

GIS DEVELOPMENT



Mapping the Developer's Toolbox

About the cover: Page 5



Image courtesy of Digital Globe

Leica Geosystems Geospatial Imaging has expanded to India!



Leica Geosystems Geospatial Imaging India Private Limited has created brand new headquarters in Gurgaon. To meet the needs of new and existing customers, Leica Geosystems Geospatial Imaging India will build customized and localized geospatial solutions. Also deployed throughout the region will be technical support, business development, marketing, software development and professional services.

This new subsidiary will be the only company in India to sell and support Leica Geosystems' entire product portfolio. Extensive services and an expanded product suite will include a complete and powerful collection of remote sensing, photogrammetry, enterprise, data sharing and visualization solutions to this market.

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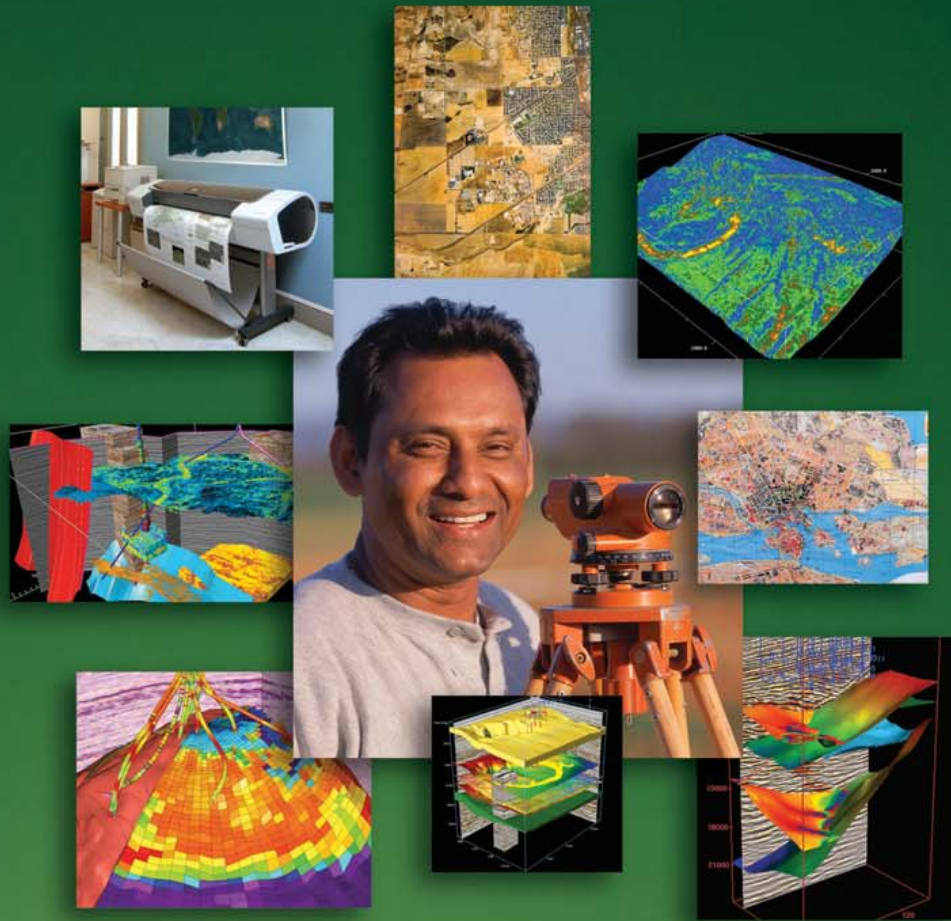
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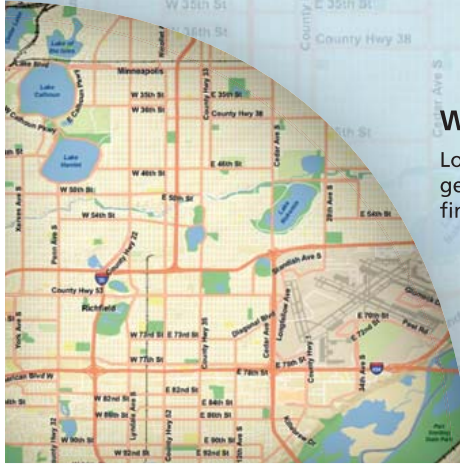
World Imagery

See a natural view of the earth at multiple resolutions.



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Political Boundaries

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Shaded Relief

Use with your maps that don't include orthoimagery.



Quick-Start Your GIS Projects with Free Online Maps

Having the right data when you need it can mean the difference between success and failure. When you are trying to meet a project deadline, the last thing you want to do is spend valuable time searching for data sources and then compiling and prepping the data.

With ArcGISSM Online, you have free access to a comprehensive collection of 2D and 3D basemaps to which you can easily add your own local data or services.

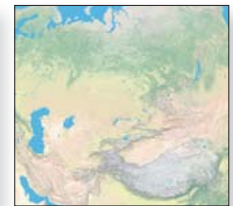
Online content includes imagery for the world, world street map, shaded

relief, topographic maps, and more. Use it as the foundation for your GIS work when you need to add context for your geographic analysis that extends beyond your normal working area.

ArcGIS Online content is prerendered, ready-to-use, and hosted by ESRI, so you **save time and money** because you don't have to invest in additional hardware, staff, or training. It also frees you from data management and data update activities so you can focus on your mission-critical work instead.



Historical World Map



Physical World Map



World Protected Areas Map



U.S. Topographic Map

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If you use ArcGIS Desktop, connect to ArcGIS Online services today at <http://arcgisonline.esri.com>. Or, request your ArcGIS Desktop evaluation at www.esri.com/desktopeval and explore ArcGIS Online.



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ABOUT THE COVER...

It's time that we-the Geospatial Professionals-realise the potential that lies ahead of us, by exploring 'The Geospatial Toolbox', to produce customised services and solutions...

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.

GIS Development does not necessarily subscribe to the views expressed in the publication. All views expressed in this issue are those of the contributors. It is not responsible for any loss to anyone due to the information provided.

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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Tools & Professionals

I find the words of Linus Torvalds inspiring even today: "We're back to the times when men were men and wrote their own device drivers." Today, I feel Geospatial Professionals and the organisations using GIS are closer to writing their own custom application. Be it using APIs & SDKs or starting with embedding simple maps in their web applications through Mashup.

What is the relevance of SDKs and APIs for a GIS Professional who is not even remotely associated with software programming?

Logically thinking, none! But, it is important to be aware of the tools and their benefits, even if we are not to use them at any point of time. The importance is heavily underlined by the fact that, when the usage application starts maturing the boxed products starts giving way to some easy to use and powerful, customised software applications each for a specific domain. This leads to the statement that down the lane we will have application specific for the various verticals like electricity, agriculture, forestry, etc. Not that, these segments do not have domain specific software today, but even if they are, they would start becoming more robust and prevalent. The nature and colour of this domain specific customised software would in all likely-hood be an integral part of the enterprise application software.

