldwide circulation.

PAID SUBSCRIPTIONS
GIM International is available monthly on a subscription basis. The annual subscription rate for *GIM International* is €140 within the European Union, and €200 for non-European countries. Subscription can commence at any time, by arrangement via our website or by contacting Abonnementenland, a Dutch subscription administration company. Subscriptions are automatically renewed upon expiry, unless Abonnementenland receives written notification of cancellation at least 60 days before expiry date. Prices and conditions may be subject to change. For multi-year subscription rates or information on current paid subscriptions, contact Abonnementenland, Postbus 20, 1910 AA Uitgeest, Netherlands +31 (0)251-257926 (09.00-17.00 hrs, UTC +1) paidsubscription@geomares.nl.

ADVERTISEMENTS
 Information about advertising and deadlines are available in the Media Planner. For more information please contact our account manager: gertjan.liefers@geomares.nl.

EDITORIAL CONTRIBUTIONS
 All material submitted to Geomares Publishing and relating to *GIM International* will be treated as unconditionally assigned for publication under copyright subject to the editor's unrestricted right to edit and offer editorial comment. Geomares Publishing assumes no responsibility for unsolicited material or for the accuracy of information thus received. Geomares Publishing assumes, in addition, no obligation to return material if not explicitly requested. Contributions must be sent for the attention of the editorial manager: wim.van.wegen@geomares.nl.



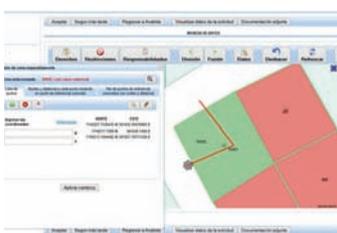
► **INTERVIEW PAGE 14**
Equality as an Underpinning Element

GIM International Interviews Tony Burns



FEATURE PAGE 21
ICT-enabled Innovation and Land Administration

Technological Developments and Game-changing Ideas



FEATURE PAGE 35
LADM-based Implementation Starts Working

An Information System for an Integral Approach to Land Management

FEATURE PAGE 26
 ► **Fit-for-purpose Land Administration**
 Building Sustainable and Transparent Spatial Frameworks

FEATURE PAGE 30
 ► **The Global Cadastre**
 Improving Transparency in International Property Markets

REPORT PAGE 38
 ► **World Bank Conference on Land and Poverty 2013**

COMPANY'S VIEW PAGE 40
 ► **Professional Adventurers Celebrate 100th Anniversary**
 Underhill Geomatics

REPORT PAGE 54
 ► **FIG Working Week 2013**

NEWS & OPINION	PAGE
Insider's View	6
News	7
Endpoint	13

INTERNATIONAL ORGANISATIONS	PAGE
FIG	43
GSDI	45
IAG	47
ICA	49
ISPRS	51

COLUMNS	PAGE
Editorial	3

OTHER	PAGE
Advertisers Index	53
Agenda	53

EAB

The Editorial Advisory Board (EAB) of *GIM International* consists of professionals who, each in their discipline and with an independent view, assist the editorial board by making recommendations on potential authors and specific topics. The EAB is served on a non-committal basis for two years.

PROF. ORHAN ALTAN

Istanbul Technical University, Turkey

PROF. DEREN LI

Wuhan University, China

MR SANTIAGO BORRERO

Secretary-general of Pan American Institute of Geography and History (PAIGH), Mexico

PROF. STIG ENEMARK

Honorary President, FIG, Denmark

DR ANDREW U FRANK

Head, Institute for Geoinformation, Vienna University of Technology, Austria

DR AYMAN HABIB, PENG

Professor and Head, Department of Geomatics Engineering, University of Calgary, Canada

DR GABOR REMETÉY-FÜLÖPP

Secretary General, Hungarian Association for Geo-information (HUNAGI), Hungary

PROF. PAUL VAN DER MOLEN

Twente University, The Netherlands

PROF. DR IR MARTIEN MOLENAAR

Twente University, The Netherlands

MR JOSEPH BETIT

Senior Land Surveyor, Dewberry, USA

PROF. SHUNJI MURAI

Institute Industrial Science, University of Tokyo, Japan

PROF. DAVID RHIND

ret. Vice-Chancellor, The City University, UK

PROF. DR HEINZ RÜTHER

Chairman Financial Commission ISPRS, University of Cape Town, Department of Geomatics, South Africa

MR FRANÇOIS SALGÉ

Secretary-general, CNIG (National Council for Geographic Information), France

MR DAVID SCHELL

Chairman Emeritus, Open Geospatial Consortium, Inc., USA

PROF. DR TONI SCHENK

Professor, The Ohio State University, Department of Civil and Environmental Engineering, USA

PROF. JOHN C TRINDER

First Vice-President ISPRS, School of Surveying and SIS, The University of New South Wales, Australia

Is a Business Built on the Prediction of Earthquakes Feasible?

The prediction of earthquakes is a challenge that has yet to be solved. Several methods have been proposed, but none are truly successful with respect to predicting when, where and on what scale an earthquake will occur. I and my partners have continually worked to develop a rather reliable method of prediction using the fixed GPS stations which are densely located all over Japan. Although we were able to predict the occurrence of the Great East Japan Earthquake that happened on 11 March 2011, we were not allowed to signal the impending risk to the general public. And afterwards, it was too late to announce that we had predicted it. Now, with the founding of a private company named Japan Earthquake Science Exploration Co. Ltd. (JESEA) in February of this year, we are allowed to provide information to the public about the possibility of earthquake occurrence. The service consists of providing weekly news updates about the possibility of earthquake

occurrence with yellow (caution advised), orange (risky) and red (very risky) marks indicating the earthquake risk for two areas of Tokyo and Osaka. In the four months since the start of the business, several earthquakes of magnitude 4 or 5 on the Richter scale occurred in different places in Japan; most of JESEA's predictions were correct with respect to where and how large. One of the biggest problems is that there is a two-week delay in obtaining data from the GPS stations which are owned by the Geo-spatial Information Authority (GSI) of the Japanese government. One earthquake with a very shallow epicenter once occurred before the data had even been acquired from GSI via the internet.



PROF. SHUNJI MURAI
Institute Industrial Science, University of Tokyo, Japan
sh1939murai@nifty.com

The business can be called successful in terms of the prediction technique, but not in commercial terms, since the number of customers is still insufficient, even though the monthly fee is the equivalent to just two US dollars. I predict that the company will not be able to survive much longer than a year since the investment base is not big enough. We were aware that people are unlikely to pay money for future risks to life, except for life and fire insurance. Japanese citizens paid money after a catastrophic accident such as the Great Earthquake and Tsunami, but not before. The business's likelihood of success would be improved if we would be able to provide a correct and timely prediction before another major earthquake occurred. The goal of the company is to save as many people's lives as possible by predicting giant earthquakes in advance. According to the statistics, Japan has experienced 30 very big earthquakes that each claimed more than 1,000 victims within the past 400, with the average time span between them just 13 years.

Shunji Murai, born in 1939 in Tokyo, Japan, was professor of the Institute of Industrial Science at the University of Tokyo from 1983 to 2000. He is now professor emeritus there, as well as president of the Japan Association of Surveyors. He is an expert in the fields of digital photogrammetry, remote sensing, satellite positioning, GIS and suchlike. His recent research has been concentrated on the prediction of earthquakes using GPS data. He initiated the Asian Conference on Remote Sensing in 1980, which has been a regular event for the past 30 years. He is currently an honorary member of ISPRS, AARS and JSPRS.



New Account Manager at *GIM International*

Gert-Jan Liefers has joined Geomares Publishing as the new account manager for *GIM International*. Gert-Jan studied business administration with a specialisation in international management at Radboud University Nijmegen in The Netherlands. To discuss print and/or online advertising in *GIM International* with Gert-Jan, please feel free to contact him at gertjan.liefers@geomares.nl. ◀
▶ <http://su.pr/2v52ju>



Gert-Jan Liefers.

Professor Deren Li Joins Editorial Advisory Board

Professor Deren Li of the Wuhan University has taken a seat on the Editorial Advisory Board (EAB) of *GIM International*. Professor Dr Deren Li is a scientist in photogrammetry and remote sensing and one of China's most renowned authorities on geomatics. He is chairman of both the Academic Commission of Wuhan University and the National Laboratory for Information Engineering in Surveying, Mapping and Remote Sensing (LIESMARS). ◀
▶ <http://su.pr/2kkJ17>



Professor Deren Li and publishing director Durk Haarsma.

Esri Location Analytics to Help Grow Franchise Further

Esri has announced that Great Harvest Bread Company, headquartered in Dillon, Montana, USA, and known for its whole-grain breads and baked goods, is using Esri Location Analytics to help grow its franchise further. A combination of Esri Business Analyst software and Tapestry Segmentation data allows the company and franchisees to quickly perform detailed market analysis that identifies market gaps and profitable potential locations to open new bakeries. ◀
▶ <http://su.pr/2h15Wr>

ACCOMPANY US!

Comprehensive GIS and engineering solutions in every environment; desktop, web, mobile and cloud...

Let's provide local solutions to your market!



global@netcad.com



No 2370





Reliable



X91 GNSS - The industry's performance and reliability standard

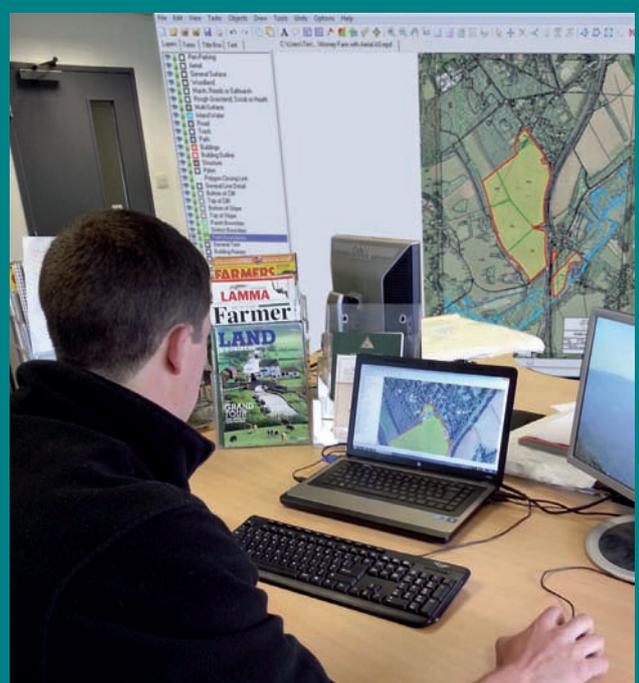
- **TRACKING EVERY SIGNAL AND EVERY SATELLITE**
Advanced 220-channel GNSS technology for state-of-the-art RTK accuracy and reliability
- **FLEXIBLE AND SCALABLE**
Internal UHF and Cellular data modems; bundled with Carlson SurvCE or CHC Landstar field software
- **EFFICIENT**
Small, lightweight and rugged design for the most demanding field work
- **SUPPORT**
Worldwide network of local service centers and dealers



Aerial Photographs and GIS Help British Farmers

Aerial photographs from Bluesky, UK, are helping farmers and rural estate managers gain a greater understanding of the environment in which they work. Working with Pear Technology, a developer and supplier of land and crop management software, Bluesky has supplied aerial photographs to enhance the overall digital mapping experience. The map-accurate images provide a backdrop for Ordnance Survey mapping offering clear, up-to-date and useable contextual detail for a range of rural applications. ◀

▶ <http://su.pr/2daLKY>



Aerial imagery from Bluesky is used within PT Mapper.

Exploring EU-Japan GNSS Cooperation

May 2013 saw the opening of the first GNSS.Asia Japan workshop held in Tokyo, Japan. Attracting over 70 participants, the event offered the opportunity for delegates from Japanese industry and academia to discuss industrial cooperation in downstream GNSS markets with European counterparts. ◀

▶ <http://su.pr/2i4y1b>



Most Shared

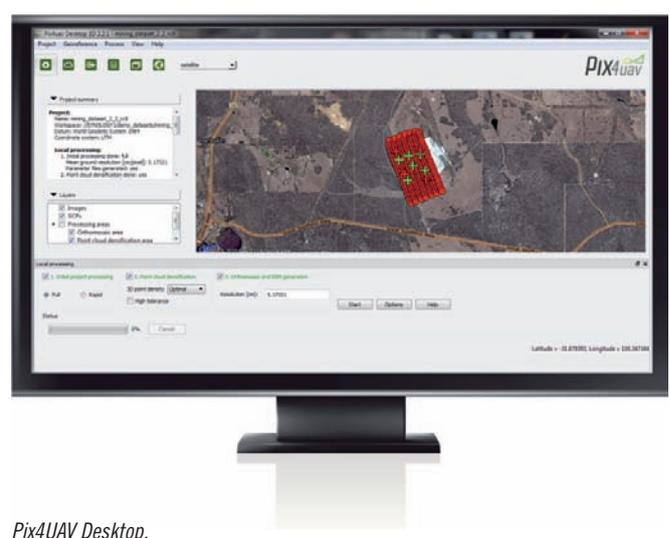
Most shared during the last month from www.gim-international.com

1. UAS Captures Aerial Images of Easter Island Volcano - <http://su.pr/1QFu6G>
2. Office Surveying Software Integrates Gatewing X100 UAS - <http://su.pr/1J4I2F>
3. Aerial Photographs and GIS Help British Farmers - <http://su.pr/2cbFU6>
4. Gyrocopter for Aerial Survey Operations - <http://su.pr/2Qj87c>
5. Dutch Schoolboy Photographs Earth from 35 Kilometres Up - <http://su.pr/20NemU>

Pix4D Releases New Version of Pix4UAV

Pix4D, Switzerland, has announced the release of version 2.2 of its Pix4UAV desktop software. Pix4UAV is a software package that combines thousands of aerial images taken by lightweight flying platforms into professional and accurate 2D maps and 3D models. ◀

▶ <http://su.pr/2ejnP7>



Pix4UAV Desktop.





AeroMetric Launches High-accuracy Mapping Solution

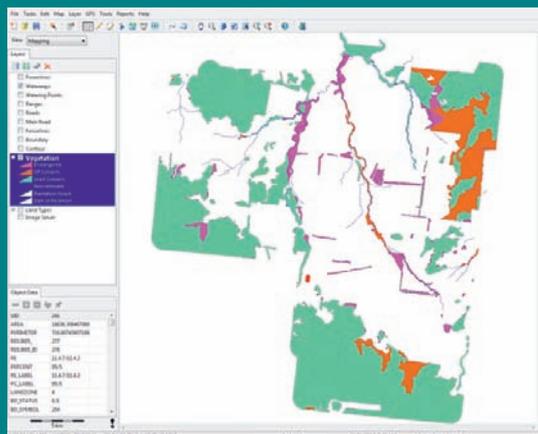
AeroMetric has announced the addition of a new high-accuracy mapping solution for its clients. The new solution is designed to obtain tight vertical accuracy and highly detailed imagery using a helicopter-based sensor system mounted on a drift-control platform. The sensor system includes a RIEGL VQ-480i Lidar sensor and a Phase One iXA 80 MP digital camera, and is controlled through TrackAir's flight management system. ◀

▶ <http://su.pr/2xAI6i>

TatukGIS Contributes to Native Vegetation Classification Software

The Queensland Department of Natural Resources, Australia, has undertaken a state-wide land-cover and tree study to identify and classify all vegetation zones across the state. The primary methodology was remote sensing backed up by field surveys, resulting in the creation of a vegetation database the government uses to stipulate vegetation management guidelines by which all landholders must abide. The idea behind this effort was to assist landholders, scientists, industry and government with the world's best-practice landscape management. ◀

▶ <http://su.pr/1wfsI6>



AGDATA native vegetation classification software.

Leica Geosystems Launches Total Station and Monitoring Station

Leica Geosystems has announced the Leica Nova TS50 high-precision total station and Nova TM50 monitoring station for applications that require uncompromising precision and reliability. The total station and monitoring station are part of the new Leica Nova solution, presented by Leica as the latest generation of surveying technology that integrates advanced measurement capabilities, modern and intuitive field software, and intelligent office software. ◀

▶ <http://su.pr/1dQgnC>



Leica Nova TS50 and TM50.

Leica Geosystems and Aibotix Sign UAS Cooperation Agreement

Leica Geosystems has entered into a cooperation and distribution agreement with Aibotix, a manufacturer of multicopter unmanned aerial systems (UAS) to create end-to-

end solutions for the professional inspection and mapping market. The Swiss manufacturer of airborne mapping solutions has licensed the Aibotix X6 for worldwide distribution. ◀

▶ <http://su.pr/1JdFWA>



Aibotix X6.

Hemisphere Launches R330 GNSS Receiver

Hemisphere GNSS has launched its new R330 GNSS receiver. The R330 delivers positioning through a variety of differential correction methods including SBAS, L-Band, Beacon and RTK. The R330 is developed for a variety of land and marine applications. ◀

▶ <http://su.pr/1ZpbnX>



KarbonTech Pioneers Unmanned Aerial Surveying in UK

Unmanned aerial surveying is developing at a fast pace. The latest progress sees the eBee UAV land on British shores being operated by KarbonTech, an aerial surveying company. In June 2013, it announced it would be the first company to obtain approval from the Civil Aviation Authority to fly this commercially. ◀

▶ <http://su.pr/1cTjLQ>

Test flight of senseFly eBee.



Monitoring Czech Floods with a UAV

Heavy rainfall in late May and early June 2013 caused severe floods in the Czech Republic. Geodis, a leading Czech company in the fields of geodesy, photogrammetry and remote sensing, used an unmanned aerial vehicle (UAV) to monitor the impact of flooding by the River Vltava in the Czech capital of Prague as well as in the evacuated village of Hrensko on the River Elbe and the village of Kamenice on a tributary of the Elbe. ◀

▶ <http://su.pr/3070to>



Geodis used a UAV to monitor floods.

Brazilian Institute of Geomatics and Geospatial Solutions Companies Established

At a meeting held in São Paulo, Brazil, on Tuesday 23 April 2013, 17 companies signed an agreement to establish the Brazilian Institute of Geomatics and Geospatial Solutions Companies ('IBG' in Portuguese). The meeting was held at the headquarters of the Brazilian Defence and Security Industries Association (Abimde), with the participation of the Brazilian Trade and Investment Promotion Agency (Apex). ◀

▶ <http://tw.gs/QxW0iZ>



Brazilian Institute of Geomatics and Geospatial Solutions Companies.

softmouse 3D™

Smooth,
lightweight
and accurate

SOFTMOUSE 3D-USB
PHOTOGRAMMETRIC
CONTROLLER



Experience unparalleled ease of use and comfortable two-handed operation with the softmouse 3D photogrammetric controller. If you require precise digitizing and manipulation of elements in a 3D virtual environment, softmouse 3D is the tool of choice. Reliable, comfortable, capable, and with a long list of photogrammetric and geospatial applications supporting it, you can't go wrong upgrading your production environment with Softmouse 3D to boost your productivity.

