JULY 2008 VOL 12 ISSUE 7

RNI 68561/18/6/98/ISSN 0971-9377 UP/BR-343/2008

Price: INR 150 / US$ 15 Subscriber's copy. Not for Sale

The Global Geospatial Magazine

GIS DEVELOPMENT

The Disconnect

Surveying

About the cover: Page 5

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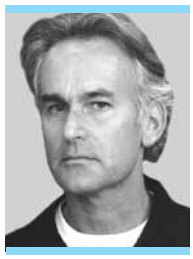

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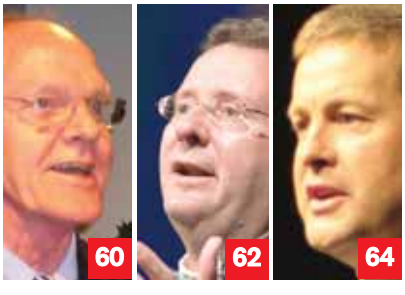

ABOUT THE COVER...

There is a curious disconnect between surveying and modern tools like remote sensing and geographical information systems. *(More in Editorial)*

GIS Development is intended for those interested and involved in GIS related activities. It is hoped that it will serve to foster a growing network by keeping the community up-to-date on many activities in this wide and varied field. Your involvement in providing relevant information is essential to the success of this endeavour.

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GIS Development Pvt. Ltd. Printed and Published by Sanjay Kumar. Press M. P. Printers B-220, Phase-II, Noida, Gautambudh Nagar (UP) INDIA Publication Address P-82, Sector-11, Gautambudh Nagar, Noida, India Editor Ravi Gupta

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From Editor's Desk

"The time has come," the Walrus said,
"To talk of many things:
Of shoes--and ships--and sealing-wax--
Of cabbages--and kings-

Lewis Carroll (Through the Looking-Glass and What Alice Found There)

Prof. Arup Dasgupta
Honorary Managing Editor
arup.dasgupta@GISdevelopment.net

I thought this might be an appropriate start to this month's editorial because there are so many things to talk about. This issue highlights surveying, one of the oldest developmental activities in recorded history. Then as now, surveying was used to plan and execute almost every form of construction including buildings, transportation networks, communications, mapping and definition of legal boundaries for land ownership. If ever there was a technique in the service of the common man it is surveying.

Survey data has to be of the highest possible accuracy and one would have expected that surveyors would be the first to adopt advanced technology solutions. Yet there is a curious disconnect between surveying and modern tools like remote sensing and geographical information systems. For example, see the entry under surveying in Wikipedia. GIS and GPS get a mentions but remote sensing does not. So, what are these very high resolution satellites being used for?

We also often see a disconnect between national mapping agencies and agencies maintaining land records. As a result, it becomes difficult - if not impossible - to transfer information from one set of maps to the other. This is because the topographic map may be well referenced with respect to its scale, datum, projection and other parameters while the land record just shows the plot boundaries without references which can allow the correct orientation and placement of the parcel on the topographic map.

Surveying, particularly land survey or cadastral survey, is a very time consuming process and as a result the record updates have backlogs that are well nigh insurmountable. So why are these technologies not popular? It is time that satellite data providers, software solution providers and system integrators address this issue. Many solutions have been explored. Some are covered in the following articles but many remain as individual project reports. Who can act as a focus and bring all these scattered efforts together and come out with an acceptable solution?

On another tack, geographical information is increasingly being viewed as a marketable commodity and therefore is getting democratised. GPS receivers are easily available and people are keen to 'see' where they are going and share their experiences with others. All these are value additions to the basic remote sensing data and GIS database. Can we look forward to a similar 'value addition' in the case of survey data? For example, a new road is planned past my house. What portion of my compound will I have to surrender? I do not want to wait till the bulldozer appears over the horizon. I need an answer now to help me plan my next course of action.

Many of these issues need discussion and exchange of ideas. I would also like to draw the attention of readers to the G I Science Forum 2009 to be held along with Map World Forum 2009 at Hyderabad. I hope many of these issues could form the subject of papers to be presented at the Forum. We have also started a blog on G I Science so if you have a view it would be a good idea to discuss it there.

I would also be delighted to hear from you as it will help us to tailor the contents to meet your expectations.

E-Sense partners with Supresoft Inc

Nigeria: E-Sense Technologies Ltd, a GIS company located in Port Harcourt, has been appointed a reseller in Nigeria by Supresoft Inc, China. This deal will see E-Sense technologies representing Supresoft in the sale of their products including the photogrammetric System Virtuozo series, IMAGiS and ImageXuite.

Announcing this, the Managing Director of the company, Mr Sibe Robinson said, "The new wave of development in the country demands more from location intelligent and spatial companies and E-Sense Technologies and Supresoft Inc are poised to take on the challenge."

Botswana, Japan partner in natural resources

Botswana: Botswana and Japan entered into cooperation in the area of natural resources and energy during the Japanese Minister of Economy, Trade and Industry's visit to Botswana. The two countries signed an agreement to establish a geological remote sensing centre in Botswana for the exploration of mineral resources, especially rare metals, and using Japanese space satellites. The project is expected to offer Botswana and the region a big advantage to effectively secure basic geological information in vast areas and to mine and extract minerals for the benefit of the people.

'Africa: Atlas of our Changing Environment' released

South Africa: Africa's rapidly changing environmental landscape, from the disappearance of glaciers in Uganda's Rwenzori Mountains to the loss of Cape Town's unique 'fynbos' vegetation, was presented at the recently held African Ministerial Conference on the Environment (AMCEN), thanks to the new publication 'Africa: Atlas of our Changing Environment'. The nearly 400-page long publication was launched by President Thabo Mbeki of the Republic of South Africa who hosted the AMCEN meeting in Johannesburg.

The Atlas, compiled on behalf of the ministers by the UN Environment Programme (UNEP), underlines how development choices, population growth, climate change and, in some cases, conflicts are shaping and impacting the natural and nature-based assets of the region. The atlas features over 300 satellite images taken in every country in Africa in over 100 locations. The 'before' and 'after' photographs, some of which span a 35-year period, offer striking snapshots of local environmental transformation across the continent.

The Atlas also examines geographic and ecological issues of relevance at the national level. It presents each country's unique features, and highlights some of the major environmental trends and challenges of each. It displays paired satellite images, focusing on specific sites in each African nation where environmental change is visually evident.

Google launches Kenya online map

Ten months after opening its regional office in Nairobi, Google has launched Kenya's online map, signaling an improvement in local content generation and innovation. The map was developed by a team of seven students from three Kenyan universities together with a team from India. Replacing a previously limited online map of four highways, the move has now placed Kenya on the level of other countries served by Google Maps. With a fiber-optic cable being laid by 2009, it is expected that the cost of Internet access and communication will significantly decrease while connection speeds increase, and people will be able to access Google applications even more quickly, said Joe Mucheru, Google lead in East Africa.

The online maps will eventually be available via mobile phone and can be loaded easily on computers with low Internet speeds. The maps will support other Google applications, such as Google Search, and businesses will be able to list their contact information and directions on the map.

In the past year, Kenya has been preoccupied with policy issues, cables, bandwidth and cost of services. The focus is now shifting from supply to the demand side.

AMERICAS

Jason-2 launch postponed

USA: The launch of ocean altimetry satellite, Jason-2, has been postponed. It was earlier scheduled to be launched on 15th June. The reason for the delay revolves around weather related problems integrating the spacecraft with the Delta II launch vehicle. Plus, adding to the delay dilemma, is NASA's slippage of their GLAST launch, which uses the same type of launcher, ground crews, and set-up procedures. Jason-2 will aid in monitoring the rate of sea-level rise and help measure the strength of hurricanes, according to Laury Miller, chief of NOAA's Laboratory for Satellite Altimetry. NOAA will use data from the Jason-2/Ocean Surface Topography Mission (OSTM) to extend a 15-year record from two earlier altimeter missions that currently show sea level is ris-

Geography, Social Studies classes becoming map-based

USA: Thousands of schools across the nation have taken their geography, social studies and history classes into the digital age through Maps101. Maps101 is an interactive, online geography and social studies educational resource that offers its member teachers and students access to over 4,000 maps, current events, educational games, quizzes, lesson plans, reference atlases and more, which can be used as teaching and learning resources in a variety of subjects.

Liz Todd, a first grade teacher at Mohawk Trails Elementary in Noblesville, Indiana, uses Maps101 as a fun way to introduce young students to the "whys and hows" of using maps. "In the first grade," says Todd, "we introduce the students to maps by describing them as 'pictures of places taken from above - most often from an airplane or a helicopter.' We used the School Locator feature on Maps101," Todd continues, "to first take a look at the area around our school with satellite images and then we pinpointed its roof and playground. I began with a long-distance view and zoomed in, one level at a time. Then I zoomed back out, one level at a time, so the boys and girls could see how maps can display an area from two different distances. Then we went to a non-satellite image to compare the two views, and ended by creating a map of our classroom from above. The program is fun, interesting and easy to use. The kids just love it and they get so excited to see their school on the computer."

Another teacher, Justin Lovelace of Park Hills Elementary in Gaffney, South Carolina, uses Maps101 to create an interactive lesson about Europe in the Middles Ages. "I began," says Lovelace, "by cutting and pasting world history maps into an ACTIV Flipchart from Promethean. By incorporating the maps into the flipchart on the computer, the students could interact, highlight, mark and focus on the specific aspects of the maps we were studying. We examined the maps to determine which smaller kingdoms changed and grew into the countries we know today.

We also used the maps on the flipcharts to recreate maps from our textbooks. "The use of technology," states Lovelace, "enhances student education, but more importantly it gives me, the teacher, the opportunity to illustrate these historical events and then let the students take control and guide the lesson into deeper concepts with broader knowledge.

ing at a rate of 3.2 mm/year - nearly twice as fast as the previous 100 years. Jason-2 is a joint, international effort between NOAA, NASA, France's Centre National d'Etudes Spatiales (CNES), and the European Organisation for the Exploitation of Meteorological Satellites (Eumetsat). Like its predecessor missions TOPEX/Poseidon and Jason-1, Jason-2/OSTM is designed to extend the climate data record by providing a long-term survey of Earth's oceans, tracking ocean circulation patterns and measuring sea-surface heights and the rate of sea-level rise.

FLAIR Act introduced

USA: A bill to develop a current, accurate Federal cadastre to inventory all Federal real property has been introduced in the U.S. Senate, earning praise from MAPPS (www.mapps.org), the national association of private geospatial firms. The Federal Land Asset Inventory Reform ("FLAIR") Act, S. 3043, introduced May 21 by U.S. Senators Claire McCaskill (D-MO) and Orrin Hatch (R-UT), was among the issues members of MAPPS discussed with members of Congress during the MAPPS Federal Programs Conference, held in March, in Washington, DC.

The FLAIR Act authorises the Department of the Interior to compile a current, accurate inventory of Federal land ownership, as called for by the Government Accountability Office and the National Academy of Sciences, as well as provides for conducting an inventory of current inventories to eliminate duplication and save tax dollars.

MAPPS Executive Director John Palatiello expressed deep appreciation for the leadership of Senators McCaskill and Hatch, saying they "have

GIS integration puts Nanaimo on the Google map

Canada: How did a little city of 78,000 souls in British Columbia earn the big title of "Capital of Google Earth"? The city of Nanaimo achieved the title inadvertently, says Per Kristensen, Director of IT. "We didn't come up with it - it was coined by Time magazine last year," he says. "They picked up on a comment made by Michael Jones, the CTO of Google, at a conference, when he said 'Nobody gets Google Earth like the city of Nanaimo.'"

Although Nanaimo didn't seek the title, it was a welcome reward for years of hard work and collaboration at both the municipal and provincial level to build up and integrate data from various GIS. Nanaimo has been building up its GIS database for over 20 years by painstakingly geo-coding (assigning geographic designations to locations) and entering associated spatial and visual data for all its paper land records, says Kristensen. "It's been a slow process with minimal investment, but we now have over 200 layers of data."

With its extensive GIS database, Nanaimo can more efficiently manage many municipal services. One example is mapping the graves in its cemeteries - a common problem in many cities. Many cemeteries have grown organically over time without a grid system. "People buried over the last 150 years were just dropped in," says Kristensen. "Finding a grave could only be done via placemarks in the scenery." Tackling this problem is surprisingly important to citizens. "This is one of the most requested services we get from the public," he says. "Questions like, 'Where's my family from? When did they come here?' come up in genealogy work. And there are many people in Vancouver doing historical work that come here looking for particular families."

The project was spurred by the looming retirement of the caretaker who'd looked after Nanaimo's cemetery for 30 years. "So we did a transfer of all her knowledge by creating a spatial map and plotting the graves. It's been available internally for a year, and we're about to open it up to the public."

Picture of downtown of Nanaimo

On the economic front, Nanaimo's advanced GIS system allows it to respond instantly to developers looking for sites for shopping malls and other commercial buildings. In one instance, visual maps with several potential sites were prepared the day after a developer made an inquiry.

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been working in a bipartisan manner to introduce this important Federal legislation.

Map collection helpful to nature lovers

USA: The New York State Department of Environmental Conservation (DEC) recently unveiled a collection of maps and a searchable catalog of geographic information. Named Mapping Gateway, a new page on DEC's web site, all sorts of data are put into easy-to-use and interactive formats. "Whether it's managing the water quality of the Great Lakes or supporting the cleanup of a brownfield site, every program managed by DEC deals in some way with the space we live in," said DEC Commissioner Pete Grannis. The Mapping Gateway project features a variety of GIS tools, including a collection of printable and interactive online maps.

In addition, the Virtual Globe Data feature allows users to access information such as contour maps for selected locations. The user can download virtual global software such as Google Earth to view interactive aerial representations of DEC bird conservation areas, environmental remediation sites, state inventory of dams and other features.

Mapping Gateway also offers the Geodata Inventory, listed on the site as "a catalog that provides descriptive information about how, when, and by whom a specific set of data was collected and how the data is formatted and accessed."

National Geographic Maps launches National Trails Database

USA: National Geographic Maps has launched TOPO!® Explorer, a new Web site and related desktop application that will help outdoor enthusiasts locate accurate trail and recreation information nationwide. With the outdoor adventurer in mind, TOPO! Explorer presents users with National Geographic's detailed topographic maps, aerial photography, hybrid maps made from the two, and an extensive, freely browsable, online database of trail descriptions, recommendations and unique points of interest. Users can customize and print their maps and connect with a GPS. The website, www.topo.com, also includes an outdoor-focused community component where TOPO! Explorer users can share their photos, video and trail recommendations.

TOPO! Explorer allows outdoor enthusiasts to browse and download the exact maps they need. Using a GPS or the application's built-in map-making tool box, users can create and share their favorite excursions with others on TOPO! Explorer and create their perfect map by combining trips from the Web site with their own content.

Innovations in Explorer include an entirely new database of detailed maps and aerial photographs known as SuperQuads™, a powerful Web-based place finder, support for video and higher-resolution photography, and a new interface and map design tools.

California launches GIS-based green buildings database

USA: The California Department of General Services (DGS) has developed the nation's first statewide online database (www.applications.dgs.ca.gov/dgs/GreenBuildings) of "green" buildings that employs GIS mapping technology.

"By using readily-available GIS mapping tools, we have created an easy-to-use online gateway to California's most energy-efficient and environmentally-friendly buildings," said DGS Director Will Bush. "The map highlights state-owned facilities that are meeting Governor Schwarzenegger's goal to build and operate buildings that save energy, conserve natural resources and decrease their carbon footprint, while furthering our goals to make state government open and accessible."

"Governor Schwarzenegger has made the use of GIS technology a priority, recognising the tremendous potential it has to serve Californians," said Teri Takai, Chief Information Officer for the State of

California. The online map will enable the public to track progress made toward achieving the energy and environmental goals of the governor's green building executive order.

Boeing/Insitu ScanEagle flight demonstrates real-time radar imaging using NanoSAR

USA: The Boeing Company in partnership with ImSAR and Insitu Inc., achieved a major milestone in May with the real-time processing of Synthetic Aperture Radar (SAR) data aboard a ScanEagle unmanned aircraft (UA) equipped with a standard inertially stabilized electro-optical (EO) camera. Combining the radar and the camera on the ScanEagle helps warfighters adapt to conditions with poor visibility. The tests marked the first time SAR and EO capabilities have flown together on such a small, lightweight platform.

During test flights, ScanEagle, outfitted with ImSAR's NanoSAR, flew over a variety of targets as real-time SAR processing was demonstrated with streaming radar images displayed on the ground station. Creating real-time images onboard ScanEagle eliminates the requirement of either processing imagery on the ground after flight or using high-speed data links to a ground station.

"This capability builds on our previous flight tests with the NanoSAR payload," said Carol Wilke, Boeing ScanEagle chief engineer. "With real-time streaming SAR imagery now available in the ScanEagle ground station, we can provide additional tactical, actionable intelligence to the warfighter.

Avencia develops Connect211.org to geographically search for social services

USA: Avencia Inc., geographic analysis and software development company, has partnered with the Delaware Valley Association for the Education of Young Children (DVAEYC) and six United Ways serving Southeastern Pennsylvania, to develop a web-based application that enables the public to find and route their way to more than 12,000 organisations and service providers in the region.

For years, residents seeking heath and human service assistance in the Delaware Valley have faced a maze of options like Medicare, county assistance, Social Security, disability programmes, job training, and drug counseling - with no single source for information about them. Without an easy alternative, many people would turn to 911 as a way to get answers, in some cases, overburdening county emergency call systems. Using GIS, now, they can use Connect211.org, a user-friendly online tool for social workers and members of the public to find nearby services for health, family, education, employment, food, and shelter. Visitors to the site can easily identify service providers based on where they live and use the routing function to plan a trip between their homes and the providers they have selected. In addition to driving directions, the system also

Agribusiness grows with crop-specific maps

USA: Crops grown in the U.S. Corn Belt and Mississippi River Delta areas are mapped extensively in the Cropland Data Layer are now available to the public for download or on disc. The Cropland Data Layer is created by the United States Department of Agriculture/National Agricultural Statistics Service (NASS). GIS software from ESRI is used to prepare the data and build the maps.

"We create resourceful maps to identify the spatial extent and associated acreage of the crops grown in these specific states," said Rick Mueller, a GIS expert with NASS.

The colourful, informative maps are used by crop farm growers associations, crop insurance companies, seed and fertilizer companies, farm chemical companies, libraries, universities, federal and state governments, and value-added remote-sensing/GIS companies. The digital data layers of land-cover information have proved helpful in watershed and environmental monitoring, agribusiness planning, crop modeling, land-use /land-cover studies, and change analysis.

includes bus, subway and train routes on the maps.

Users can search the database for services at a range of geographic levels including county, township, zip code, neighborhood, and distance from a specific address. Results are listed by address and displayed on a map that enables users to select specific search results, zoom in and out, and pan in any direction.

The application uses Microsoft .Net framework, Microsoft SQL Server, ESRI's ArcIMS, ArcSDE and ArcWeb Services. Although Connect211.org serves social workers and individuals seeking social services, its technology is relevant for any application in which geographically-based assets need to be matched with a particular target audience. These scenarios might include historic landmarks with the tourism industry; museum collections with visitors; and landscape resources with conservation activists.

Remote-sensing techniques can slow rising air, water and CO2

USA: Remote-sensing techniques can make forests more productive, offsetting increased carbon-dioxide (CO_2) concentrations in the atmosphere and oceans, said Dr. Randolph Wynne, a NASA investigator and Virginia Tech professor of Forest Biometry and Geomatics. "We've entered the era of precision forestry," Dr. Wynne declared. "Remotely sensed data can be combined with in situ data to provide accurate inventory, support state-of-the-art silviculture techniques, supply accurate growth and yield estimates, and facilitate optimal harvest scheduling. Chosen as a NASA New Investigator in 2001, Dr. Wynne is now researching ways in which NASA could improve the integration of remote sensing into decision support systems used for forest carbon monitoring, among other projects.

Associate director of the Conservation Management Institute, Dr. Wynne noted that protecting forests and sustainably managing them requires the collection of remotely sensed data along with traditional ground-sampling techniques.