The software components are already reaching a stage where a small customisation of software application can be done in few months. This coupled with new methods like 'Agile', should increase the comfort level at both the ends: the service provider and the client for whom the customised application is being developed. Hopefully this would also reduce the apathy of the developer and the client. For often the client gets to know what he wants only after he has seen the 'first cut' of the software application. By that time the developer is far beyond the design stage and is the process where he is not willing to make much change, least to affect the fundamentals of the base design.



Maneesh Prasad

Managing Editor & Chief Operating Officer

maneesh.prasad@GISdevelopment.net

Tools are not only for the technician, but for everybody. If not as a user, you can certainly contribute more by little understanding about these tools around us.

Just as they say, to drive a car you need not be an automobile engineer. But with little understanding of the tool box, which is lying in the boot, lot of pain can be avoided. Certainly, one should draw a line here and not get into the working of engine and transmission of power.

Technology is like our life, very simple and easy to understand if we have a simple approach to it. It can also become complicated like rocket-science, if we start asking what, when, why, where, whom, whose etc. Factors leading spider-web is beyond the scope of the current discussion. What I know is many a times we get stuck in understanding the automobile engineering rather than keeping our focus on driving the automobile.

In the present context it is important that we understand that there are options of customised software application which beyond the 'Out-of-Box' software we are familiar with, like ArcGIS, Microstation, Autodesk Map, PB MapInfo etc. These solutions based on geospatial API's and SDK's are available from 'Brands' which you are aware of, and some them being mentioned above. This means you just have to explore the very 'stable', which you are so comfortable buying from!

It is time we now explore the product portfolio of our GIS vendors for they do have something very interesting!





Guyana Forestry Commission integrates Remote Sensing for monitoring

Guyana: The Guyana Forestry Commission (GFC) is implementing the Remote Sensing and Bar-Coding system into its existing log tracking programme in its promotion of sustainable forestry development. The GFC project is funded by the International Tropical Timber Organization (ITTO) at a cost of more than \$100M, a press release from the Government Information Agency said. It uses modern tracking devices to combat illegal logging activities.

The GFC said the Bar-Coding System is part of its efforts to modernise its monitoring capacity since it will feed into a central database linked to a national wide-area network. This will allow for real-time transfer of data and the availability of tracking information for the regulatory agency and operators in the private sector. The project will make detection of illegal logging and other non-compliant activities easier both in transit and at point of sale, by scanning bar code labels on log tags to determine if the tag being used is valid, date/time last checked.

The GFC said this initiative will enhance the work of its Forest Monitoring Division which scrutinizes

22 forest stations located at strategic points throughout Guyana. These include stations at Canje, Springlands, Bamboo Landing, Kwakwani, Soesdyke, Linden and Bartica.

Nigerian Government to check land fraud

Nigeria: The Abia State Government has introduced Abia Land Information System (ALIS) project to check anomalies in all land transactions in the state.

"With this system in place it will be difficult for fraudsters to sell the same land to multiple buyers because the true ownership of any land in Abia State can be instantly ascertained," said state governor, Dr Theodore

Orji, adding that it would also enable government to plan appropriately with the existence of a central data base of landed properties.

Commissioner for lands, survey and urban planning, Prince Paul Ikonne explained that ALIS, is the road map in Abia State land reforms involving full computerisation of the Abia Lands Deeds Registry with a clear view to completely digitalise the operations of the registry.

He further stated that the benefits derivable from ALIS project include the fact that information on lands in Abia State could be accessed on internet "there-

ECA publishes report on Determination of Fundamental Datasets for Africa

South Africa: The United Nations Economic Commission for Africa has published a new report defining fundamental geospatial datasets for Africa. The report is the first attempt to provide a continental common definition of what constitutes a minimally necessary core of geospatial data and information products to which policy makers can add other sectoral datasets to ensure geographic consis-

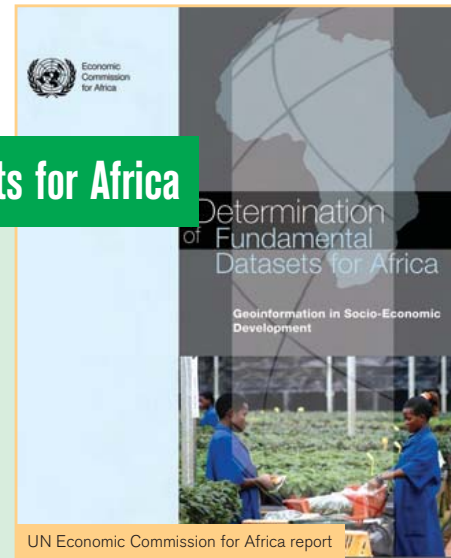
tency in making decisions on socio-economic development issues.

The report comes following an exhaustive literature review and widespread consultations with other institutions on the continent, details of which was compiled by EIS-Africa and the South African Human Sciences Research Council. It proposes the following definition:

"Fundamental data sets are the minimum primary

sets of data that can not be derived from other data sets, and that are required to spatially represent phenomena, objects or themes, important for the realization of economic, social and environmental benefits consistently across Africa at the local, national, subregional and regional levels."

Based on this definition, the report goes on to identify ten fundamental data themes, which are geodetic



control network, imagery, hypsography, hydrography, boundaries, geographic names, land management units, transportation, utilities and services, and natural environments.

by making it possible for our people to obtain information on-line wherever they may be while the new Certificate of occupancy "will facilitate the transferability of title documents as well as increase market transactions in land."



Bangladesh EC to use GIS for outlining constituencies

Bangladesh: The Election Commission (EC) of Bangladesh announced a plan for redrawing the boundaries of parliamentary constituencies in 61 districts of the country based on densities of population in an effort to maintain a consistency in the number of voters for each seats.

The EC said the constituencies will be redrawn using computerised GIS. Assistance will be sought from the Centre for Environmental and Geographic Information System, and from Local Government Engineering Department in exchange for payment, and the hired experts will also train the EC staff to develop the commission's capacity for running the system in the future, the written work plan of the commission says.

China to finish updating national geographic info database in 2010

China: China has finished 40 percent of the updates of its largest national geographic information database and will complete the entire project by 2010. The database, completed in February 2006, is a 1:50000 national basic geographic information database that covers the whole country with the largest scale and highest precision up to date. The Bureau planned to finish another 14 percent of the project in 2008.

The 1:50000 database is the digital version of paper maps and visual materials shot from a high altitude, said Lu Xinshe, director-general, State Bureau of Surveying and Mapping. He added, the database will play a role in the decision-making of the governments in land and regional planning, resources surveying and evaluation, disaster prevention and alleviation.