For a special upgrade promotion visit our web page to request information and enter GIMPROMO in the Promo Code box.

GGS
GLOBAL GEO SUPPLIES, INC.

www.soft-mouse3d.com
Softmouse@ggsnet.com
(US) +1 303 223 4638

No 2384



Softmouse 3D™ is a trademark of Global Geo Supplies, Inc.

RIEGL Solution for 3D Digital Scene Processing

RIEGL has launched the RiSOLVE software package that allows the speed and ease needed to simplify the 'field to office' exchange and provides a fast workflow for true-colour 3D scene scanning. The software is especially developed for accident investigation and rapid deployment scene capture, where time is of the essence. ◀
▶ <http://su.pr/1CK4j3>



Accident investigation with the RIEGL VZ-400.

Esri President Receives Honorary Doctor of Science Degree

Jack Dangermond, founder and president of Esri, was presented with an honorary Doctor of Science degree at the commencement ceremonies of the University of Massachusetts, Boston, USA, on 31 May 2013. Dangermond is one of the world's pioneers in the creation and practice of geographic information systems (GIS) technology used for managing, analysing and sharing location-based information for better decision-making. ◀
▶ <http://su.pr/2yQQ89>

Laser Scanner for Surveying Roads at 100 km/h

The Fraunhofer Institute for Physical Measurement Techniques (IPM) has developed a laser scanner for measuring road surfaces with high precision. A single high-resolution laser scanner scans the topography of the road surface across a span of four metres. Even at speeds of up to 100 km/h, measurements are accurate to between 0.15 and 0.3 millimetres. In cooperation with a road surveying specialist, Fraunhofer IPM has already scanned a total of 15,000 kilometres of highway and other major roads across Germany. ◀
▶ <http://su.pr/2zrxkD>



Fraunhofer IPM laser scanner.

New Zealand Launches New Place Name Database

Finding and viewing information on official place names is now much easier, thanks to a new web-based database launched by the New Zealand Geographic Board (NZGB). The database – called the Place Names Gazetteer – allows people to search for both the official and unofficial names of places and geographic features throughout New Zealand, as well as those within New Zealand's continental shelf and the Ross Sea region of Antarctica. ◀
▶ <http://su.pr/5d1zns>

Indoor Location: the Mobile Revolution Starts Now

For more than 20 years, the use of global positioning system (GPS) has been the gold standard for outdoor navigation. The satellite-based navigation system has become an indispensable tool for anyone wanting to determine their location outside a building, whether driving on roads or motorways or walking down the street. More recently, cell-phone manufacturers have added GPS capabilities to mobile devices, which in turn has created new opportunities for existing location-based services (LBS) such as mapping and navigation. ◀

▶ <http://su.pr/1ACVTP>



Advancements in indoor navigation.

Remote Sensing to Identify New Mineral Targets in Nevada

Tungsten, an exploration-stage company focused on the evaluation, acquisition and development of domestic tungsten mining opportunities, has announced that it has successfully implemented spectral mapping to significantly advance the initial study of mineralisation at its flagship Nevada property, USA. ◀

▶ <http://su.pr/3WkvWd>

Lords and Serfs

The food price rise of 2008 prompted countries that rely on imports for nourishing their people to seek farmland overseas. South Korea, the world's third-largest buyer of corn – mainly from the American continent – turned its attention to Africa and bought over one million hectares of Madagascar's fertile land for yielding corn. The result was violent protests among Madagascan citizens, two-thirds of whom were living below the poverty line, and the country's president was forced from office. His successor declared: "The constitution stipulates that Madagascar's land is neither for sale nor for rent," and revoked the deal.

Food security is not the only issue causing industrial countries to look for land in regions where the majority of people are 'uprooted' as a result of the global economy. The need for biofuel, timber and minerals is equally pressing, and all this is shored by the easy transportation of goods across the globe. Indeed,



MATHIAS LEMMENS
Senior editor, GIM International
m.p.j.m.lemmens@tudelft.nl

foreign investors are purchasing extensive areas in Africa for the construction of huge industrial farms. Their interests and those of the native rulers often do not match with those of the locals. The latter are the ones who suffer as their livelihoods erode. Why are foreign investors so keen on Africa? Land there is cheap compared to other parts of the world, and it is also plentiful; massive tracts are still uncultivated, although farmland in Sub-Saharan Africa has increased from 145 million to 225 million hectares over the last 50 years. In addition, most land in this region is

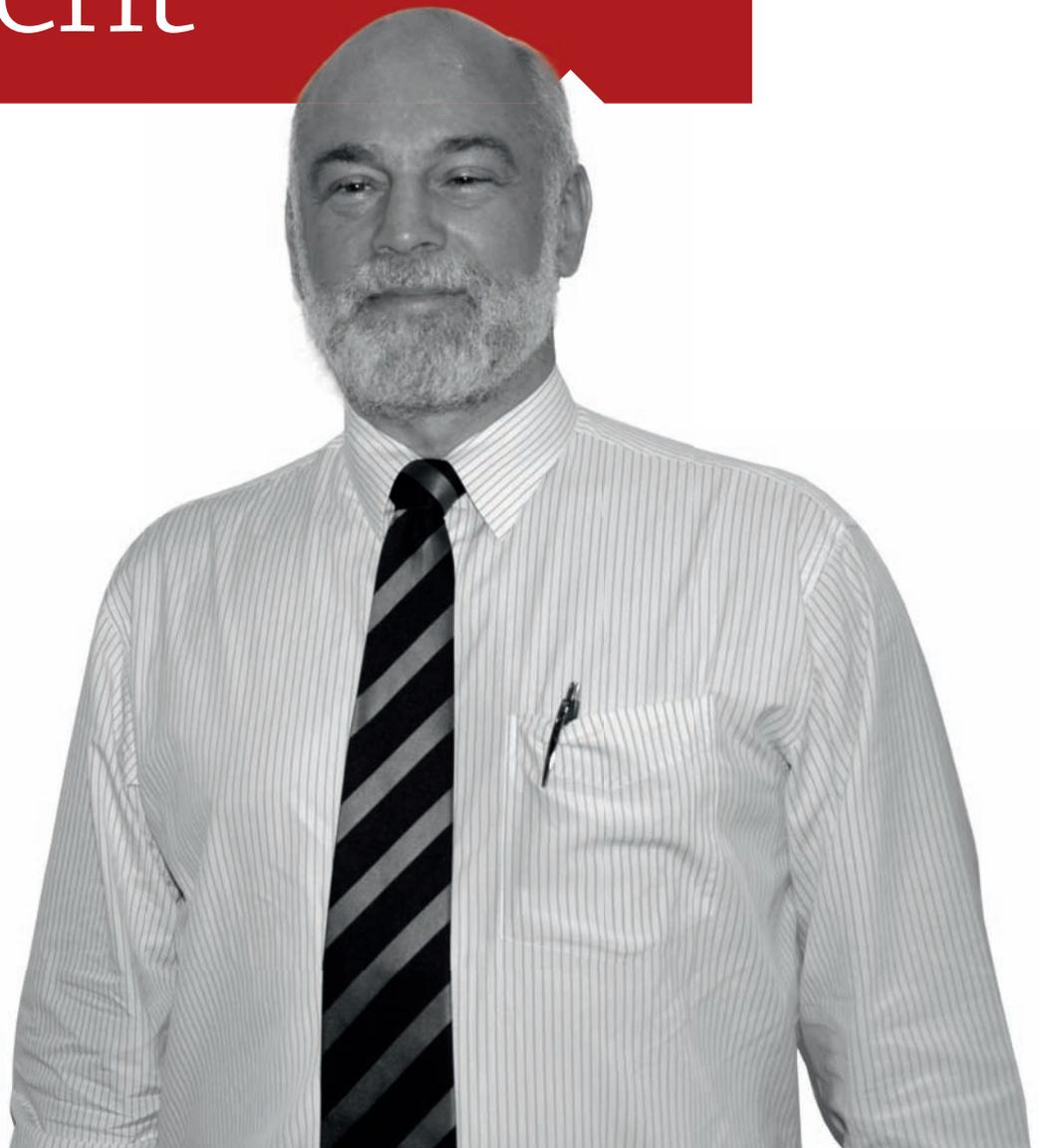
formally controlled by the state, allowing leaders to easily transfer land rights.

ICT makes it possible to transmit huge sums of money from the one corner of the globe to the other in a split second. International supply chains enable the production of goods designed at Western drawing tables to countries with an abundance of low-cost labour. In the wake of the above, land has also 'gone global' and land markets are shifting from domestic to international. Land rights are being transferred on a record scale from one part of the world to another, mainly from vulnerable hamlets in Africa to megacities in major economies. The livelihoods of millions of people are being affected with impoverishment as the outcome. Land is the only source of wealth – definitely, full stop! So, some inconvenient questions arise. Should land be owned by an industrial or financial giant quartered in a high-rise building some 10,000 miles away? Is industrial-scale farming really a means of eradicating poverty in developing countries, one of the Millennium Development Goals? How can the North call itself civilised when it allows millions of people in the South to be driven out of their homes, extruded from their land as once were the Native Americans, even if they were tidily compensated in the eyes of US law? Is this the dawn of a new era of feudalism, with a few lords and millions of serfs? And finally the key question: what role should land administration experts play in the transfer of land rights from the South to the North?



GIM INTERNATIONAL INTERVIEWS TONY BURNS

Equality as an Underpinning Element



Land Equity International operates worldwide and is well known for its involvement and support in land policy formulation and land administration reform. Apart from the technical dimension to its activities, the company gives prominence to the social dimension – ensuring that land is managed and administered in an equitable manner, protecting the interests of all. GIM International interviews managing director Tony Burns on his motivations and his involvement in projects such as the World Bank's Land Governance Assessment Framework and a cost and revenue analysis for Land Administration Services.

The name of your company sounds ambitious and also idealistic. What's the story behind it?

Land Equity International was established in 2001 by a team of specialists that had been working on land sector projects since the early 1980s as part of larger consulting organisations. We had been involved from the start on the Thailand Land Titling Project, which was awarded a World Bank Award for Excellence in 1997, and had built on this experience to win work throughout Asia, South America, Europe and Africa. The founding partners of Land Equity International all came from a survey background – but we approached our work in a very non-technical manner. It was important to us that land initiatives were grounded in the local legal, socioeconomic and institutional context. Technology was becoming an increasingly important element in any land administration reform initiative, but it was only a tool. I can remember in the nineties, when we were designing a project in Peru, the head of the property formalisation institution there commenting that I was the most 'non-engineering' engineer that he had ever met. I was very happy with that comment as I saw that it encapsulated our whole approach. We put a lot of thought into our 'brand' when we set up the

company, and eventually settled on Land Equity International as we felt the name reflected our approach to land policy formulation and land administration reform.

Could you tell me about your company and its activities?

Our core activities are working with government and private-sector counterparts to improve systems for land regularisation, registration, adjudication, surveying and mapping. We then assist in training trainers to carry out the activities in the field. When developing new systems and approaches, it is important to work closely with counterparts to ensure every aspect of local knowledge and practice is accounted for. All of our activities embrace equality as an underpinning element, and often this specifically requires resources at the conceptual and inception phases to analyse where these must be proactively addressed, particularly in the area of land rights for women and vulnerable people.

You are one of the key authors of the Land Governance Assessment Framework developed by the World Bank. Could you explain a little more about it?

The Land Governance Assessment Framework (LGAF) is a diagnostic

tool that aims to identify the key land sector issues in a jurisdiction and agree on appropriate steps and strategies that might be adopted to address these issues within a framework that enables land governance to be monitored over time. It takes at least four months for a team of local experts to implement an LGAF study; this long process with wide participation is necessary since land and land governance is more complex and more nuanced than assessing a topic such as public expenditure and financial accountability. The LGAF Country Scorecard can be used to assess both areas where things are going well and areas where things could be improved. The way the LGAF dimensions are structured and the wording of the pre-coded statements are such that policy or strategic action is evident. The 80 core LGAF dimensions are structured under thematic areas such as the legal and institutional framework, land use planning, management and taxation, the management of public land, the public provision of land information, and dispute resolution and conflict management. The LGAF broadly covers the land sector and the LGAF methodology can be extended ▶

Tony Burns



Tony Burns is a land administration specialist with extensive experience of designing, managing and evaluating land titling and land administration projects. Mr Burns has over 25 years' management experience, including experience as a team leader and project director, supervising large-scale, long-term, multi-disciplinary projects. He has also undertaken numerous short-term consultancy projects for the World Bank, AusAID and ADB. His technical expertise includes land policy, cadastral survey and mapping, land titling, land administration and spatial information systems.

Mr Burns has extensive experience in the systematic registration of rights in land, in particular the optimisation of field process, the legal implications of systematic registration and the development of human and technical resources to support land administration. He is a specialist in managing change and the interface between systematic registration field work and the land registry and institutional arrangements. He assists clients with performance auditing and is experienced in assessing project implementation against objectives and milestones. Mr Burns has also carried out significant research on land administration and worked with the World Bank to develop the set of global indicators for good governance in land administration.

✉ tburns@landequity.com.au

INTERGEO®

Conference and Trade Fair for Geodesy,
Geoinformation and Land Management

www.intergeo.de



8 – 10 October 2013
Essen, Exhibition Grounds

INTERGEO®

along with

2nd National INSPIRE Conference 2013



Sponsors:

 **esri** Deutschland

 **HEXAGON**

 **Trimble**

Host: DVW e.V.
Conference organiser: DVW GmbH
Trade fair organiser: HINTE GmbH

DVW

by adding further modules. Modules have been developed to cover large-scale land acquisition, forestry and regularisation.

By whom is the framework used?

Primarily by policymakers in developing and implementing policies and strategies. The framework also provides a platform for discussion between governments and development partners on how the international community can help governments in improving governance.

Initial results were presented at the World Bank Land and Poverty Conference in April this year. Are the results so far in alignment with the expectations?

It was very pleasing to participate in the LGAF sessions at that conference in Washington and to hear that LGAF has now been implemented in 32 countries and that sub-national LGAF reviews were planned in Brazil, India and other federal countries. The LGAF enjoys general acceptance as a tool that has broad application in the land sector and is being applied to support a number of multilateral and bilateral initiatives, including the African Union Land Policy Initiative. I see this as very positive. There are however a number of challenges. There is clearly a need to ensure that there is a wide understanding of the nature and objectives in undertaking an LGAF study in a country. There are already implementations that will test the usefulness of the LGAF as a tool to monitor change. There is the need to ensure that the LGAF report results in some real change rather than just another report on someone's desk. This perhaps highlights the need to engage policymakers earlier in the process. There is also the need to respond to continued requests for quantified indicators that might provide some clear metric for monitoring outcomes from land sector reforms without the LGAF becoming too unwieldy or losing its generic global application.

You're currently working on a cost and revenue analysis for Land Administration Services. Why is such analysis not readily available?

That's right, we are undertaking a cost and revenue analysis for land administration services for UN Habitat and partners in the Global Land Tool Network.

As you note, there is very limited information on standards that may be appropriate for both the funding of land administration services and the projected revenue that governments might expect from the provision of land administration

records that record rights for all land in the country. In many developing economies, however, the formal system is incomplete. Many countries have restrictions on land transactions that limit the formal market and encourage the development of informal markets. There is lack of a consistent rationale for land administration. In some countries it is seen as a public good, whereas in others it is seen as a source of government revenue. There are different models for sharing the revenues: some countries have policies that agencies retain all or

There is no information to guide key land-sector staff in preparing and costing plans

services. This is primarily due to the great variety in land administration arrangements – or even what constitutes 'land administration'. In many countries there are separate institutions for survey and mapping and for land registration, whereas other countries have a single agency. Globally, land administration is also undertaken at different levels in government. Furthermore, there is a great variety in tenure arrangements and what tenure is recorded or registered in the formal land administration system. In many developing countries there is typically a duality of systems, with a 'formal' system operating under some model of land administration in the areas where colonial interests were concentrated, and 'customary' systems elsewhere that operate under varying degrees of formal recognition. The urbanisation seen in recent decades further complicates land administration. There is a great variety in the completeness, comprehensiveness and up-to-dateness of land administration records. A few countries have largely complete cover with spatial and textual

some of the revenue collected on a self-funding basis, while others are moving into public-private partnerships to provide land administration services that share costs and revenues. Development partners often support the development work, and in some cases even routine operations.

In view of the substantial investments in land administration worldwide, could we not expect some type of standard in financing to be available?

Even in developed systems there is a lack of guidelines on appropriate levels of service delivery, funding norms and revenue expectations. We undertook a comparative study of land administration systems for the World Bank about a decade ago. A prime rationale for this study was to attempt to clarify the unit cost of systematic registration. The comparative study did provide some benchmarks for systematic registration and the provision of land administration services. More recent investigations by the World Bank have documented cost norms for a range of land administration activities including CORS installation, ▶

► Brian Roberts, urban development specialist, Kylie Anthony, business development manager, Tony Burns, managing director in front of the Logo of Land Equity International.



large-scale mapping and cadastral surveying. The UNECE Working Party on Land Administration has been investigating land administration systems, including cost and revenue information. There is no information to guide key land-sector staff in preparing and costing plans for major land administration reform, nor is there reference material for key decision-makers in evaluating such proposals. This is a real gap, particularly in evaluating proposals for land administration reform. The study of a cost and revenue analysis is an attempt to fill the gap and provide some standards for policymakers. During an expert group meeting in Rotterdam, The Netherlands, in May 2013 we largely finalised the questionnaire. The questionnaire did generate significant discussion and it will be interesting to see the results from testing the questionnaire in some key European systems and then gathering data in a number of developing countries.

Economic development around the world is often complicated by unclear people-to-

land relationships. The same holds for environmental protection and management of natural resources. What's your view on the possible achievement of global coverage of land administration?

As a number of commenters have pointed out, about 30 countries have been able to develop efficient land administration systems – over a long period of time. These systems have typically evolved from systems that serve the elite into systems that serve the community. The traditional land administration system has evolved from systems for recording private rights in land and for recording the trading of these rights. Over the past few decades, land administration systems have been extended to also record public land and provide the basic layer to support a range of uses – to facilitate a spatially enabled society. In most land administration reform initiatives in developing countries, there seems to be the expectation that the elite will put in place and allocate the resources necessary to implement policies and laws that benefit wider

society and in many cases also address international environmental concerns such as global warming and deforestation. This will be possible in some countries, but is a big risk in many developing countries and new approaches will be necessary. Technology such as high-resolution satellite imagery, global portals such as Google Earth, the mainstreaming of global navigation satellite systems and improved, readily available ICT platforms greatly broaden the options available for a country seeking major land reform. The countries that will succeed in implementing real land administration reform will be those which develop policies and laws that benefit society as a whole, and those which show flexibility in adopting new approaches that are facilitated by the new technology. Those that do not will see alternative approaches evolve, such as the possibility of land administration systems that build on data provided by crowdsourcing.