Satellite pictures tell of human rights violation

USA: The term 'the morality of altitude' was coined to apply to bomber pilots who released their payloads on victims they couldn't see, without ever feeling any sense of remorse or empathy for the people whose lives, families, homes and property they destroyed. A new initiative by the American Association for the Advancement of Science (AAAS), publisher of the journal Science could well give the term a completely opposite and far more positive meaning. A project launched by the AAAS aims to use satellite imagery to

provide evidence of human rights atrocities that have been denied by the governments that perpetrate them.

The AAAS worked with Human Rights Watch to produce a 130-page report on attacks on eight villages across the remote Ogaden region of eastern Ethiopia, where "before" and "after" satellite images of villages identified by Human Rights Watch (HRW) were analysed by Lars Bromley of the AAAS.

It is confronting read, but the really damning evidence lies in the 'before' and 'after' images, which show blackened fields and destroyed homes where before there were whole villages.

ASIA PACIFIC

GEOIMAGE wins ALOS Reseller of the Year award

Japan: RESTEC (Japan) announced that Geoimage Pty Ltd has won a 2007 ALOS (Advanced Land Observing Satellite) Reseller of the Year Award. The awards are presented to the top performing resellers around the globe to honour their commitment and dedication to the promotion and utilisation of ALOS Data. ALOS was developed by the Japan Aerospace Exploration Agency (JAXA) and successfully launched on January 24, 2006. The mission objectives of ALOS include cartography, regional observation and disaster monitoring. The satellite has three sensors - two optical imagers (PRISM & AVNIR-2) and an L-band Synthetic Aperture (PALSAR).

New digital maps for Japan

Japan: GeoMarketing recently updated and expanded its digital map set for Japan. The revised map set includes a map with coverage of the country's approximately 950 three-digit postal code districts as well as a map featuring 10,000 city points. Together the maps are

claimed to comprise the most comprehensive digital map set available for postal and administrative districts in Japan. The map set is available in all common data formats and includes Japanese and international name attributions.

Digital postal code maps provide companies with foundation for sales territory and expansion planning. In conjunction with a geomarketing software application, the maps allow companies to visualise their company and market data through the use of the postcodes associated with this information.

The city maps have also been completely revised and expanded: featuring more than 10,000 city points depicted according to the number of inhabitants, these maps provide an ideal orientation tool.

Mapping Philippine baselines to cost RP P10b

Manila: It would cost the government about P10 billion to draw up the country's archipelagic baselines that will support its claim on Kalayaan islands and other maritime areas in accordance with the United Nations Conference on the Law of the Seas (UNCLOS).

This was pointed out by Senator Miriam Defensor-

Launching "Locate Your Land" Service

UAE: Ajman Municipality & Planning department has launched "Locate Your Land" service recently.

"Locate Your Land", is a new and innovated service that is available for the first time on the level of Municipalities in the UAE. It is provided through an interactive and user friendly kiosk that is located in the reception hall of the Department main building. It works by simply entering the parcel number by touching the screen, and then get the location of the parcel on the map in addition to all planning information of the parcel such as area, land use, and zoning regulations.

Ajman Municipality Receives Excellence in GIS Implementation Award

Eng. Mohammed Bin Omair and Rashid Al Kaabi receiving the award

UAE: Ajman Municipality and Planning Department received The Excellence in GIS Implementation Award. This award is instituted by GISTEC to promote innovation and experimentation in the area of GIS implementation and to honor GIS implementation programmes .

Eng. Mohammed bin Omair Al Muhairy,Assistant Director General for Engineering Affairs and Rashid Al Kaabi Head of GIS Section received the award in a special Ceremony held at AL Bustan Rotana Hotel in Dubai .

Eng Mohammed bin Omair, said that Ajman Municipality and Planning Department was willing to implement and benefit form the modern technologies and systems for the succession of work and development of the infrastructure under the direction of H.H. Sheikh Rashid bin Humid Al Nuaimi, the chairman of Ajman Municipality and Planning Department.

Rashid Al Kaabi, said that the department was selected for this award because of the big achievement in the filed of GIS application such as the Ajman Base Map Project that includes high resolution aerial survey and 3D mapping for the emirate, the Land Information System, "Locate your Land Service" for the public.

Santiago, chairman of the committee on foreign relations, as she asked whether the government has the money to conduct the "hydrographic and geo-scientific" studies to be used in delineating the baselines. Santiago said the National Mapping and Resources Information Authority asked for the Plo billion funding but budget authorities gave it only Pl.7 billion. These studies, Santiago said, are needed to support the Philippine claim on maritime territories to which it is entitled under UNCLOS.

Urban India gets under digital mapping radar

India: Evasion of property tax and construction of illegal buildings will no longer be easy in urban India. With the work on satellite mapping of 158 towns across India gaining momentum, the city managers will soon have easily-accessible evidence to nab tax evaders. Digital database and geographical info-rmation system (GIS) mapping, being undertaken by Survey of India (SOI), will help various cities preparing their master plans and executing detailed town planning, according to the officials in the

Geospatial in China earthquake relief

Red Cross workers at a relief camp

Satellite assesses earthquake damage

Australia: Researchers from the University of New South Wales (UNSW) are providing Chinese authorities with highly detailed satellite assessment of the area devastated by the earthquake which hit China on May 12, killing more than 60,000 people. Radar satellite surveying of the ground movements in the quake zone by the InSAR (Synthetic Aperture Radar Interferometry) team at UNSW's School of Surveying and Spatial Information Systems and the Cooperative Research Centre for Spatial Information is giving the China Earthquake Authority information about the level of damage from the magnitude 8.0 earth tremor. The UNSW/CRCSI InSAR team was among the first in the world to generate a ground displacement map of the quake zone, showing upheavals in the Earth's surface of up to 5m. The UNSW team is also the only group supplying information to Chinese authorities. The high-resolution map generated from analysis of satellite radar images shows ground lifting by up to 5m in areas affected by the quake. Associate Professor Linlin Ge, who led the UNSW team, said the China Earthquake Authority could overlay the image provided by UNSW onto satellite photos to assess damage around buildings or bridges.

China TransInfo Technology to provide free GIS services

China: China TransInfo Technology Corp., provider of public transportation information systems technology and comprehensive solutions in the People's Republic of China ("PRC"), has joined the Wenchuan Earthquake Enterprise Rescue Alliance ("ESRI Earthquake Alliance"), which is headed by Environmental Systems Research Institute, Inc ("ESRI"), by providing free GIS services and products to the Sichuan earthquake relief effort. The recent 8.0 magnitude earthquake in Southwest China has seriously damaged basic infrastructure in Sichuan Province. By adopting advanced GIS technology, the ESRI Earthquake Alliance has been providing real time information related to weather forecasting, transportation, electrical grids, and other areas in the disaster zone. Through the ESRI Earthquake Alliance, China TransInfo primarily provides GIS services and technical assistance related to transportation in the disaster area. China TransInfo and its employees have also made cash donations of over RMB 120,000 through the Red Cross Society of Sichuan to support relief and reconstruction efforts.

Urban Development Ministry.

The towns include Port Blair in Andaman & Nicobar Islands, Adilabad and Nalgonda in Andhra Pradesh, Dibrugarh and Nagaon in Assam, Arrah and Bhagalpur in Bihar, Bhavnagar and Jamnagar in Gujarat, Shimla and Solan in Himachal Pradesh, Samba and Rajouri in Jammu and Kashmir, Jamshedpur and Dhanbad in Jharkhand, just to name a few. Delhi, for example, has launched a pilot programme on GIS mapping in some parts of the city.

Sources further said that the satellite images for 120 towns in 33 states were already been procured, and aerial survey is being planned for 142 towns. Also, Survey of India has completed construction of 333 permanent ground control point monuments in 71 towns in 32 states, and 454 monuments are under observation in 66 towns in 32 states. The government's initiative is a part of the ongoing national urban information system (NUIS).

Remote Sensing training centre in Kolkata soon

India: A remote sensing application-training centre is scheduled to come up in the city by the next year, said G. Madhavan Nair, Chairman of the Indian Space Research Organisation (ISRO), at a function in Kolkata.

"Work on the project has already started at the Salt Lake City site provided by the State government," he said. Expressing satisfaction about the success of the recent Polar Satellite Launch Vehicle (PSLV) launch at Sriharikota, he said, "Images better than the Google Earth will be available through the satellites in another six months." Speaking about the future projects of ISRO, Dr. Nair said, "the unmanned Chandrayaan lunar vehicle is in its building and testing phase and is expected to be launched by the third quarter of this year."

Dr. Nair said policy restrictions of some foreign countries were hindering more commercial satellite launches which are only 14 as opposed to 50 indigenous launches so far. "We are in talks with various international agencies to smoothen the process," he said.

Dr. Kalam tells ISRO to help state

India: Former President A.P.J.Abdul Kalam urged the Indian Space Research Organisation (ISRO) to use its remote sensing facilities

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and inputs from the Cartosat-2 mapping satellite to help the Kerala government develop the Manjeswaram-Kovalam Waterway. "Chief Minister V.S.Achuthanandan spoke passionately about the waterway project when we met. I request the ISRO to use its remote sensing and Cartosat- 2 capabilities for the project," Kalam said. Creation of waterways across the country and interlinking of rivers, he said, are among the important infrastructural necessities in developing food, economic and national security.

The Youth Satellite that ISRO proposes to launch by the beginning of 2009 will be a platform connecting the youth of multiple countries, Kalam said.

Weather channel on cards for India

India: The Indian Meteorology Department (IMD) has plans to launch a dedicated weather TV channel through public-private partnership, said director-general of meteorology Air Vice-Marshal Ajit Tyagi. Briefing the reporters here about IMD's modernisation plans, Tyagi said the proposed weather channel would be finalised by end of 2008. The channel would initially telecast programmes on weather for six hours a day he said, adding that it would be expanded to 24-hours after a while. Insat-III D is likely to be launched by end of this year or early next year and a receiving station will be set up at New Delhi which will send real time data to regional meteorology centres, said the IMD head. Unfolding the modernisation plans during the 11th Year Plan, Tyagi said an estimated Rs 900 crore would be invested in the first two years. The focus would be on observation, communication, remote sensing and dissemination of information to public. An agro-meteorology service will be launched across the country by the end of this year.

GIS mapping for municipal areas by November-end

India: For the first time in the history of the Kolkata Municipal Corporation (KMC), a GIS map is being created. Funded by the Department for International Development (DFID), the map is expected to be ready by the end of November. Once the system is in place, one can just log onto the web portal and file a complaint to the department concerned of the KMC. Not only this, the map will show every minute detail of each of the municipal ward. "We will open an online counter with CESC and PWD - the two most important departments with which we need to coordinate all the time. If a tax payer has any complaints regarding these two departments, they can mediate through us," said a senior engineer of the civic body. Anindya Karforma, an officer working on the project, said: "We are trying to follow Hyderabad's approach for setting up the GIS map." Refusing to divulge details, Mayor Bikash Ranjan Bhattacharya said: "The creation of the map is a part of the capacity building programme for which DFID has already issued a grant. The map will be ready in the next six months."

RMSI ranked the 'Best Workplace' across all industries

India: For the second year in a row, RMSI has achieved the number one position in the Top 25 Great Places to Work 2008 study in India. This year the study was conducted by the Great Place to Work Institute, US, in partnership with The Economic Times- Indian's financial daily. The study relied on direct employee feedback. Authors of the study define a great place to work as having employees who trust in management, take pride in their job, and enjoy the company of colleagues.

Rolta set to enter new biz verticals

India: Rolta India Limited is getting into new business verticals such as high-end security systems, EPC (engineering procurement and construction management for power plants), and ERP implementation for GIS and engineering companies. The company is also working on infrastructure opportunities and core IT and software developments. "At present, we are concentrating on the high end security business in India. We are providing technology for homeland securities such as police and fire department, and we are also looking into airport asset management.

The police department of Mumbai, Rajast-han, Jammu & Kashmir is already using this technology for high-end security," said S K Shirguppi, director, business operations & head, engineering design business group.

"As we are expanding our business verticals, we are also bullish on increasing our headcount to 8,000 by 2012," he added. Apart from strengthening their business in India, Rolta is also concentrating on gaining a strong foothold overseas. According to a spokesperson, the company is planning to acquire firms in the US.

Maps and atlases on agriculture

Myanmar: Food & Agricultural Organisation (FAO) has launched a new website offering a wide range of data and information tools on agriculture in Myanmar. The site contains downloadable digital and printed atlases, maps from the FAO-maintained Geo Network digital library, agro-climatic charts and crop calendars, and related agriculture, forestry and fisheries publications. The site also includes the recently released 120-page Digital Agricultural Atlas of the Union of Myanmar, a collection of GIS-derived maps, tabular data and related documents depicting political, physical and agricultural resources in Myanmar.

Since nearly four-fifths of Myanmar's population earns its living from the land, raising crops, livestock and fish, reconstruction efforts following the devastating cyclone Nargis will be crucial.

'FAO is eager to provide its tools, data and analysis to all those involved in reconstruction efforts, in order to assist the people of Myanmar in rapidly rebuilding their livelihoods,' said Alexander Müller, Assistant Director-General.

Pilot project to view residential properties through satellite

Pakistan: The Excise and Taxation Department Punjab has launched the pilot project of digital mapping to view residential and commercial properties through satellite in the city of Lahore. The Punjab Urban Unit will provide its technical and administrative facilities in this regard. The project will be launched throughout Punjab in phases. During the first phase, the Excise and Taxation Department will focus on 12,000 residential and commercial areas of Gulberg. The project will help the Excise and Taxation Department to examine each and every part of the property through satellite to evaluate its actual size. Available data to the department will facilitate it to determine the percentage of tax. The project will also oblige the people to get tax information. It will also help them to pay their taxes though on-line facility.

Land revenue office goes digital

Nepal: District land revenue office, Syangja, has started putting land ownership certificates in computers with a view to providing fast and efficient services to the public. The move is aimed at modernising the office's services, reducing the gap between the office and the customers and promoting services based on ICT. The project is assisted by Economic Counseling Unit of the Monitoring Division of the National Planning Commission, said chief of the office Raju Poudel.

He said the information is stored into GIS-based software and Syangja was one among the five districts including Kathmandu and Kaski selected for computerisation of the land revenue offices. The task of putting the information on landownership has been given to Pokhara-based Skillnet Pvt Ltd.

B7.5bn for tap water upgrade

Thailand: Metropolitan Waterworks Authority (MWA) is preparing to make capital investments totaling 7.5 billion baht between 2009 and 2011 to expand its tap water capacity and improve the quality of its tap water distribution.

According to MWA governor Chareon Chaikittisilpa, the authority would be installing a GIS, which would allow MWA technicians to identify the sources of tap water leakage across its 25,000-kilometre pipeline network covering Bangkok, Nonthaburi and Samut Prakan.

SA, Russia to finalise Sumbandila satellite launch

Russia: South Africa (SA) and Russia are working out the details for the launch of the multi-billion Rand Sumbandila science satellite later this year, informed the Department of Foreign

H. Coetzee, A. Roos - amateurs who developed on Sumbandila Sat.

Affairs. Foreign Affairs Minister Nkosazana Dlamini-Zuma said the two countries have agreed to meet before the end of June to "thrash out details" of the launch of the South African satellite.

The Minister was speaking at the South Africa-Russia intergovernmental committee on Trade and Economic Cooperation in Moscow. The Sumbandila science satellite is part of three-year integrated national space programme developed by the Department of Science and Technology in 2006.

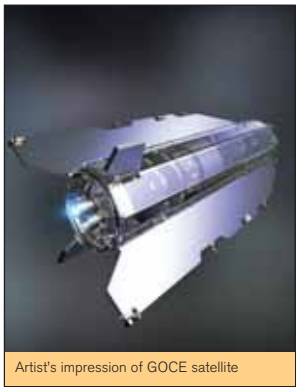
The Sumbandila programme aims to provide South Africa affordable access to space technology as well as useful data.

Trimble's GNSS Infrastructure Network for Croatia

Croatia: Trimble has been chosen by the Central Financing and Contracting Unit (CFCU) at the Croatian Ministry of Finance to supply 31 Trimble NetR5 Reference Stations, 31 Trimble Zephyr Geodetic antennas and Trimble VRS (Virtual Reference Station) technology to establish a nationwide Global Navigation Satellite System (GNSS) infrastructure network for the Republic of Croatia called the CROatian POsitioning System (CROPOS). The VRS network will provide a geospatial infrastructure for surveying, engineering and GIS professionals that enables higher-accuracy, real-time kinematic (RTK) GNSS positioning without the need for separate base stations. The CROPOS network, the largest and only nation-wide network in the country, will be operated by the State Geodetic Administration of the Republic of Croatia - Dravna Geodetska Uprava (DGU). Croatia plans to use CROPOS as the basis for the country's new geodetic reference coordinate system.

Sept. 10 set for the GOCE satellite launch

France: The European Space Agency (ESA) has set Sept. 10 for the liftoff of its GOCE (Gravity field and steady-state Ocean Circulation Explorer) satellite. The ESA satellite, the first dedicated to measuring the Earth's gravity field, was due to be launched at the end May, but the date change was necessitated by precautionary measures taken after the malfunction of an upper-stage section of a


Artist's impression of GOCE satellite

Russian Proton launch vehicle. Now confirmed not to affect GOCE's launcher, the most advanced gravity mission to date is scheduled for liftoff from the Plesetsk Cosmodrome in northwest Russia aboard a SS-19 Russian rocket and inserted into an unusually low orbit. As well as being designed to fly in an orbit as low as is technically feasible to retrieve the strongest possible gravity signal, the ESA said the sleek arrow-shaped satellite is unique in that its instrumentation actually forms part of the satellite's structure and the spacecraft has no mechanical moving parts. Once launched, GOCE is expected to map global variations in the Earth's gravity field with unprecedented detail and accuracy.

New radar possibilities - do your own assessment of TerraSAR-X data!

Germany: ScanEx R&D Center and Infoterra GmbH offers all users from Russia and CIS countries to do their own independent assessment of TerraSAR-X data quality - first radar images at 1 meter resolution. The German radar satellite was launched on June 15, 2007 and started to deliver data to commercial users as of January 15. TerraSAR-X satellite performs imaging in three different modes, varying in spatial resolution, nominal scene size and polarization.

Scottish Government to tackle noise pollution with help from Ordnance Survey

Scotland: Mapping from Ordnance Survey is behind newly published action plans to tackle unwanted noise in Scotland. The action plans, published by the Scottish Government this week, are based on innovative noise maps underpinned by Ordnance Survey data and created by acoustic experts Hamilton & McGregor. The maps cover all major roads, airports and rail lines. Users can search by postcode, zoom and move around to compare with other areas nearby.

It is hoped that the maps and action plans will help tackle the problem of unwanted and excessive noise. Minister for the Environment Michael Russell says: "Noise is often referred to as the forgotten pollutant, but the Scottish Government is determined to do more to highlight, and therefore deal with, the problem of excessive noise. Improving our environment is a key part of our plans for a greener Scotland. "I want to look at what is feasible to reduce excessive noise and make Scotland a quieter place."

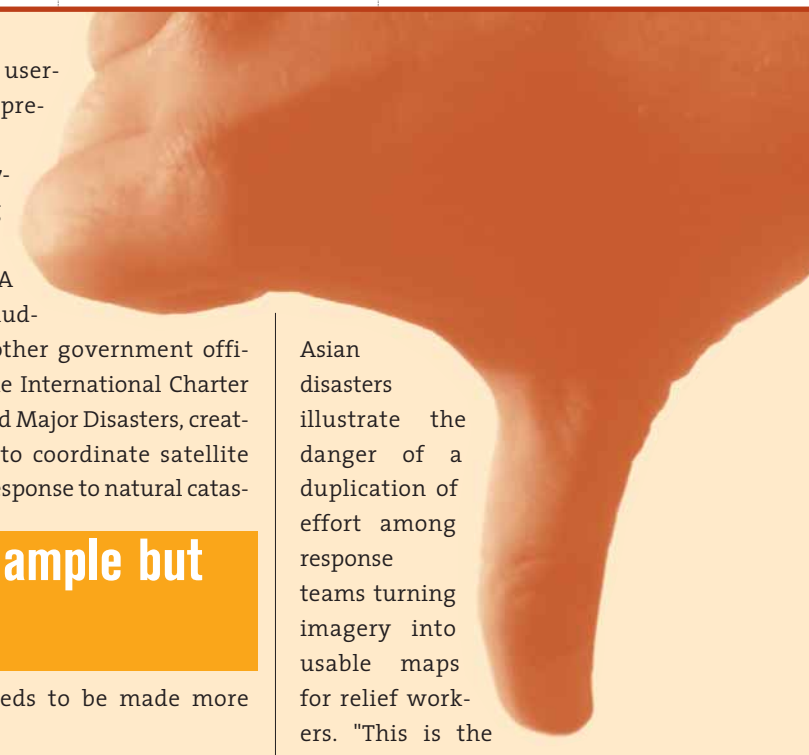
The noise map study harnesses computer software that can take account of landscape features and how they affect the spread of different sounds. This includes whether something is acoustically absorbent, such as trees and vegetation, or reflective like concrete and water. All this information is then overlaid on Ordnance Survey mapping data.