ASI, IIT-Kanpur signs MoU

India: To equip itself with scientific methods that can be used in archaeology, the Archaeological Survey of India (ASI) has entered into a Memorandum of Understanding (MoU) with the Kanpur-based Indian Institute of Technology (IIT) for terrain mapping and

archaeo-scientific investigations of Ahichchhatra in Bareilly, UP in which various scientific applications like GPS, Total Station and GIS will be put into use.

Sikkim has the largest number of glaciers in India

India: Sikkim, comprising 0.5 per cent of India's landmass, has 84 glaciers, the largest number as compared to any other state or union territory. The present number of glaciers at 84, with the mapping exercise still underway to find about out more ice caps in the state has grown by about four times over the past six years as the figure of glaciers stood at 21 at that time, a senior scientist of the science and technology department, which has been carrying out mapping of the glaciers and other landscapes of the state. The glaciers have been mapped by using remote sensing application system and capturing data through satellite, he said.

The rise in the number of glaciers belied the impact of the global warming phenomena in this region with the scientist pointing out that the impact of global warming has never been a factor in the climate of the border state with the state being landlocked and surrounded by the mountainous landscape on all sides.

ISRO plans satellite series for mapping and climate monitoring

India: As part of an effort to increase its ability to map the country through satellite imaging, India plans to create a chain of nine earth observation satellites which will be used for civilian applications such as identi-

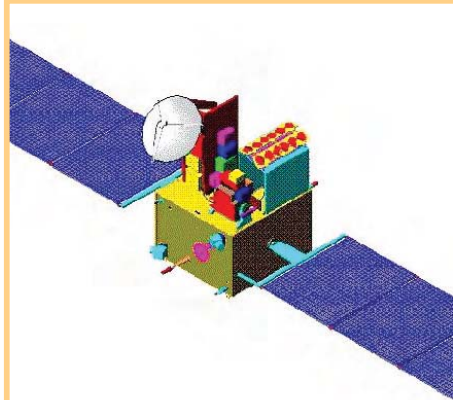


Illustration of the deployed OceanSat-2 spacecraft (image credit: ISRO)

fying potential fishing zones or mapping streets in cities.

The Indian Space Research Organisation (ISRO) will launch the satellites over the next five years beginning June with Oceansat-2. The launch of these civilian satellites will be preceded by the launch, in February, of Cartosat-2A, using a PSLV rocket.

India and France are jointly working on two satellites, Saral and Megha Tropiques, to track climate changes in the ocean and the tropics. ISRO is building a family of radar imaging satellites that carry synthetic aperture radars, all-weather imaging sensors that are capable of taking images in cloudy and snow-covered regions.

Japanese satellite flops at map-making

Japan: An advanced Japanese surveying satellite launched two years ago is proving to be a disappointment, producing images too blurry for map-makers. The 457.8-million-dollar "Daichi" satellite was sent into space to create detailed maps of remote parts of Japan, but the images have not been of sufficient quality, the government's Geographical Survey Institute said.

The institute takes aerial pictures of Japan every five years for thorough updates of local maps and had hoped the satellite would complement the work. But officials have so far used the Daichi satellite's images to update maps of just 52 of 4,300 section images of Japan.

Engineers and officials from the map institute



and the Japan Aerospace Exploration Agency are discussing ways to improve the Daichi

images and how best to use the data," said Takashi Hayashi, an official with the institute.

ment Programme (UNEP) for the application of Rainwater Harvesting Technology in the Tigum-Aganan Watershed Area, to test effects on water supply and mitigate adverse effects of climate change.

The MOU primarily aims to enable the Philippines to adapt to the impacts of climate change on water by assessing the rainwater potentials under different climate change scenarios, through six sets of GIS maps and by demonstrating rainwater harvesting application for minimizing these impacts.

Sri Lanka mapped from space for tsunami re-building

Sri Lanka: A mapping programme using satellite images will help Sri Lanka's government do better planning and rebuilding in the tsunami-hit eastern and southern provinces, officials said.

The French-funded GIS project using high resolution satellite imagery costs almost 100,000 USD. The detailed digital maps that can be prepared will also help local authorities in their work and eventually be available to the public, said L H Indrasiri, Director GIS at the Urban Development Authority (UDA), which is implementing the project. The satellite images will be used to prepare

Bharat Gaurav Award for Doha GIS engineer

India: Shaik Kareem Basha, Hon Treasurer of Qatar Chapter of the Institution of Engineers (India) has been honoured with Bharat Gaurav Award 2008 in New Delhi. Basha is working as Senior GIS Engineer for

Qatar Petroleum. He did his Bachelor of Engineering in Computer Science and Master of Science in Geo-Informatics. For his outstanding contributions to GIS, he was conferred with many awards by governmental authorities in Qatar. He is a founder member and financial controller of GIS Engi-

neers Society, Affiliated to the Indian Cultural Centre.

UNEP to address water supply, climate change in Philippines

Philippines: The Philippine province of Iloilo has signed Memorandum of Understanding (MOU) with the United Nations Environ-

Singapore LA Vs Virtual Maps -stalemate?

Singapore: Where does the IPR on a map or spatial data end? Does value addition to a map change its ownership? Is state generated spatial data public property? These and a lot many questions will surface from the legal battle between Singapore Land Authority and Virtual Map. Virtual Map, which operates streetdirectory.com, argued in court last week that it developed its own framework to create its maps, but the Singapore Land Authority (SLA) maintained that Virtual Map had copied those created by SLA. Last August, the court had ruled in favour of SLA, prompting Virtual Map to file an appeal.

Virtual Map said it may have used the Singapore Land Authority's maps, but only for the purpose of driving around Singapore to collect its own data using global positioning system (GPS). Using that data, Virtual Map said it then developed its own framework or backbone to create its maps. To that, the Singapore Land Authority was quick to disagree. SLA's lawyer, Dedar Singh Gill, noted that if Virtual Map did not copy SLA's framework, Virtual Map would not have been able to produce the maps in the first place. Mr Gill added that this is why all the phantom features, planted on SLA's map to catch copiers, also showed up on streetdirectory.com.

<http://www.gisdevelopment.net/ezine/weekly/jan1408.htm>

e-Quote

detailed digital maps of urban areas and the project includes preparation of new maps and also updating old Survey Department maps of the one inch: 50,000 types made using

satellite images with a resolution of only 50 metres. They will be used to help reconstruction of the damage caused by the December 26, 2004 Indian Ocean tsunami.



Satellites help canegrowers identify affected paddocks

Australia: Scientists are examining how satellite imagery can help sugarcane farmers to identify weaker parts of their cane fields. Queensland's Department of Primary Industries (DPI) has finished a pilot project that involved analysing satellite imagery of the Silkwood and Upper Murray area in the state's far north. DPI senior agronomist Derek Sparkes says, a poorer crop

will reflect less light in the imagery. "If we can isolate that affected part of the paddock and find out what the problem is, you can selectively treat that paddock with whatever it might need to bring it up to par with the rest of the field," he said.