And what is the role of surveyors in this?
I see a real role for surveyors in

helping governments understand the potential of the new technology and helping to develop flexible approaches that maximise the benefits of the new technology and meet the increasingly challenging expectations of implementing real change; change that addresses a broader range of issues or concerns in a shorter period – in years, rather than decades.

What is your message to surveyors?

My key message to surveyors is to embrace the opportunities for adopting new technologies and to work with policymakers to develop new approaches to implement significant land administration reform in the time frames that policymakers and the development community are talking. If surveyors fail to do this, they risk being sidelined by society. In Tanzania

there are about 180 registered surveyors in a population of about 46 million. Cadastral surveys are specified by a 1957 ordinance put in place by colonial administrators. Survey costs are very high due to factors such as high standards and a limited number of registered surveyors. As a result, there are few cadastral surveys undertaken. A draft Survey and Mapping Policy was prepared about five years ago and a key message in this policy was that government should allocate more money for cadastral surveys. This policy was not accepted by cabinet. One is left wondering what would have happened if the profession had sought to use the significant improvements since 1957 in survey technology to adopt new standards that better address the needs of society in Tanzania.

Are you optimistic about the future?

Land governance is increasingly recognised as a foundation for socioeconomic development. This is evident in the increasing number of land sector initiatives throughout the world. The Voluntary Guidelines on Responsible Governance of Tenure of Land, Fisheries and Forests which were adopted by the UN provide a platform for efforts to improve land governance. Tools such as the LGAF will be increasingly important in identifying problems and reaching consensus on strategies to resolve these problems. Improved technology will facilitate the implementation of improved land administration systems and there are plenty of opportunities for surveyors to play a real role in helping government implement systems to improve land governance. So yes, I am very optimistic about the future. ◀

WHEREVER DECISIONS DEMAND INTELLIGENCE, TERRAGO DELIVERS

When mission success depends upon finding and sharing the most accurate, timely and relevant location intelligence, from any source, TerraGo delivers. TerraGo allows organizations to discover location intelligence, integrate geospatial intelligence and deliver situational awareness to the edge of operations and back. Find the location intelligence solutions that matter to your mission at www.terragotech.com.



INTEGRATED RTK GNSS SURVEYING SYSTEM

- ▶ LI/L2, 220 channels
- ▶ GPS+GLONASS+COMPASS+GALILEO
- ▶ Static H./V. accuracy:
±3mm+0.5ppm/±5mm+0.5ppm
- ▶ RTK H./V. Accuracy:
±8mm+1ppm/±15mm+1ppm



Outstanding Waterproof

Extremely Rugged

External Memory Storage

Intuitive Voice Guide

582-2013

Key Features:

- Compatible to popular brand of external radio & receiver
- Built-in transmitting radio (0.5/2w switchable),
410-430/430-450/450-470MHz optional
- Intuitive voice message guide
- Quick access to CORS
- 12 LED for status/mode settings
- 4GB flash memory+4GB SD card (extendable)
- IP67 water/dustproof

586-2013

Key Features:

- Built-in transmitting radio (2/5w switchable),
410-430/430-450/450-470MHz optional
- 4GB flash memory (extendable, maximum 32GB)
- Quick access to CORS
- Colorful OLED screen for status/mode settings
- Double built in battery for long hours operation
- Extremely rugged and durable
- IP67 water/dustproof

TECHNOLOGICAL DEVELOPMENTS AND GAME-CHANGING IDEAS

ICT-enabled Innovation and Land Administration

Apart from being a prerequisite for a functioning market economy, environmental action and secure livelihoods, land administration systems create invaluable base data for all spatially based innovation. Nevertheless, most countries still fail to provide inclusive land administration services that reach all stakeholders in equal terms, plus they tend to be slow in adapting alternative new approaches and technologies or game-changing ideas.

The recently adopted FAO Voluntary Guidelines on the Responsible Governance of Tenure (VGs) provide a strong justification for establishing land administration institutions and systems in support of responsible governance of resources and equal treatment of stakeholders. The VGs set an ambitious agenda for land

administration to enable responsible governance of land. The VGs call for the States to establish systems (such as registration, cadastre and licensing systems) to record individual and collective tenure rights that are appropriate for their particular circumstances and cover all tenure arrangements inclusive

of the public and private properties, indigenous and customary tenure systems, and without discrimination on any basis. The VGs also call for the implementing agencies to adopt simplified procedures and locally suitable technology to reduce the costs and time required for delivering services. The information on the ▶



Mika-Petteri Törhönen is a land professional and project manager with outstanding knowledge in the fields of land tenure, policy and administration. Mika has held the post of senior land policy specialist at the Europe and Central Asia Region of the World Bank since August 2011. He is the task team leader and technical expert of several lending and technical

assistance projects. Previously Mika worked in FAO's Climate, Energy and Tenure division as a senior land tenure officer co-ordinating the work towards the Voluntary Guidelines for Responsible Governance of Land, Forests and Fisheries. Mika is a Finnish national and holds a Doctor of Science degree from the Helsinki University of Technology.

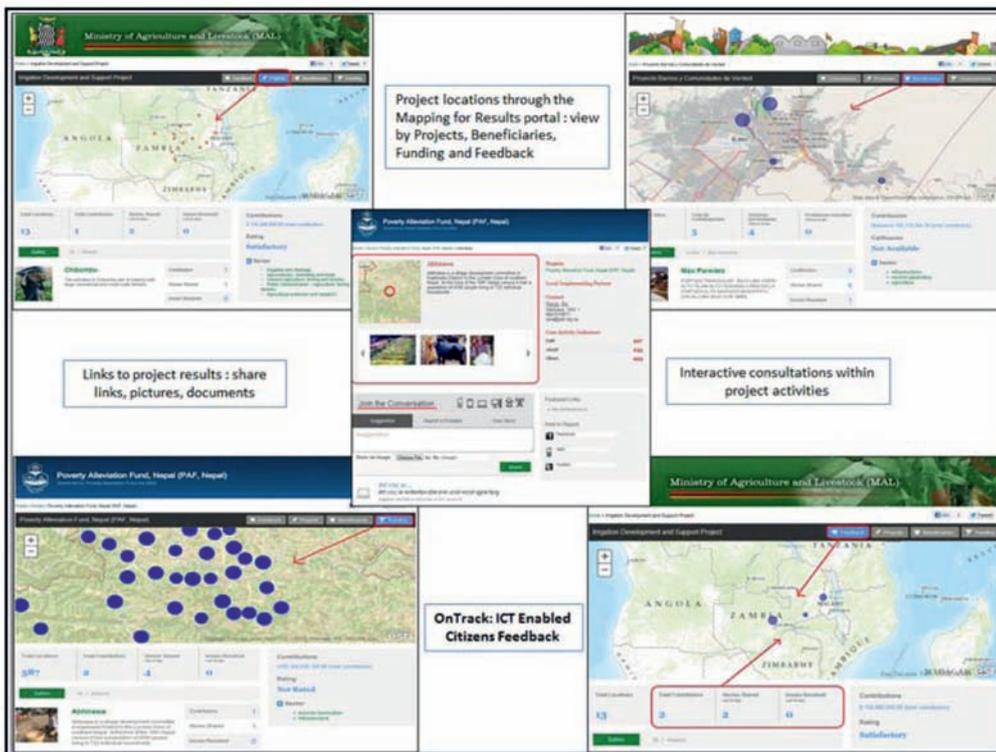
✉ mtorhonen@worldbank.org



Qiyang Xu is geospatial specialist in the World Bank Institute's Innovation Labs. She has worked in the areas of open data and open governance, innovative use of ICT and geospatial technology in international development. She is currently leading geospatial components and activities for various initiatives for World Bank groups, sectors and countries including Kenya, Malawi, Bolivia and the Philippines involving spatial and statistical analysis, data

management and visualisation, web-mapping and crowdsourcing applications. Between 2011 and 2012, Qiyang also worked for Sustainable Development Network Information Services at the World Bank focusing on the Climate Change Knowledge Portal and infrastructure mapping, and the Foundation Center in New York facilitating spatial analysis for CSOs and NGOs using open source applications.

✉ qxu1@worldbank.org



▲ Figure 1, ICT-enabled citizen feedback platform.

rights, the holders of those rights and the spatial units related to those rights should all be integrated and records should be indexed by spatial units as well as by holders to allow competing or overlapping rights to be identified.

The problem is that most countries fail to provide the type of inclusive systems and services the VGs promote and, in particular, fail to provide services that reach all stakeholders.

ICT INNOVATIONS

With the advent of personal computers, broadband internet and mobile phones, Information and Communication Technology (ICT) has become an important driver in fostering innovation leading to enhanced productivity and economic growth. Affordability of new technologies together with game-changing ideas can lead to more inclusive development whereby services can also reach out to those

sections of the population that have so far been marginalised from the global knowledge economy.

In developing countries, innovation actors still operate in their own silos and systems do not connect across different sectors. Government as a technology client can establish conditions for ICT-enabled innovation by bringing stakeholders together to co-create services and re-invent ways for outreaching to disadvantaged groups with new business models. Implementing ICT innovations that are based on open, local data may empower citizens to communicate effectively with public service providers and also become a catalyst for a fundamental transformation of the relationship between government, civil society and development partners. Light innovation models known from the web industry – low-cost and agile development and rapid prototyping of ideas, concepts, products, services and processes in a highly decentralised and user-centric manner – are becoming more common and could set a new pace for every sector (including land administration) over the next decade.

MOBILE PHONES

Developing countries are beginning to adopt the concept of e-governance. Among various types of ICT that drives e-governance, the mobile phone is usually positioned as an entry point to the era of information and computer technology, and is now grabbing the emerging market share in developing countries with booming economies and rapid social development. The rapid penetration of cell phones in developing and middle-income countries is not only reshaping lives dramatically, but also provides a solid testing ground for traditional and social media that engages citizen voice and audits government information in the aim of promoting transparency, accountability and participation more effectively and at lower cost.



Ilari Patrick Lindy is senior ICT policy specialist at the ICT Sector Unit. Ilari has been involved in a wide range of international, regional and national initiatives supporting innovation policy and systems development with particular

focus on development and take-up of ICT-enabled innovations. Most recently he co-chaired the European expert group of EU-Africa strategic partnership No. 8 focusing on science, information society and space.

✉ ilindy@worldbank.org



Johannes Kiess is an operations officer for the Mapping for Results initiative in the Innovation Practice at the World Bank Institute. Prior to this position, he worked as an economist at the World Bank doing

research and advising on and implementing innovative finance for development initiatives. Johannes holds a doctorate in economics and a master's in finance from the University of St. Gallen, Switzerland.

✉ jkiess@worldbank.org

CITIZEN ACCESS

Connecting the land registration system to personal mobile phones would allow citizens to use mobile services to locate land and property. They could record a geographic boundary of their holdings using a GPS tracker, take pictures of nearby area, and to edit and submit a land owner's profile. The technology would also allow the submission of legal documents as pictures, and oral evidence as audio or video files. The challenges of mobile disparity within countries caused by high service costs, product unavailability and lack of knowledge or support can hinder the adoption of mobile services. Not every citizen has equal access to ICT, high-speed internet and mobile technologies, in particular in remote areas. 'On/offline' technologies can bridge this digital divide and provide access to a wider group of people.

ORGANISATIONS

Apart from citizens equipped with smartphones or tablets, international organisations are also in a transition phase to incorporate geographic information into their new policies. In October 2010, the World Bank undertook a major initiative to geocode over 30,000 activity sites of 2,000 World Bank-financed projects and visualised them on the 'Mapping for Results' platform, overlaying poverty and human development indicators at sub-national level. An Open Aid Partnership is bringing together development partners to replicate the initiative and support governments in creating their own mapping initiatives. The Inter-America Development Bank (IDB) and Global Agriculture and Food Security Program (GAFSP) also created interactive mapping platforms to display not only project sites but also processes, results and impact. Such mapping platforms bring forward the possibility of showcasing project-level profiles like images and videos in the next step. In the field of international development, more countries are

joining the conversation of open government and open data, and launching publicly accessible data portals whereby government budgets and infrastructure locations are being released into the private sector and civil society.

TANZANIA

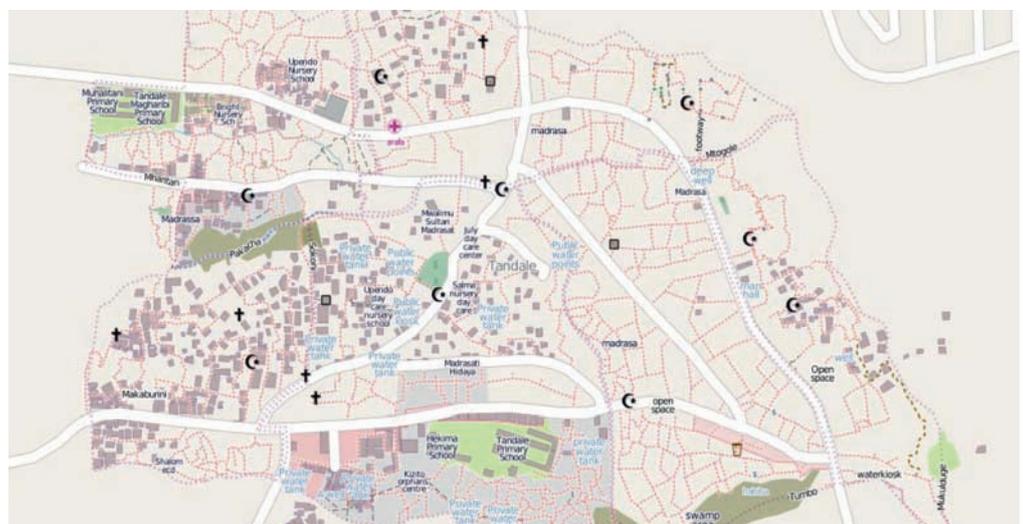
Tanzania has sought to increase the use of citizen-based monitoring and feedback mechanisms through ICT (see an example in Figure 1). Such services are essential to achieve efficient and participatory government. The Tanzanian National Strategy for Growth and Poverty Reduction (MKUKUTA) states that ICT is critical to increased productivity and transparency in all sectors. Moreover, the Strategy states that good governance, accountability and participation are "bedrocks" for the overall development of Tanzania. These opportunities are also emphasised in the World Bank Country Assistance Strategy (CAS) for Tanzania for 2012-2015, which includes the goal of using ICT to increase social accountability. The experience exchange was directly linked to the Bank-financed Local Government Support Project. Tanzania lacked experience in two important aspects: the adoption of low-cost and user-friendly urban infrastructure mapping and the use

of crowd-voicing tools to generate useful local data.

Meanwhile, Kenya has had extensive experience with both strategies in the Kibera area of Nairobi. Using South-South Facility funding, World Bank staff connected Dar es Salaam city planners and community leaders with experts from Kenya to help the Tanzanians increase stakeholder awareness about issues and tools related to community mapping. The exchange also increased the capacity of the Dar es Salaam City Council and other relevant institutions such as University of Ardhvi and its students studying spatial planning – to systematically monitor and verify urban infrastructure and service validation (see Figure 2). The exchange allowed citizens to use publicly available maps, visualise the city's urban infrastructure and submit their own community feedback.

CROWDSOURCING

Crowdsourcing leveraged by initiatives such as dataset creation, correction and open data refers to efforts and donations of spatial or real-time information contributed voluntarily by the public. As a comparatively new approach experimented in development, crowdsourcing is particularly



▲ Figure 2, Linking citizen voice to public service provision in Dar es Salaam, Tanzania.



Upgraded EDM on the new RTS-820R⁵/860R⁵ series.
Measure more possibilities!

500m

incredibly long reflectorless range

0.3s

stunningly fast measuring speed



prominent in the field of geography, with the world's largest crowdsourcing and open source project, Open Street Map, being an example. While geolocation information such as facility coordinates or road networks is generated in some crowdsourcing projects, there are quite a few projects where information is created based on feedback from citizens in the form of text messages or emails. When it comes to natural resource conservation and ground condition monitoring using crowdsourcing, WWF's Moabi website allows searching, adding and discussion to track mining, roads and REDD+ projects in the Democratic Republic of Congo. Meanwhile, Global Forest Watch 2.0 (launched in spring 2013) visualises forest status on a two-monthly basis in tropical countries and accepts datasets on deforestation areas submitted by citizens.

INNOVATION NEEDED

Once land administration records, cadastres and land registries – which even in developing countries are increasingly available in digital form – are put on the web-mapping platform and made publicly accessible, they can break down silos between different states, regions and municipalities as units for data collection. However, many countries lack consistent data models and technical standards across the country, which hinders possibilities for capitalising on new opportunities in ICT. The new ISO standard on the Land Administration Domain Model (LADM, ISO 19152) presents a generic solution and a way forward for countries starting with little background. Generally OECD countries plus many others are very advanced in adopting geo-enabling solutions to link and share data in land administration, such as European Union (EU) countries implementing the EU's INSPIRE directive, Australia's national framework for managing land information that involves multiple

levels of government agencies, and the national cadastral database in the US. The question is, how can these experiences – or parts of them – be adapted in a developing-country context?

VULNERABLE GROUPS

More often than not, conventional land administration systems fail to serve the poorest and most vulnerable groups of the society.

a hindrance to the adoption of new approaches, thinking and innovation in land administration.

MOVING FORWARD

By facilitating citizen participation, crowdsourcing bridges the gap in the relationship between government and citizens by opening a direct channel for information transmission from ground level to policymakers and the government's land registration

Crowdsourcing bridges the gap in the relationship between government and citizens

The problem lies not in the level of knowledge or understanding; the VGs promote principles of good land administration that have been known for a long time. Rather, land administration systems live in their time, but are also heavily influenced by their long history, traditions and establishments – such as professions – that impact on policies and approaches applied. The history and traditions are assets. They provide continuity to the arrangements of secure tenure such as formal land administration systems, which ensure the predictability, continuity and stability required for positive investment decisions. However, the history and traditions are often also

system. By utilising devices owned by citizens both in urban and geographically marginalised areas, it successfully transfers the workload from professionals to the masses, thus 'breaking down the cost barriers' in labour and research. Crowdsourcing provides a potential opportunity for dataset submission in remote areas without physical presence of land administration personnel, when an effective arbitration process is applied between data collection and utilisation. Furthermore, when citizens are involved in the process of governance, they are able to monitor the administration processes of civil servants and therefore help to reduce corruption. ◀

FURTHER READING

- FAO, 2012. The Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security. The Committee on World Food Security. The Food and Agriculture Organization of the United Nations.
- Keenja, E., de Vries, W.T., Bennett, R.M. & Laarakker, P. (2012) Crowdsourcing for Land Administration: Perceptions within Netherlands Kadaster. FIG Working Week 2012.
- McLaren, R. (2012). Crowdsourcing Support of Land Administration – A Partnership Approach.
- Vodafone Group. (2005). Africa; the Impact of Mobile Phones. Moving the Debate Forward (Vodafone Policy Papers Series No. 2).
- Wallace, J., Marwick, B., Bennett, R., Rajabifard, A., Williamson, I., Tambuwala, N., & Agunbiade, M. (2010). Spatially Enabling Land Administration: Drivers, Initiatives and Future Directions for Australia. *Spatially Enabling Society, Research, Emerging Trends And Critical Assessment*.