Scientists design procedure for detecting shadows in satellite images

Spain: Scientists from the University of Malaga have devised a procedure for accurately identifying shadows in high-resolution images captured by satellites, making it possible to obtain more precise information on streets, buildings, vehicles, crops and other elements detected from space. The results of this research have been passed to a company in the Parque Tecnológico de Andalucía (Andalusia Technology Park) which is already applying them in satellite image processing and detection of urban changes.

The Professor of the IT Engineering School at the University of Malaga and co-author of the study, Vicente Arévalo, explained that high-resolution images provided by current satellites and planes "have opened a new era in the field of teledetection, and that resolution enhance-

Disaster response imagery ample but distribution still tough



Italy: The Myanmar cyclone and Chinese earthquake disasters demonstrated that the world has plenty of imaging satellites to monitor disasters but is still unable to make imagery and other data easily and widely available to emergency-response teams, government officials said.

The supply of imagery continues to grow. Italy's Cosmo-Skymed and Germany's TerraSAR-X radar satellites both contributed imagery to the relief efforts following the recent catastrophes in Myanmar and China. In terms of what is available, government officials said the combination of those two satellites, along with Canada's Radarsat, has made radar imagery nearly as easy to obtain as optical imagery. "Today we can no longer complain about the Earth observation infrastructure," said Delilah Al Khudhairy, head of the Institute for Protection and Security of the Citizen at the European Union's Joint Research Center in Ispra, Italy. "There is an overwhelming amount of product available. What we need is to facilitate the tasking of the data. It needs to be more user-driven." In presentations here May 27-28 during the Berlin air show, ILA 2008, Al Khudhairy and other government officials said the International Charter for Space and Major Disasters, created in 1999 to coordinate satellite operators' response to natural catastrophes, needs to be made more responsive.

Charter members include the European Space Agency and the national space agencies of Argentina, Britain, Canada, China, France, India, Japan and the United States.

The charter has been activated 175 times since 1999, most recently May 12 when China, as a charter member, called on charter assistance following the earthquake in Sichuan province. David Stevens, of the U.N. Office of Outer Space Affairs and a coordinator of the U.N. Space-based Information for Disaster Management and Emergency Response, or Spider, programme, said the two Asian disasters illustrate the danger of a duplication of effort among response teams turning imagery into usable maps for relief workers. "This is the first time we have seen this," Stevens said of the overlap of agencies assembling data on disaster areas. "It is an example of how things are developing and it needs to be resolved." Guenter Schreier of the German Aerospace Center, DLR, which in 2003 established the ZKI Center for Satellite-Based Crisis Information - a 24/7 facility to assemble satellite data in the hours after a disaster strikes - said what is missing is a middle layer of data management between those assembling the data and those who need it.

ment also means that shadows, something inherent in any image, take on special significance". Arévalo pointed out that the identification of shadows enables the subsequent application of specific information recovery techniques, as well as the preparation of three-dimensional designs. Thanks to the shadows, IT engineers can estimate, amongst other parameters, the height of elements in a landscape, such as a house.

Online maps reveal noise levels across UK

UK: Maps showing noise levels in towns across England have been published online in an attempt to reduce the disruption caused by factories, planes, trains and cars, the British government said. Residents in 23 towns and cities will be able to check how noisy their area is by visiting a new government website, www.defra.gov.uk/noisemapping. Ministers say the maps represent the most thorough attempt yet to grasp the scale of a problem that some studies have linked to serious illness and educational difficulties.

The maps, drawn up to meet a European Union directive, will be used to help cut noise in the worst-affected areas.The maps were created using data taken at industrial sites, roads, railways and airports. They cover 50,000 miles of roads and 3,000 miles of railways.

The information was collected by airport operators, the Department for Transport, the Highways Agency, Network Rail and the Environment Agency. London, Manchester, the West Midlands, Liverpool and Nottingham are among the areas covered by the maps. Researchers have linked loud noise to illness and educational problems in children.

Nokia navigation service harnesses Ordnance Survey data

UK: Nokia is taking advantage of Ordnance Survey location data in its new Nokia Maps 2.0 service. With the launch of Nokia Maps 2.0, Nokia is taking its mapping and navigation experiences to the next level. The new service features improved optional car navigation, enhanced pedestrian navigation, added multimedia city guides, and now satellite images and a redesigned user interface, Ordnance Survey's Code-Point data is underpinning the GPS service by providing the exact location for the 1.7 million postcodes in the UK. This allows users to get direction information that is both highly accurate and linked to an actual place "on the map".

Nokia Maps 2.0 update adds Walk, a pedestrian-focused navigation component, to the application while still offering an optional car navigation system. The pedestrian navigation efficiently walks you from A to B with visual turn-by-turn guidance. Because Ordnance Survey's Code-Point data goes beyond a simple list of postcodes and provides each one with a specific location, users can be confident they are heading in the right direction.

New map shows fire scars at different areas across world

UK: Map shows global vegetation over an area equivalent to the European Union, EU27, burns every year. A University of Leicester geographer has come up with a map that shows that about 3.5 to 4.5 million square km of the global vegetation burns every year, an area which is equivalent to the European Union (EU27) and larger than India. The map produced by Dr Kevin Tansey, a leading scientist in the Department of Geography, shows a visual impression of the fire scars on earth between 2000 and 2007.

"We have produced, for the first time, a global database and map of the occurrence of fire scars covering the period 2000-2007. Prior to this development, data were only available for the year 2000. With seven years of data, it is not possible to determine if there is an increasing trends in the occurrence of fire" said Dr Tansey, a Lecturer in Remote Sensing.

NHS chooses Dotted Eyes for digital mapping

UK: The NHS (National Health Service) Information Centre has awarded a four year contract to Geographical information specialist Dotted Eyes to provide digital mapping data to the NHS. The contract provides NHS organisations with a range of digital mapping data products available through a fixed schedule of prices.

SIDEREUS 2008 to take place on Nov 26-28 in Beijing

SIDEREUS is a business matchmaking event between European and Southeast Asian companies operating in the aerospace and ICT sectors on satellite navigation applications with a special focus on GALILEO. The event aims to promote the internationalisation of European and Asian SMEs by facilitating direct business cooperation and the transfer of know-how and technology between Asia and Europe. It also aims at increasing economic cooperation between Europe and Asia, encouraging growth and transnational agreement in the regions in the aerospace sector.

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Luciad wins key contract with FAA

Belgium: Luciad, software provider for visualisation of geospatial information, has signed an important contract for the development of an SUA (Special Use Airspace) editor with the US Federal Aviation Administration (FAA), the agency responsible for the safety of civil aviation in the United States. The system will support AIXM 5 (Aeronautical Information Exchange Model), the new global aeronautical data interchange standard.

The FAA has awarded a contract to Luciad to prototype a web-based editor for special use airspaces (SUAs). This contract builds on Luciad's record of providing software solutions to large system integrators and Air Navigation Service Providers (ANSPs).

Avenza Online Forum announced

Canada: Avenza Systems Inc., (producers of MAPublisher cartographic software for Adobe Illustrator and Geographic Imager spatial tools for Adobe Photoshop) announced the inception of the Avenza Forums, a set of online message and information groups for all MAPublisher and Geographic Imager users, evaluators and other interested parties. The new Avenza forums are a 24-hour a day, 7-day a week online resource from where MAPublisher and Geographic Imager users and other interested parties can collect additional product information and dialog with other users as well as Avenza staff. The Avenza Forum can be found at www.avenza.com/forum and provides a three-tiered mechanism for asking and answering questions, for learning more about Avenza's products and services and for sharing knowledge with other users. Each forum member's initial status in the Avenza forum is dependent upon the current maintenance subscription held at the time of registration.

CIST wins PGIS contract from Heyuan City

China: China Information Security Technology has won a contract to construct the Police Geographic Infor-

Mettenmeier, Tensing sign partnership agreement

Germany: Enterprise mobile and geo solutions specialist Tensing has named Mettenmeier as Tensing Business Partner. As a business partner, Mettenmeier, a consultant and software provider in the utilities industry, will be able to sell and implement Tensing's entire suite of enterprise mobility solutions to the German speaking market in Europe.

"The partnership between Mettenmeier and Tensing will serve to benefit growing client needs for GIS data in every day tasks such as maintenance and inspections. We are honoured to work with such an innovative company in the utilities space," says Dirk Verbeek, Director of Business Development at Tensing. Tensing's mobility suite includes: the field service solution, Tensing Mobile Workflow, Tensing Track & Trace, Tensing Fleet Management, and Tensing Mobile and Web GIS.

Rolta's acquisition of US IT biz intelligence company

India: Rolta is learnt to be close to acquiring a US-based IT firm in the area of business intelligence. The firm has been searching for an asset that will add to its skills on the IT side and complement its core strengths in GIS and engineering.

The firm is understood to building up skills in the areas it is not very strong and where it wants to grow, through acquisitions. Earlier this year, it had acquired Broech Corporation, an IT company specialising in ERP applications and Oracle database technologies, for $45 million. The acquisition of a business intelligence software firm is a natural extension to this.

Los Angeles county expands agreement with Pictometry

USA: Pictometry International Corp., provider of geo-referenced aerial image libraries announced that its aerial imagery and software agreement with the Los Angeles Region Imagery Acquisition Consortium (LAR-IAC) has been renewed and expanded. LAR-IAC is directed and managed by the Los Angeles County Chief Information Office and the County Department of Regional Planning. The renewed two-year agreement provides for the capture of new aerial oblique and orthophotos for the County's more than 4,000 square miles. Pictometry is partnering with Colorado-based Sanborn for the high-accuracy digital orthophotos included in the new agreement. Pictometry will capture the imagery and Sanborn will create precision orthophotos with photogrammetric methodologies to produce the imagery to customer standards.

mation System for Heyuan City, Guangdong province in China, with a total contract value of $2.68 million. The contract is estimated to be completed within 2008. The company expects that each Police-Use GIS (PGIS) roll-out in a new city will provide follow-on contract and maintenance service opportunities with the potential to generate additional revenues for the company.

EADS Astrium wins 263 M-euro ESA satellite order

Germany: Satellite maker Astrium, a unit of European aerospace firm EADS, has won a contract worth some 263 million euros ($415 million) to build an earth observation satellite. The firm signed the contract with ESA to develop the EarthCARE satellite. Weighing some 1.7 metric tons, the satellite is due to be launched in 2013. The firm said the satellite should aid understanding of the earth's climate and deliver data for research and meteorological forecasting models. EarthCARE (Earth Clouds, Aerosols and Radiation Explorer) is the sixth Earth Explorer mission to be launched by ESA as part of its "Living Planet" programme, Astrium said.

Sierra Atlantic partners with Callidus to advance Software-as-a-Service (SaaS) delivery

USA: Sierra Atlantic, dealing in offshoring enterprise applications and outsourced product development, has worked out an agreement with Callidus Software, working primarily on Sales Performance Management (SPM). The master services agreement will cover areas such as professional services, development and support. Under the agreement, Sierra Atlantic will provide a range of operations for Callidus Software's on-demand business, including engineering capabilities and 24/7 technical services. Callidus Software will train specialists at Sierra Atlantic's delivery center in Hyderabad, India, to implement a broad range of integrated SaaS (Software-as-a-Service) product development processes and technology solutions.

MDA to provide solution for a high-resolution satellite programme

USA: MacDonald, Dettwiler and Associates Ltd. (MDA), has been awarded a multi-million dollar upgrade contract to supply a confidential customer with additional capabilities for a complete system solution for a high-resolution satellite programme. Under this contract, MDA will provide the customer with a second ground system, to be located in a separate facility to the existing system, capable of programming and receiving imagery from the satellite. MDA will also upgrade the existing system, previously announced in May 2007, to integrate with the new system. The new system upgrade is currently being developed and will be fully operational in 2009.

O'Connor to become an executive officer of Topcon Corp

USA: Ray O'Connor, president and CEO of Topcon Positioning Systems (TPS), has been selected to become an executive officer of Topcon Corporation, headquartered in Tokyo. O'Connor is also chairman of Topcon Europe Positioning Business, and sits on the board of Topcon America Corporation and Topcon Europe BV. He is the first person of non-Japanese descent and the youngest person ever to be named as a Topcon Corporation executive officer.

Intermap wins $6.8 M order from NGIA

USA: Intermap Federal Services Inc. unit has won a $6.8 million delivery order from the National Geospatial-Intelligence Agency (NGA). The digital mapping company said the order completes the purchase of licensed imagery and elevation data from Intermap's NEXTMap USA geospatial dataset.

Intermap said the order is the sixth purchase of NEXTMap data from the company for the combined purchase of about 8 million square kilometres of data or 3.1 million square miles of the contiguous United States and Hawaii.

GeoEye receives additional Government awards totaling $22 M

USA: GeoEye, Inc., announced new awards totaling $22 million to supply geospatial products and related services. Under this award GeoEye will provide National Geospatial-Intelligence Agency (NGA) a significant amount of value-added, imagery-based geospatial-intelligenceproducts including the company's airport mapping product line.

GeoSage releases RGB image stretching tool

Australia: GeoSage has released RGB Image Stretching Tool, claimed to be a time-saving utility programme for versatile image stretching. The Tool is a DOS-based utility programme and contains both linear and non-linear stretching options. Users can define a set of band-specific, adaptable parameters for both options in a single run. RGB Image Stretching Tool analyses 8- or 16-bit multiple-band GeoTIFF inputs, and outputs 3-band, 8-bit RGB composite in GeoTIFF format with a single image planar configuration.

Luciad releases LuciadMap V8.0 with Oracle Spatial (11g) integration

Belgium: Luciad has released LuciadMap Version 8.0 with substantial new functionality and increased performance, enabling developers to rapidly and effectively build and deploy high-end mission-critical systems. Luciad's partnership with Oracle is reinforced in the seamless integration with the latest edition of Oracle Spatial. LuciadMap is a suite of customisable software components that system integrators and original equipment manufacturers can easily integrate into their existing systems. The product has a global user base in aviation, security and maritime sectors.

Galdos Systems Inc. launches KML Validator

Canada: Galdos Systems Inc. has announced the launch of KML Validator, which was designed to help produce higher quality KML files. The automated KML validation engine is a public service to KML developers and users. This service will make it easier to develop and test KML tools and components, and will contribute to the increasingly wide spread adoption of KML. Galdos Systems Inc. plans additional KML support in the future, including professional validation services for KML tool developers, and a registry of KML test files.

OnPoint 6.2 released

Canada: Orion Technology Inc., a Rolta Company, announced the latest release of its flagship product OnPoint, version 6.2. This newest release marks the arrival of enhanced thematic mapping as well as support for various formats common to European locales and ESRI ArcGIS Server geocoding services. It also sets the stage for the much anticipated release of the OnPoint SDK.

ALTA Photogrammetry Suite (APS) Version 7.1 release

Canada: Groupe Alta has released Version 7.1 of its professional Alta Photogrammetry Suite (APS). This software has been re-branded from its formally known DVP-GS since version 7.0. The updated version offers new and improved functionality that increases productivity.

Key features in this update include:

- On-the-fly contour and TIN using features within the view
- Export to .asp (an XML based orientation file format) for compatibility with our ALTAVU free desktop viewer
- Enhancement of multiple filter applications including better control for color balancing and other filters in Orthomosaics

Other main enhancements in Version 7.1:

- Modifications for 2D snapping
- Viewing of relatively orientated stereo models (does not require absolute orientation before using)
- More functions incorporated to our JavaScript macro programming engine and keyboard custom keys

Rapid Surveyor from Infoterra

Germany: Infoterra Ltd has launched Rapid Surveyor, a new mobile laser mapping system. The system is specifically designed for mobile use, to enable the capture of precise information of the built/natural environment at unrivalled resolution and coverage. For example, Rapid Surveyor can identify and accurately position assets, such as poles and road drainage features, for planning and infrastructure management. Rapid Surveyor is claimed to capture high quality data with a speed of capture far faster than traditional terrestrial-based surveys. Rapid Surveyor makes up to 200,000 measurements per second, allowing highly detailed 3D information.

Leica releases MobileMatriX v3.0

Switzerland: In its newly released version 3.0, Leica MobileMatriX offers the ability to synchronise survey data with an enterprise geodatabase, transfer digital images taken from a mobile phone via Bluetooth and link it with a feature, in addition to many other improvements.

With the survey enhancement of distributed databases concept from ESRI, Leica MobileMatriX v3.0 provides a flexible and powerful mobile GIS application. Leica MobileMatriX v3.0 is designed to benefit large and complex mobile GIS projects, down to small projects involving only a few field crews.

Getmapping launches maps, imagery of Northern Ireland

UK: Getmapping has announced the availability of new aerial imagery and mapping of Northern Ireland to add to its coverage of England, Wales and Scotland. Both the aerial imagery and 1:50,000-scale mapping are available for immediate download from Getmapping.com. Aerial imagery covering the whole province of Northern Ireland is available at 25cm resolution, sufficient to clearly see, roads, buildings, trees and vegetation. The mapping is available at 1:50,000 scale. Specific tiles may be ordered online for immediate download whilst specialist areas may be ordered from Getmapping's sales office. The data is available in a variety of file formats including JPEG and ECW.

Google Earth's 3D goodness comes to the browser

USA: At the Google I/O conference, VP Engineering Vic Gundotra stressed the supremacy of the browser among all internet-enabled platforms. So it should come as no surprise that the Google Earth team has announced on the same day that it has ported the Google Earth desktop client's 3D mapping technology into the browser. Website developers are now able to embed 3D maps, which can be modified using Google's JavaScript API to add KML data, draw 3D buildings, attach callbacks, and more. The entire embed is powered by a special Google Earth Browser Plugin that end users must install. It is only available for Internet Explorer and Firefox users on Windows.

MetaCarta launches discussion blog

USA: MetaCarta, Inc., provider of geographic search and referencing solutions, announced the creation of "The MetaCarta Blog," an online community where MetaCarta and other industry experts and visitors can connect to discuss their views on new and innovative ideas and to share their collective knowledge of how geography is adding a new dimension to the Internet to create the "geoweb." The geoweb enables information to be organised and searched by location and promises to generate new consumer, business, and entertainment opportunities.

The blog, located at http://metacarta.wordpress.com, will focus on advancing industry dialog on topics such as geography, location intelligence, and how digital maps have already started to become a new user interface.

Geographic Imager 2.0 for Adobe Photoshop

Canada: Avenza Systems Inc., has released Geographic Imager 2.0 for Adobe Photoshop CS2 and CS3. Geographic Imager 2.0 is the latest version of this software that adds geospatial functionality to Adobe Photoshop. Geographic Imager enhances the already commanding Adobe Photoshop imaging environment by adding all the tools and technology necessary to support the import, edit, manipulation and export of geospatial images such as aerial and satellite imagery. . In addition to allowing the use of Photoshop and its native imaging functions such as cropping, transparencies, individual pixel editing and brightness/contrast control, Geographic Imager adds the ability to import and recognise GeoTIFFs and other referenced raster formats, automatically mosaic and tile images spatially, reproject and transform images, geo-reference images based on ground control points and re-export images with all spatial information intact.

Spectra Precision introduces Rugged Data Collector

USA: Spectra Precision announced the addition of Spectra Precision Nomad data collector running its new Field Surveyor 2.0 field software for its FOCUS 10 Total Stations and EPOCH 25 GPS Systems. The rugged data collector and new field software solution provides increased functionality for surveying applications including topographic data collection, staking and layout, boundary and cadastre, and comprehensive COGO and roading routines.