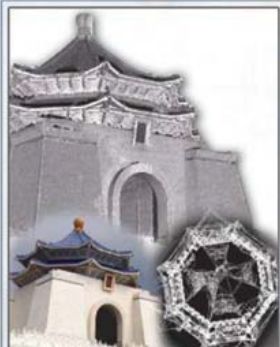
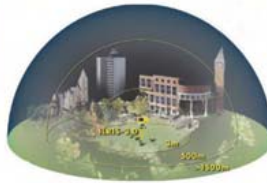
Satellite imagery reveals disappearing forest birds

Papua New Guinea: Analyses of satellite images have revealed the extent of deforestation occurring on the island of New Britain, Papua New Guinea, indicating that many more bird species are threatened with extinction than previously

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Near extinct Yellowish Imperial-pigeon

feared. Conservationists are now calling for an effective system to adequately protect the crucial lowland forests that remain on New Britain. In the paper, scientists from the RSPB (BirdLife in the UK), BirdLife International, Conservation International, an independent consultancy and Institute of Environment and Sustainability, EC JRC, analysed 'before-and-after' high resolution images of New Britain, showing that approximately 12% of forest cover was lost between 1989 and 2000, including over 20% of forest under 100 m altitude, with substantial areas cleared for commercial oil palm plantations.



GIS for litter management in Dublin

Ireland: Dublin city councilors are expected to adopt a litter management plan which will involve increased use of video surveillance and so-called blitz patrols by wardens. The new plan would involve

the expenditure of 54m USD over the next three years and would use GIS technology to identify litter blackspots. The plan would involve a commitment to empty litter bins up to four times a day and wash streets once a day in busy city centre areas.

Royal Berkshire Fire and Rescue Service selects VectorCommand

UK: Royal Berkshire Fire and Rescue Service have chosen VectorCommand's Command Support System as the command and con-



VectorCommand: Command Support System

trol system for managing its new incident command vehicles and fire appliance fleet.

The Command Support System user interface allows non-technical users to follow an easy-to-use, intuitive, touch screen-based decision-making model (DMM) based on nationally agreed fire service command doctrine. All command decisions - made on electronic white board sketch maps, using asset icons and GIS mapping, emails, video conferencing

and voice commands - can be easily communicated to all relevant parties (and stored for analysis or enquiry purposes).



CGDI Interoperability Pilot demonstration

Canada: The Carbon Project announces that its CarbonArc and Gaia software has successfully supported the Canadian Geospatial Data Infrastructure (CGDI) Interoperability Pilot. The CGDI Interoperability Pilot is sponsored by GeoConnections, a Canadian partnership program led by Natural Resources Canada.

The program works with decision-makers and technology developers to increase the use and sharing of location-based (or "geospatial") information and technologies online, via the Canadian Geospatial Data Infrastructure. In the pilot, GeoConnections is collaborating with provincial partners to test better mechanisms for distributing and updating framework data (geographic names, national road network, administrative boundaries, etc.), providing users with access to the most current and authoritative data, avoiding version disparities, and minimizing duplication. The recent

highly successful pilot project demonstration featured the latest web and geomatics advances, including Web Feature Service (WFS) technology to distribute spatial information nationally while simultaneously managing it near provincial sources.

Malaspina Univ. researchers tap into groundwater study

Canada: Vancouver Island Water Resource Vulnerability Mapping Project will analyze the susceptibility of water quality to hazards associated with human activities and land use. It's a collaborative project involving professors and students from Malaspina's Chemistry, Geology and Geography departments, plus expertise and funding from the Ministry of Environment, Ministry of Health, Vancouver Island Health Authority, Natural Resources Canada, Islands Trust and Vancouver Island regional districts. Headed

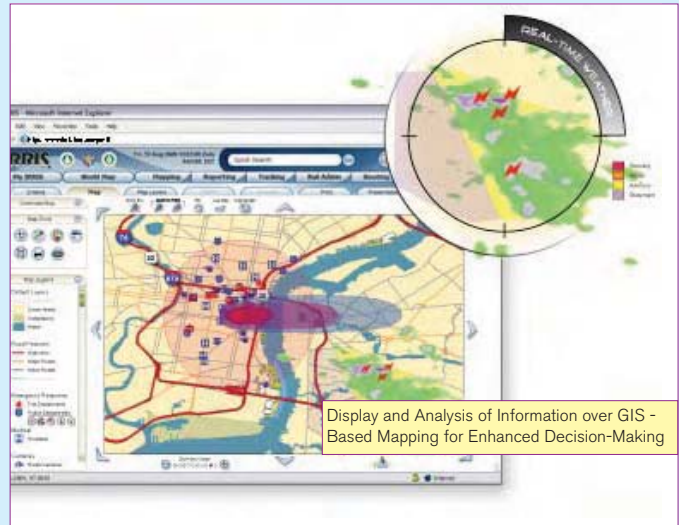


Vancouver Islands: Groundwater study area

GeoDecision IRRIS used during Emergency preparedness scenario

USA: GeoDecisions' IRRIS technology was recently used during the Federal Emergency Management Agency's (FEMA's) participation in the Top Officials 4 (TOPOFF 4) terrorism preparedness exercise. The patented IRRIS technology incorporates the latest advances in information technology (IT), GIS, and location-based services (LBS) to aid decision makers in coordinating response, managing assets, and tracking equipment or personnel through a COP. It incorporates and displays worldwide infrastructure data, live-vehicle tracking, near-real-time weather, and active route conditions in a map format.

The exercise required participants to make quick decisions and carry out essential functions by using a common operating picture (COP) during an incident. For this simulated response, IRRIS was used at the National Response Coordination Center (NRCC) to view simulated disaster outcomes as well as track FEMA's mobile disaster recovery vehicles. Data for the exercise was coordinated through FEMA's GIS Solutions Branch within the Office of the Chief



Information Officer, responsible for the overall mapping support for the NRCC. The use of IRRIS helped FEMA decision makers visualize and comprehend activities taking place in response to the disaster scenario.

up by Malaspina professor and GIS expert Dr. Alan Gilchrist, the team will generate a GIS map outlining groundwater vulnerability.

Over the next four to six years, the study will focus on groundwater in the regional districts of Cowichan Valley and Nanaimo. The research team will acquire, compile and assess geological and hydro-geological data from a variety of public and private sources, and test and adapt mapping methodologies that are specific to Vancouver Island water resources. Eventually, susceptibility maps will be produced for the entire Vancouver Island region using

a GIS-based methodology called DRATIC. The maps will categorize aquifers on Vancouver Island that are deemed vulnerable.

Real-Time mapping and analysis of US Presidential Election

USA: Local and regional watchdog organizations will be monitoring and reporting on the integrity of these democratic activities like, the presidential election, that promises a series of primaries, caucuses and straw polls, culminating in a general election in November. Philadelphia-based Committee of Seventy in collaboration with Avencia Incorporated GIS

and software development company will help geographically record, map, and analyze election day incidents in real-time.