Fit-for-purpose Land Administration

There is an urgent need for a flexible approach to building the spatial framework in terms of technology and investment choices. Building such a spatial framework is not primarily about accuracy. Instead it is about adequate identification and representation of the spatial objects and parcels, completeness to cover the total jurisdiction, and credibility in terms of reliable data that is trusted by users.

Most developing countries have cadastral coverage of less than



Stig Enemark, professor of land management at Aalborg University, Denmark, is honorary president of the International Federation of Surveyors (FIG), of which he was president from 2007 to 2010. He is also past president and honorary member of the Danish Association of Chartered Surveyors.

Professor Enemark is a well-known international expert in the areas of land administration systems, land management, spatial planning and related educational and capacity-building issues, and he has published widely in these areas.

✉ enemark@land.aau.dk

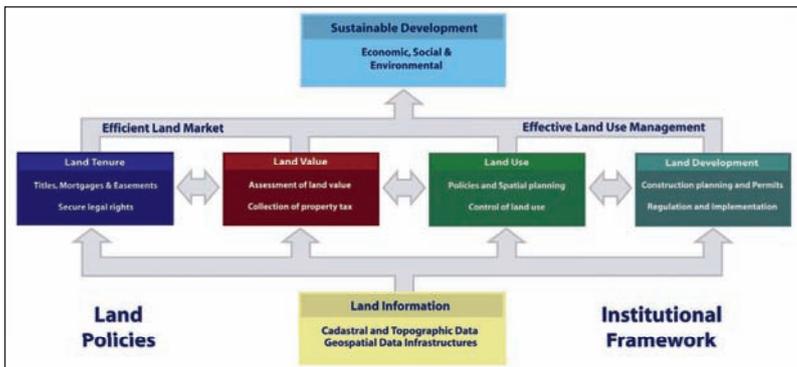
30 percent of the country. These cadastral systems normally operate in line with procedures for cadastral surveys and land registration as introduced (mainly for the elite) by Western societies in colonial times, and the systems do not recognise the range of more informal, social or customary types of tenure. This means that over 70 percent of the land in many developing countries, such as the sub-Saharan region, is generally outside the formal land administration system. This has caused enormous problems with regard to food security and rural land management issues in cities with an increasing population of slum dwellers, for example, and in rural areas. Building spatial frameworks in developing countries is a major challenge, but one that is fundamental for building systems in support of sustainable and transparent land governance.

GLOBAL PERSPECTIVE

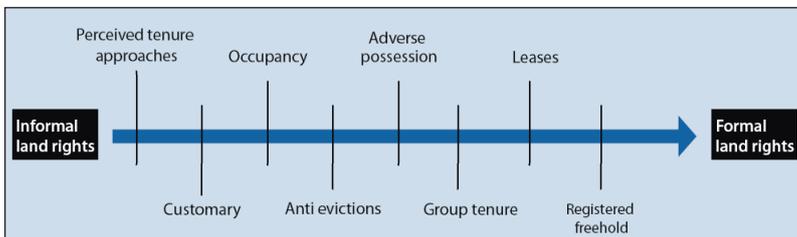
A land administration system (LAS) provides a country with the infrastructure to implement land-related policies and management strategies. It is not a new discipline

but has evolved out of the cadastre and land registration areas with specific focus on security of land rights. The need to address land management issues systematically pushes the design of a LAS towards an enabling infrastructure for implementing land policies. Such a global land administration perspective is presented in Figure 1.

Modern LAS deliver an essential infrastructure and encourage integration of the processes related to land tenure (securing and transferring land rights), land value (valuation and taxation of land), land use (planning and control of the use of land), and land development (implementing utilities, infrastructure and construction planning). The four functions interact to deliver overall policy objectives, and they are facilitated by appropriate land information infrastructures that include cadastral and topographic datasets linking the built and natural environments. Ultimately, the design of adequate systems of land tenure and value should support efficient land markets



▲ Figure 1, A global land administration perspective (Enemark, 2004; Williamson et al., 2010).



▲ Figure 2, Continuum of land rights (UN-Habitat).

capable of facilitating trading in simple and complex commodities.

SPATIAL FRAMEWORK

The spatial framework is basic large-scale mapping showing the way land is divided into parcels and plots for specific use and ownership purposes. It provides the basis for dealing with land administration functions such as: recordation and management of legal and social tenure; assessment of land and property value and taxation; identification and management of current land use; planning for future land use and land development; delivery of utility services; and administration and protection of natural resources. The framework should be linked to the country's National Grid point reference system through a positioning infrastructure based on Global Navigation Satellite Systems (GNSS) so that maintenance, updating and upgrading can take place whenever needed. Also, the framework may well include volunteered information provided by citizens (crowdsourcing) where authoritative data is not required or available. When considering the resources and capacities

required for building such spatial frameworks in developing countries, the Western concepts may well be seen as the end target but not as the point of entry.

SOCIAL TENURE

The legal or formal Western systems do not serve the millions of people whose tenures are predominantly social rather than legal. The Social Tenure Domain Model (STDM) recognises land rights as a continuum ranging from informal to more formalised stages as shown in Figure 2, even though this process does not mean that all societies will or should necessarily develop into freehold tenure systems.

The STDM concept focuses on the relationship between the parties (tribes, people, villages, co-operations, organisations or governments), social tenure relations (people-land relationships, which can be formal, informal, customary or may even conflict) and spatial units (a sketch-based, point-based, line-based or polygon-based representation of the real situation in which the social tenure occurs).

The FAO voluntary guidelines on 'Responsible Governance of Tenure' place tenure rights in the context of human rights such as the rights to adequate food and adequate housing. With the help of the Guidelines, a variety of actors can determine whether their proposed actions and the actions of others constitute acceptable practices.

CONTINUUM OF ACCURACY

The spatial framework should be developed using a flexible and fit-for-purpose approach rather than being guided by high-tech solutions and costly field survey procedures. Accuracy can then be incrementally improved over time when relevant and justified by serving the needs of citizens and society. In relation to UN Habitat's concept of the continuum of land rights, such a fit-for-purpose approach could be referred to as a 'continuum of accuracy'. The key focus should be on providing secure land rights for all, and managing the use of land and natural resources for the benefit of local communities and society as a whole.

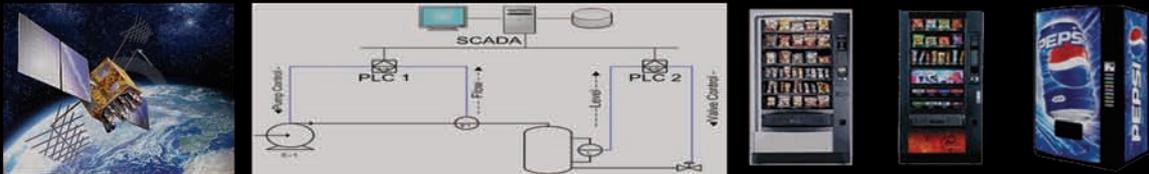
FIT FOR PURPOSE

'Fit for purpose' means that the framework should be designed for the purpose of managing current land issues within a specific country or region, rather than following more advanced technical standards. The land administration functions may place different requirements on accuracy, which again may vary depending on the geography and density of the use of land. Security of tenure does not in itself require accurate boundary surveys when the important aspect is identification of the land object with its legal or social right. Also, the accuracy required for the purpose of planning and management of the use of land varies considerably. The scale of the framework depends on topography and density of development, and may vary from large-scale mapping in dense urban areas to minor-scale images in rural and remote

WWW.TRACE.ME



Never lose control with this innovative little piece of GPS/GPRS hardware.



TraceME can protect, follow and control most of your valuables.



Hardware dimensions of the smallest version: 44 x 22 x 7mm
Extremely small and lightweight including housing, antennas and battery.

TraceME applications: Personal tracking with SOS. Object protection and tracking. Logistics. M2M. Security and Surveillance. Remote control and Diagnostics. ODB-II version available. Vehicle immobilisation. Rentals tracking. Alternative and cheaper solution for SCADA. Alzheimer-, elderly-, patients- and people tracking. Remote control of Vending- and other machines in the field. Animal tracking. Backup Power Generators. **OEM version is possible.**

All product and company names mentioned herein may be the trademarks of their respective owners.

regions. Accurate surveys of property boundaries may be justified in high-value urban areas. Accuracy is a relative term that relates to the purpose of creating the spatial framework. Four key principles of a fit-for-purpose approach for developing the spatial framework can be recognised, as outlined below.

1. GENERAL BOUNDARIES

Using general boundaries (the physical object in the field) will be sufficient for most land administration purposes, especially in rural and semi-urban areas, while fixed boundaries (monuments and surveyed) will contribute to interoperability between legal and physical objects in advanced land information systems and also to reducing boundary disputes to some extent. Fixed boundaries can be used where relevant or necessary for any specific purpose or when required and paid for by the landowner/stakeholders.

2. SATELLITE IMAGES/ORTHOPHOTOS

Using large-scale satellite images (e.g. 50cm resolution) or orthophotos will be sufficient for most land administration purposes. Boundaries can easily be identified on the images/orthophotos in most cases. Experience shows that people can generally read the images easily, which enables a participatory approach to boundary determination to be applied. Non-visual boundaries can be added simply using handheld GPS or field survey field survey measurements. Satellite images/orthophotos are much cheaper than field surveys and do not require trained professionals to undertake the field work. The mapping methodology using satellite images/orthophotos also provides the general topography of land use and buildings and infrastructure.

3. ACCURACY RELATES TO THE PURPOSE

Accuracy of the information such as the parcel boundaries should be understood as a relative issue related

to the use of this information, while technical standards are often inflexible and out of proportion to the purpose. The need for accuracy of the various features should be determined by the purpose of using this information for dealing with the various land administration functions. In this regard, registration of legal and social tenure rights requires identification of the object but the process itself does not call for a high degree of accuracy. Also, planning and land development processes mainly require sufficient mapping for identifying physical and spatial objects rather than high accuracy. Any demand for accuracy may stem from issues such as high land value in dense urban areas or implementation of costly construction work.

4. OPPORTUNITIES FOR UPDATING AND UPGRADING

Building the spatial framework is not a one-stop process; it should be seen in a perspective of opportunities for ongoing updating, sporadic upgrading and incremental improvement whenever relevant or necessary for fulfilling land policy aims and objectives. This of course requires that mapping and surveys are linked in a National Grid system. It is essential to continually update procedures in order to ensure that all data is complete and reliable. Without such procedures, the investment is easily wasted over a relatively

short period. The opportunity for upgrading is essential and allows for providing an improved map base whenever needed for specific purposes such as land development activities, major construction works and building of infrastructure. This allows for incremental improvement that, in turn, will establish a spatial framework in line with modern and fully integrated land information systems.

CONCLUDING REMARKS

The spatial framework in most developed countries has evolved over a long period of time and in response to societal, institutional and technological advancements. While developing regions cannot wait for the framework to evolve naturally, it should nevertheless always be built in response to current societal needs and available economic resources. Professional codes support the existing systems, and there are many examples of resistance to change that will challenge their position. On the other hand, by including all land in the formal land administration systems, land professionals will contribute to social development while at the same time enlarging their functions and customer base. The key benefit of a fit-for-purpose approach is that it is possible to include all land in the formal land administration system within a reasonably short time and at a relatively low cost. ◀

FURTHER READING

- Enemark, S. (2004): Building Land Information Policies, Proceedings of Special Forum on Building Land Information Policies in the Americas, 26-27 October 2004, Aguascalientes, Mexico.
- FAO (2012): Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of Food Security. Rome, Italy
- FIG/GLTN (2010): The Social Tenure Domain Model. FIG Publication No. 52, Copenhagen, Denmark
- FIG/World Bank (2010): Land Governance in Support of the Millennium Development Goals – A new agenda for land professionals. FIG Publication No. 45, Copenhagen, Denmark
- Williamson, Enemark, Wallace, Rajabifard (2010): *Land Administration Systems for Sustainable Development*. ESRI Academic Press, Redlands, California, USA.

IMPROVING TRANSPARENCY IN INTERNATIONAL PROPERTY MARKETS

The Global Cadastre

In our highly connected world, land has become a global commodity. However, systems that support land transactions at a global level are incomplete, lack transparency and remain largely disconnected. As part of the continuing dialogue on Cadastre 2034, the authors ask the question: Is a globally connected cadastre possible?

The term 'land' has global resonance; however, agreement on what constitutes 'land' is far less certain. Are buildings included? What about the water, carbon, and minerals? Who can 'own' it? Can I mortgage

my land? Different countries devise different answers to these questions. To operationalise the answers, many make use of land markets – although others do not, and many cannot. Nevertheless, markets are seen as a way of creating more stable and viable communities by enabling the efficient transfer of 'land' from one party to another.

Most land transactions occur in domestic, national land markets. However, many parties are now looking beyond their borders. Indeed, international land trading is burgeoning: governments, businesses

and citizens from various countries, whether rich or poor, are now actively engaged as buyers and sellers in global land deals. Figures on the number and size of international land transactions are difficult to find and vary greatly; for example, estimates of international land deals over the last decade include 47 million ha (World Bank), 63 million ha (The Global Land Project – in Africa alone), 80 million ha (The Land Deal Politics Initiative) and possibly up to 227 million ha in deals completed or under negotiation according to Oxfam based on the Land Matrix data.



Kevin McDougall (51) is a visiting scientist at University of Twente, ITC Faculty, The Netherlands, and associate professor at the University of Southern Queensland, Australia. There, he held the position as head

of the Department of Surveying and Spatial Science from 1995 to 2002 and from 2008 to 2012.

✉ kevin.mcdougall@usq.edu.au



Rohan Bennett (32) is an assistant professor at University Twente, ITC Faculty, The Netherlands, and UNU School for Land Administration Studies. He is also an honorary fellow with the Centre for

SDIs and Land Administration at the University of Melbourne Australia.

✉ bennett@itc.nl



Paul van der Molen (63) is professor at University of Twente, ITC Faculty, The Netherlands, and former head of Kadaster International. He served as chairman

of the FIG Commission 7 from 2002 to 2006 and FIG vice president from 2007 to 2008.

✉ molen@itc.nl

36895 Residential Listings

4950 Commercial Listings

70 Vacation Listings

41947 Total Global Listings



▲ International land trading is burgeoning. (<http://www.worldpropertychannel.com/listings/>)

the unrecognised interests of weaker parties.

Perhaps the most important issue from a land information manager's perspective is the lack of data that is available on international land transactions, and hence the transparency of these transactions. Many global land transactions are undertaken directly between foreign investors and individual land owners or governments, often with requests for secrecy by both the foreign investor and the vendor. This is not uncommon in property transactions. However, restrictive practices can lead to fraudulent and corrupt behaviours. Disclosure of the location, spatial extents, terms of contract and tenure is often not readily available at the country level, so aggregation to the global level is problematic.

The incomplete and often unclear system of rights with regard to property is also a major obstacle in building an efficient global land market. The lack of clarity or formal recognition of rights can lead to the dispossession of land often

occupied by the most vulnerable. Conversely, buyers can also suffer from insecure dealings and fraud. Cadastres can provide a strong foundation for providing clarity in terms of identifying owners, spatial extents and rights. In this discussion, the term 'cadastre' is regarded as synonymous with 'land registry' and 'land administration system', since the converging power of technology means that the distinction between these concepts is becoming increasingly blurred. Hence, cadastre is used to mean any up-to-date spatial and textual record of owners, parcels, interests and transactions.

As identified by Peter Dale in his Land Market Model, effective land markets usually require supporting infrastructure. Foundational land policies and laws are needed to facilitate the three pillars of 1) financial services, 2) valuation services, and 3) the land registry or cadastre. Each pillar establishes processes and information that protect the transacting parties and the community. All tend to operate at a national or state level, but what are the implications when land markets

operate globally? From a land administration perspective, it seems that at least one of the three pillars is missing. Whilst global financial services might be well established, globalised valuation services or globally connected cadastral networks are not evident. If this is the case, are there problems with dealing in the global land market?

MISSING PILLARS

The problem of the missing pillars is not unique to the global land market; many developing land markets experience similar deficiencies, usually to their detriment. In these cases attempts are made to establish and institutionalise the missing pillars. These processes can take decades or even centuries to mature. For example, to ensure transacting parties remain true to their word, procedures have developed from 1) mere symbolic gestures in customary settings, to 2) private deed conveyancing, to 3) more contemporary deed registration systems, and where appropriate, 4) full title registration systems. The latter two approaches can be found supporting the domestic land



▲ The Land Matrix (version 1) provided a glimpse of the international land transactions...but is quite weak on detailed spatial identification. (<http://landportal.info/landmatrix/get-the-detail>)

markets of most nations that are classed as 'developed countries'.

However, these market management tools are less developed for the global land market. There are no internationally connected cadastres ensuring that transactions are authoritative, assured and accurate. There is no system to ensure the unambiguous identification of transacting parties and the land in question. For many of the larger deals, there is no requirement to make the transacting information accessible to the public. In the land sector, the Land Matrix portal [41] provides a glimpse of international land transactions but relies on notifications from the public or volunteers and is quite weak on spatial identification. It should be noted that an updated version of the Land Matrix was released in June 2013 and plans to circumvent some of these challenges. Although lacking 'authoritative data', the role of volunteers and local communities in providing data should not be underestimated, as the growing recognition by cadastral agencies of the potential utility of

crowdsourced land information demonstrates.

However, it is also wrong to say in a global context that there is no cadastre in place. Disaggregated national and state systems play their role in securing transactions in the global land market. In those countries with functioning pillars, with a little legal advice and the right finance, non-nationals can participate quite easily in the local land market. In other places, where the pillars are incomplete or dysfunctional, the situation is more precarious. Is your land transaction legal? Is the land subject to competing claims? Is the nation or the business you are investing in engaging in unethical land deals? The lack of a complete or globally connected cadastre means such questions are not easily answered.