PB MapInfo launches MapInfo Professional 9.5

USA: Pitney Bowes MapInfo announced the release of MapInfo Professional 9.5, the latest version of the company's flagship application for business mapping and analysis. The new version offers additional data editing and creation tools, supports Oracle Database 11g and Microsoft SQL Server 2008, and provides workgroup enablement features for greater IT support. MapInfo Professional 9.5 offers:

- Improved data creation and editing
- Increased database support
- Greater ease of use
- Higher quality maps
- Greater programming language support
- Increased support for industry standards

ESRI

ESRI (UK) enables academic access to GI software

ESRI has renewed and expanded its agreement to supply software to universities, in the UK and Ireland, through the Chest scheme developed by Eduserv. The new three-year agreement adds to ESRI (UK)'s existing 16 year participation in Chest, through which over 75 per cent of UK universities and other educational institutions purchase GIS from ESRI (UK).

Institutions participating in the scheme benefit from discounted software as well as a 50 per cent discount on ESRI (UK) training courses and access to ESRI Inc's online training courses. The new agreement gives students and staff an increased selection of geographically based software tools from the ESRI portfolio including extensions to the core software not previously available to UK educational institutions and the option to join the EDN (ESRI Developer Network). Administration staff can also use the software in all aspects of university administration.

ESRI Canada's Sun Media's StreetPerfect for ArcGIS

ESRI Canada announced the availability of the Earth-To-Map GIS Inc. developed ArcGIS extension called StreetPerfect for ArcGIS. This wizard-based extension utilises Canada Post's national database, to verify, correct, and enhance address data from any Canadian location and automates the geocoding process. StreetPerfect for Canadian Address Accuracy was originally developed in 1992 by Sun Media Corp to take advantage of discount mailing rates available through the Canada Post Corporation (CPC) Address Accuracy Programme. The software enables users to validate addresses at the time of data entry and format them to CPC standards, significantly increasing productivity and data quality.

DIGITALGLOBE

DigitalGlobe expands imagery solutions for the oil, gas industry

DigitalGlobe has unveiled ImageConnect: Oil and Gas, an online imagery service for oil and gas professionals worldwide with on-demand access via GIS and WMS services to areas of global oil and gas exploration. Built upon DigitalGlobe's standard ImageConnect solution for GIS professionals, ImageConnect Oil and Gas provides high-precision, accurate imagery of geographic areas important to upstream oil and gas exploration, including oil basins, refineries, pipelines and high-interest geological areas for the oil and gas industry. ImageConnect: Oil and Gas provides immediate online access to a 1 million square kilometer global image layer of high-resolution satellite imaged oil basins.

INTERGRAPH

Intergraph GeoMedia to support MS SQL Server 2008 spatial enhancements

The Intergraph GeoMedia suite of geospatial information management and analysis products will support Microsoft's SQL Server 2008 spatial enhancements to provide Intergraph customers with an improved capacity for interoperability and information sharing. The spatial enhancements to SQL Server 2008 will benefit all of Intergraph's customers who utilise SQL Server for the storage and management of their geospatial information.

ERDAS

ERDAS announced the opening of a new office in Liège, Belgium. Effective May 27, 2008, ERDAS has moved from its Grâce-Hollogne, Belgium office to a new, larger location in Liège. Supporting ERDAS' growth in Europe, the Liège office includes training and meeting facilities, in a convenient and central location for customers and business partners. Prior to becoming ERDAS, Inc., the company was known as Leica Geosystems Geospatial Imaging.

Affordable GIS/GPS with nothing missing

MobileMapper 6

True Mobile GIS for Everyone

MobileMapper 6 provides a complete set of all necessary features required of a mapping device for anyone who needs productive data collection and efficient asset management in the field. Unlike consumer-grade units, the low-cost easy-to-use MobileMapper 6 offers full compatibility with popular GIS software to enable companies to select and use GIS software of their choice.

The MobileMapper 6 comes with Microsoft Windows Mobile 6, a color touch-screen, and has Bluetooth for wireless connectivity. This handy feature-rich GPS includes an integrated 2-megapixel camera, an embedded speaker and microphone to enrich the collected data with pictures and voice notes.

With MobileMapper 6, Magellan innovates and fills a market gap in GIS data collection between high-cost devices and consumer-grade products.

Features

- **High-sensitivity GPS**
- **Rugged and IPX7**
- **Windows Mobile 6**
- **2-megapixel digital camera**
- **Bluetooth connectivity**

For more information:
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China +86 10 65 66 98 66
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Check out today www.pro.magellanGPS.com to equip your GIS crew with MobileMapper 6

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RELEASES

Apple unveils new 3G iPhone - with GPS

Apple introduced the 'next-generation iPhone' - which will be faster than the earlier version, and capable of satellite navigation. The

new 8GB iPhone will cost $199 (£100) in the US. A 16GB version will sell for $299. The new phone has GPS will offer more services tailored to the owner's location, such as the ability to find nearby restaurants and businesses. The new device would be available in 22 countries.

Inrix Debuts Navigation Software Suite

Traffic data provider Inrix is moving beyond traffic data, unveiling a comprehensive suite of products for navigation devices, telematics services, and other in-car applications. Inrix Connected Services uses a third-generation routing engine, dynamic traffic data covering 800,000 miles of roadways, additional location-relevant content, and a developer zone designed to simplify creation of location-based service applications. The routing technology involved incorporates real-time, predictive, and historical traffic information.

MapmyIndia launches 'iNav' navigation services

MapmyIndia launched iNav, its GPS navigation solutions for mobile phones. iNav offers comprehensive maps and navigation software for the growing number of GPS phones. Its wide network includes 2,80,000 points of interest across 52 categories, such as ATMs, restaurants, petrol pumps and police stations. As many as 55,000 towns and villages, landmarks in 150 cities, national and state highways and detailed street, by-lane, locality, sub-locality and comprehensive points of 18 major cities are available for the users.

CSR launches chipset with Bluetooth, GPS and FM

CSR has launched its seventh generation BlueCore

silicon. BlueCore7 is a device integrating Bluetooth v2.1+EDR, Bluetooth low energy, eGPS and FM transmit and receive technologies on a single chip. CSR's BlueCore7 reduces the power, size, cost and complexity of adding multiple radios into a mobile phone. CSR has reduced the cost and made significant power and performance improvements necessary for embedding GPS functionality into a mobile handset. CSR's eGPS provides users with faster and more accurate position information.

Microsoft unveils OS for PNDs

Microsoft introduced its first operating system designed for manufacturers of handheld portable navigation devices. Windows Embedded NavReady 2009, which is based on Windows Embedded CE, includes technologies for connecting PNDs to online services, mobile phones using Bluetooth, and Windows-based PCs. The OS includes online search through Microsoft's Live Search and also includes the software maker's Live Search Map service.

BUSINESS

OxLoc ties up with TomTom on fleet management

TomTom Work and OxLoc have integrated their respective technologies for equipment monitoring and fleet management. Users can monitor the location and condition of remote equipment via the OxLoc Asset Alert, an autonomous GPS/GPRS unit with a battery life in excess of three years. This information is sent onto TomTom's

Launches at COMMUNICASIA 2008

Garmin Launches nüvifone in COMMUNICASIA 2008

Garmin International has launched the nüvifone which combines communication, navigation and some basic MP3 at the CommunicAsia 2008.

Mio launches 2 PNDs with South East Asia maps

Mio Technology has launched its new portable navigation system, the C320b and C230 with the four pre-loaded maps of the South East Asian countries of Thailand, Indonesia, Singapore and Malaysia at the CommunicAsia 2008.

CommunicAsia 2008: Samsung Omnia SGH-i900

Samsung has launched a new touch-screen smartphone called Omnia featuring a 5MP camera with smile detection and geo-tagging features at CommunicAsia 2008

Webfleet, a real time vehicle management application which connects with vehicles fitted with TomTom Go navigation units.

SatNav secures $7M from Sequoia Capital

SatNav Technologies has recently attracted investment of $7 million from one of the venture capital players, Sequoia Capital. The investment will be used to enhance the product portfolio of SatNav besides boosting the depth of the company's map content which is the backbone of all its products.

Intrinsyc to acquire parts of Destinator

Intrinsyc Software International Inc. has entered into an agreement to acquire certain parts of navigation software provider Destinator Technologies Inc. The deal includes Destinator's navigation technology and products. Destinator is undergoing a court-ordered restructuring; the acquisition is subject to court-administered restructuring proceedings in Canada and the United States involving Destinator and certain of its affiliates.

TomTom-Tele Atlas deal receives EU approval

After a six-month review by European antitrust officials, TomTom received unconditional approval to proceed with its 2.9 billion ($4.5 billion) acquisition of digital mapmaker Tele Atlas. The commission said that the merger would not significantly impede effective competition in Europe. The Commission said its investigation focused on the merged company's ability and incentive to increase the costs of other personal navigation device (PND) manufacturers for digital maps, or to limit their access to these maps.

Report

Declining Prices, Rising Demand Driving Global GPS Technology Market

The global market for mobile location technologies is anticipated to grow at a CAGR of 17% from 2007 to 2010. This 17% growth in GPS systems is supported by the portability feature of the systems:

RNCOS

Technology Integration and Business Acquisitions Likely to Define GPS IC Markets

Semiconductor vendors that pioneered the GPS market may face an uncertain future, and might best ensure their continued ability to innovate by being absorbed into much larger IC manufacturers:

ABI Research

GPS-enabled devices to exceed 830M units by 2012

Worldwide shipments of GPS-integrated mobile devices will grow at an annualized rate of nearly 40% over the next five years, reaching 834 million units in 2012:

Parks Associates

ABI: GPS Handset Market Poised for Huge Expansion

The market for GPS-enabled handsets is set to boom over the next four years, with more than 550 million units shipping in 2012:

ABI Research

APPLICATION

Tata Indicom Announces Plans to Deploy First A-GPS Location-Based Service in India

Tata Teleservices announced that it will commercially deploy a new location-based service that is the first to use Qualcomm's Assisted GPS (A-GPS) technology in the Indian market.

The service leverages Qualcomm's QPoint solution and gpsOne chipset technology, with hosting services from wireless communications provider TeleCommunication Systems.

MAP PROVIDERS IN NEWS

Navteq Signs up Navigon for 3-Year Deal

Navteq has reached a three-year agreement to provide Germany's Navigon with its maps as a preferred supplier. The agreement covers onboard navigation across all Navigon's PNDs, plus software products for other PND brands and mobile phone customers worldwide. This is in addition to a recent contract to supply mapping products for Navigon's off-board business.

Tele Atlas Unveils MultiNav Development Platform

Tele Atlas has unveiled Tele Atlas MultiNav, its digital map platform for next-generation mapping application development. MultiNav provides Tele Atlas digital map database delivered with a smaller data

footprint, which will decrease developers time-to-market by speeding the development process and allow a smaller run-time format for their applications.

New GIS based cadastral precision efficiences

For many years surveyors have been remote from the GIS industry as the levels of precision they maintain was not represented in cadastral databases and the business case to rectify that is only now being recognised.

The spatial accuracy of cadastral databases is now seriously on the agenda as technology provides high accuracy across all data. The time has come for cadastral management in GIS to be driven by surveyors, their surveying methods and their high level of spatial awareness.

SURVEY BOUNDARY DEFINITION PROCESSES

Survey information is preserved on public record for surveyors to accurately redefine property boundaries in the field and serves underpin land title security guaranteed by government. Surveyors create the cadastre with the highest precision but that spatial quality is lost in creating cadastral databases.

Surveys are now undertaken with the highest accuracy in measurement and geodetic spatial referencing. However when defining boundaries they often have to interpret accurate spatial location on the ground from survey plans that may be over 100 years old with dubious accuracy or occasionally contain incorrect or misleading information. It becomes an exercise in survey experience to fit that record information with survey marks or monuments found on the ground to effect a decision on the spatial location of a property boundary.

In Australia and many other jurisdictions, all the evidence to make that decision is represented on public record and provides confirmation of the title measurements to the authority registering the plan. That data also provides current (more accurate) title measurements of surrounding properties. Up till now this supporting survey measurement information used in the surveyor's decision making process was never utilised in GIS cadastral management.

A CADASTRAL DATABASE BUILT SOLELY FROM SURVEY MEASUREMENTS

20 years ago experienced land surveyor turned academic Dr Michael Elfick and

IT Systems Analyst Michael Fletcher recognised that position based systems (GPS) would supersede measurement based systems that historically had defined land boundaries. A process based on survey methods was developed to meet that challenge.

Property ownership underpins the capitalist economy and defining that ownership accurately can be critical. Changing the survey method of defining those boundaries will not happen in the near future as surveyors are required to verify definitions in comparison with historical records and mark the new location on the ground with survey marks.

When a surveyor places survey marks to redefine parcel corners, the measurements between those marks often differ from the dimensions shown on the title. Usually older titles have the greater differences. This difference means trying to fit together shapes only defined by the title dimensions will not replicate the continuous fabric of the cadastre in the real world. Slithers and overlaps occur when only the raw title data is modeled and adjustment of that data is required to create the continuous fabric. In the model, the parcel dimensions are adjusted, however, the original title dimensions legally define the property and should always be available as the title attributes.

Elfick has developed an electronic process that follows survey boundary definition protocols to provide a cadastral database system that combines historical survey measurement information with modern measurement and computing technology. This creates a SURVEY DATA MODEL as the basis for a geodetic cadastral database.

A high level of financial responsibility rests on a surveyor's boundary definition work and as such, normal practice is to incorporate as much checking of their work as possible. This level of rigour is inherent in the Elfick process.

Fig. 1: DATA ENTRY - Survey Information collected

GIS CADASTRAL DATABASE HISTORY

Up till the 1990's cadastral databases consisted of paper or plastic film charting maps maintained by hand. Spatial accuracy for charting maps was not important as they provided the link to the registered survey title plans which provided the survey measurements and background monument information for spatial accuracy in a local reference frame.

Fig. 2: PARCEL JOINING

These charting maps were the only reference database of the cadastre and were generally digitised to provide the first electronic cadastral databases for GIS. This was adequate at the time as the GIS representation was 'pictorial' and was a means of linking to other feature datasets relating to the property. Also the computing technology limited the storage & computations of accurate Geodetic coordination.

These databases were of no benefit to surveyors other than as a mapping tool for 'big picture' representations.

As GPS technology highlighted the spatial deficiencies of cadastral databases, improvements to the precision of cadastral databases involved 'rubber sheeting' the model to fit surveyed coordinates. Increasing the density of coordinated points then increased model precision. This method provides no spatial validity to intermediate points between accurately coordinated points and can become 'survey' intensive.

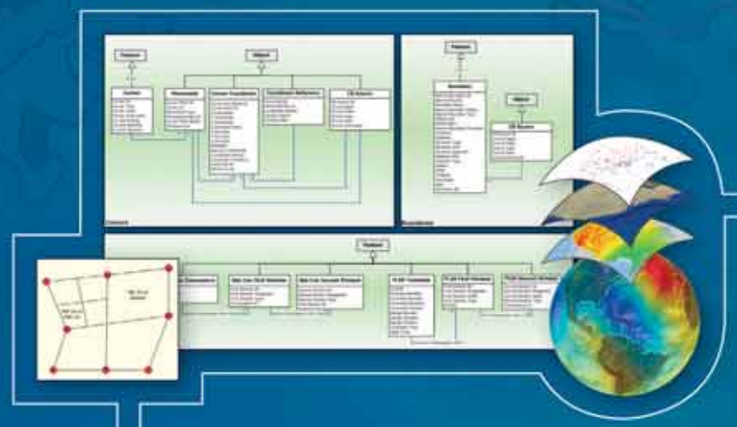
More recently, spatial precision has been increased by adding varying degrees of survey measurement information. This is a progression towards the Elfick model but will always remain an improved mapping outcome rather than a tool of survey merit.

SURVEYORS MEASUREMENT DATABASES

Surveyors are renowned for not throwing away anything. In their records every job they have worked on contains some elements of survey information that may be of benefit to them in the future. Thus for years, these file records on paper have been retained as their personal database.

Since the 1980's Geodetic referencing of surveys was required, but the majority of titles were still referenced by local survey monuments such as pegs, buried pipes or

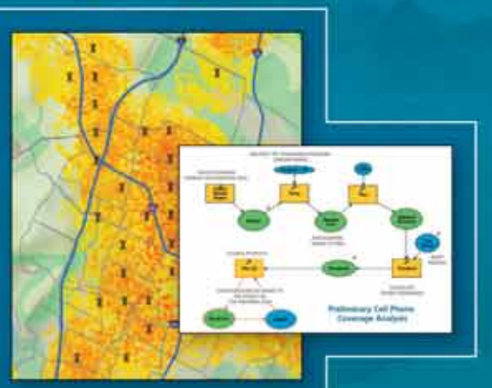
ArcGIS® 9.3—Improving Your Entire GIS Workflow



Data Management

Better Maps

Planning and Analysis



Dissemination

Mobility

ArcGIS® 9.3 offers a complete suite of software that improves organizational workflows within a standards-compliant environment. With ArcGIS, you also get the benefits of an established and active user community, instructor-led and online training, and new online resource centers.

Data Management

ArcGIS 9.3 provides new tools for accessing data within an organization, including the addition of PostgreSQL and Microsoft® SQL Server® 2008 support, a new image service, version management, enhancements to geodatabase replication, and better geocoding.

Better Maps

ArcGIS 9.3 includes many enhancements that make it easier than ever to create and share production-quality maps. These enhancements include a new Disperse Markers tool and, via Maplex® for ArcGIS, better contour labeling and more control over where labels are placed inside and around polygons.

Dissemination of Information

ArcGIS 9.3 makes dissemination of geographic information much easier. New tools that aid in dissemination include improved map cache management, which allows maps to be published more quickly, and a series of JavaScript™ APIs for mashup-style development. These new APIs allow JavaScript developers to easily embed ArcGIS Server Web mapping applications into any Web site.

Mobility

The new ArcGIS Mobile application increases data accuracy and enables real-time decision making in the field. Also, the ArcGIS Mobile SDK now offers enhanced map control rendering, data storage capabilities, and expanded projections.

Planning and Analysis

Many modeling tools have been enhanced, and some entirely new tools have been added to help users get more answers from their data. These include a new scatterplot matrix graph, improvements to the Near tool, and advanced Ordinary Least Squares and Geographically Weighted Regression tools.

www.esri.com/whatsnew

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Fig. 3: The Adjustment Report

concrete blocks. Surveyors found these marks to orientate their surveys and stored references to them in their records. Some of this data would be used in the preparation of subdivision plans and would then be available on public record.

The surveyor's public database consists of the survey plans of subdivisions done by other surveyors and stored on paper in local or State Offices.

The advent of computers and coordinate geometry software then allowed them to electronically store their personal survey boundary definitions, firstly on a local datum and more recently on a standard geodetic one.

CREATING A SURVEY DATA MODEL AND CADASTRAL DATABASE

The measurements from survey plans are used to model the parcels and those parcels are then joined to form a mesh of survey geometry known as the SURVEY DATA MODEL. The SURVEY DATA MODEL is then used by the least squares adjustment to fit the geometry mesh to geodetic survey control marks and then generate coordinates to create the cadastral database. The stages of the process are:

DATA ENTRY

The options to create a survey data model include:

Manual data entry of survey plans - Survey measurements are used to define parcels. Other survey information from plans is entered to provide updated dimensions and connectivity to other parcels. Connections across roads are also generated to ensure those roads maintain their nominated fixed width. Survey bearings and measurements are entered and held fixed in tables. Other cadastral parcel attributes are included. i.e. Plan Number, Age, Area, survey status (historical, compiled). Weightings are generated to nominate survey quality based on the age of the plan or can be nominated manually.

Manual data entry is the preferred method as 'parcel' miscloses are checked before joining to the model which checks data entry and plan quality.

Importing electronic data from other survey geometry software - Survey software packages can usually output relevant cadastral data (with parcel attributes) in a format which can be imported to the survey data model.

Migration of other existing GIS cadastral databases - Blocks of some mapping databases are able to be imported by inversing the existing mapping boundaries. This method is used to quickly populate a cadastral database but has no survey merit and is often too inaccurate to be adjusted. In such circumstances, pockets of good data can be used to improve large areas of relatively poor data as an iterative process.