The primary challenge of incorporating GIS into this endeavour was to create a system that would enable both quick recording of incidents and real-time map generation. Avencia's experience with GIS technologies and thorough knowledge of the political landscape came handy to tackle the challenge of creating a variety of maps throughout the day, including not just point maps showing individual incidents, but also aggregations by larger political

boundaries indicating both relative numbers of incidents and proportions of different types of incidents.

GISCI announces Mentoring Program

USA: The GIS Certification Institute (GISCI) has created a mentoring program to link students and young professionals up with certified GIS professionals (GISPs). The mentored individual must be a student (undergraduate or above), non-traditional student (student attending school later in life) or young professional (1-2 years in the field). The mentoring relationship is meant to last for a minimum of six months.

World Heritage Map 2007-2008 now available

USA: The 2007-2008 World Heritage Map, the third to be produced in collaboration with National Geographic and Hewlett Packard, is now available. The goal of the partnership, signed at the end of 2005 for a period of three years, is to raise awareness of the World Heritage Convention, and the map is an essential tool for this pur-

pose. The partnership combines National Geographic's unsurpassed cartography with HP's high technology printing to illustrate the location of World Heritage sites across the globe. The World Heritage map is above all an educational visual tool, allowing UNESCO to communicate its work in this field on a large scale. It is especially important since print documents, accessible to everyone, are an essential communication tool.

The map features the 851 World Heritage properties, brief explanations of the World Heritage Convention and World Heritage conservation programmes, as well as superb photos of World Heritage sites with explanatory captions. A copy of the map may also be requested by registering on this website <http://whc.unesco.org/en/register>



Radical new lab fights disease using satellites

USA: A group of atmospheric research scientists at NASA's National Space Science and Technology Center and University of Alabama at Birmingham's School of Public Health representatives are collaborating in project which will lead to 'forecasting public health' using data from remote sensing satellites. Both UAB and NASA want to understand, using NASA satellite data on how the environ-

ment is influencing the diseases and conducive conditions. This study's findings will help health officials with environmental exposure and health recommendations." This idea led UAB to create a remote sensing lab - in fact the first U.S. dedicated remote sensing lab for medical and public health. Studies sponsored by the lab have already led to critical research in fighting malaria. Infrared imagery from satellites is helping scientists locate warm standing water - fer-

tile breeding ground for mosquitoes.

ESRI offers \$25,000 cash prizes for ArcGIS Server Code Challenge

USA: ESRI invites developers to share their creativity and expertise with GIS developer community by submitting original code samples to the second annual ArcGIS Server Code Challenge at www.esri.com/codechallenge. The Code Challenge is open to all developers, including ESRI business partners, pro-

vided the applicant or the applicant's organization is a licensed user of ArcGIS Server 9.2 or current ESRI Developer Network (EDN) subscriber.

The developer community will vote for first-, second-, and third-place winners and the prize is \$15,000, \$7,500 and \$2,500 respectively. Winning applications will be announced no later than Thursday, March 20, 2008, at the Developer Summit and will be showcased on the ESRI.com and EDN Web sites.

Innovation



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Optech appoints airborne survey products GM

Canada: Optech Incorporated, provider of advanced lidar survey instruments, announced that it has appointed Glenn Farrington as General Manager of Airborne Survey Products. This new position gathers



Glenn Farrington

the company's existing ALTM, Gemini and SHOALS airborne survey systems into a single business unit, providing a better focus of expertise and strengthening the overall team as new airborne products are introduced. In his new role he will be responsible for managing all aspects of Optech's Airborne Survey Products, ensuring that this core line of business meets customer requirements and overall success within Optech's expanding product offerings.

Galdos recruits Richard Brown as VP Sales

Canada: Galdos announced that they have recruited

TerraSAR-X Services now available

Germany: Data acquired by radar satellite TerraSAR-X is now operationally available. Infoterra GmbH, the owner of the exclusive commercial exploitation rights for this data, has announced its commercial sales operations to be up-and-running.

With the beginning of the operational business, Infoterra GmbH has concluded the TerraSAR-X promotional acquisition campaign: during the past months, more than 1,500 users from around the globe have placed a request for a total of 3,000 TerraSAR-X

scenes, many of which could be recorded during the commissioning phase. These scenes - provided free of charge for evaluation and trial purposes - are scheduled to



TerraSar X image: Giza Pyramids - Credit:Infoterra



TerraSAR-X: Noerdlinger Ries

be delivered starting February 2008. Infoterra's global marketing activities are significantly enhanced by the extensive TerraSAR-X Distribution Partner Network spanning the six continents: nearly sixty partners in as many countries are available to support customers with their distinct local knowledge and experiences.



Richard Brown

Mr. Richard Brown to head up the company's sales department. Prior to joining Galdos, Richard held the position of Director, International Sales with DigitalGlobe for five years. He also has spent fourteen years with Mac-

Donald Dettwiler, where he held positions in business development and project management.

CARIS achieves ISO 9001:2000 certification

Canada: CARIS, a developer of geomatics software, has achieved ISO 9001:2000 certification. NSF International, an independent

leader in ISO certification processes and services, conducted the audit. A globally recognized quality management standard developed by the International Organization for Standardization (ISO), ISO 9001:2000 applies to organizations that design, develop, manufacture, install and service products. To achieve certification, companies must

have a comprehensive quality management system that addresses all areas of its operation. "This recognition communicates to our customers, worldwide, that they are working with an organization that prides itself in incorporating the very best practices and processes in the industry to consistently meet or exceed their needs," said Dr. Salem Masry, President and Chief Executive Officer at CARIS.

Ness Technologies to map Prague

Czech Republic: Ness Technologies, Inc., a provider of information technology

solutions and services, today announced that it was engaged by the Spatial Information Division of Prague Municipality to implement the Digital Map of Prague (DMP) project, worth \$6 million. The project includes building a digital map of the Prague area to be used as the reference source for the division's geographical information systems, and flexible, operational digital map management to facilitate ongoing enhancement of quality and content. DMP will simplify planning queries, supporting various authorities, and will benefit the Czech capital's citizens.

Following the development and implementation phase of the complex solution, which began on October 1, 2007, Ness will provide ongoing enhancements and support over the next five years. Ness will also provide project management and analytical consulting services for the project as a whole, in its role as integrator.

Ness' partner in the project is T-Mapy, a GIS provider in the Czech Republic backed by T-Kartor, a Swedish-based geospatial company. The project employs well-proven technology platforms - ESRI and Oracle.

eSpatial appoints UK Sales Manager

Ireland: eSpatial, enterprise geospatial software and technology company announced the appointment of a new Sales Manager, Mr. Ian Holmes, who will take responsibility for the UK market as part of an aggressive expansion plan. Ian will lead business and revenue generation as well as management of existing UK customers.