PLAN OF ACTION

The move towards a globally connected cadastre could be seen as an extension of the well-documented Land Administration Paradigm (Stig Enemark, Ian Williamson, et al). When recasting the paradigm in a

global rather than national context, the elements and principles are similar although arguably potentially much more complex. Like other global markets, land administration systems must look to have greater visibility and connectedness in the global marketplace. The focus and principles of such a vision should be to protect all stakeholders in land transactions by providing greater transparency and promoting responsible governance. So, how could this vision be achieved? Whilst global in nature, developments will still be needed at multiple levels.

First, the unregistered land interests found in many countries need better visibility in the immediate term – regardless of whether they represent full ownership or not. Experience shows best results can be achieved by utilising the knowledge and authority held at local or community levels. Use can be made of emerging spatial tools to capture information cheaper, faster and in more fit-for-purpose ways. This work, already ongoing in many contexts, will be an essential foundation for the establishment of any effective local and national

cadastre, let alone a global one. Second, at the national or state level, those countries without complete coverage must work towards it, preferably and where appropriate using agreed international norms relating to responsible governance and transparency in land management. The FAO's recently agreed voluntary guidelines on land tenure management provide a recent example [42]. These voluntary guidelines place strong emphasis on the need for land tenure and recording systems to be transparent and accountable.

However, at the global level we need to understand what might motivate states to share cadastral and land transaction information through a connected global network, and what might be the benefits? Given the recent contagion across the global financial markets, a more transparent global land market could benefit many institutions, such as mortgage markets, by providing greater confidence and hence stability. Investors and consumers of large multi-national corporations are now also demanding greater transparency in the company's investment decisions, including encouraging sustainable and ethical outcomes in international operations. The benefits from more ethical decisions flow to all parties and can provide some degree of protection to the most vulnerable people who are often those most severely affected in international land deals.

IN PROGRESS

Of course, a globally connected cadastre implies that information must also be shared beyond state borders. This is already happening with a range of initiatives seeking to make global or regional information on land and geographic data more accessible. For example, the OneGeology initiative [43] provides a portal for sharing geological data across 97 countries, the UN Secondary Level Administrative

Boundaries (UNSLAB) facilitates the sharing of state administrative boundaries, whilst the UN Global Geospatial Information Management (UN-GGIM) promotes the wider sharing and dissemination of geographic data to address key global challenges. Over time, voluntary sharing may progress to more formal arrangements such as protocols.

Beyond this, exploration of the available tools for enabling data sharing is also needed. Here, ISO19152 or the Land Administration Domain Model (LADM) might provide a relevant starting point. Some countries will adopt the standard for development of cadastres. Indeed, numerous country profiles have been constructed and are being piloted. Those with functioning cadastres will at least understand where they deviate from the standard. Evidence suggests that major software and technologies vendors are also assessing the impact of the LADM on product offerings. These activities create dialogue and enable the possibility of data sharing in the longer term. In an operational sense, it could be that regional hubs are the most realistic starting point. The EU has already moved down the path towards seamless land transacting within its constituent countries through its European Union Land Information Service (EULIS) project, the Cross Border e-Conveyancing (CROBECO) initiative and the INSPIRE legislative framework, amongst others. In practical terms, with EuroTitle, Loenen and others provided a standard for enabling land transactions across European borders.

A BIGGER WHEEL

Summarising, global land trading is a reality; however, the supporting information infrastructure or cadastre needed to help protect all parties seems to be lacking. The good news: the wheel does not need to be

reinvented – it just needs to be made a little bigger. Like any cadastre, the underlying motivation for recording information is the same: to ensure the fair treatment of transacting parties and the community, wherever they are from, whatever they are transacting, and wherever they might be transacting. ◀

WEBSITES

1. <http://landportal.info/landmatrix>
2. <http://bit.ly/T1NE7s>
3. www.onegeology.org

FURTHER READING

Anseeuw W., Wily L, Cotula L, and Taylor M., 2011, Land Rights and the Rush for Land: Findings of the Global Commercial Pressures on Land Research Project, www.landcoalition.org/cpl/CPL-synthesis-report

Dale, P., (2000), The importance of land administration in the development of land markets – a global perspective, *Land markets and land consolidation in central Europe*, TU Delft – UDMS, pp31-42.

Global Land Project International Project Office, 2010. Land Grab in Africa: Emerging land system drivers in a teleconnected world, www.globallandproject.org/arquivos/GLP_report_01.pdf

Loenen, Bastiaan van, Sergio Nassarre-Aznar, Hendrik Ploeger, 2005, EuroTitle: a standard for European Land Registry Paving the road to a common real estate market. *GIM International* Volume 18, ISSN 1566 9076.

Oxfam, 2012, Our Land, Our Lives Time Out on the Global Land Rush, Oxfam Briefing Note, www.oxfam.org/en/grow/policy/%27our-land-our-lives%27

Pearce, F., 2012, *The Land Grabbers – The New Fight over Who Owns the Planet*. Transworld Publishers, London.

AN INFORMATION SYSTEM FOR AN INTEGRAL APPROACH TO LAND MANAGEMENT

LADM-based Implementation Starts Working

In a new and integral land management approach in four municipalities in Honduras and Guatemala, the Land Administration Domain Model has been used as a tool in support of system development for land administration. With the necessary additions to the core LADM conceptual schema, it has been possible to implement a complete and coherent system for land administration.

A pilot implementation for municipal information infrastructure in four municipalities (Puerto Cortes, Omoa and Tela in Honduras and Puerto Barrios in Guatemala) set out to test improved management of geographic information, known as the GIT (Gestión Integral de Tierras or 'Integrated Land Management') project. Data is now published on the internet for online access by citizens, a one-stop shop has been introduced, and integration of data at different levels avoids data duplication. One very important consequence of improved access has been increased trust through more transparency.

HONDURAS

In Honduras, the responsibilities for land administration are distributed

over different organisations at national and municipal level. Four organisations have duties related to the representation of parcels – this is the legal cadastre. The National Property Institute (NPI) is responsible for the cadastral and registry part for the whole of the country. Additionally, it is responsible for the process of titling for private parcels in urban areas. The National Agrarian Institute is responsible for

land titles in the rural areas and the Institute for Forest Conservation for titling in national forest areas. Finally, the municipalities are responsible for titling in areas which are property of the municipalities. Municipalities also have a separate fiscal cadastre in order to collect land tax.

MODERNISATION

The complex situation in legislation in Honduras has meant that a



Jan Koers obtained an MSc degree in GIS in 2001. He has worked in local government administrations and in the private sector in The Netherlands and in an international consultancy role for Kadaster International in

Central and South America. He specialises in project management, the design and implementation of geographic information systems, and information management in land administration and cadastre, topographic map production, development planning, urban and rural planning, spatial analysis, geostatistics and integral municipal management.

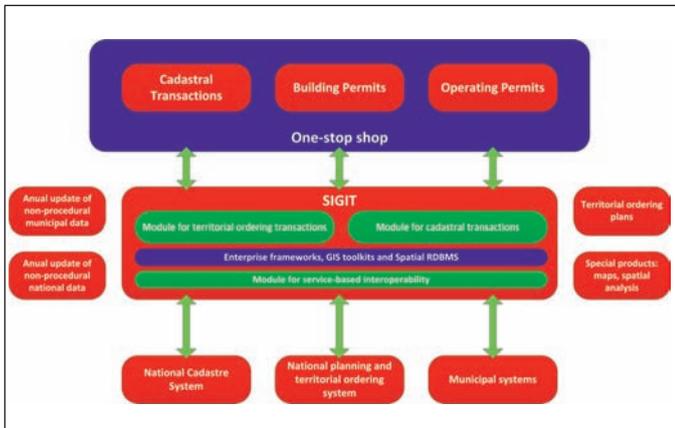
✉ j.b.koers@gmail.com



Rodimiro Cerrato Espinal holds an MSc in computer science from University of Minnesota, USA. He has extensive experience in enterprise application software development in several programming

languages on many platforms. He is an expert in spatial data management and the architect of the Integrated Land Management System (SIGIT) in Honduras. He is designer and developer of a system enabling on-the-fly advanced promotion deployments accessible through SMS codes to cellular subscribers.

✉ rodyce@gmail.com



▲ Figure 1, System concept of SIGIT.

consistent and complete registration has been difficult to achieve. Since it is unclear to citizens where to go in case of land transactions, there are many informalities related to ownership. The government recognised the complexities, and legislation was modernised about 10 years ago. The new law is currently under implementation, which is a slow process. The new legislation establishes the integration of fiscal and legal cadastre. Additionally, the legislation arranges the possibility for local governments to become associates in maintaining the cadastral data at national level, by integrating their local data with the central database. The NPI uses a central information system called SURE ('Sistema Unificado de Registros' meaning Unified Register

System) for land administration data. The legislation for land use plans has also been modernised defining strict procedures for the design and elaboration of these plans by the municipalities.

GUATEMALA

In Guatemala, the situation is different and has a more centralised approach. The National Cadastre is responsible for the cadastral registration while for the land registry there

is a separate institution, the Real Estate Registers. The municipalities are not an official player in the maintenance of land records and cadastral maps, although they have their own cadastral database for taxation purposes. Land use plans and regulations are directed by the Secretary General for Planning.

PILOT

This environment has been the basis for the GIT project. One the one hand, it focuses on the acquisition of cadastral data and the elaboration of land use plans as a fundamental basis for the land management, and on the other on decentralisation of the maintenance of this data by municipalities to augment the sustainability of the maintenance of the data and to promote the

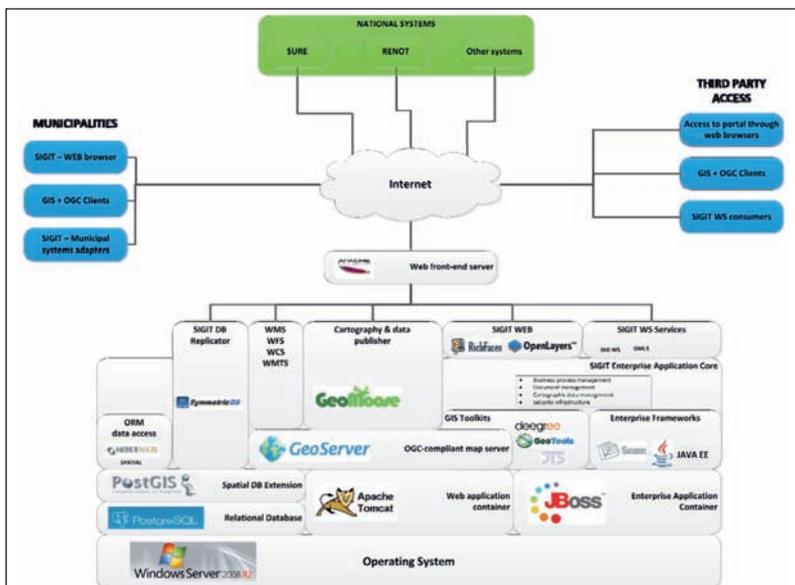
integration of its use at local level. New work procedures have been defined and implemented, and the information system SIGIT (Sistema de Información Gestion Integral de Tierras) has been designed, developed and implemented supporting these concepts.

SYSTEM OBJECTIVES

The design and implementation of the municipal infrastructure for the management of land administration data in the municipalities has been based on the concepts of integral local maintenance and use of the land tenure and land use data, utilising existing information systems and bridging the gap between them. Therefore SIGIT has the following objectives (see Figure 1):

- registry of the cadastral data at local municipal level by managing cadastral transactions
- registry of the land use data at local municipal level by managing permit transactions
- data exchange between the municipal cadastral registration and the national registration system SURE in Honduras;
- data exchange between the municipal system and the national system for land use planning, Registro Nacional de Normativas de Ordenamiento Territorial (RENOT) in Honduras
- data exchange between the municipal cadastral registration and the municipal information systems for taxes
- maintenance of the land use data
- data exchange between the municipal system for land use planning and the municipal systems for building permits, public services and other relevant systems and online publication of information relevant for the integral land management process at local level.

► Figure 2, Technologies used for the SIGIT design.



Apart from forming the basis for sustainable land transactions and land use planning, the SIGIT can be supportive in a situation where all citizens in a municipality pay land tax and where land possession can be converted to legal land ownership.

This will be based on an up-to-date and complete dataset in a transparent environment.

FUNCTIONALITY

SIGIT functions as follows: customers can go to the municipality with their application forms, which may include the survey sketch in the case of a subdivision. From SIGIT, a Cadastral Certificate will be provided on paper. The customer takes the certificate, the deed and (if needed) the survey sketch to the NPI. The municipality also sends the data digitally from SIGIT to SURE. Then NPI can compare both datasets (from customer and from SURE). A transaction is done in SURE and the municipality is informed once the transaction has been approved in SURE (approval at NPI office). This workflow has been agreed between the involved parties (see Figure 1).

USE OF LADM

SIGIT operates as a one-stop shop on the municipal side. The design of SIGIT is based upon the Land Administration Domain Model ISO 19152 to manage the cadastre and land use planning data from this point of view. The LADM provides an extensible basis for the development and refinement of efficient and effective administration systems. The organisation of the LADM allows for implementation in a distributed environment. The LADM could be used for design of the system, deciding which information will be managed by whom and who is 'owner' of the data. Because the LADM provides an overview of all relevant data for land administration, the model proved to be very useful in design discussions. The LADM contains legal/administrative attributes on parties and rights, geometric attributes and survey data. The LADM includes documentation such as field documents, deeds, transaction documents, imagery, etc. To meet the requirements, additions to the LADM were designed. The LADM additions to implement SIGIT in Honduras and Guatemala were necessary to store extra attributes



◀ Figure 3, Interface for changes in a parcel dismemberment.

about spatial zones, parcels and buildings as required by the municipalities during development. Furthermore, the information regarding building and operation permits, with their respective user-defined spatial and administrative rules, were out of the LADM scope, which made the corresponding additions necessary.

SIGIT DEVELOPMENT

The SIGIT system has been developed in a multi-user and business process-oriented way with history and transaction support and with a 100% web user interface with international language support and open source technology programmed in. The technologies used are shown in Figure 2. The LADM was implemented using object-relational mapping technology called 'Hibernate', using mostly Java EE standard JPA annotations. A Hibernate extension called 'Hibernate Spatial' was used to support handling of spatial data. During SIGIT development, one important goal was to make it self-contained in the sense that no additional or external application was strictly necessary to perform topological operations and calculations using spatial data, so that it entailed no extra costs for deploying and learning how to use external tools. Figure 3 shows a parcel dismemberment operation by drawing a border to obtain the two new parcels – all within the web interface. Historical data support is paramount

within SIGIT; it is always possible to track changes since the beginning. Furthermore, no data can be altered outside the confines of a transaction.

IMPLEMENTATION OF SIGIT

SIGIT has been implemented at local level and specific procedures have been elaborated between the NPI and the municipalities to define how cadastral transactions are executed in a decentralised way – in a one-stop shop environment. For transactions relating to building permits and operation permits, similar procedures have been developed and implemented. Web services are used to manage the transfer of transactional data between local and central information systems or between different local information systems.

CONCLUDING REMARKS

Generally speaking, we believe that the use of the LADM as the foundation for SIGIT's data model represents a measurable step forward in the design of serious land management systems for the future.

ACKNOWLEDGEMENTS

The authors thank the European Commission's Agency Europe Aid for granting financial aid within the framework of the URB-AL III programme for the 'Integral Land Management' project in Puerto Barrios, Guatemala, and in Omoa, Puerto Cortés and Tela in Honduras (the GIT project). ◀

World Bank Conference on Land and Poverty 2013

The latest World Bank Annual Conference on Land and Poverty was held in Washington DC, USA, from 8 to 11 April 2013. Bringing together economists, social scientists, legal specialists and geospatial experts, the annual event seeks to reveal and robustly debate the latest developments within the international land sector. The forum encourages cross-pollination of ideas between governments, donors, advocacy groups, the private sector and academia.

Themes of agreement across this year's event included: the importance of alignment between local and national institutions; that land titling is not the only means; the need to further reduce the costs of land administration; ensuring fit-for-purpose solutions; and the requirement to adhere to good land governance principles. A workshop on the World Bank's Land Governance Assessment Framework (LGAF) revealed that it has already been applied in more than 30 countries.

Innovative land information acquisition approaches were highlighted, such as the use of UAVs to support the democratisation of data collection in a remote village in Ghana, crowdsourcing to improve the quality of cadastral information, and opening cadastral records to the public for feedback. Crowdsourcing techniques challenge the status quo and are being perceived as a particular threat to the current 'gatekeepers', namely national mapping and cadastral agencies, the surveying and



▲ The World Bank building during the conference.

legal professions, and land and property investors – all of whom at times take advantage of the current chaos.

In the arena of large-scale land acquisitions, a new database of concessions in Lao PDR was presented which has already had a significant impact on land policy there. The Observatory on Land Acquisitions Project aims to improve the quality and inclusiveness of policy dialogue and decision-making on land, both at national and global levels, by making spatial data – as well information on actors and their activities – more accessible and engaging. The interactive platform enables individuals and organisations to provide information. They can also explore commercial pressures on land. The tool will enable

international and national policy dialogues with greater insight into the real conditions at the grass roots level. It will provide affected people a more

sector and have exposed significant tensions. The progressive branch of the profession sees these radical changes as essential: if the

The progressive branch of the profession sees these radical changes as essential

direct voice in these processes. The aim is to create a Land Matrix 2.0.

Many other radical, innovative and exciting opportunities for positive change were also put forward. These included 'spatially fit-for-purpose' and the 'continuum of continuums'. These concepts pose particular challenges to land professionals in a very conservative land

profession is to seriously contribute to solutions to the 21st-century challenges, the opportunities need investigation. Meanwhile, those in a more conventionalist branch, currently holding more influence with regards to change, are not persuaded that a radical change programme is necessary. Herein lies the challenge for FIG: to engage all members and provide strong

▼ Sessions during the World Bank Conference.



▲ Panel during the closing session. Second from left: Michael Anderson, UK.

leadership on a comprehensive journey of change. If this is not successful, other professions will simply fill the vacuum. In parallel, as witnessed through recent G8 and G20 interest in land, the profession is being seriously challenged to solve land issues faster. It seems that land professionals are at a very significant juncture.

The highlight of the closing session was the appearance of Michael Anderson, the director general for Policy and Global Issues at the Department for International Development in the UK. Michael is on part-time secondment to the UK Prime Minister's office as a special envoy to support the Prime Minister's role as co-chair of the UN High Level Panel of Eminent Persons on the post-2015 development agenda. Michael arrived at the World Bank having just been to the White House to discuss a new framework for international development after the expiry of the 2015 deadline of the UN Millennium Development Goals (MDGs); the new framework will most

likely be called the 'Sustainable Development Goals'. Michael indicated that land, especially transparency on land ownership, was one of the key issues within the new framework. He argues that allocating 'polygons to people' should be straightforward, and that 20 years from now everybody will be surprised that this was ever a problem! He challenged the land sector to come forward with innovative ideas for accelerating solutions to the problem.