PARCEL JOINING

The geometry model of each parcel is then joined to the Survey Data Model which invokes another level of survey rigour.

Each point of the joining parcel is joined directly to the correct node on the model. If a point sits somewhere along an existing line that point is designated as a 'line point' to maintain the existing line as a straight line.

As each point is connected, the precision of the 'fit' of the new geometry to the survey data model is measured so the spatial quality of the new geometry is reported. A parcel is not joined until the user is satisfied with the joining residuals. Drafting or other problems with plans are quickly found in this process.

The joining process is currently being investigated by the Land Titles Office of New South Wales (Australia) as a means of checking the survey integrity of new subdivision plans relative to the existing cadastral survey data model and as a format for future electronic lodgment.

THE ADJUSTMENT

The survey data model stores the original measurement data and always returns to that original data to form the least square equations for every adjustment. ACTIVE control points are held fixed and the geometry mesh is adjusted to them. NON-ACTIVE control points are not held fixed and new coordinates are calculated through the mod-

> **"The GIS can assist the surveyor with additional information (aerial photography) that may assist in locating survey marks or other assets in the field"**

el for them. They provide an independent check on the spatial quality of the database created. After each adjustment is run by the operator, a report is available which compares the computed database distance with the original surveyed distance for every line in the model.

THE OUTCOMES FOR A SURVEY DATA MODEL

- Curve geometry is mathematically defined
- The survey data model produces the most complete and accurate representation of the legal cadastre.
- The precision of the model is determined by the accuracy of the survey information used.

i.e. for modern survey information the model accuracy should be less than 20-30mm

- Once entered, all the survey information is stored as part of the model and is efficiently updated with new information.
- As the model uses survey measurements to compute the database coordinates between control points, the amount of survey control is greatly reduced.

THE SURVEY DATA MODEL AS A FIELD SURVEY TOOL

Using laptop computers, surveyors are taking the survey data model in the field to locate remote or buried survey marks by handheld or RTK GPS with sub-meter accuracy. Once a survey mark is found the survey coordinates are held fixed for that point in the model and the adjustment is rerun. Within 15 minutes the surveyor is then searching for the next mark with a much higher model precision. This has been of great benefit in rural areas or rugged terrain or to quickly confirm a mark has probably been destroyed. Surveyors have reported benefits by being able to resolve problems with old or poor standard plans in the field.

As surveys are completed, a coordinated survey database is built. This information is available as a basis for future surveys in the same or adjoining areas.

THE OUTCOMES FOR GIS

If an existing database is spatially accurate, there is a greater awareness of all users to ensure new information meets the same level of spatial quality, so all data being added to an asset database should retain its spatial integrity.

The rules for an accurate database can then ensure that no data is adjusted away from an accurate coordinated spatial location to match a poor quality cadastre

A NEW RELATIONSHIP BETWEEN SURVEY AND GIS

Survey accuracy in a cadastral database encourages a mutually beneficial environment for both surveyors and GIS professionals

Fig. 4: CONTROL REPORT - Review of model precision through non-active control points

In local government and utilities, the surveyors are now working more closely with the GIS staff for a mutually beneficial environment. Surveyors are now more interested in contributing accurate information for the GIS. The GIS can assist the surveyor with additional information (aerial photography) that may assist in locating survey marks or other assets in the field.

THE BUSINESS CASE

The benefits of an accurate survey data model are efficient operations and no problems caused by a cadastral layer of unknown spatial quality.

Currently there is no appreciation of the real economies of the issues and no true accounting of the real cost of inefficiencies or problems.

Spatially accurate data is more efficiently migrated internally & externally and risk management issues and potential liabilities are reduced.

THE FUTURE

In New South Wales a Continuous Operating Reference Stations (CORS) network of GPS stations will soon provide centimetre accurate geodetic coordinates to surveyors across the State and the general accessibility of modern spatial technology means a spatially accurate cadastral database is critical to effective data management.

The survey data model is the key to meeting the future spatial challenges of Surveyors and GIS Professionals so the cadastral layer has survey and spatial merit. ■

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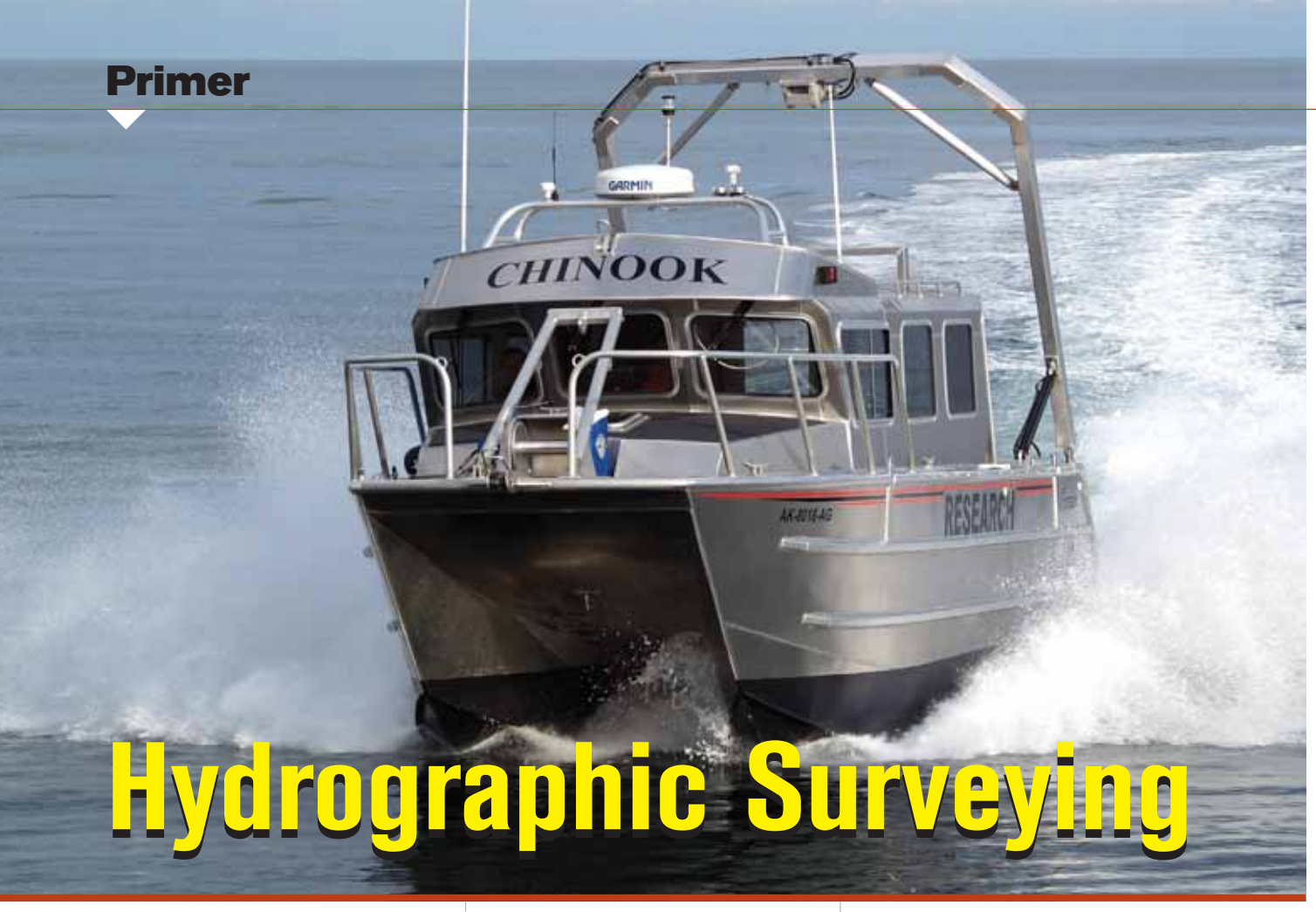

Hydrographic Surveying

Maritime safety and navigation are important issues in transoceanic conveyance. Government agencies, private companies and investment groups often need to collect hydrographic data in order to enable safe navigation and freedom of manoeuvre at sea and to exploit the physical operating environments above and below the water surface for strategic, operational and tactical advantage.

Hydrography is the science that deals with all measurements and descriptions of the physical features of bodies of water and their littoral land areas. Hydrographic surveys support a variety of activities such as port and harbour maintenance (dredging), coastal engineering (beach erosion and replenishment studies), coastal zone management, and offshore resource development. In broad terms hydrographic surveys would include all underwater surveys encompassing all navigational, pipeline routing and sub marine cable installation and dredging surveys. However, typical hydrographic surveys are carried out for the purpose of navigation and other surveys differ from it in terms of techniques used and the final desired output. For example, bathymetric surveys are aimed at collecting depth data.

A bathymetric map or chart usually shows floor relief or terrain as contour lines (called depth contours or isobaths). They don not provide additional surface navigational information such as accurate positions and representations of hills, mountains and lights towers that will aid in fixing a ship's position. Similarly, reflection seismology or 'seismic' is used to map the subsurface structure of rock formations. Seismic offshore surveys are the primary method of exploring oil and gas deposits on land, under the sea and in the transition zone between the land and sea (depths less than 30 to 40 metres).

The surveys are most commonly conducted by or under the supervision of national organisations with responsibilities for chart making and distribution as per the standards set by various international agencies such as the IMO (International Maritime Organisation), IHO (International Hydrographic Organisation), ISO, IMCA (International Marine Contractors Association) and Commission 4 of the International Federation of Surveyors (FIG) .

TECHNOLOGY

There are five fundamental consideration in a hydrographic survey, viz. the position, orientation or a direction or azimuth to orient the survey, scale, shape and the detail of information required which will include - regular water depths, least depth positions over all shoals, wrecks, reefs, banks and obstructions, coastline position (HW - high water, and LW - low water mark) , nature of the bottom, tidal measurements, the positions of breakers, tide rips, fishing stakes, positions of all floating navigation marks among others. The surveys should also establish datum controls (Horizontal and Sounding), time, hydrographic position, horizontal positional accuracy using Differential Global Positioning System (DGPS) and establish resolution Standards before undertaking the survey.

The complex nature of hydrographic surveys entails the use of advance technologies and devices. Early hydrographic surveys consisted of depths measured by sounding pole and hand lead line, with positions determined by three-point sextant fixes to mapped reference points.

The development of single-beam echo sounders in the early 1930s greatly speeded up the survey process and allowed more data points to be collected. Further advancement came with the development of electronic navigation systems in the 1940s . In the 1970s, multibeam swath mapping systems were developed, improving quality and coverage with multiple sounding sensors (Figure 1).

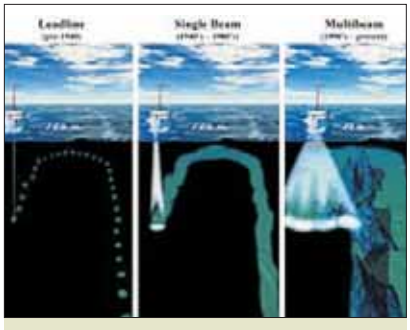

Fig. 1: Evolution of Hydrographic surveying techniques
(Source: http://www.oceanservice.noaa.gov)

Modern surveys make use of a range of software and equipment that can be installed on an inflatable craft, such as zodiacs, small craft, AUVs (Autonomous underwater vehicles), UUVs (Unmanned Underwater Vehicles) or large ships, and can include sidescan, single beam and multibeam equipment for hydrographic surveys primarily with side scan and multibeam sonar. The surveys are increasingly being conducted with the aid of airborne remote sensing LIDAR systems and optronics. The core advantage in LiDAR technology is to measure quantities faster and better by utilizing state of the art lasers techniques. Interferometric sonar systems are capable of providing large swath bathymetry in shallow-water areas.

The **Single-beam echo sounder or Side scan sonar (Sound Navigation and Ranging)** consists of three basic components: a towfish, a transmission cable, and the topside processing unit. The towfish is dragged behind a ship near the sea floor, where it transmits sound energy and receives echoes from the surrounding sea bed. The strength of the return echo is recorded, creating a "picture" of the sea floor where objects protruding create a dark image (return) and shadows from these objects are light areas (little or no return). Side scan sonar is most useful to locate sea-floor features and possible obstructions, but does not provide depth information.

Multi-beam echo-sounder may be considered as a series of single-beam echo sounders mounted on an array. For example, in SeaBat 8101, there are

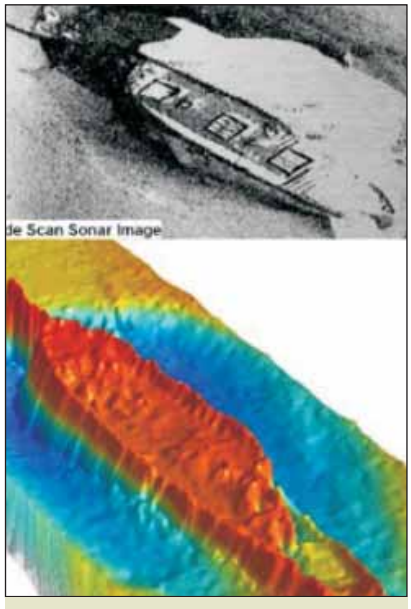

Figure 2: The shipwreck Herbert D. Maxwell (sunk on May 16, 1910, east of Annapolis, Maryland)depicted by side scan sonar (top) and Digital Terrain Model (DTM) generated from multibeam sonar data (bottom).
(Source: http://www.oceanservice.noaa.gov)

altogether 101 transducers (beams), each with 1.5 degree along track and across track respectively. Every ping of signal emitted will be equivalent to a fan-shape transmission from directly beneath a ship's hull which results in the receiving of 101 soundings across the track of the vessel. Multibeam sonars produce a "swath" of soundings (i.e. depths) to ensure full coverage of an area.

The Scanning Hydrographic Operational Airborne Lidar Survey (SHOALS) system system was developed for the US Army Corps of Engineers (USACE) by the Joint Airborne Lidar Bathymetry Technical Center of Expertise (JALBTCX) as part of an objective to facilitate private sector investment in Lidar bathymetry by demonstrating the technology and commercial applications in 1994.

SHOALS employs a Lidar based technique known as Airborne Lidar Bathymetry (ALB) or Airborne Lidar Hydrography (ALH) to rapidly and accurately measure seabed depths and topographic elevations. SHOALS can survey over large areas, far exceeding the capabilities and efficiency of traditional survey methods. The attraction of ALB lies in its ability to overcome many of the disadvantages of conventional acoustic survey technique. JALBTCX executes survey operations using the Compact Hydrographic Airborne Rapid Total Survey (CHARTS) system and industry-based coastal mapping and charting systems. CHARTS includes an Optech, Inc., SHOALS-3000 Lidar instrument integrated with an Itres CASI-1500 hyperspectral imager that collects Lidar or bathymetric data. Survey operations support the USACE National Coastal Mapping Program and NAVOCEANO nautical charting missions.

DIFFERENTIAL GPS

Differential GPS (DGPS) is now the principal system used in hydrographic surveying to accurately determine the position of seabed features. These error corrections are then broadcast through a radio link to the ships in the vicinity. By applying the corrections to the signals received, a user can typically improve the accuracy in the order of 5 metres or less depending on the quality of the receivers.

DATA PROCESSING AND PRODUCTS

Massive amount of data to the extent of several soundings per square foot is collected during the typical hydrographic survey. Various errors (bad soundings) get incorporated in the data necessitating correction for the effects of tides,

Role of GIS in the ma when data types are

Andrew Hoggarth
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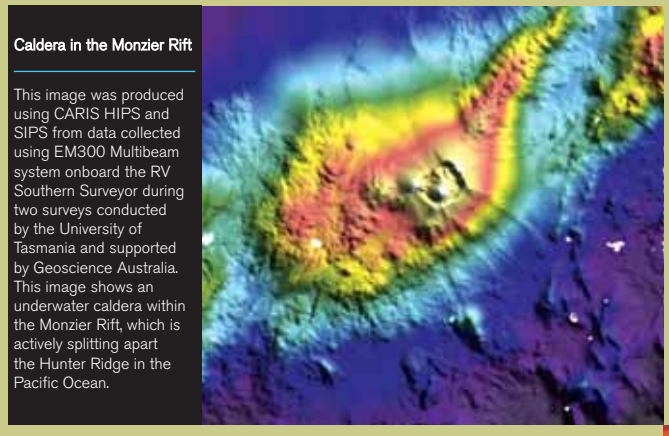
Andrew Hoggarth, Marketing and Sales Manager of CARIS on the current status and evolution of the hdyrographic survey industry.

Q. What constitutes a hydrographic survey? Do the requirements for a survey, say one focused on identification of sea-floor materials differ from that for port and harbour maintenance?
A hydrographic survey can take place in a river, lake, port, seaway or the ocean itself. The simplest definition could be a geodetic data gathering exercise primarily, but not exclusively, for navigable waters.

Q. How have new technological advancements such as ECDIS, ENC facilitated hydrographic surveying? What role does GIS play?
The purpose of an ECDIS is the same whether the vessel is conducting hydrographic surveys or transporting cargo. It aids the mariner to navigate safely through charted waters.

On a hydrographic survey vessel ENCs may also be used as an information layer in the online navigation system to accurately plan and execute the survey itself. The online navigation system is not an ECDIS, it is a specialized system used by hydrographic surveyors to provide the survey line information for the mariner to follow and to acquire the various survey sensor inputs. The mariner will often plot lines on paper charts, especially if the survey lines are long but the ECDIS itself will not be used to display the survey-pertinent information.

The increasing use of ENC and ECDIS systems has certainly given Mariners access to more geospatial information on board. ENC with its rich attribution and symbology has brought GIS concepts into the nautical realm, but it is important to remember that its principle purpose is to aid navigation not to serve generic geospatial information.



Caldera in the Monzier Rift

This image was produced using CARIS HIPS and SIPS from data collected using EM300 Multibeam system onboard the RV Southern Surveyor during two surveys conducted by the University of Tasmania and supported by Geoscience Australia. This image shows an underwater caldera within the Monzier Rift, which is actively splitting apart the Hunter Ridge in the Pacific Ocean.

The role of GIS in the marine realm becomes more interesting when you start to consider other data types e.g. the location of environmentally sensitive habitats, iceberg movements and oil spills. This type of information can be modelled using IHO S-57, which is the data model that official ENCs utilise, as Marine Information Overlays (MIOs). These MIOs could add another dimension, not directly related to safety of navigation, which could provide a basis for decision-making and spatial analysis e.g. the impacts of coastal erosion or tsunami based flooding and the effects of pollution on the coastal environment. While ENCs provide a very useful backdrop for survey operations, MIOs could deliver additional benefits. Traditionally, the type of information that is modelled in a MIO would be gathered pre-survey in the form of a desktop study. This information could now be mapped and overlaid on the ENC backdrop in field.

Q. How is the surveying process governed by local government policies? How open are various countries policies to allow private players in this field?
While I am not sure, I believe this likely varies from country to country and in certain countries state to state. Hydrographic surveys may be conducted for reasons of sovereignty, to determine a nation's coastal waters and rights to minerals. Surveys may be conducted in order to build infrastructure in the case of surveys relating to oil and gas or in the installation of telecommunications cables, this kind of survey work will likely be initiated by the oil or telecommunications company in question, with the country's permission. A nation's Navy or national survey agency responsible for the safety of navigation may also conduct surveys. It is common for these types of surveys to undertaken by commercial survey companies on behalf of the country in question.

Q. Are there any standards for the hydrographic sur-

arine becomes interesting considered

veying softwares to comply with the IHO and international organizations specifications?
Yes. CARIS software uses international standards to ensure robust and reliable results. The IHO has many such standards. S-44 is the standard for establishing the quality of surveyed bathymetry data; data can be displayed and filtered to this standard in the CARIS HIPS application. The International Standards Organisation (ISO) has also established standards to ensure the quality of bathymetry data as well. These standards are often stipulated in a statement describing what is required from the survey work.

Other groups like the International Marine Contractors Association (IMCA) and FIG have extensive standards for hydrographic surveying that are widely used in industry.

Pearl Harbor

This is a view from CARIS BASE Editor is of the Pearl Harbor Naval facilities looking West toward Ford Island and the Middle Loch. The US Army Corps of Engineers Portland and St. Louis Districts collected the bathymetry for the navy. The survey will be used for dredge project planning and for the update of National Oceanic & Atmospheric Administration (NOAA) Nautical Chart: Pacific Coast # 19366.