Ian has over 20 years experience in the global Engineering and IT industries including 10 years Sales & Business Development experience within the



II International Conference Remote Sensing - the Synergy of High Technologies

April 16 – 18, 2008
Moscow

The Conference invites for experience sharing the leading scientific and production companies, state and private enterprises involved in GIS and mapmaking, oil and gas industry, energy sector, municipal and administrative management, ecology and natural resources management

PARTICIPANTS:

- Research Centre for Earth Operative Monitoring (Russia)
- Khronichev State Research and Production Space Centre (Russia)
- DigitalGlobe (USA)
- GeoEye (USA)
- Infoterra (Germany)
- European Space Imaging (Germany)
- SpotImage (France)
- ITT VIS (USA)
- Bentley Systems (USA)



VENUE:
Atlas Park-Hotel,
Moscow Region, Russia

MAIN SUBJECTS:

- The state of the art and development trends of Russian and foreign Earth Remote Sensing software;
- Software systems, Earth Remote Sensing data processing systems and solutions from leading Russian and foreign designers;
- Experience in resolving practical tasks using Earth Remote Sensing data.

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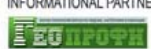
PARTNER:



MEDIA PARTNER:



INFORMATIONAL PARTNERS:



GIS Sector. Before joining eSpatial Ian headed up GIS Sales for Swift-LG. Ian will also take the lead on eSpatial's aggressive expansion in delivering solutions designed specifically for UK Local Government.

HP India appoints Jaideep Dahiya

India: The Graphics Arts division at the Imaging & Printing Group of Hewlett-Packard India appointed Jaideep



Jaideep Dahiya

Dahiya as the company's new Country Category Manager for

Large Format Printers. Jaideep will work with Paresh Shetty who recently joined HP as the Business Manager of the Graphics and Imaging Division. Jaideep has been working with the Imaging & Printing Group at Hewlett-Packard since July 2005 as the Category Manager for the Ink Supplies business in India. Prior to joining HP, Jaideep has been associated with sales and marketing divisions of leading companies in the FMCG and Food and Beverages segment.

Trimble appoints new Surveying Distribution and support partner

Philippines: Trimble announced the appoint-

ment of Rope Systems Corporation as the new distribution, service and support partner for Trimble survey solutions in the Philippines. Rope Systems Corporation was incorporated in 1978 and is a supplier of navigation and communications equipment.

"We are pleased to sign a business partnership with Trimble, we are confident that with our strong technical expertise, the partnership will benefit the surveying community in the Philippines" said Nelson Ong, the Vice-President of Rope Systems Corporation.

According to Ronald van Coevorden, the Asia-Pacific regional manager for Trimble Survey Division, "In addition to having access to

the latest Trimble survey solutions, Rope Systems' proven support and technical background means that Trimble customers in the Philippines will receive high-quality and reliable support. We are excited to team up with Rope Systems Corporation to strengthen Trimble's commitment in the Philippines."

Ordnance Survey appoints Mark Alexander

UK: Mark Alexander will head the national mapping agency's finance, procurement and programme delivery teams.

He has over 20 years' experience in all aspects of financial management in both the private and public



Mark Alexander

sectors, most recently with the construction group Bovis Lend Lease.

He has also held senior roles at train operator Laing Rail and in the technology sector at science and engineering group AEA Technology.

"Mark brings a wealth of talent and experience from different industries," says Ordnance Survey's Director General and Chief Executive, Vanessa Lawrence CB.

"He will offer us added

ANTRIX and Euromap expand cooperation

India: Euromap GmbH, a wholly owned subsidiary of GAF AG, and ANTRIX Corporation Limited of India announced their new agreement to expand Euromap's participation in the Indian Remote Sensing satellite program with the reception and distribution of high-resolution stereo imagery from the Cartosat-1 (IRS-P5) satellite.

Under the terms of the new three year agreement, Euromap will have the exclusive distribution rights in Europe to receive and distribute Cartosat-1 data collected over Europe and North Africa. Euromap represents the only

receiving and distribution facilities for IRS satellite data in Europe.

The new agreement marks the continuation of a successful cooperative partnership between Euromap, ANTRIX and the German Aerospace Center DLR, which started in 1996 when Euromap began receiving and distributing imagery from India's IRS-1C and 1D satellites. Euromap's ground station in Neustrelitz, Germany is owned and operated by DLR-DFD and has been successfully upgraded and added to the world-wide network to receive, process and distribute data from Cartosat-1.



strength in strategic planning, business analysis and management as we go forward with delivering the benefits of our digital mapping data and other geographic information."

Infotech and Informed Solutions awarded OG buying solutions Catalyst framework agreement

UK: Infotech Enterprises and Informed Solutions in separate announcement said that it has been selected by OG buying solutions, the Government's procurement services organisation for the UK, along with sixteen other leading service providers, to provide a broad remit of Geospatial Information Services and Solutions for public sector customers under the new Catalyst GISS framework agreement.

The two companies achieved the award across all lots of the framework agreement; including Geospatial Information Solutions, Mapping Services, and Data Services.

The inclusion of geospatial services to the Catalyst framework agreement is a reflection of the increasing demand for cost-effective, scalable, and expert geospatial services and resources required to support IT programmes driven by the Transformational Government and Efficiency

Agendas. Catalyst provides an EU compliant procurement catalogue that supports the Transforming Procurement initiative calling for greater centralisation of buying and reuse of experiences, and lessons learned, between projects.

New Finance Director at Getmapping

UK: Simon Holmes ACMA has been appointed the new Finance Director at aerial photography and mapping product company Getmapping Plc. Holmes who officially joined the company on 1st January 2008 will drive the business forward through advanced financial systems as well as providing financial reporting and an advisory service to the main board. He will also be responsible for commercial agreements and investor relations.

Holmes, has had extensive experience working in senior financial roles within businesses from SMEs to multinationals. Prior to coming to Getmapping he was employed as Group Finance Controller for leading Channel Island based insurance provider The Rossborough Group.

Fugro acquires Falcon Technology

USA: Fugro Airborne Surveys Pty Ltd, an operating

company of Fugro N.V., has signed a term sheet with BHP Billiton, to acquire BHP Billiton's proprietary Falcon geophysical technology. Under the terms of the sale agreement the Falcon assets are to be sold to Fugro with BHP Billiton retaining exclusive use and priority access to the technology for minerals exploration until March 2010. Final completion of the sale is subject to the satisfaction of conditions precedent and it is anticipated that execution of the sale agreement will be completed by March 2008. Falcon is an Airborne Gravity Gradiometer (AGG) technology and was jointly developed by BHP Billiton and Lockheed Martin. Since deployment in 1999, technology enhancement has led to improved operational efficiencies and data quality.