Following the conference, UN secretary-general Ban Ki-moon announced a report called 'A New Global Partnership: Eradicate Poverty and Transform Economies through Sustainable Development'. It sets out a clear roadmap for eradicating extreme poverty by 2030 that will form the basis for two years' negotiation on the agenda to replace the MDGs, and identifies 12 goals:

1. End poverty
2. Empower girls and women and achieve gender equality
3. Provide quality education and lifelong learning

4. Ensure healthy lives
5. Ensure food security and good nutrition
6. Achieve universal access to water and sanitation
7. Secure sustainable energy
8. Create jobs, sustainable livelihoods and equitable growth
9. Manage natural resource assets sustainably
10. Ensure good governance and effective institutions
11. Ensure stable and peaceful societies
12. Create a global enabling environment and catalyse long-term finance.

Tenure security was originally included in the MDGs, but a lack of globally comparable data at the time led to its replacement. However under this new framework's first goal, End Poverty, one of the illustrative universal goals and national targets provided is to "increase by x% the share of women and men, communities and businesses with secure rights to land, property and other assets." This will require further technical work to find appropriate indicators.

The conference did start the discussion on improving monitoring and reporting of metrics on land at global, regional and national levels. An initial set of indicators were proposed for discussion, and included:

- Private land mapped
- Land registered to women
- Transfer statistics, e.g. mortgages
- Land tax revenue receipts
- Expropriation figures
- Land conflicts in court.

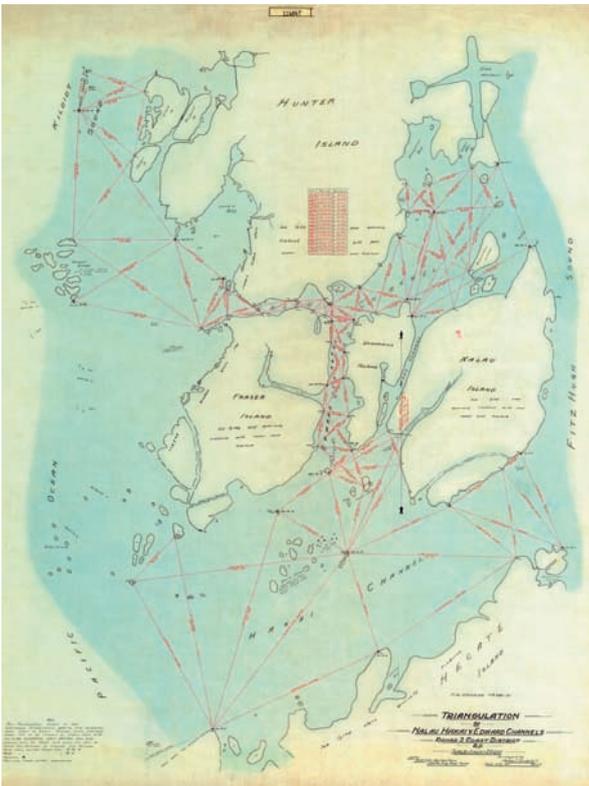
It is important that stakeholders take ownership of the processes to generate indicators and that they become institutionalised and therefore sustainable. ◀

By Robin McLaren, Know Edge, UK, and Rohan Bennett, Twente University/ITC, and Christiaan Lemmen, Kadaster & Twente University/ITC, The Netherlands

MORE INFORMATION

www.conftool.com/landandpoverty2013/sessions.php

Professional Adventurers Celebrate 100th Anniversary



▲ "Underhill Island" triangulation survey by Jim Underhill, 1921.

This year, Underhill Geomatics Ltd. celebrates 100 years of providing engineering, geomatics and land survey services in Western and Northern Canada. As it passes this significant milestone, the company looks back on its development over the past century. It has grown through early development and adoption of new geomatics technologies and services, and this remains one of the hallmarks of the business to this day.

The company was founded in 1913 by brothers Clare and Jim Underhill as Underhill & Underhill, a partnership of British Columbia Land Surveyors, in Vancouver, British Columbia (BC). The firm was one of the pioneering enterprises in the early development of the West Coast region of Canada. Shortly after they started the business, war broke out in Europe. The company was shut down during the war while the brothers served overseas, with business resuming after the war had ended.

The BC region of Canada is largely a mountainous wilderness. Most survey activity outside of the urban centres was in support of resource development. Principal modes of transportation in the

province included steamship, rail and horseback. It would often take weeks of travel by pack train, over mountains, ice fields and rivers, to reach an area to be surveyed. Surveys could take up to six months to complete. In the 1920s, Clare Underhill would often travel on horseback to Atlin in northern BC to spend the summer working with their new partner, Horace Fraser, on mineral claim surveys.

After WWI, Underhill was heavily involved in geodetic triangulation and mapping surveys for the Province of BC. Coastal triangulation and mapping supported the development of early navigational charts. BC's surveyor general instructed the surveyors of the day to give names to geographic features. Jim Underhill did just that, and to this day many of BC's geographic features carry names associated with the Underhill family or with the other members of the survey parties.

This was the era before the advent of aerial photogrammetry. Mapping of mountains and valleys was accomplished via triangulation and stadia. Mountains would often have to be climbed many times before

Every month *GIM International* invites a company to introduce itself in these pages. The resulting article, entitled Company's View, is subject to the usual copy editing procedures, but the publisher takes no responsibility for the content and the views expressed are not necessarily those of the magazine.



◀ Turning angles and taking notes on a BC coastal triangulation survey, 1922.

weather conditions were such that measurements could be made. Consequently, survey crews were credited with the first ascent of many of the mountains in BC.

On one of these mountain valley surveys in 1927, the surveyor general instructed Jim Underhill to triangulate and trigonometrically determine the height of a mountain in the coastal range that was creating quite a buzz in the mountaineering community. Jim did so during his survey and reported back his findings to the surveyor general. At 13,260 feet (4,042 metres) the 'Mystery Mountain', as it was then known, was the highest mountain identified within BC. It was soon renamed Mt. Waddington, and to this day is still the highest peak within BC. They were truly 'professional adventurers'.

During the Great Depression of the 1930s, clients often paid for surveys in land, canned fish or penny mining stocks. The land was eventually worth some money, and the food helped to feed the Underhill families, but most of the stock was worthless and would just end up as wallpaper for the office. The company survived the Great Depression to find itself virtually shutting down during WWII. This time, it was their sons and staff who served in the war. The effort of the partners (Jim, Clare and Horace) primarily focused on coastal defence and survey efforts related to the war.

The period after WWII was one of great expansion and prosperity. Technologies such as electronic

distance measurement (EDM), computers, helicopters and photogrammetry were rapidly changing the fields of surveying and mapping. The Underhill company led the way in this region with many of these technologies. Early EDM and vacuum tube computers facilitated the surveying of thousands of kilometres of electrical transmission corridors in the province.

In 1970, the company's long experience in the north of the country led it to open an office in Whitehorse, Yukon. In the 1980s, the advent of the microprocessor led to an explosion in technologies that continues to this day. The late 1980s also saw the start of the First Nations Land Claim surveys in Northern Canada (Yukon, North West Territories and Nunavut). These were the largest and most extensive legal surveys in Canada since the creation of the township system in the Prairie provinces in the 1800s. From 1987 to 2012, Underhill completed more than 40% of all of the Land Claim surveys in Northern Canada including those closest to the North Pole on Ellesmere Island.

Underhill conducted some of the first GPS geodetic surveys in the region in the late 1980s and was involved in the geodetic control surveys for BC's digital mapping programme (TRIM). The TRIM mapping programme, one of the first of its kind, provided numerous BC surveying and mapping firms with new skills that could be marketed internationally. Underhill, along with many other BC firms,



▲ The current Underhill partners and their families at the first 100 year celebration in Whitehorse, Yukon.

formed a consortium called IGS to pursue this type of work, and IGS subsequently provided surveying and mapping consulting services in Europe, Asia and South America. Additionally, Underhill became involved in GPS positioning for gravity surveys throughout the world with MWH GeoSurveys.

In the 1990s, Underhill entered the field of GIS mapping through Underhill Geographic Systems Ltd. (UGSL). UGSL mapped the electrical distribution system for BC Hydro for the most populated regions of the province (Vancouver Island and Greater Vancouver). GIS mapping projects were also completed in Miami (Florida) and Phoenix (Arizona). Underhill developed utility GIS field mapping software that was successfully utilised throughout BC and the USA.

Today, the firm has five partners and over 100 employees with offices in Vancouver, Whitehorse and Kamloops, BC. Technology continues to be a driving force, with recent forays into terrestrial laser scanning and 3D modelling for industrial, commercial and shipbuilding applications. Development of services around digital close-range photogrammetry and aerial UAV mapping are currently being pursued. One hundred years on, the Underhill 'adventure' continues... ◀

MORE INFORMATION 
www.underhill.ca

New Generation RTK---A30

- ★ Professional GNSS satellites tracking (GPS, GLONASS, Galileo, Beidou...)
- ★ built-in sensor technology, automatic centering and data collecting while pole is tilting in ± 30 degree
- ★ Industry standard GNSS engine (Trimble, Novatel...)
- ★ Super bright display & Voice message
- ★ One button base setup
- ★ FOIF PRS technology, compatible, with other brands GNSS products
- ★ 3.5G WWAN module option



FOIF Since 1958
It's professional

For more information please visit our website:
www.foif.com
or email to: internationalsales@foif.com
Suzhou FOIF Co.,Ltd.

or Canada distributor:
FOIF Canada Inc.
Email: info@foif.ca
website: <http://www.foif.ca>





FÉDÉRATION INTERNATIONALE GÉOMÈTRES
INTERNATIONAL FEDERATION OF SURVEYORS
INTERNATIONALE VEREINIGUNG DER
VERMESSUNGSINGENIEURE

PRESIDENT

CheeHai Teo, Malaysia

VICE-PRESIDENTS

Bruno Razza, Italy
Pengfei Chang, China
Chryssy A. Potsiou, Greece
Rudolf Staiger, Germany

REPRESENTATIVE OF THE ADVISORY COMMITTEE OF COMMISSION OFFICERS

Yerach Doytsher, Israel

COMMISSION CHAIRS

COMMISSION 1: PROFESSIONAL STANDARDS & PRACTICE

Leonie Newnham, Australia

COMMISSION 2: PROFESSIONAL EDUCATION

Steven Frank, USA

COMMISSION 3: SPATIAL INFORMATION MANAGEMENT

Yerach Doytsher, Israel

COMMISSION 4: HYDROGRAPHY

Michael Sutherland, Canada/Trinidad and
Tobago

COMMISSION 5: POSITIONING & MEASUREMENT

Mikael Lilje, Sweden

COMMISSION 6: ENGINEERING SURVEYS

Gethin W. Roberts, United Kingdom

COMMISSION 7: CADASTRE & LAND MANAGEMENT

Daniel Roberge, Canada

COMMISSION 8: SPATIAL PLANNING & DEVELOPMENT

Wafula Nabutola, Kenya

COMMISSION 9: VALUATION AND MANAGEMENT OF REAL ESTATE

Frances Plimmer, United Kingdom

COMMISSION 10: CONSTRUCTION ECONOMICS AND MANAGEMENT

Robert Šinkner, Czech Republic

FIG OFFICE

Louise Friis-Hansen, manager

International Federation of Surveyors, FIG
Kalvebod Brygge 31-33
DK-1780 Copenhagen V, Denmark
Tel + 45 3886 1081
Fax + 45 3886 0252
Email: fig@fig.net
Website: www.fig.net

STDM Training during the Abuja Working Week

Seventeen young land surveyors recently gained hands-on experience in the use and application of the Social Tenure Domain Model (STDM) as part of the FIG Young Surveyors Network activities during the recent FIG Working Week in Abuja, Nigeria, from 4 to 6 May 2013. The Training of Trainers (TOTs) was organised by the Global Land Tool Network Secretariat which is hosted by UN-Habitat, International Federation of Surveyors (FIG), FIG Foundation and Young Surveyors Network (YSN).

The training provided participants with an appreciation of the concepts behind the STDM. Participants developed an understanding of the STDM's contribution to addressing key land issues and the role of land surveyors in partnership with grassroots communities. There was also a technical element to the training, with participants engaging with the elements of database management and gaining an overview of the structure of the software itself – learning how to enter, manipulate and analyse data. To ensure the ongoing use and development of the STDM, participants further took the opportunity to provide feedback on key STDM concepts and its accompanying information system, and shared how the STDM could fit into their own work and country context.

In the end, the participants were challenged to redefine their land surveying profession to meet the challenging needs of communities, both now and in the future. All participants are now considered 'Trainers', and they all have plans to extend the knowledge of the STDM back in their home countries. It is anticipated that the next STDM



Intensive discussions during the Joint UN-Habitat GLTN and FIG Social Tenure Domain Model (STDM) Training of Trainers workshop for young surveyors.

training will be hosted in the Caribbean by one of the new trainers from this training session.

Kate Fairlie, Chair Young Surveyors Network – FIG

Danilo Antonio, Global Land Tool Network – UN Habitat

FIG LADM Workshop in Kuala Lumpur

On 24 and 25 September 2013, the International FIG Workshop on the Land Administration Domain Model (LADM2013) will be held, in conjunction with ISG2013, in Kuala Lumpur, Malaysia. The FIG organisation invites land professionals, members from academia and industry experts to participate.

The LADM is a common standard for the land administration domain. It will stimulate the development of software applications and will

accelerate the implementation of proper land administration systems that will support sustainable development. The LADM covers basic information-related components of land administration. Workshop topics are:

- refined LADM modelling
- LADM data input/output
- Information infrastructure
- LADM scope and beyond
- LADM implementation

The venue of the LADM Workshop is the International Campus of the Universiti Teknologi Malaysia, Jalan Semarak, Kuala Lumpur.

*Peter van Oosterom
Christiaan Lemmen*

MORE INFORMATION
www.fig.net



Qstar *Qstar High-precision GIS Handheld Collector*

- ✓ Receive GPS+GLONASS+COMPASS
- ✓ 806MHZ high-speed CPU
- ✓ 256RAM, 8G flash memory
- ✓ 5 Megapixel auto-focus camera with LED
- ✓ 1.5 meter anti-drop IP67
- ✓ Integrated high precision G-sensor
- ✓ 8800mAh Li-ion battery, over 12 hours continuous work.



**PRESIDENT**

David Coleman, Canada

PAST PRESIDENT

Abbas Rajabifard, Australia

PRESIDENT ELECT

David Lovell, Belgium

EXECUTIVE DIRECTOR

Harlan Onsrud, USA

SECRETARY

Alan Stevens, USA

TREASURER

Marilyn Gallant, USA

EXECUTIVE COMMITTEE

President, president elect and past president

GSDI STANDING COMMITTEES**1) LEGAL AND SOCIOECONOMIC**

Chair: Bastiaan van Loenen, The Netherlands

Vice-chair: Katleen Janssen, Belgium

2) TECHNICAL

Chair: Erick Van Praag, Venezuela

Arup Dasgupta, India

Chris Holmes, USA

Doug Nebert, USA

Mick Wilson, Kenya

3) OUTREACH AND MEMBERSHIP

Chair: Mark Reichardt, USA

Vice-Chair (Communications): Roger Longhorn, Belgium

Vice-Chair Africa: Sives Govender, South Africa

Vice-Chair Americas: Nancy Aguirre, Colombia

Vice-chair Asia Pacific: Tien-Yin (Jimmy)

Chou, Chinese Taipei

Vice-Chair Europe: Joep Crompvoets, Belgium

Vice-Chair Middle East: Khalid Al-Haidan, Bahrain

4) SOCIETAL IMPACTS

Chair: Carmelle Terborgh, USA

Juna Papajorgji, USA

Jeremy Shen, Chinese Taipei

Brigitta Urban-Mathieux, USA

International Geospatial Society

President: Mabel Alvarez, Argentina

GSDI OFFICE

GSDI Association

Attention: Marilyn Gallant, Business Manager

946 Great Plain Avenue, PMB-194 Needham, MA 02492-3030, USA

www.gsdi.org

Arctic Spatial Data Infrastructure – a Base for Arctic Applications

The development of an Arctic Spatial Data Infrastructure was proposed and adopted as a formal activity by the Arctic Council countries to create a mapping environment for use in the polar region. The Council is a forum for the eight circumpolar nations and sovereign indigenous populations to collaborate on social and scientific research of concern to the region. Topics addressed by the Council include biodiversity, environmental protection, effects of climate change, search and rescue, and the marine environment – all of which use and produce geospatial information for monitoring and decision-making and need a geospatial framework to co-ordinate their work.

A consistent public map has never been produced for use in the Arctic at a local to regional scale, nor have existing map service environments supported native equal area polar projections critical for visualisation and analysis in the Arctic. The Arctic SDI is developed to fill these gaps. It provides a freely available online base map and data for use at scales between 1:250,000 and 1:1 million through adaptation of existing national map services from the Council nations. Higher-resolution data and maps are provided by some nations, as their national SDI policies allow. The Arctic SDI is 'virtual' in the sense that it is not an SDI built from scratch but re-purposes existing national maps and interoperability standards to enable a seamless circumpolar view.

The eight Council member countries – Canada, United States, Iceland, Norway, Sweden, Finland, Russia, and Denmark/Greenland – have adapted their national map services to serve a



The Arctic SDI re-purposes existing national maps and interoperability standards.

compatible base map. A single 1:1 million scale map service is hosted in the Amazon EC2 environment based on the most recent Digital Chart of the World (VMAP 0) data. The General Bathymetric Chart of the Oceans (GEBCO) dataset is also served – developed by the British Oceanographic Data Centre to provide a bathymetric base map for the oceans at a resolution of 90m or better.