Q. What are the challenges in ensuring the accuracy of data and handling of voluminous amount of data?
Bathymetry data, especially from modern multibeam sensors, is among dense of hydrographic survey datasets. A few days of multibeam acquisition can result in tens of Gigabytes of data and a total survey into the Terrabyte realm. In order handle this quantity of data, it is essential to achieve efficient acquisition-to-processing ratios (the time to collect versus he time to process). Processing is essential to not only geo-reference seafloor data but also to remove erroneous noise that will corrupt the results. Processing is also required to tidally correct the vertical measurement, to remove the effects of vessel motion and for sound velocity which affects the results if not corrected for. Software like CARIS HIPS is used for this processing task.

Accuracy of data is also critical to meet international standards, this coupled with the pressure of processing huge volumes of data quickly makes it essential to ensure that real features are not removed. Quality control methods and workflows in software like CARIS HIPS enables the hydrographer to be confident the data is safe and accurate.

The result of processed bathymetry data is a georeferenced validated sounding set or DEM. The density of the cleaned dataset will be less than the raw data that was initially collected but it will still be large and therefore difficult to manage and access for future projects. This problem is being solved by the emergence of software like the CARIS Bathy DataBASE which allows the DEMs to be stored along with metadata allowing for efficent data access and retrieval. In addition to data management, this type of technology should allow contours and soundings for use in engineering and navigational charts to be quickly derived from the DEMs stored within DataBASE.

Q. What is the current trend in the market for hydrographic survey in terms of focus and technology? Where do you see it heading?
There is the desire to get the multibeam measurement or the echosounder "Ping" on to the "Chart" in as short a timeframe as possible. New data processing techniques like the Combined Uncertainty Bathymetric Estimator (CUBE), a semi-automated data cleaning algorithim devised by the University of New Hamshire (UNH) in the USA, is helping with this challenge. Another focus area is in the characterisation of the seafloor geology and new technologies like Geocoder (also devised by UNH), are providing advanced capabilities in seafloor imaging which can only benefit the hydrographic survey community.

The rapid and safe creation of electronic chart products from newly acquired survey data is also an area of great interest, especially with international communities desire for ENC to become mandatory carriage requirement for ocean going vessels. Likewise, as hydrogrpahic surveying plays an increasing role in the care and protection of our environment and as the creation of MIOs for applications beyond safety of navigation hydrographic surveying is more important than ever.

waves/heave, water level and water temperature differences (thermoclines). The accuracy of sounding using multi-beam echo sounder deteriorates from the beam at nadir to the outer side beams because of the dynamic movement of the vessel (Figure 3).

The one data type common to all hydrographic surveys is water depth. With the advent of modern swath mapping and seafloor imagery systems, the density and types of data available has changed radically. Copious bathymetric data acquired by these systems pose very serious technical and philosophical challenges to the traditional data processing and cartographic approaches. Research is aimed at developing new, efficient, and statistically robust approaches and algorithms for data processing along with a suite of new cartographic and visualization products. Projects such as Combined Uncertainty and Bathymetry Estimator (CUBE) of NOAA /UNH (National Oceanic & Atmospheric Administration) that takes advantage of the inherent density of multibeam sonar data and applies automated, objective statistical techniques to remove outliers have tried to address the initial bottlenecks in the data processing pipeline.

Hydrographic surveys provide information on height, depth contours and spot heights and various irregularities both above and below the sea surface. They have the following deliverables

- Electronic Charts - There are two kinds of official digital charts commonly available; Electronic Navigational Charts (ENC) and Raster Navigational Charts (RNC)
- Digital Terrain Model
- Volume calculation for dredging
- Topography information
- Bathymetry information

Table 1: Major hydrographic companies and their products

Company type	Product category	Product
Hydrographic equipments manufacturers	AUVs/ROVs	Desert Star's SeaMor Konsberg's Hugin
	Echosounders	• RESON - SeaBat, NaviSound • Simrad's (Navico) EA502, Simrad EM3000D, • ATLAS Fansweep 20-200 • Edgetech LS100, • Furuno • GeoSwath Plus • L-3 SeaBeam
	Velocimeters	• RESON's SVP's • Nortek Velocimeters • Odom Digibar
	GPS/ DGPS/ Positioning	• Ixsea's Hydrin • Simrad's MX525A DGPS Sensor • Trimble • TSS (UK) Ltd. POS/MV
	Gyrocompass	• Ixsea's Octans
	LIDAR	• Optech - Optech's Shoals Airborne Laser Bathymeters • AHAB's Hawk Eye II
	Acoustic Doppler Current Profiler (ADCP)	• Nortek • General Acoustics
Software solution providers	Survey Planning and Navigation	• TritonNav (DelphNav), Triton's survey planner • Kongsberg
	Charts and design	• Caris S-57 Composer, Caris GIS Professional • Chartworx's TheMAP TRAX and Quodfish. • TritonMap • Hypack Design
	Hydrographic Data processing and visualization	• Caris Bathy DataBASE, Caris Hips and Sips • Triton - Survey Office, Isis Playback, TargetPro, BathyPro, TritonMap • SAIC - SABER
Surveying consultancy services		Fugro, Gardline Hydro of the Gardline Marine Sciences Limited (GMSL)

NAVIGATIONAL CHARTS - ENC & RNC

With the amendment to SOLAS (Safety of Life at Sea) convention in 2002, IMO makes it encourages its member states to make use of Electronic Navigational Charts (ENC's) in place of conventional paper charts on board the ships for navigation.

ENCs are new generation of nautical charts. ENC data is vector based consisting of points, lines and area features with detailed attributes; and is organized into cells. They also conform to IHO specifications, as contained in Publication S-57. In order to display ENC and make use of the information it contains, ships have to be equipped with an Electronic Chart Display and Information System (ECDIS). Unlike static paper charts, the dynamic ENCs can provide varied levels of displayed details to suit prevailing situations, alarm functions, has automatic updating features, and provides time-varying information such as tidal levels.

Raster Navigational Charts are raster charts that conform to IHO specifications and are produced by digitally scanning a paper chart image. Since the displayed data are merely a digital photocopy of the original paper chart, the image has no intelligence and other than visually, cannot be interrogated.

Standards and specifications for navigational charts

Several International bodies establish the hydrographic data content standards as;

- International Hydrographic Organization (IHO) - IHO governs chart contents, updating and display.
- International Maritime Organization (IMO)

IMO sets the ECDIS Performance Standards, the focus of which is on the navigational safety & functionality aspects.

- (IEC International Electrotechnical Commission)

IEC identifies and describes the performance tests for IMO-compliant ECDIS (IEC Publication 61174 (IEC 61174)). Raster Chart Display System (RCDS) are used for display as per SOLAS carriage

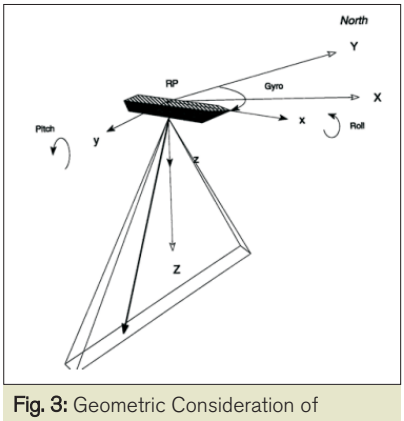


Fig. 3: Geometric Consideration of Multi-beam Echo-sounder

requirements for nautical charts, to fill in the gaps at places where the ENC's are not available.

HYDROGRAPHIC DATABASES

Many countries maintain massive database of survey results, charts, and data for public use. The National Ocean Service (NOS) Hydrographic Data Base (NOSHDB), maintained by NGDC in conjunction with NOS, provides extensive survey coverage of the coastal waters and Exclusive Economic Zone (EEZ) of the United States and its territories. The NOSHDB contains data digitized from smooth sheets of hydrographic surveys completed between 1851 and 1965, and from survey data acquired digitally on NOS survey vessels since 1965.

The Hydrographic and Oceanographic Department of the Japan Coast Guard (JHOD), has been publishing the Electronic Navigational Chart (ENC) since 1995. In Singapore Computer Integrated Hydrographic Operations System (CIHOS) which was implemented in 1989, has aided hydrographic functions such as hydrographic surveys, survey data processing, chart production and maintenance, and the management of hydrographic information. Hydrographic Offices of Canada and Australia make their RNCs and ENCs available to users via their own distributor networks; these distributors often offer additional folio services to shipping companies. The worldwide digital data bank of oceanic soundings is maintained in several data bases, including the GEODAS global marine geophysical data base, and the Hydrographic Survey Data System. IHO provides an interactive web catalogue (www.iho.int) displaying the status of worldwide ENC production. This system has pointers for guiding users to ENC suppliers and distributors. A three-colour scheme is used to distinguish between degrees of accessibility (Figure 5).

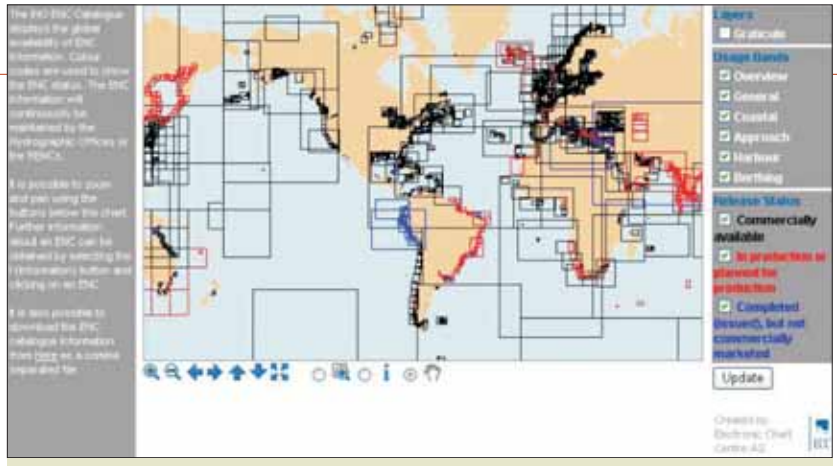


Fig. 5: IHO Global ENC Catalogue displaying the global availability of ENC's, March 2007

MARKET TRENDS

A number of private companies operate in the hydrography and oceanography sector offering services and software solutions. It includes companies as Fugro that provides a broad package of solution-oriented services and products for entire project cycle; Companies that manufacture navigational, positioning, ADCP (Acoustic Doppler Current Profiler), LIDAR, ROV (Remotely Operated Underwater Vehicles), echosounders, Velocitimeters and other survey equipments such as IXSea and Nortek; and the geospatial software producers catering to the hydrographic and marine industries as Caris and Trimble (Table 1).

Technology wise, there is growing emphasis on automated process flows for and innovative techniques that enable faster and error free processing of torrents of survey data acquired during SONAR and LIDAR hydrographic surveys. The aim is to take advantage of the full power of modern computer visualization tools to create a multidimensional, interactive, system in which traditional navigational safety products can be extracted (respecting established hydrographic protocols) directly from the cleaned and processed data model and to integrate a wide range of bathymetric and other information into a dynamic and intuitive display that can serve the mariner as well as a range of other users. ■

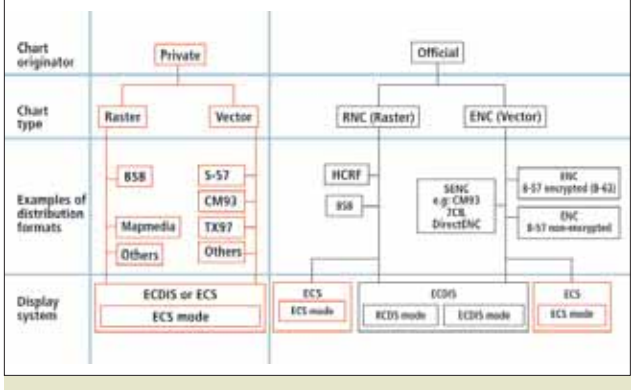


Fig. 4: Electronic Chart formats used to represent hydrographic data

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Surveying in India
Operational issues

In India, till the 70's, Surveying was confined to basic theodolite, plane table, sight rule and levels followed by manual drafting. It was gradually replaced by electronic distant measuring devices (EDMs) followed by low order Total Stations and GPS with limited range of focus, storage capacity, battery backup, accuracy etc.

Now, those total station instruments are being replaced by auto focus, reflectorless and robotic systems which are long range, high precision, high accuracy and operable by single person.

Indian surveying industry too has shared the ongoing developments but there are certain operational problems that beset the industry. Let us look at few of them

• **Unrealistic pricing, competion and underquoting** - Since most of the bids are price based and surveyors are usually subcontractors to some engineering consultant, there is scope for underquoting by the surveyor or the main consultant. This usually results in poor quality of work; sometimes even the field data is not validated .

• **Increase in the surveyor's scope of work** - To save time and cost, clients prefer a single agency to undertake all the pre construction activities like survey, related investigations, securing the boundary, pre engineering services like geotechnical, geological & hydrological investigations, site grading, access roads, sourcing water, environmental clearance etc. Survey of underground buried utilities, meteorological data etc., are also included in the surveyor's work scope. The above requirements demand a high level of multi tasking and multi skill set.

• **Consistent delay in payment** - The nature of work is such that the entire work assigned cannot be completed within the deadline because of several constraints like free access to site, lack of clarity etc. Some clients take advantage of the situation by extending payment cycles upto 6 - 9 months. Bankers are also reluctant to lend for want of collaterals.

• **Staff Attrition** - A trained surveyor is a valuable asset and is in great demand. Many good surveyors especially from reputed companies switch jobs to take up assignments in the Gulf and Middle East Region. Surveyors also leave to join large contracting firms and corporate who are undertaking massive infrastructure projects. Some surveyors also retire since surveying entails long stays away from the family.

• **Lack of good training institutes** - In India there is a lack of good training institutes producing surveyors.

• **Local opposition at site while surveying** - This is a growing problem and can be quite serious. Usually the locals are agitated when a survey is carried out that may involve the acquisition of the locals' land. This puts the surveyor at risk of physical assault by the locals and loss or damage to expensive surveying equipment.

• **Getting permission to fly** is a very long and tedious process. Granting of permission for aerial mapping. may take between 6 - 9 months, whereas the project has to be completed within 3 months.

- **The latest high resolution satellite data can be procured only through the national agency** and further permissions delays the delivery.
- **Continuously changing technology** - Running a large survey company involves many technological challenges. Survey equipment, computer hardware, software, scanners, plotters, printers etc., must continuously be updated and the staff trained on these updates which is capital intensive.
- **Poor return on investment and effort -** Surveying in India, is not as remunerative as it is in Western Countries, it is difficult for Indian companies to generate finances to purchase the new and expensive surveying equipment with the latest technology. Customs duties also render these Survey equipments much costlier than they would be in the USA or Europe. There is also the absence of leasing of equipment which is common in the USA.

THE FUTURE

Surveying and mapping has tremendous scope in a developing country like India. With the opening up of the Indian economy, there is a great demand for Infrastructure Services. The work is getting more diverse from wind farms, SEZs, telecom infrastructure to traditional areas like roads, pipelines, irrigation networks and townships. New and exciting technologies like LIDAR Mapping and Mobile Video Mapping are starting to make inroads. These technologies are still in their infant stage in India, though they have existed in countries like the USA for over a decade. Private sector ph- togrammetric mapping is also making a beginning. We foresee stunted and restricted growth in the private sector aerial mapping unless the permission process is made friendlier and the permit processing time is cut down drastically.

There is large scope for Cadastral mapping and development of Land Information Systems in the country and this provides a tremendous opportunity. Andhra Pradesh has made the first steps with its Bhubharathi program and other states are also developing similar programmes. All these projects demand aerial mapping since the areas are very large and widely distributed. We must liberalise the permitting process to be on similar lines as other developed nations, if these projects are to be implemented in a rapid and timely manner.

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Processing Digital Vector Map Data

Patterning (Symbolization) and generation of CYMK films from digital topo data

With the advancement of technology and service of mapping and advent of printing, multicopies of maps was made feasible. The art of cartography and map printing kept pace with the advancement. Now a days, most map data is archived in vector digital form which is used for printing multicolour maps on paper. Hither to for cartography and map printing had been in sole domain of the National Mapping Agency, the Survey of India (SOI). SOI now, has with them a huge collection of vector digital mapping data in polyconic projection. Publishing of its huge quantum of maps has stretched the inhouse resources of SOI. SOI has decided to get this work done from commercial agencies. As part of qualifying criteria to participate in this out sourcing by SOI, all interested bidders were required to produce print ready colour separates. Pan India being an in house R&D agency accredited by DSIR, Ministry of Science and Technology, under took a pilot project to produce the color separates ready for print. This exposition briefly describes the methodology for this task.

Offset printing solves the practical limitation. Success of print run depends on the production of printing plates which are produced by photographically exposing the image on to them. To do an accurate work in optimum registration of detail and colour, this is currently achieved by the state-of-art image setters. Where an inkjet printer sprays ink droplets, the image setter builds up its output, dot by dot with absolute pin point accuracy of resolution better than 2500 dpi. The image setter accepts post script. This post script output is a programme that has to be designed. Commercially available software need to be supplemented with user's symbol library. It is a general understanding of all computer users that any thing that appears on their screens can be printed out by simply processing the print command. However our understanding for unknown to computer users, is that there are built in software in printer and its driver. The image appearing on screen undergoes to a processing not obvious to the user which briefly is an image processing assembly that combines a first input of copied image data and a second input of electronic data to a storage device. A control device compares the resolution and orientation of the two types of data with each other. Where the resolution does not match or the orientation does not match, one type of data is rotated to match the orientation of the other type of data. The properly converted and oriented data are combined as well as half toned and then printed out as CYMK colour separated files.

There is a growing demand for GIS map products to be mass-produced. When it is not cost-efficient or practical to make multiple copies of a digital prod-

uct on a plotting device or colour output device such as a colour laser printer, it is then necessary to combine the technology of digital mapping and offset printing.

There are a variety of means to this end, depending on the user's software/hardware capabilities, and also on the capabilities of the printing vendors in one's area to accept and utilize electronic data, or to use mechanical separations to accomplish the finished, four color CYMK product.

SCREEN MAPS V/S PAPER MAPS

It is important to realise that printed maps are very different from screen maps. The major distinction is that screen maps usually have some degree of dynamism, whereas paper maps lack this characteristic completely.

The producers of printed maps have to make sure that their maps are as clear and legible as possible. Traditionally in map printing, special techniques and methods are used to achieve this aim.

Software that is used to prepare maps for printing must make it possible to use cartographic techniques, whereas GIS software usually does not, at least not in an efficient way. GIS software was developed to collect, structure, manage and analyse geospatial data and to display the resulting maps on a screen, not on paper.

GIS providers added modules to convert their screen maps to a format that is printable. Most often they used PostScript, sometimes TIFF, more and more PDF now (the new standard in the printing industry). As was already pointed out above, a straight copy of a screen map is not readily usable as a paper map, because of the higher demands on clarity and legibility of the letters. There are other reasons as well, such as the fact that GIS operators usually work on a small section of the map by zooming in. This means that there is never a need to visualise the whole map in detail on the screen and that shortcomings in the symbolization of the data remain undetected.

Another reason that makes converted GIS maps less suitable as printed products originates from the fact that they usually have a temporary character. Therefore, producers of these maps do not (want to) spend a lot of time on designing the symbology (the "looks") of the map. And therefore, in their turn, the developers of GIS software have not spent a lot of attention to providing the design tools needed for the symbology of printed maps. As a consequence of all this, high-quality publishers usually need to spend a considerable amount of time and effort to turn the converted GIS maps into paper maps that comply with their standards. Modifications may include but are not restricted to the:

- Correction of inks and colors (as the RGB to CMYK conversion may run astray)
- Replacement of fonts
- Removal of hairlines
- Addition of high-quality symbol definitions
- Re-arrangement of layers

The production of ready-for-publishing documents can be automated completely by means of a number of commercial software. These modules combine the strength of a professional workflow management software and a purpose-built cartographic layer.

We distinguish 6 major steps in the first-time production of a map or chart:

- Importing the geospatial data
- Designing the symbology
- Defining the map layout
- Adding production features
- Performing a final check
- Generating the output

Converting incoming data to a single format has a number of definite advantages. First of all, we can use a number of standard operations to filter and correct the data. Secondly, it is easy to combine data coming from different sources into a single map.