Dr. Russell G Congalton named editor-in-chief of PE&RS

USA: Dr. Russell G. Congalton has been named Editor-in-Chief of Photogrammetric Engineering and Remote Sensing (PE&RS), the journal of the American Society for Photogrammetry and



Dr. Russell G. Congalton

Bushnell ONIX GPS to use AccuTerra Maps

USA: Intermap Technologies Corp. announced at the Consumer Electronics Show in Las Vegas, an agreement with Bushnell Outdoor Products that enables recreational enthusiasts to download AccuTerra outdoor map content for the new ONIX series of handheld GPS devices. Through this agreement, Bushnell customers will be able to access digital terrain data, roads, trails, and points of



3D AccuTerra Mapping data

interest for most recreation areas in the United States. Intermap's AccuTerra mapping data will provide rich content for the contiguous 48 states and Hawaii. Digital maps for geographic specific regions - small or large - will be available from Bushnell in early 2008.

AccuTerra will feature several layers of geospatial information including elevation data, trails, paths, roads, and outdoor-specific points of interest, such as campgrounds, service facilities, and trail heads.

Remote Sensing (ASPRS). Dr. Congalton replaces Dr. James Merchant, who has performed outstanding service in that role since 2001. The transition of responsibilities begins January 15th with receipt of new manuscripts for review.

"We are very pleased that Dr. Congalton was chosen to join our outstanding PE&RS editorial staff," said ASPRS Executive Director James Plasker in announcing the appointment. "Congalton follows an excellent role model in Dr. Merchant, and Russ' experience and

professional credentials will enable us to continue to serve the Society readership, as well as the broader geospatial community of PE&RS subscribers, with the highest journalistic standards without interruption."

Trimble acquires Crain Enterprises

USA: Trimble has announced that it has acquired privately-held Crain Enterprises, Inc., Illinois, in an all-cash transaction. Crain is a manufacturer of accessories for the geomatics, surveying, map-

ping, and construction industries. Financial terms were not disclosed.

The purchase of Crain allows Trimble to provide the necessary accessories that can be offered as part of its positioning solutions used in the Engineering and Construction markets. In addition, Crain and Trimble will be able to leverage distribution channels. Steve Crain and the staff of Crain Enterprises will join Trimble and operate as a wholly-owned subsidiary as part of Trimble's Engineering and Construction segment.

OGC calls for participation in ECo8 OGC Pilot

USA: OGC has issued a Request For Quotations and Call for Participation (RFQ/CFP) to solicit proposals in response to requirements for the Empire Challenge o8 Pilot (ECo8 OGC Pilot). The ECo8 OGC Pilot will examine the suitability and performance of OGC Sensor Web Enablement (SWE) and OGC Web Services (OWS) standards for providing open management of and access to sensors of varied types and Web service access by analysts to the resulting data and products.

Several use cases and supporting workflows are provided to enable understanding of the design of the pilot. The use cases involve both sensor management and exploitation by a targeting analyst.

ATK to acquire information systems and geospatial businesses of MDA

USA: Alliant Techsystems announced that it has negotiated definitive agreements with Canadian-based MacDonald, Dettwiler and Associates, to acquire its Information Systems and Geospatial Information Services businesses for \$1.325 billion (CDN).

The company expects that this acquisition will pro-

DigitalGlobe Announces General Availability of Worldview-1 Imagery

USA: DigitalGlobe, provider of high-resolution commercial satellite imagery and geospatial information products, announced that WorldView-1 has reached Full Operating Capability (FOC) for all customers.

The general availability of WorldView-1 imagery marks the final milestone for the satellite which launched from Vandenberg Air Force Base on September 18, 2007, delivered its first sample set of high-resolution images on October 15 and began supplying imagery to the National Geospatial-Intelligence Agency (NGA) on November 26, 2007.

"Following a successful roll-out with the NGA as part of the NextView program, DigitalGlobe is now taking orders for



WorldView-1 imagery from its global resellers, partners and customers," said Jill Smith, chief executive officer of DigitalGlobe. "General availability of WorldView-1 imagery allows us to more aggressively serve the growing global demand for accurate, high-resolution satellite imagery and geospatial information."

vide a higher growth and earnings profile, and be neutral to earnings per share (EPS) in fiscal year 2009 (FY09) and accretive thereafter.

The transaction, which is subject to regulatory and MDA shareholder approval, is expected to close early in the first quarter of the company's FY2009.

This acquisition will establish ATK as a full-spectrum international space company, providing launch services, next-generation satellites, robotics, and the ground systems that will process and deliver mission critical information solutions. It will also provide an entry point for MDA's proven high-performance technology to the U.S. market, creating significant sales growth opportunities.

ESRI joins EUROGI

USA: ESRI has joined the European Umbrella Organization for Geographic Information (EUROGI), an independent non-profit organization dedicated to maximizing the availability and effective use of geographic information (GI) throughout Europe. EUROGI-



believes that its efforts will help promote good governance, economic and social development, environmental protection, and sustainability.

Jack Dangermond, ESRI president, said, "We are honoured to join EUROGI and wholeheartedly support its stated goal of promoting geographic information as a 'fully integrated component of the European knowledge-based society.'"

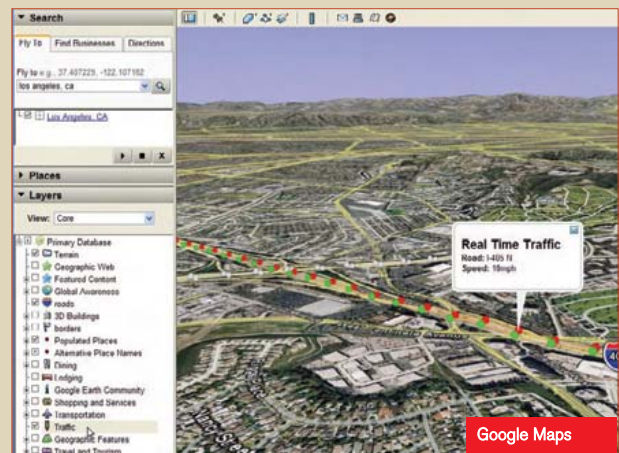
Intermap Technologies becomes Autodesk ISV Partner

USA: Intermap Technologies Corp. announced its partnership with Autodesk as an Independent Software Vendor (ISV). Intermap's 3D elevation models for the United States will be combined with AutoCAD Map 3D and Autodesk MapGuide Enterprise applications to enable users to gain access to terrain mapping data essential in a wide range of applications and markets. These high-resolution models will enhance a myriad of solutions, including background referencing, site planning, visual impact presentations, and managing natural and civil resources.

The bundled products will be available in 2008 from the Web sites of Intermap and Autodesk.

Google Maps closing in on MapQuest

USA: More Americans view more maps online now than they did a year ago, and Google Maps has gained popularity to narrow MapQuest's lead as the most popular mapping Web site, according to a company that analyzes Web traffic. Heather Hopkins' research showed that U.S. visits to mapping Web sites increased 10% overall in the last year or so. MapQuest receives most of the visits, but Google Maps is catching up. Last year, MapQuest drew 429% more U.S. vis-



its than Google Maps. Earlier this month, it drew 126% more. Yahoo Maps and Local Live (MSN) ranked behind Google Maps in third and fourth place, Hopkins said. Hopkins had pointed out that in March, Google's search engine began sending more of its traffic to its own map application than MapQuest.