In each country, OGC Web Map Services (WMS) have been developed from data at 1:250,000 scale. The eight national WMS support a common symbology based on the EuroRegionalMap specification to provide consistent cartography. All layers are served using several Lambert Azimuthal Equal Area coordinate reference systems to provide regional views centred on the North Pole. National map data includes the territorial sea, a 12 nautical mile buffer into the sea or ocean. An OGC Web Map Tile Service (WMTS) is being created to provide a rapid-access cached tile view of the Arctic. OGC Web Feature Services are also being investigated as companions to the WMS to enable

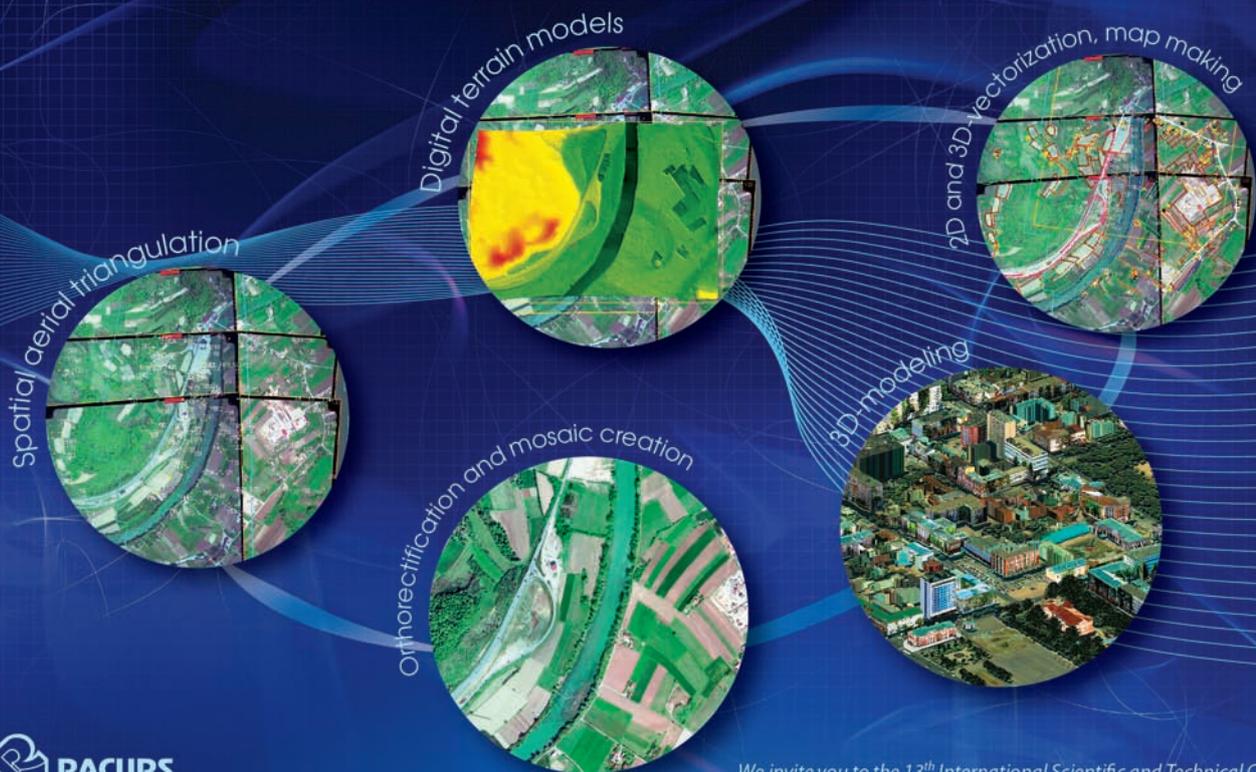
download of selected map features and data for further GIS analysis.

The Arctic SDI is a unique virtual data infrastructure supporting unique regional requirements through common standards and providing access to existing national map services and data. As the project goes operational this year, several international applications will evaluate the utility of the Arctic SDI to support polar applications. These projects will be co-ordinated with and through the Council activities to identify additional stakeholder requirements and capabilities to be added. ◀

Doug Nebert is a member of the Technical Committee of the GSDI Association and the editor of the original 'SDI Cookbook'. He is senior advisor for Geospatial Technology and system-of-systems architect with the Federal Geographic Data Committee Secretariat with the United States Government.

MORE INFORMATION
www.gsdi.org

PHOTOMOD



No 2375
 **RACURS**

+7 (495) 720-51-27, info@racurs.ru, www.racurs.ru

We invite you to the 13th International Scientific and Technical Conference
"From imagery to map: digital photogrammetric technologies".
The conference will be held on September 22-26 in France.

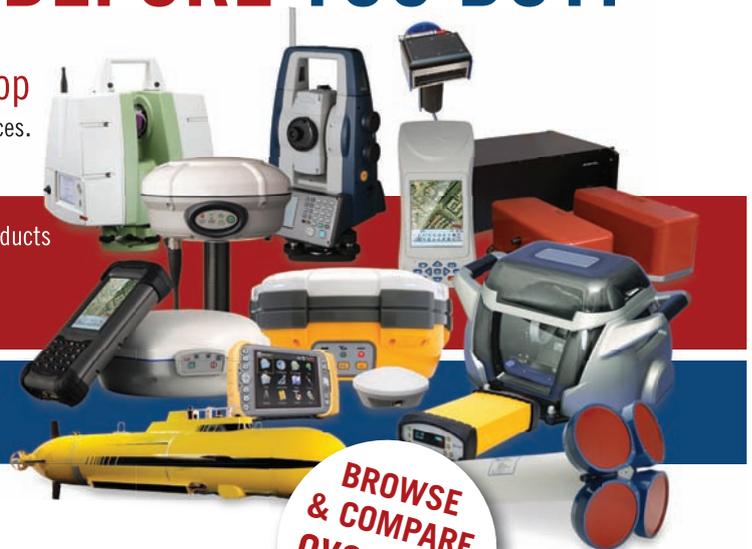
COMPARE TOOLS **BEFORE** YOU BUY!

Make **Geo-matching.com** your first stop

The independent product comparison website for geomatics devices.

- Find detailed spec-based comparisons for more than 500 products
- Read other industry professionals' comments and opinions
- Access data quickly, easily and free of charge

Bringing together the highly valued GIM International
and HYDRO International product surveys all in one place.



**BROWSE
& COMPARE
over 500
PRODUCTS!**

 **Geo-matching.com**
The right choice

 **geomares**
PUBLISHING



The mission of the Association is the advancement of geodesy.

IAG implements its mission by:

- advancing geodetic theory through research and teaching,
- collecting, analysing and modelling observational data,
- stimulating technological development, and
- providing a consistent representation of the figure, rotation and gravity field of the Earth and planets, and their temporal variations.

IAG EXECUTIVE COMMITTEE 2011 - 2015

President:
Chris Rizos, c.rizos@unsw.edu.au

Vice-President:
Harald Schuh, harald.schuh@tuwien.ac.at

Secretary General:
Hermann Drewes, iag@dgfi.badw.de

Immediate Past President:
Michael Sideris, sideris@ucalgary.ca

President of Commission 1 Reference Frames:
Tonie van Dam, tonie.vandam@uni.lu

President of Commission 2 Gravity Field:
Urs Marti, urs.marti@swisstopo.ch

President of Commission 3 Rotation & Geodynamics:
Richard Gross, richard.gross@jpl.nasa.gov

President of Commission 4 Positioning & Applications:
Dorota Brzezinska, dbrzezinska@osu.edu

Chair of Global Geodetic Observing Systems (GGOS):
Hansjörg Kutterer, hansjoerg.kutterer@bkg.bund.de

President of Communication & Outreach Branch (COB):
József Ádam, adam@sci.fgt.bme.hu

Representatives of the Services:
Riccardo Barzaghi, riccardo.barzaghi@polimi.it
Tom Herring, tah@mit.edu
Ruth Neilan, ruth.e.neilan@jpl.nasa.gov

Members at large:
Claudio Brunini, claudiobrunini@yahoo.com
Richard Wonnacott, rwnnacott@gmail.com

President of the ICC on Theory:
Nico Sneeuw, sneeuw@gis.uni-stuttgart.de

Assistant Secretary:
Helmut Hornik, hornik@dgfi.badw.de

Since the predecessor of the IAG, the 'Mitteleuropäische Gradmessung', was established back in 1862, IAG is celebrating its 150th anniversary in 2012. Celebrations will climax in September 2013 at the IAG Scientific Assembly in Potsdam, Germany. This location is particularly significant since the first ever meeting, in April 1862, was organised by General Baeyer, as representative of the Kingdom of Prussia, in Berlin. The participants were several geodesists from the Kingdom of Saxony and the Austrian-Hungarian Empire.

IAG Commission 4, 'Positioning & Applications'

The IAG is organised into Commissions, Services, the Global Geodetic Observing System (GGOS) and the Inter-Commission Committee on Theory (ICCT). Details can be found in the *Geodesists' Handbook* [41]. The four Commissions, their goals and their activities are being highlighted in a series of articles in *GIM International*.

Commission 4 promotes research that leverages current and emerging positioning techniques and technologies to deliver practical and theoretical solutions for engineering, scientific and mapping applications. It carries out its work in close cooperation with the IAG Services and other IAG entities, as well as via linkages with relevant entities within scientific and professional sister organisations. In fact, the Commission 4 Steering Committee includes representatives of the International Federation of Surveyors (FIG), International Society for Photogrammetry and Remote Sensing (ISPRS) and the Institute of Navigation (ION).

Recognising the central role of GNSS in providing high-accuracy positioning information today and into the future, Commission 4 maintains a focus on developing tools that enhance and assure the positioning performance of GNSS-based positioning solutions for a range of geodetic and other scientific and engineering applications. Significant activities involve the development of theory, strategies and tools for modelling and/or mitigating the effects of interference, signal loss and atmospheric effects as they apply to precise GNSS positioning technology. It also addresses technical and institutional issues necessary for developing backups to GNSS, integrated positioning solutions, automated processing capabilities and quality control measures.



President Dorota Brzezinska.

In the past few years, the scope of Commission 4 has broadened to include geodetic remote sensing using Synthetic Aperture Radar (SAR), Lidar and Satellite Altimetry (SA) systems for a variety of applications. One of the primary goals of Commission 4 is to promote research collaborations across various science and engineering disciplines, and to organise joint professional workshops and seminars with its sister organisations FIG, ISPRS and ION.

Commission 4 is grouped into a number of sub-commissions as below (with the chairpersons listed in brackets):

- SC4.1 Alternatives & Backups to GNSS (Guenther Retscher, Austria)
- SC4.2 Geodesy in Geospatial Mapping & Engineering (Jinling Wang, Australia)
- SC4.3 Remote Sensing & Modelling of the Atmosphere (Marcelo Santos, Canada)
- SC4.4 Applications of Satellite & Airborne Imaging Systems (Zhenhong Li, United Kingdom)
- SC4.5 High-Precision GNSS Algorithms & Applications (Yang Gao, Canada)
- SC4.6 GNSS-Reflectometry & Applications (Shuanggen Jin, China)

The Commission 4 Steering Committee comprises president Dorota Brzezinska; vice president Allison Kealy; the chairs of the six



Vice president Allison Kealy.

sub-commissions; representatives of sister organisations: Charles Toth (ISPRS), Gethin Roberts (FIG) and Larry Hothem (ION); representative of the Services: Andrzej Krankowski; and a member-at-large: Pawel Wielgosz.

The main tasks of Commission 4 in the future will include:

- Participation in conferences, seminars, workshops, symposia and schools as session chairs, conveners, workshop instructors, committee members and presenters
- Conducting research activities in multi-sensor navigation, cooperative positioning and disaster monitoring and management
- Acting as co-editors for several special journal issues
- Maintaining a dedicated website for all Commission 4 activities [42].

Commission 4 will coordinate a number of sessions at the upcoming IAG Scientific Assembly to be held in Potsdam, Germany, 1-6 September 2013, to celebrate the 150th anniversary of the IAG [43]. ◀

MORE INFORMATION

1. <http://bit.ly/XYhh8e>
2. <http://bit.ly/16W6J4m>
3. www.iag2013.org/IAG_2013/Welcome.html
4. www.iag-aig.org



INTEGRATION IS OUR SOLUTION

High Accuracy GIS Device

- Integrated high sensitivity SIRFstar III GPS receiver and antenna
- Microsoft Windows Mobile 6.5 Pro and Win Mobile Office
- Sunlight readable touch screen
- Mini USB
- Bluetooth, Wi-Fi, Wireless GSM/GPRS
- Integrated 3MP camera, speaker and microphone.

SXPad
by Geneq inc.



sxbluegps.com
info@geneq.com
+1 514 354 2511

No 2349



Professional GIS Solution Provider

2D & 3D Pipeline Information Management System



Add.: Room 1608, No.3 Building, Weibo Shidai Center, No.17 Zhong Guangcun South Str., Hai Dian District, Beijing, 100081 China
Tel.: 86-10-85271488 Fax: 86-10-85271489 Email: marketing@kqgeo.com Web: www.kqgeo.com

KQ GEO Technologies

No 2316



EXECUTIVE MEMBERS

PRESIDENT

Georg Gartner, TU Wien, Austria

SECRETARY-GENERAL & TREASURER

Laszlo Zentai, Eotvos University, Hungary

VICE-PRESIDENTS

Derek Clarke, Surveys and Mapping, South Africa
 Menno-Jan Kraak, ITC, The Netherlands
 Sukendra Martha, Bakosurtanal, Indonesia
 Paulo Menezes, Federal University of Rio de Janeiro, Brazil
 Anne Ruas, IFSTTAR, France
 Tim Trainor, Census Bureau, USA
 Liu Yaolin, Wuhan University, China

PAST-PRESIDENT

William Cartwright, RMIT University, Australia

EDITOR ICA NEWS

Igor Drecki, University of Auckland, New Zealand

COMMISSION CHAIRS

Cognitive Visualisation

sara.fabrikant@geo.uzh.ch

Map Design

kfield@esri.com

Art & Cartography

scaquard@gmail.com

History of Cartography

elri@worldonline.co.za

Map Projections

mlapaine@geof.hr

Theoretical Cartography

qydu@whu.edu.cn

Data Quality

chenxy@ecit.cn

Atlases

peter.jordan@oeaw.ac.at

Mapping from Remote Sensor Imagery

xyang@fsu.edu

Geospatial Analysis and Modeling

bin.jiang@hig.se

Geovisualisation

gennady.andrienko@iais.fraunhofer.de

Maps and the Internet

rcammack@mail.unomaha.edu

Ubiquitous Cartography

arikawa@csis.u-tokyo.ac.jp

Digital Technologies in Cartographic Heritage

livier@topo.auth.gr

Open Source Geospatial Technologies

suechith.anand@nottingham.ac.uk

Generalisation and Multiple Representation

dirk.burghardt@tu-dresden.de

Planetary Cartography

hhargitai@gmail.com

Mountain Cartography

karel.kriz@univie.ac.at

Neocartography

s.l.chilton@mdx.ac.uk

Maps and Graphics for Blind and Partially Sighted People

acoll@utem.cl

Maps and Society

chris.perkins@manchester.ac.uk

Use and User Issues

elzakker@itc.nl

Cartography and Children

jesus@map.elte.hu

Education and Training

dave.fairbairn@newcastle.ac.uk

GI for Sustainability

vstikunov@yandex.ru

Map Production and Geobusiness

philippe.demaeyer@ugent.be

Cartography in Early Warning and Crises Management

undatra@yahoo.com

Geoinformation Infrastructures and Standards

acooper@csir.co.za

GIM CORRESPONDENT

David Fairbairn, Newcastle University, UK

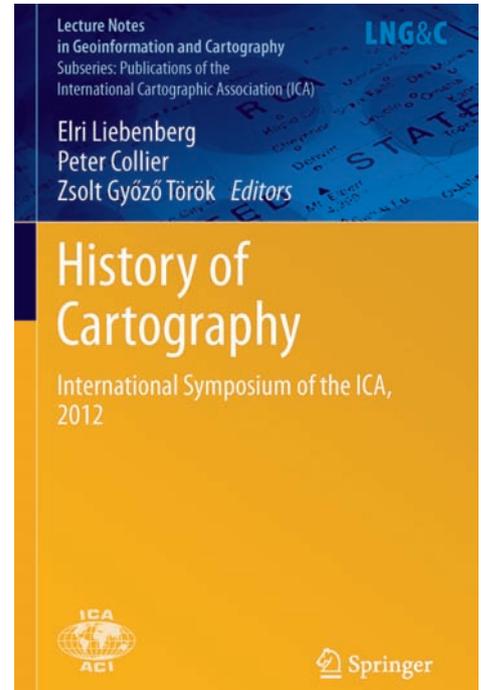
Examining the Past

As the international organisation responsible for the study of all aspects of spatial data and mapping, ICA has long been interested in the discipline of cartography's rich history. Its Commission on the History of Cartography has existed since 1972, and has established specialist expertise in a number of areas and periods of cartographic development since then. In recent years, the Commission and its subject matter have contributed significantly to the biennial International Cartographic Conferences, and also to the quadrennial International Conferences on the History of Cartography. Furthermore, the Commission itself has organised regular biennial symposia in recent years. Meetings in Utrecht (2006), Portsmouth (2008), Arlington, Texas (2010) and most recently Budapest (2012) have demonstrated the depth of scholarship of Commission members and the importance of the history of cartography to the worldwide cartographic community.

The most recent symposium in June 2012 was attended by over 50 participants from Europe (Austria, Belgium, Croatia, Czech Republic, France, Germany, Hungary, Romania, Switzerland and UK) as well as others from as far afield as the USA, Brazil, Japan and South Africa. The general theme of the symposium was 'Exploration, Discovery, Cartography'. Although the Commission is primarily interested in cartographic endeavours during the 19th and 20th centuries, cartographic activities during earlier centuries have usually formed the background for later developments and are also considered important. A total of 24 papers organised into eight sessions were presented, and

the edited *Proceedings of the Symposium* were subsequently published by ICA publisher Springer-Verlag (ISBN 978-3-642-33316-3).

Sample titles from the contents page of this volume exemplify the detailed and international nature of research undertaken by members of the Commission. Madalina Veres (History, University of Pittsburgh) examined 'Redefining Imperial Borders: Marking the Eastern Border of the Habsburg Monarchy in the Second Half of the Eighteenth Century' and in a similar part of the world, Zsolt Torok and Domonkos Hillier (Cartography and Geoinformatics, Eötvös Lorand University) considered 'Exploring and Mapping the Danube: Reading Topographic Map of Buda and Pest (1833)'. Some aspects of the history of geodetic work in Europe were presented by Jana Moser – Leibniz Institute for Regional Geography, Leipzig ('Saxony's Role in the Measurement of the Central European Meridian Arc as an International Geodetic Project since 1862'), and by Mirela Altič – Institute of Social Sciences, Croatia ('Exploring along the Rome Meridian – Roger Boscovich and the Production of the First Modern Map of the Papal States'). Further afield, Sri Handoyo (Bakosurtanal, Indonesia) wrote a 'Brief History of the Boundary Mapping between Indonesia and Timor-Leste', and the



The latest publication in the ICA subseries of the Lecture Notes in Geoinformation and Cartography (Springer), sourced from the Symposium Proceedings of the Commission.

chapter by Wu, Chia-Jung (Geography, National Taiwan University) addressed 'Colonial Mapping and Naming of the Pacific Islands – a Case Study of Orchid Island, Taiwan'.

Under the active leadership of the chair, Elri Liebenberg (University of South Africa), and vice chairs Imre Demhardt (University of Texas, Arlington) and Peter Collier (University of Portsmouth), the Commission continues its investigations into the important and fascinating annals of the discipline of cartography. ◀

MORE INFORMATION
www.icaci.org



YOUR TRUSTABLE PARTNER FOR

GNSS POSITIONING DEVICE
OPTICAL INSTRUMENT
ACCESSORIES & TOOLS

WE NOW OFFER
THE BEST DEALS
TO NEW CLIENTS WORLDWIDE
DON'T MISS IT !