The imported sample data are used to define the symbology for the areas, lines, points, text and images that will appear on the map. As the data are kept in vector format throughout the whole workflow, we immediately see the result of our work on the screen. More importantly still is the fact that the maps will come out on paper exactly as we see them on the screen. Thanks to our WYSIWYG technology (What-You-See-Is-What-You-Get). This is possible because Mercator does not work in RGB but with representations and compositions of the actual printing inks (CMYK and Pantone).

Software that is used to prepare maps for printing must make it possible to use cartographic techniques, whereas GIS software usually does not, at least not in an efficient way

The symbology definitions are stored in a so-called Map Style File. This MSF also contains the information on the printing priorities of the objects with relation to each other. The Map Style File is stored independently of the data, so that we only have to create it once and can then apply it to all maps in the same series. Extra map elements such as the legend, scalebar and text boxes can all be created and added to the map to create a complete cartographic document. Images (TIFF primarily) can also be included.

Elements that are used in more than one map can be generated and stored once and are then linked to all the documents in which they are used. If an element has to be modified later, this only needs to be done once for all the documents in which the element is used.

As, said before, everything we do should immediately be visualisable on the screen in WYSIWYG (at an unsurpassed speed). This allows to check designs immediately. If necessary, we can switch off and on layers to make the checking process easier still. As the imported GIS data remain in vector format, we can correct them till the last minute before the final output.

It is also possible to check the final map ink per ink, so that we can look at the printing separations on the screen and correct any mistakes in the masking without wasting consumables.

For high-volume producers that make use of different external printing houses, the TIFF Group 4 output option seems the best possible option for consistency in printing results.

All production parameters should be possible to be saved independently of the map. They can then be re-applied to other maps in the same series, with no or only with minor adaptations.

PROJECTION & DATUM ISSUES

SOI has, interalia, laid down some procedural guide lines for layout orientation, symbology & others which briefly are as under:

The open series map are to be published in UTM projection on WGS84 datum. The central meridian of UTM projection lies at the centre of 6 degree longitudinal belt zone. Dimension and orientation of each UTM projected sheets differ among themselves in 'East West' as well as in 'North South directions. It also differs from existing sheets which are projected on polyconic projection. The latitude lines of UTM projected sheets are not parallel to X-axis (horizontal). Tilt towards east or west increases as we go away from the central meridian of UTM Zone. Maximum deviations will be in the Western and Eastern edges of a UTM zone. Dimension & Orientation of sheet also varies as per latitude. Maximum tilt is up to 2 degree. Therefore designing a standard layout for the map for OSM (UTM projected) is much more complicated than the polyconic maps. Besides there are guidelines on designing the lay-out. The guidelines also give the details of layout and symbology along with levels (layers) in which the data has been organized. SOI has vectorised the data in 63 levels. Each level contain a specified item such as building, Hydrology, land cover, boundaries & so on. Each feature in any level has a unique four digit feature code and level code. With this kind of specification, it becomes imperative to carry out a thorough examination to eliminate all possible inconsistencies. As has already been stated that if any discrepancy remain unnoticed the entire work may have to be re-done, which involves lot of time and expense. We followed the procedure set by SOI and are able to get our sample safely from our system on to printer service provider's. It is now ready for direct outputting. For colour work, however, there's a whole other stage involving CYMK colour separates and digital half toning that has to be gone through to ensure that the results come out as we would like. That stage is prepress and beyond the scope of this exposition, since it is more of print technology than cartographic technquie.

Now the sample data provided by SOI was patterned as per the data structure. Printout of the map was taken on colour laser printer as per standards laid down for hard copy examination. Corrections were carried out accordingly, after the examination. Now the digital data was ready to generate

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final output of patterned map without hill shades.

Yellow and green tint was extracted now from the final data as a separate file and imported to a new file in ARC-GIS 9.1. This file was overlaid on Hill shade file (.eps/.tiff) provided by SOI. 50% transparency was applied to yellow and green tint, vector data and saved the output as another .eps file. After this, inkjet plots of patterned output with hill shading and with / without contours were generated.

CYMK films were generated from the above data now. Data scrutiny in 63 levels is a huge task in itself. Manual checking involves opening each level and visually examining and correcting discrepancy. We therefore have undertaken development of software for auto detection of discrepancies in level assignment and these are displayed in single file. By this a lot of optimisation and time saving has been achieved. This software is currently in beta version and work is in progress to refine and optimise it.

SOME SOLUTIONS

While there are a variety of answers to any production problem, some experimentation is required to discover the most straightforward approach to a solution, tailored to the hardware and software available to the user. In the case of SOI maps the straight forward line was for us to produce .EPS files using shadesets based on the four color process colors of Cyan, Magenta, Yellow and Black, and to deliver them in digital .EPS format to a commercial printer who had the capacity to create color separation. .EPS files and output them directly to their image setter device to produce half toned CYMK color separated films. In the process, for the future reference, we also experienced that mechanical separations originating from these same digital .EPS files, separated with Adobe Separator, and output on our high resolution laser printer result in very satisfactory final printed maps, in cases when we are proofing without using traditional offset printing methods.

This indirect method of outputting PostScript files undoubtedly works and it allows budget programs like Microsoft Publisher to claim that they can produce commercial print. However, in the real world the problems soon mount up. The first is the far more problematic is the whole question of control. By its very nature, the PostScript file process is inflexible. Once the PostScript file has been created that's it. It will either output as you wanted it to or it won't; there is no room for manoeuvre. If we notice a last minute typo the only option is to change it on the original, recreate the file and transfer it again. More importantly, for advanced work there are the whole host of settings-halftone screens, trapping, crop marks and so on - that must be set exactly to ensure correct output. If any of these is wrong- and without a PostScript printer you won't be able to proof your design to check them- you have just wasted a lot of time and money.

Ultimately then the indirect PostScript print file route is a non-starter for most serious work. It's like trying to operate on a patient in another room- and with your eyes shut. For the level of control necessary for regular successful output the only viable option is to output your publication files directly. That means finding an image setting bureau happy to accept PC work. Not only that, they must also use the same software as we or- more realistically - we must use the same software as them.

Cartographers face the daunting task of compiling and maintaining huge amounts of data in order to create digital map files. The problem often faced is that the existing applications cannot produce a map, acceptable for final output and publication, either on paper or electronically. Maps, created in a GIS often look pixelised and on paper contain various colours and textures that do not match with what was initially present on the computer screen. As well, problem with text is common.

In order to avoid such problems, several cartographic solutions are available. These were examined by us. Some of these are Mercator carto editor, used in SOI, Intergraph Map Finisher, Map Publisher lay Adobe illustrates and Macromedia and Cartographic Software package by ACE the complete description of these is out of scope for this exposition.

Acknowledgement

The authors are grateful to the management of Pan India Consultants Pvt. Ltd. for their permission to publish this exposition. Moreover the authors are grateful to Mr. Darshan Singh, CEO Pan India for his valuable advice and unstinted support for writing this exposition.

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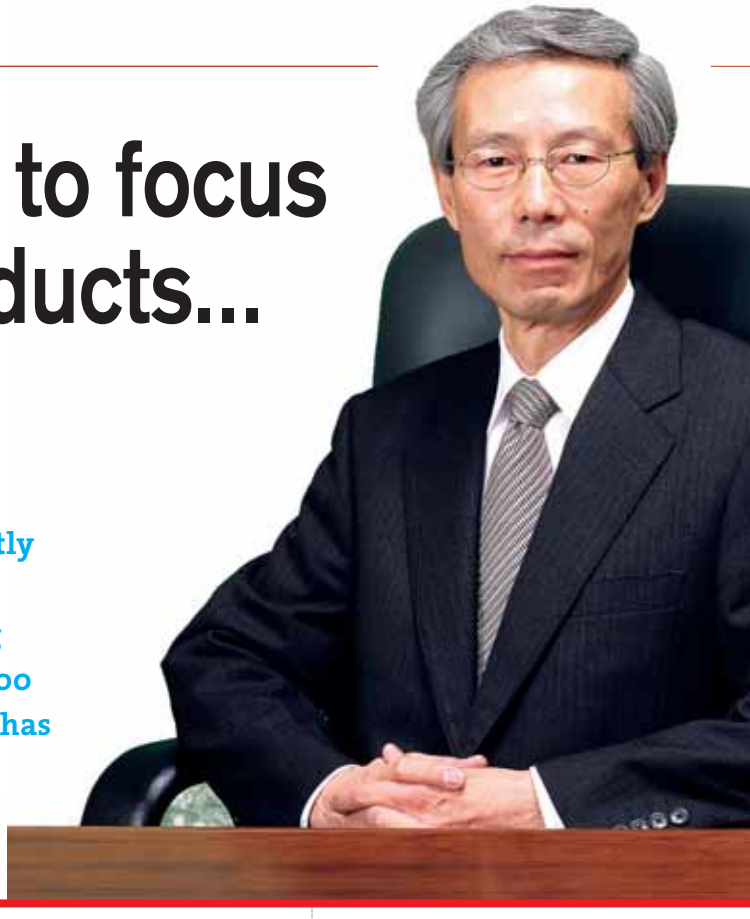

Hitoshi Ito joined Sokkisha Co., Ltd. (presently SOKKIA CO., LTD.) in 1972. In 1994, he was promoted to Manager of the Manufacturing Administration Department and later in 2000 was appointed to the Board of Directors. He has been President of SOKKIA since 2003

Q. What is the philosophy of SOKKIA as a company, its objectives and product portfolios?

We aim for the highest accuracy and precision in our products. Our main product categories are GPS, Total Stations, Digital Theodolites (DT) and Levels, and we have recently introduced instruments with automatic measurement capabilities within these categories.

Our business is growing from being a surveying instrument manufacturer to include positioninginstruments as well as focusing on measurement accuracy and measuring the sensors themselves.

Q. How has SOKKIA witnessed changes in the Geospatial domain (more and easy access to data, demand for accuracy, developments in IT, land surveying to present 3D scanning, etc.)?

We aim for the highest accuracy based on our Total Station, DT and GPS technology. Our recent GIR1600 is an example of the application of our base technology for the GIS and positioning market. GIS is a vast market and we focus on the data collection aspect of it through our surveying and positioning equipment.

Another way SOKKIA is responding to increased demands for accuracy is the MONMOS 3D Coordinate Measuring System for the emerging industrial measurement market.

MONMOS provides a flexible solution for monitoring applications even during construction. We consider the industrial measurement industry to be a key market ahead and MONMOS is part of our strategy to expand from surveying to positioning and GIS.

Q. In terms of technology what initiatives has SOKKIA made in the GIS mobile mapping segment?

A. We continue to supply

SOKKIA and TOPCON partnership

SOKKIA and Topcon have a long history in the surveying and positioning industry, 88 and 76 years respectively. Both companies regularly introduce out-of-the-box technological innovations and ideas to the market. SOKKIA and Topcon are proud of their technological capabilities which in turn will help to develop advanced and intuitive products to meet the future needs of our users. This association of SOKKIA and Topcon is one of complimenting companies that will allow SOKKIA to become number one in the industry.

Hitoshi Ito
President, SOKKIA

products that have both GPS and GIS attribute capturing capabilities and support images. We have entered into a business partner relationship with ESRI to better understand the needs of GIS mapping community. We also have created a Geospatial Technology Information division in 2005. Prior to 2005 we had already started to prepare the delivery of products that support ESRI products such as ArcGIS and ArcPAD. Currently we are developing extensions that support post-processed DGPS and are provide increased accuracy. Our software provides unique and original solution for geo-referenced imagery and is competitive with respect to accuracy.

Q. How is the issue of interoperability dealt with - among SOKKIA products and between SOKKIA's products and that of others?

We understand that some of our data formats are unique to SOKKIA. We entered into a business partnership with ESRI to increase the useability of our product, but we need to collaborate with others in the industry in order to develop solutions that are compatible with each other and are based on standards such as those developed by the OGC.

We entered into a business partnership with ESRI to increase the useability of our product, but we need to collaborate with others in the industry in order to develop solutions that are compatible with each other and are based on standards

Q. Does company plan to enter into applications development sector for different areas?

A. Our company primarily focuses on the production of advanced hardware sensors and basic data collection and analyzing capabilities. Different applications call for different methods of data collection, monitoring and analysis which is why our users can expand our products to include special technological advances with support from both SOKKIA and our partners.

Q. Will SOKKIA make an entry in small scale asset management in the LBS market?

A. The main emphasis of asset management in the LBS market is placed on compact instrument size over accuracy and precision.

SOKKIA will continue to focus on high-end products offering precision and accuracy rather than on the smaller and less accurate GPS receivers for the LBS market. We will, however, continue our constant effort to make our high-end products as compact as possible.

Q. What is SOKKIA's strategy for different regions viz. Asia, Africa, Middle East, Europe and America?

A. Cadastral mapping, environmental management, large scale asset management, surveying and construction are key emerging markets in Asia, Africa and the Middle East, and it will be our objective to cater to all of these segments in these regions in terms of hardware, software and technical support.

Our focus for the American and European markets will be to maximize our market size across all of the application sectors. ■

Product Overview

GIR-1600 (Photo)

The SOKKIA GIR1600 is a compact sub-meter accuracy DGPS receiver. The GIR1600 features a single 12 channel integrated receiver for GPS and SBAS (EGNOS, MSAS, and WAAS) correction information realizing real-time sub-meter DGPS for use in a wide range of GIS applications. This compact receiver has the industry's lightest (100g, 13.5oz) and only detachable antenna that allows you to take measurements wearing the trekking set. The GIR1600 can also be used for mobile mapping and pole mounted surveys, giving you the freedom to choose the best method for the job. Integrated Bluetooth® wireless technology allows a cable-free connection with your PDA, digital camera and other Bluetooth enabled devices.

MONMOS (Photo)

SOKKIA's NET1200 3D Station opens a new dimension of precision, range and speed for large structure 3D measurement. Use this industrial total station to measure ships, tunnels, buildings, bridges, domes and other large objects. Some of the features include long-life detachable battery, one-second precision, a weather-proof compact body, and laser-pointer and target illumination functions.

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Rolta is a leading provider and developer of state-of-the-art and field proven Geospatial/GIS solutions/services for core segments such as Defence, Telecom, Electric, Airports, Urban Development, Infrastructure, Town Planning and Environmental Protection to clients worldwide. Rolta has successfully executed multi-million dollar projects in this segment over 20 countries.

Rolta provides a wide array of Geospatial solutions for Modeling Urban Environments, Transportation Corridors, Land-Use Analysis and Tax Management, Mapping Floodplains, Assessing Geological Hazards, Crop Monitoring, and Watershed Management. With the acquisition of Orion Technology Inc. of Canada, Rolta also provides secured web-based, platform-neutral no-programming Geospatial solutions for efficiently integrating enterprise-wide GIS resources.

Rolta also has an impressive track record in building sophisticated solutions for the defence sector, which address the needs of military mapping, operations, intelligence, and resource planning, with the provision for on-demand access to mission critical information. Rolta has steadily progressed up the value chain and now offers solutions for very sophisticated and complex applications; an example is the advanced missile planning system for Indian Defence.

With one of the largest State-of-the-art Photogrammetry & GeoSpatial delivery center / production facility in Asia, highly skilled and dedicated team of over 1300 technical professionals & several thousand man-years of domain experience, Rolta offers a blend of cost effective GeoSpatial solutions & services that you can trust upon.

A Principal Member of the Open GeoSpatial Consortium (OGC®), Rolta employs an innovative GeoSpatial business model that fully exploits the internet and OGC Web Service standards, bringing in valuable technology to customers world-wide helping them derive maximum benefit from their investments. You can rely on Rolta's expertise in managing and executing large projects from its offshore facilities in India providing the benefits of high-quality, cost-effectiveness and on-time delivery of projects world-wide.

Rolta, headquartered in Mumbai, employs over 4500 professionals with countrywide infrastructure and international subsidiaries across the globe. Forbes ranked Rolta as one of "Asia's Best 200 Under a Billion" three times in a row. The Company with a Market Cap over US $1.5 billion is listed on the NSE in cash and F&O segment and forms part of NIFTY MIDCAP 50, CNX IT and CNX 500 indices. The company is also listed on BSE 'A' group and forms part of BSE Midcap, BSE 200, BSE IT and BSE TECK indices. The Company's GDRs are listed on the Main Board of London Stock Exchange and its FCCB's are listed on the Singapore Stock Exchange (SGX).

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Book Review

Geospatial Analysis

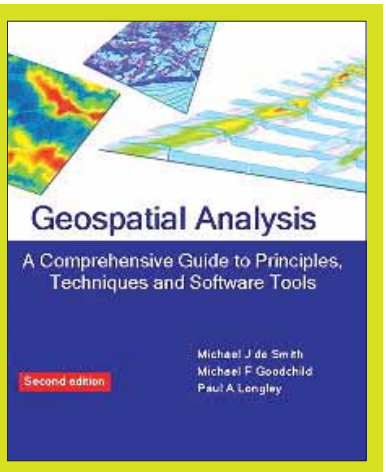
Authors: Michael J de Smith, Michael F Goodchild, Paul A Longley

The subtitle of this book reads "A comprehensive guide to principles, techniques and software tools" and this perhaps highlights the contents of this excellent work. The book aims to cover the entire spectrum of spatial analysis covering GIS and other software. Geospatial analysis encompasses many technologies and techniques which this book covers in great detail.

The introductory chapter describes the motivation behind the book and media formats used to disseminate it. The book is comprehensive but does not claim to be exhaustive. At the same time, by providing an on-line version that is updated regularly it aims to keep itself up to date. The stress is on applications and tools and techniques are discussed in this context. I found the sections on Terminology, Common measures and Notations and the listing of software tools most useful. The authors may consider adding ILWIS developed by ITC to the list of software tools. ILWIS is now open source and I have found it very useful as a teaching and learning aid.

Chapter 2 deals with concepts and is system and technology neutral and therefore very useful for teaching basics and fundamental principles. I would make chapter 2 essential reading for a course on any geospatial topic. Basic concepts relating to data in terms of location and attributes, spatial objects, spatial relationships and statistics are covered extremely well. The discussions bring out the unique features of spatial relationships and spatial statistics. However, the discussion on Spatial Data Infrastructure at this stage is somewhat premature and therefore inadequate. The historical and methodological context discussed in chapter 3 deals with project planning. Here the coverage is adequate to start off the thinking process. It identifies the various elements and the role of analytical methods and tools. However, if project planning is your task then this chapter can only provide a philosophical background.

Chapters 4 to 8 cover the bulk of the analysis tools and methodologies and here the



"The book is comprehensive but does not claim to be exhaustive."

coverage is extensive and exhaustive. Chapter 4 deals with the basic building blocks and covers data models, geometrical, query, computation, distance and direction and grid operations and map algebra. An interesting aspect is the discussion on classification and clustering. This is treated as a part of geometrical and related operations and by doing so a very coherent treatment of the subject is possible. This section can well be viewed as a taxonomy of classification beginning with univariate and multivariate analysis and proceeding to multispectral and hyperspectral image analysis. I found this treatment of image operations as a part of geospatial analysis very interesting as it puts them in the perspective of overall geospatial analysis. Too often I have seen artificial barriers created between remote sensing and GIS resulting in the under exploitation of both systems. The section on queries and computation brings out the importance of combinatorial analysis and its applicability to both vector and raster data sets. The sections on distance and direction operations brings out the complexities of what seems at first glance to be a simple topic.

Application of statistical techniques to spatial data is not straight forward as classical concepts of randomness and independence may not be applicable in a spatial context. Chapter 5 does a very thorough job of examining these issues and covers a wide variety of statistical measures adapted to spatial data analysis. Chapter 6 deals with surfaces and fields. The concept of field where we can use any parameter as 'height' can give rise to many interesting visualisation and analysis possibilities. In this chapter I had expected to see a coverage of photogrammetry as a topic. Photogrammetry is an important geospatial analysis tool and I do hope future editions will cover this area. Other than this the subject is covered exhaustively. The sections on interpolation are specially recommended to those who need to work on geospatial modelling. Chapter 7 deals with network analysis. This chapter would be extremely useful for those working in the field of Location Based Services. The final chapter deals with modelling and should be of great interest to researchers. Models over time and space enables us to draw pictures of the future. All the serious studies on global warming do make use of such models.

The coverage and discussion of this topic is excellent. Some of the topics like cellular automata, agent based modelling, artificial neural networks, genetic algorithms and evolutionary computing are covered here. Visualisation is a topic that is missing. Strictly, visualisation is not a part of analysis but again analysis without visualisation is incomplete. So this also remains on my wish list.

The strategy adopted by the publisher is to have a hard copy and a PDF version. This enables the book to be produced without colour illustrations thereby controlling the cost. The colour illustrations can be referred in the PDF version. Special student discounts are available. For reference, an on-line free edition that is periodically updated is available. A very good set of educational resources are available on-line for instructors. For more details see http://www.spatialanalysisonline.com

Prof. Arup Dasgupta
arup.dasgupta@GISdevelopment.net

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GEOSPATIAL SCIENCE FORUM

An opportunity for researchers

In this age of convergence scientific research is becoming a fusion of several disciplines. The field of geospatial information systems is also subject to this phenomenon.

We observe that a subject like geography has been strongly influenced by technologies like remote sensing, global positioning, information systems and communications. Technology has enabled geographers to become multidisciplinary in their approach to research. Similarly, other disciplines like computer science, geodesy, communications technology and social sciences have absorbed geography and come out with innovative solutions for spatially oriented problems.

In order to address this complex, multidisciplinary milieu it is necessary that professionals from contributing disciplines come together on a common platform to discuss current issues and share their experiences and so contribute to this enormous body of knowledge that we call Geospatial Information Science. This includes the core areas of geography, geodesy and cartography; supplementary subjects like statistics and mathematics and the modern areas like computer science, communications and information systems, and emerging areas like cognitive science and applications in the social sector.

Conferences related to GIScience are organised mainly in Europe and Americas. Some of the popular conferences include

- AGILE
- COSIT
- GI_Forum
- GIScience

These event and forums are of great benefit to researchers. GIS Development realises the need for such initiative in the Asia Pacific region, to cater to the GIScience community here and provide a platform to share research findings.

Geospatial Science Forum is the outcome of this vision, and efforts in this area includes a dedicated Portal and Geospatial Science Forum 2009, a Symposium on Geospatial Information Science Research which will be held along with Map World Forum 2009 at Hyderabad from 12 to 13 February 2009.

The broad topics that will be covered include:

- Data Acquisition
- Data Processing
- Data modelling
- Data Analysis
- Human Interaction
- Interaction with Social Systems

Call for Papers

Researchers working on any of the topics listed above are encouraged to submit papers of their original work for the seminar. A panel of experts will select the papers and the authors will be given an opportunity to present them in detail at the seminar. The seminar will consist of four half-day sessions. In each session there will be a maximum of four papers followed by a panel discussion to identify a research agenda for the session topic. The following tracks have been identified for the symposium:

- Data Acquisition systems
- Data processing, database, interoperability
- Spatial Analysis and Modelling
- Human Interfaces and Applications

Selected papers will be printed as a monograph and distributed widely in the research community dealing with the topics of Geospatial Information Science.

Authors can submit papers online at http://www.easychair.org/conferences/?conf=gsf09

Important dates

Paper submission 26 Sep'08

Acceptance 24 Nov'08

Camera ready papers 1 Dec'08

Conference 12-13 Feb'09

For details mail us at:

giscience@gisdevelopment.net

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- Land Administration
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ITC

INTERNATIONAL INSTITUTE FOR GEO-INFORMATION SCIENCE AND EARTH OBSERVATION

FIG Working Week - Integrating Generations

Stockholm, Sweden 14 - 19 June 2008

GIS Development participated in the recently held FIG Working Week at the Stockholm City Conference Centre in Sweden. The Working Week was organised by the International Federation of Surveyors (FIG) in association with the local organising body - Swedish Association of Chartered Surveyors (SLF) under the patronage of the King of Sweden, His Majesty King Carl XVI Gustaf.

The conference witnessed a rich cultural milieu of nearly 950 delegates from 95 countries, which is an all time high figure for FIG Working Week. The conference had an interesting theme - Integrating Generations, which aimed at developing capacities of the young surveyors while integrating knowledge base of the older ones. There were over 450 scientific and professional papers presented during the 7 day event. In conjunction to the Working Week, a Seminar on "Improving Slum conditions through Innovative Financing" was held by FIG and UN HABITAT. The event was sponsored by Trimble, ESRI,
Lantmateriet, Swedesurvey and Structutor.

The programme for the Working Week began on Friday, June 13th with the Council meetings, a Workshop on History of Surveying and Measurement, FIG ACCO meeting and FIG General Assembly meeting. The Opening Ceremony on June 16th started with the majestic and melodious welcome music by the Swedish Mountain Band of Royal Lifeguard. The ceremony was later followed by a very alluring performance of traditional folk dances from different parts of Sweden by a theatre group. The Welcome Address was given by Mr. Svante Astermo, Conference Director and SLF Director. Mr. Astermo commented on the success of the theme 'Integrating Generations', as the conference had more than 100 students attending from various countries. He said that Integrating Generation is a bridge not only of ages but of countries and cultures as well. This was followed by the Welcome Address by Prof. Stig Enemark, President FIG, who spoke on the relevance of the theme Integrating Generations and encouraged the student community by saying that students are the future and FIG is always behind them. Prof. Enemark said, "FIG is becoming a majour partner in supporting sustainable development and achieving the millennium development goals as adopted by UN." Prof. Enemark introduced a new term, Land Governance that relates to the spatial dimension of land property and natural resources. He commented on how "…property rights are the basic right for economic development and growth."

The Inauguration ceremony was formally opened by Mr. Andreas Carigren, Minister for Environment, Sweden.

Following the formal opening of the FIG Working Week, Dr. Anna Tibaijuka, Executive Director of UN HABITAT addressed the audience by presenting the Opening Keynote Speech.

The technical programme of the conference consisted of 70 Technical Sessions in addition to 3 *Plenary Sessions on Sustainable Urban Development and the Millennium Development Goals*, *Land Administration and Finance Systems* and *Technical and Organisaitonal Innovations*, which had some very diverse issues being addressed and gave opportunity to an equally diverse set of Plenary Speakers to present their views. Running parallel to the conference was an exhibition with participation from Blom, Bentley, Lantmateriet, Swedsurvey, ESRI, Trimble, Leica and Fugro. The working week brought out the dynamic and multifaceted concerns that a Surveyor faces today. It addressed issues such as land administration, land management, land governance, environment management, education, cooperation, human resource issues of the Surveying profession and many more such issues in the technical sessions and the networking circles. FIG gave due importance not only to issues related to the 'hardcore' surveying work, but also to 'soft' skill sets and surrounding concerns like retention of human resource in the surveying field, knowledge management, communication, coordination, partnership and dialogue. The event was a time the survey community took to validate their existence and 'feel good' about being an important component of Geospatial world.

> **"It was a time the survey community took to validate their existence and 'feel good' about being an important component of Geospatial world"**

The closing ceremony was held on Thursday June 19th where Mr. Svante Astermo, Chair of the Local Organising Committee presented the conference report and Prof. Stig Enemark gave the Closing address and summarised the proceedings of the Working Week. He welcomed delegates for the next FIG Working Week, scheduled from May 3-8, 2009 at Eilat, Israel. The theme for the forthcoming conference is 'Surveyors Key Role in Accelerated Development: New Horizons Accross Red Sea'. ■

Megha Datta, *megha.datta@GISdevelopment.net*

BE Conference 2008

THEME
"BEst Practices for Sustaining Infrastructure"

28 - 30 May, Baltimore, Maryland

CEO Greg Bentley shared key business developments of the year 2007 with respect to company's new products and acquisitions. "The quality of life depends on the quality of our infrastructure," Bentley remarked. He focused on Bridge Information Modeling (BrIM) as an example of the way Bentley is making its solutions portfolio more comprehensive while advancing interoperability over the asset lifecycle

Keith Bentley, CTO, addressed the issues and present strategies for creating and deploying software technology in order to enable Bentley users to meet their own long term objectives in the creation of a sustainable world

Senior Vice President of Bentley Software, **Bhupinder Singh** was joined by Vice Presidents Shaun Sewall, Styli Camateros, and Rob Whitesell to present Bentley's products and solutions for sustaining infrastructure

Jury for BE Awards

BE Communities Web Site

Launched at BE Conference 2008, BE Communities website is aimed to help shape technologies and advance best practices. This social networking site allows one to find information and share knowledge through several means of communications under one interface; Forums, Wiki, Blogs, Image and File Repositories.

Malcolm Walter, COO, made his closing remarks by featuring user projects which illustrate "ROI3: Return on Investment, Return of Interoperability, and Return on Innovation

Andrew Winston founder of Winston Eco-Strategies and co-author of the "Green to Gold", delivering Guest Keynote

2008 BE Awards of Excellence

The 2008 BE Awards programme received a record number of outstanding projects and recognised 17 professional category winners.

Industry/Solutions Categories

- Innovation in Cadastre and Land Development
- Innovation in Commercial or Residential Building
- Innovation in Industrial Facilities
- Innovation in Metals and Mining
- Innovation in Military, Installations, Campuses, and Airports
- Innovation in Oil and Gas
- Innovation in Power Generation
- Innovation in Rail and Transit
- Innovation in Road and Bridge
- Innovation in Utilities and Communicat ions Networks
- Innovation in Water Resources

Special Categories

- Attaining Return on Innovation
- Communicating Through Visualization
- Connecting Project Teams
- Developing the Infrastructure Workforce
- Sustaining Society
- Sustaining the Environment

INTERGRAPH 2008

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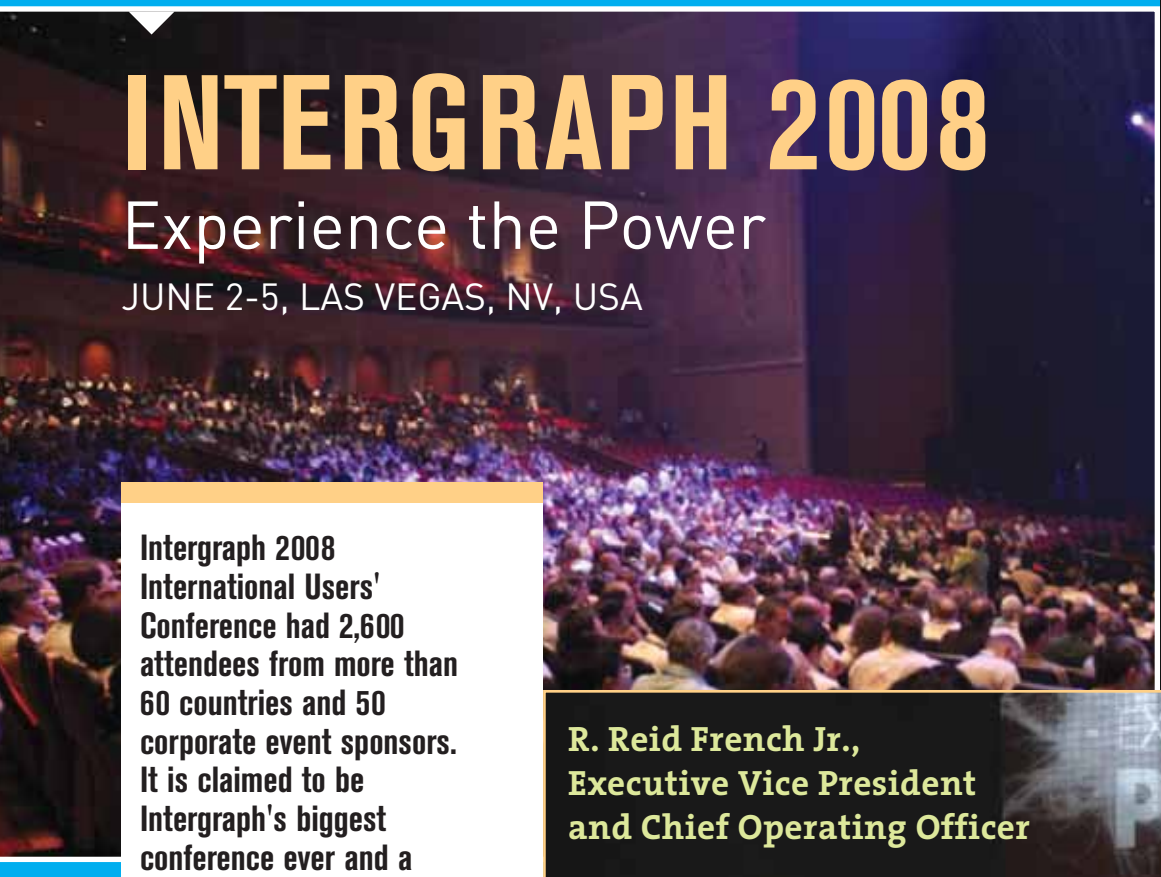
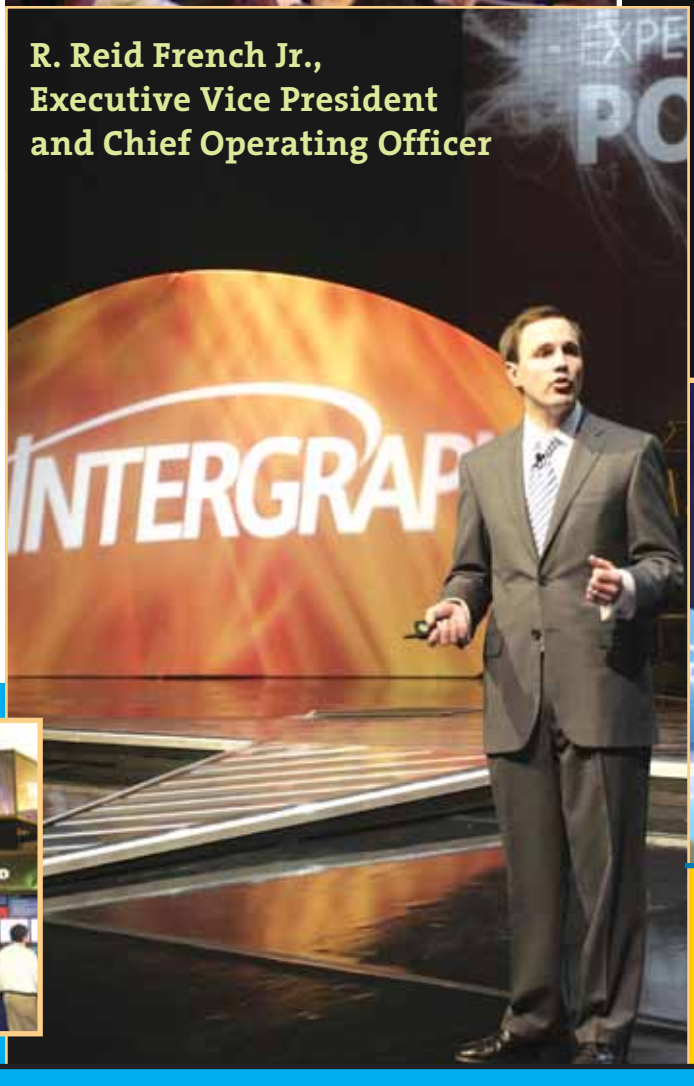
JUNE 2-5, LAS VEGAS, NV, USA



Intergraph 2008 International Users' Conference had 2,600 attendees from more than 60 countries and 50 corporate event sponsors. It is claimed to be Intergraph's biggest conference ever and a resounding success!

Sessions under Security, Government & Infrastructure (SGI) included Defense and Inteliigence, Government, Photogrammetry, Public Safety, SG & I - Technology, Transportation, Utlities and Communities



R. Reid French Jr., Executive Vice President and Chief Operating Officer

The 2008 Icon innovative use

Halsey Wise
Chairman,
President and CEO

Exhibit Area

Lance Armstrong
(Guest Keynote Speaker)
with Halsey Wise

n Awards were presented to eight industry and government leaders for their se of Intergraph's enterprise engineering and geospatially powered software

July 2008

19 - 23 July
MAPPS 2008 Summer Conference
Sun Valley , ID , USA
www.mapps.org

21 - 24 July
Spatially Enabled Government 2008
Canberra, Australia
www.iqpcevents.com:80/ShowEvent.aspx?id=82362

21 - 25 July
GeoWeb 2008
Vancouver, Canada
www.geowebconference.org

August 2008

4 - 8 August
ESRI User Conference
San Diego, USA
www.esri.com/events/uc

6 - 9 August
Technology Exhibition; Geoinformation, GPS and Mapping; National Coordinating Agency for Survey and Mapping
Jakarta, Indonesia
http://www.geospatial-exh.com

25 - 27 August
GITA 2008
Sydney, Australia
www.gita.org.au

25 - 29 August
URISA's Fourth Caribbean GIS Conference
Grand Cayman, USA
www.urisa.org

September 2008

8 - 10 September
Canalys Navigation Forum - EMEA
Budapest , Hungary
http://emea.canalysnavigationforum.com

8 - 11 September
10th International Symposium High Mountain RS Cartography
Kathmandu, Nepal
www.icimod-gis.net/news/showDetail.php?id=193

26 - 27 September
ASIA GIS 2008
Busna, Korea
www.asiagis2008.com

29 September - 3 October
FOSS4G2008
Cape Town , South Africa
www.foss4g2008.org

30 September - 2 October
INTERGEO
Bremen, Germany
www.intergeo.de

October 2008

1 - 3 October
4th Asian Space Conference
Taipei
www.nspo.org.tw/ASC2008

27 - 31 October
7th International Conference of the African Association of Remote Sensing of the Environment (AARSE)-2008
Accra, Ghana
http://www.aarse2008.org/index.html

28 - 30 October
2008 ESRI Europe, Middle East & Africa User Conference
London, United Kingdom
www.esriuk.com/emea2008

November 2008

2 - 4 November
2008 China International Trade Fair for Geodesy, Geo-Information and Land Management Surveying Technology and Equipment
Shanghai, China
www.chinageo-expo.com

10 - 14 November
29th Asian Conference on Remote Sensing
Colombo, Sri Lanka
http://220.247.235.243/acrs2008/index.html

12 - 14 November
Digital Earth Summit on Geoinformatics
Potsdam, Germany
www.isde-summit-2008.org

GIS DEVELOPMENT EVENTS

18 - 20 August
Map Asia 2008
Kuala Lumpur, Malaysia
www.mapasia.org

25 - 26 August
Map Africa 2008
Cape Town, South Africa
http://mapafrica.gisdevelopment.net

20-21 October
Geospatial Technologies for Design and Engineering 2008
Dubai, UAE
info@gisdevelopment.net

10 - 13 February, 2009
Map World Forum
Hyderabad, India
www.mapworldforum.org

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March 22-27, 2009
Riviera Hotel • Las Vegas

AAG Association of American Geographers
www.aag.org

Hoover Dam, Welcome to Las Vegas (Las Vegas News Bureau), and Lake Tahoe (Lake Tahoe Visitors Authority)

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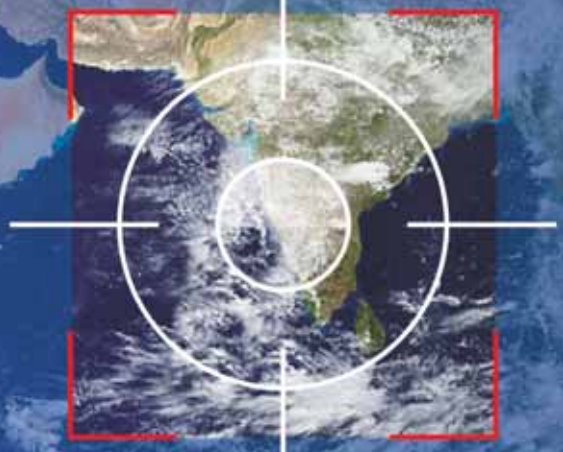

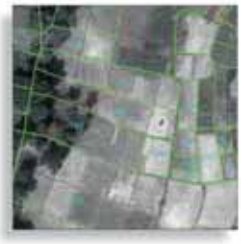

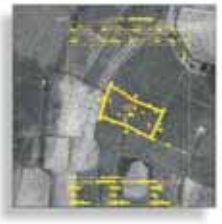

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