- WE PROVIDE **PERSONAL HANDS-ON CUSTOMERS SERVICE**
- WE **SAVE YOUR TIME AND MONEY** BY ELIMINATING THE NEED FOR MULTIPLE SUPPLIERS WHILE FULFILLING YOUR REQUIREMENTS OF PRODUCT DIVERSIFICATION
- OUR MATURE PRODUCTS AND SOLUTIONS HAVE BEEN RECOGNIZED AND PROVED IN **OVER 60 COUNTRIES**

K9-T



- ◇ GPS + Glonass + Galileo + Compass
- ◇ 220 Channels, Centimeter Level Accuracy
- ◇ Internal UHF Radio and Cellular Modem
- ◇ Rugged IP65 Construction, 1 year warranty
- ◇ Field Software and Post-processing Software for Free

KTS-460



- ◇ Full Color LCD Screen
- ◇ Reflectorless Range Up To 800m
- ◇ SD Card, USB Port, Bluetooth
- ◇ Laser Pointer and Laser Plummet



ISPRS COUNCIL 2012 – 2016

CHEN JUN
PRESIDENT

National Geomatics Centre of China
28 Lianhuachixi Road Haidian District,
Beijing 100830, PR CHINA
Email: chenjun@nsdi.gov.cn

CHRISTIAN HEIPKE
SECRETARY GENERAL

Leibniz Universität Hannover
Insitut für Photogrammetrie und
GeoInformation (IPI)
Nienburger Str. 1,
30167 Hannover, GERMANY
Email: isprs-sg@ipi.uni-hannover.de

ORHAN ALTAN

1ST VICE PRESIDENT
Istanbul Technical University Faculty of
Civil Engineering
Department of Geomatic Engineering
34469 Ayazaga-Istanbul, TURKEY
Email: oaltan@itu.edu.tr

MARGUERITE MADDEN

2ND VICE PRESIDENT
Center for Geospatial Research (CGR)
Department of Geography
The University of Georgia
Athens, Georgia 30602-2305, USA
Email: mmadden@uga.edu

LENA HALOUNOVA

CONGRESS DIRECTOR
Czech Technical University
Faculty of Civil Engineering
RS Laboratory
Thakurova 7 166 29 Prague,
CZECH REPUBLIC
Email: Lena.Halounova@fsv.cvut.cz

JON MILLS

TREASURER
School of Civil Engineering and
Geosciences
University of Newcastle
Newcastle upon Tyne,
NE1 7RU UNITED KINGDOM
Email: jon.mills@ncl.ac.uk

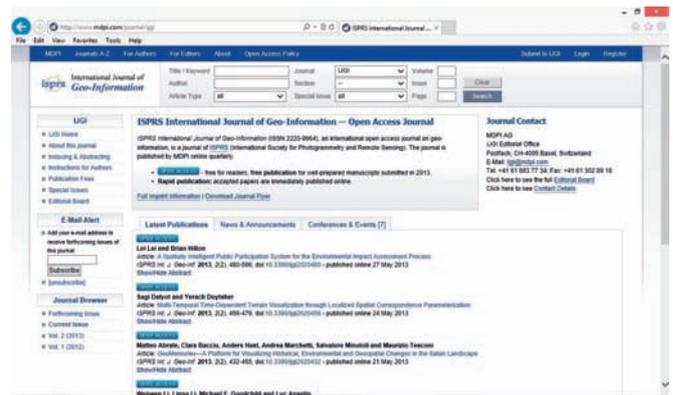
ISPRS HEADQUARTERS

see address of secretary general

The Open Access *ISPRS International Journal of Geo-Information*

In August 2011, ISPRS signed a contract with MDPI AG of Basel, Switzerland, to establish the open access *ISPRS International Journal of Geo-Information* [1]. This is the first ISPRS-owned open access journal devoted to geoinformation, and the first volume appeared in June 2012. All papers are peer-reviewed and the journal provides all the advantages of open access journals, namely fast review and reasonable publication costs for the authors as well as free access for all. To further stimulate the progress of this new journal, accepted papers will not be subject to publication fees from now until the end of 2013.

The scope of the journal is to publish regular research papers, reviews and communications. The aim is to encourage scientists to publish their results in as much detail as possible. Geoinformation covers a wide range of disciplines from geography, remote sensing, cartography, surveying engineering, photogrammetry, mathematics and physics to social sciences, philosophy, psychology, cognitive science and linguistics. Many application domains – from archaeology to zoology – use geoinformation technology. Contributions are expected from but not limited to the domains of data collection and acquisition, data structures and algorithms, spatiotemporal databases, spatial analysis, data mining and decision support systems, visualisation theory and technology in real and virtual environments, cartography, location-based services, uncertainty handling in spatial data, topology, geocomputation,



Webpage of the *ISPRS International Journal of Geo-Information*.

geotelematics, spatial information infrastructures, interoperability and open systems, as well as applications of geoinformation technology.

The journal is now in its second year of full operation and Volume 2 is in progress. Volume 1 (2012) comprises three issues with one editorial and 18 papers covering 350 pages. Volume 2 (2013) so far comprises two issues with 24 papers and 506 pages. Several special issues with invited guest editors have been completed or are in progress:

- Geospatial Monitoring and Modelling of Environmental Change (guest editor Duccio Rocchini)
- Spatial Data Infrastructures, Cyberinfrastructure, and e-Science for GIScience (guest editors Sergio Rey, Michael P. Finn)
- Geovisualisation and Analysis of Dynamic Phenomena (guest editors Marguerite Madden, Chiao-Ying (Jill) Chou, Andrea Presotto)
- Collaborative Mapping (guest

editors Linda See, Steffen Fritz, Jan De Leeuw)

- Indoor Positioning and Indoor Navigation (guest editor Harald Sternberg)
- Coastal GIS (guest editor Timothy Nyerges)
- GIS for Renewable Energy (guest editor Martin Raubal)
- GIS in Public Health (guest editor Stefania Bertazzon)

As editor-in-chief, I would like to encourage scientists from around the world to submit contributions to this new journal. My wish is to stimulate scientific exchange through high-quality papers and contributions to this journal.

Wolfgang Kainz
Editor-in-chief

MORE INFORMATION
1. www.mdpi.com/journal/ijgi
www.isprs.org

➔ **When accurate enough is not enough**

ALWAYS THOUGHT POST-PROCESSING WAS MIND BOGGLING? TRY US!

EZSURV[®] PROVIDES YOU WITH:

- ✓ centimeter accuracy at a single keystroke
- ✓ easy access to GNSS data from 8,000 base stations worldwide
- ✓ easy identification of the closest base stations
- ✓ automatic time synchronization
- ✓ custom output



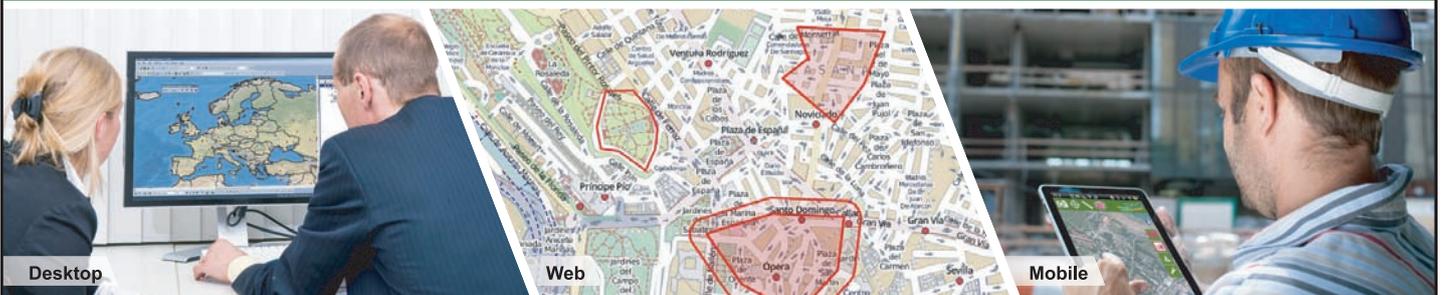
Compatible with
MicroSurvey
FIELDGenius

Scan the QR code or visit <http://effgis.com/ezsurv> to see EZSurv in action.

effgis

No 2383

SuperGIS Server 3.1a *Extends Powerful Enterprise Applications*



Access important GIS capabilities from various client apps

- Efficient online geoprocessing and Web editing services
- Map Cache Tool for fast map tile generating and management
- Strong geodatabase support for Oracle Spatial, MS SQL, PostgreSQL, etc.
- Comprehensive APIs & samples for Flex, Silverlight & JavaScript on SGN site
- Customizable Mobile SDK for iOS, Android, and Win Mobile OS (*Standard/Advanced Edition only*)
- Various Analysis Extensions like 3D, Spatial & Network Analysts (*Standard/Advanced Edition only*)



Effortlessly create & share a variety of GIS services

Free trial: www.supergeotek.com/download_6_server.aspx

APIs & samples: sgdn.supergeotek.com

Supergeo[®] www.supergeotek.com | staff@supergeotek.com

©2013 Supergeo Technologies Inc. All rights reserved. SuperPad, SuperObjects, SuperGIS, SuperWebGIS, @supergeotek.com and www.supergeotek.com are trademarks or registered trademarks of Supergeo Technologies Inc. Other companies and products mentioned herein are trademarks or registered trademarks of their respective trademark owners. Android Robot is modified based on work created and shared by Google and Windows Mobile logo is modified based on work created and shared by Microsoft.

No 2386

Future events

► JULY

Esri International User Conference

San Diego, USA
from **08-12 July**
For more information:
W: www.esri.com

IGNSS 2013

Queensland, Australia
from **16-18 July**
For more information:
E: krys@ignss.org
W: www.ignss.org

IGARSS 2013

Melbourne, Australia
from **21-26 July**
For more information:
E: info@igarss2013.org
W: www.igarss2013.org

SA Surveying + Geomatics Indaba 2013

Ekurhuleni, Gauteng, South Africa
from **23-24 July**
For more information:
E: president@sagi.co.za
W: www.sagi.co.za/indaba2013.php

► AUGUST

AUVSI13

Washington, DC, USA
from **12-15 August**
For more information:
E: mgreeson@auvsi.org
W: www.auvsishow.org/auvsi13

Agro-Geoinformatics 2013

Fairfax, VA, USA
from **12-16 August**
For more information:
E: info@agro-geoinformatics2013.org
W: <http://agro-geoinformatics2013.org/index.html>



International Cartographic

Conference 2013
Dresden, Germany
from **25-30 August**
For more information:
E: manfred.buchroithner@tu-dresden.de
W: www.icc2013.org

8th International Symposium on Digital Earth

Kuching, Sarawak
from **26-29 August**
For more information:
E: isde2013@aosconventions.com
W: www.isde2013kuching.com

► SEPTEMBER

UAV-g 2013

Rostock, Germany
from **04-06 September**
For more information:
E: info@uav-g.org
W: www.uav-g.org

54th Photogrammetry Week

Stuttgart, Germany
from **09-13 September**
For more information:
E: dieter.fritsch@ifp.uni-stuttgart.de
W: www.ifp.uni-stuttgart.de/phowo/index.en.html

XV International ISM Congress 2013

Aachen, Germany
from **16-20 September**
For more information:
E: sponsoring@ism-germany-2013.de
W: http://ism-germany-2013.de/index_en.htm

Geomatics Atlantic 2013

Saint John, New Brunswick, Canada
from **23-25 September**
For more information:
W: www.geoatlantic.org

13th Int'l Scientific and Technical Conf: From Imagery to map: Digital photogrammetric technologies

Fontainebleau, France
from **23-26 September**
For more information:
E: awada@racurs.ru
W: www.racurs.ru

► OCTOBER

International UAV Innovation Grand Prix

Beijing, China
on **01 October**
For more information:
E: UAVGP2013@163.com
W: www.uavgp.com.cn

6th International Conference "Earth from Space — the Most Effective Solutions"

Moscow, Russia
from **01-03 October**
For more information:
E: nadezhda@scanex.ru
W: www.conference.scanex.ru/index.php/en.html

Intergeo 2013

Essen, Germany
from **08-10 October**
For more information:
E: dwenzel@hinte-messe.de
W: www.intergeo.de

GeoForm+ 2013

Moscow, Russia
from **15-17 October**
For more information:
W: www.geoexpo.ru

MapTek - Users Conference 2013

Brisbane, Queensland, Australia
from **21-23 October**
For more information:
W: www.maptek.com/users2013

Latin American Remote Sensing Week (LARS 2013)

Santiago, Chile
from **23-25 October**
For more information:
E: viviana.barrientos@saf.cl
W: www.lars.cl

► NOVEMBER

AfricaGIS 2013 and GSDI14

Addis Ababa, Ethiopia
from **04-08 November**
For more information:
W: www.gsdi.org/gsdiconf/gsd14

Calendar Notices

Please send notices at least 3 months before the event date to:
Trea Fledderus, marketing assistant, email: trea.fledderus@geomares.nl

For extended information on the shows mentioned on this page, see our website:
www.gim-international.com.

ADVERTISERS INDEX

CHC, www.chcnav.com	8	KQ Geo Technologies, www.kanq.com.cn	48
Effigis, www.effigis.com	52	Netcad, www.netcad.com.tr	7
FOIF Co. Ltd., www.foif.com.cn	42	Pythagoras, www.pythagoras.net	56
Geneq, www.geneq.com	48	Racurs, www.racurs.ru	46
Geo-Matching.com, www.geo-matching.com	46	Ruide, www.ruideinstrument.com	24
Global Geo Supplies, www.softmouse3d.com	11	SOUTH Surveying, www.southsurveying.com	20
Hemisphere GPS, www.hemispheregps.com	2	SuperGeo, www.supergeotek.com	52
Hi-Target Surveying, www.zhdgps.com/en	44	TerraGo, www.terragotech.com	19
KCS TraceMe, www.traceme.tv	28	TI Asahi Co. Ltd., www.pentaxsurveying.com/en	4
Kolida Instrument, www.kolidainstrument.com	50	Trimble Navigation, www.trimble.com	55

FIG Working Week 2013 in Abuja, Nigeria

Under the theme 'Environment for Sustainability', the FIG Working Week was held in Abuja, Nigeria, in May 2013. The Working Week is the global forum for surveyors, practitioners, land professionals and FIG partners. There were in excess of 180 papers and presentations including peer-reviewed papers, academic, technical and practical papers and presentations from over 40 countries. It was a large event with more than 2,000 colleagues participating.



The FIG Working Week in Abuja, Nigeria

PHOTO: PETER LARAKKER

During his keynote, Hubert Ouedraogo (UN Economic Commission for Africa) highlighted the engagement of the community of surveyors in the implementation of the Land Policy Initiative (LPI). Surveyor contributions are in innovative/cost-effective land administration with evidence-based processes and in documenting customary-based land rights. Remy Sietchiping, Global Land Tool Network (GLTN)/UN-Habitat, held a presentation on innovative tools and solutions to land challenges such as the Social Tenure Domain Model, the gender evaluation criteria, and decentralised land recordation systems. Peter O. Adeniyi gave an overview of the developments in surveying, geodesy and land administration in Nigeria. Jide Kufoniyi fnis, former rector of RECTAS Nigeria, sees very viable solutions in joint (cross-border) education. Jean du Plessis (UN Habitat) introduced the GLTN approach to capacity building: going beyond the technical aspect is key, as are partnerships. The expected

accomplishment on capacity is, "Strengthened capacity of partners, land actors and targeted countries, cities and municipalities to promote and implement appropriate land policies, tools and approaches that are pro-poor, gender appropriate, effective and sustainable". Frank F. K. Byamugisha, World Bank, mentioned that documentation of all land is needed for security and for support to investors. Forced evictions should be avoided, object identification is relevant here – there is no need to see this as accurate boundary surveys, he said: "We need to act with a sense of urgency. We need to move away from surveying standards and technologies that are rigid to flexible ones to meet today's needs while anticipating those of tomorrow. Relevance, and not accuracy, has to be our guiding principle. We have to balance accuracy with speed and cost when designing spatial frameworks. And we have to take advantage of opportunities offered by modern technology".

Hussein Omar Farah, director general of the Regional Centre for Mapping of Resources for Development in Nigeria, gave a presentation on geoinformation for societal benefit. Peter C. Nwilo, surveyor general, Nigeria, presented the Nigerian adaption in technology. Peter O. Large, vice president of Trimble Navigation Ltd, presented a broad view of geospatial technology and systems. GNSS infrastructure provides a unified framework for high-precision positioning in support of agriculture, civil engineering and infrastructure development (and BIM), logistics and development of cadastre.

In addition to keynote plenary presentations, there were high-level segments and roundtables plus training-of-trainers workshops together with the FIG partners, notably UN-Habitat/GLTN, the African Union Land Policy Initiative and the World Bank. The Joint UN-Habitat GLTN/FIG Surveyor Generals Roundtable/

Director Generals Forum discussed LPI, the future for land professionals in Africa and the suite of pro-poor, gender-responsive GLTN land tools, tools to improve transparency in land administration, the social tenure domain model, and costing and financing of land administration services.

Brent Jones from Esri presented on 'Cadastre 2.0 – Leveraging New Technology for Efficient, Comprehensive Cadastral Systems'. There was also a focus on the FAO SOLA software.

All the sessions were well attended and participants engaged in lively discussions – always with a smile. We'd like to say a big thank you to our fellow surveyors from Nigeria! It was great! ◀

**CHRISTIAAN LEMMEN
LOUISE FRIIS-HANSEN**

MORE INFORMATION 
<http://www.fig.net/fig2013>

**NOW YOU CAN HAVE A PERFECT
POINT OF VIEW FROM ANYWHERE**



Trimble VISION

Trimble VISION™ is designed to make surveying more efficient wherever the job takes you. Our portfolio of solutions provides you with the ideal tool kit to get your job done right the first time.

Choose Your Vision at:
www.trimble.com/trimblevision





Pythagoras DTM

As easy as driving a car

other modules:



Pythagoras
Base



Pythagoras
Geocoding



Pythagoras
Road Design



Pythagoras
GIS

Pythagoras was initially developed for land surveyors and civil engineers. The need for a custom made CAD software turned out to be so big Pythagoras is currently being distributed in over 60 countries. Pythagoras is one of the most powerful and intuitive applications ever designed. It has integrated calculus functions, COGO and drawing functions. This makes Pythagoras faster than all other CAD & GIS software. And more importantly: Pythagoras is the most user friendly ever.



The Pythagoras DTM module allows users to create complex digital terrain models. Points and breaking lines are easily transformed into a field model.

- Load surface point cloud data
- Quickly create accurate profiles
- Draw contour lines
- Create DTM colorization and legends
- Calculate accurate volumes