Michael F. Horn, Sr. appointed as GeoEye Board of Directors

USA: GeoEye, Inc., provider of satellite, aerial and geospatial information, announced the appointment of Michael F. Horn, Sr. to its Board of Directors.

Matthew O'Connell, GeoEye's chief executive officer, president and director said, "Mike will serve on

GeoEye's Audit and Strategy Committees and provide financial guidance to the executive management team. This is especially important as we complete our remaining financial milestones to prepare our next-generation GeoEye-1 satellite for launch and begin to plan the development and financing of GeoEye-2."

1Spatial releases validation tool for Oracle-based spatial databases

UK: 1Spatial have released Radius Check Lite, a health



Radius Check Lite: Health check tool

check tool for Oracle-based spatial databases. Working on both Oracle Locator and

Oracle Spatial this tool provides a simple and easy-to-use way of validating the set-up of a spatial database. It is suitable for any user from a DBA through to the GIS user, and has the added benefit of actually educating the novice user about the conditions required for a spatial database. Radius Check Lite connects from desktop to Oracle Spatial database and assesses the spatial data looking for specific validations (presence of metadata and spatial indexes). It then returns a data health check report in

a simple colour coded format so the user can target and rectify any potential problems.

PB Group 1 Software introduces new functionalities

USA: Group 1 Software, Inc., a Pitney Bowes Company, introduced Centrus Points, a geocoding solution to combine parcel centroid-level geocoding precision with Assessor Parcel Number and elevation attributes specifically designed to meet property informa-

tion and risk analysis needs. And it also introduced, Centrus Parcels, to identify the property boundaries for each parcel, removing ambiguity related to the location and extent of the actual property. By attributing both products with address, location, APN and elevation information, this solution provides a coordinated data set to meet the needs of all Location Intelligence applications.



Tar Spots- photo by Robert Anderson, USDA Forest Service

US Forest Service launches web-based forest threats viewing tool

USA: The Forest Service's Eastern Forest Environmental Threat Assessment Center (EFETAC) recently launched its forest threats summary viewer, a tool that will provide images, threat distribution maps, additional forestry contact information, and brief descriptions about forest threats throughout the eastern U.S. EFETAC

partnered with the University of North Carolina Asheville's National Environmental Modeling and Analysis Center (NEMAC) to develop the tool.

"The forest threats summary viewer is an excellent tool for individuals concerned about environmental threats to healthy forests, or how these threats affect trees in their backyard," says Danny C. Lee, EFETAC Director. "The viewer will make forest research more relevant and useful to forest land managers and homeowners by connecting them with resources to help address their concerns." The viewer is a user-friendly, Web-based tool searchable by forest threat or by State. Threats are categorized by today's familiar forest concerns, including invasive plants, insects and diseases, loss of open space, climate change, and wild land fire.

The user is also provided current and credible Web links to other Federal, State, and local resources that offer additional in-depth information. This initial version of the multi-phased tool will be continually updated with environmental threats as well as additional search features.



User-friendly viewer with web-based tool searchable by forest threat or State

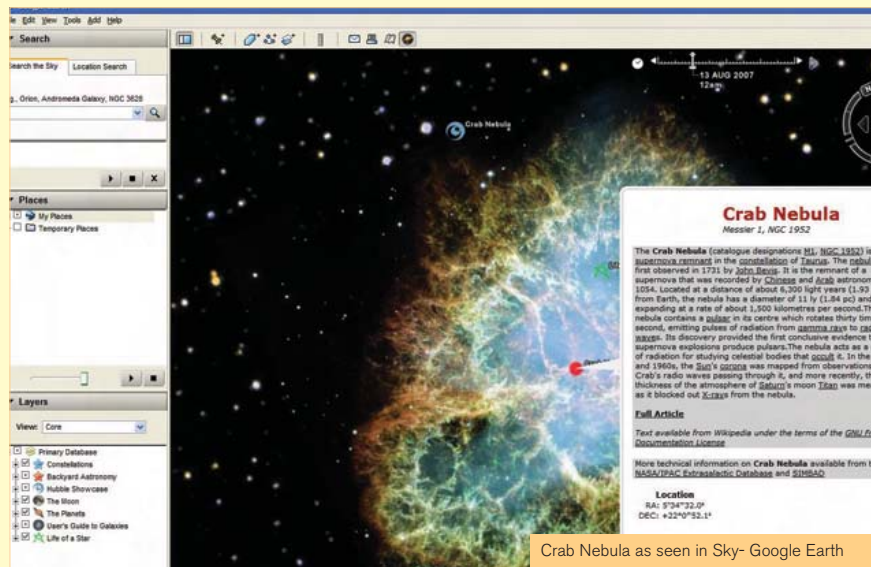
Introducing the next generation of 'Sky in Google Earth'

USA: Google's Engineering Director Andrew Moore announced a new version of Sky in Google Earth. Sky now includes several new features that provide scientists, students and amateur stargazers with new tools to explore the millions of stars and galaxies visible in Sky get up to date on current sky events, learn basic concepts of astronomy. Features include-

Earth & Sky Podcasts: podcasts about stars, galaxies, planets and events coming up in the sky from the NPR program Earth and Sky. Current

Sky Events: provides timely updates on recent cosmological events from VOEventNet

Featured Observatories: images from NASA observatory satellites including X-ray images from NASA's Chandra satellite; infrared images by the Spitzer Space Telescope and the Infrared Astronomical Satellite (IRAS); ultraviolet images by the GALEX Satellite; and a microwave map of



Crab Nebula as seen in Sky- Google Earth

the sky by the Wilkinson Microwave Anisotropy Probe (WMAP).

Historical Sky Maps: David Rumsey's historical maps of the sky date back to 1792 and illustrate how conceptions of the sky have changed over time.

Sky community: The best content published by the Sky community on the Sky discussion forums.

Sky API, that will enable developers to develop their own sky mash-ups using the extensive sky imagery was also introduced.

GE Energy releases Oracle-based solution for utilities

USA: GE Energy announced the availability of its new geospatial network design and maintenance product portfolio built using Oracle Database, Oracle Spatial and Oracle Fusion Middleware.

GE Energy's Smallworld Electric Office powered by Oracle is designed specifically to meet the needs of the North American electric distribution market.

Oracle is providing the geospatial database and

application server mapping software and GE Energy's Smallworld business is providing the industry application layer for a solution that has significant impact for customers.

TatukGIS releases GIS SDK Edition for Compact Framework

USA: TatukGIS announced the release of the .NET Compact Framework edition of the TatukGIS Developer Kernel toolkit product for development of custom GIS applications for Pocket PC type applications for Windows CE/Mobile operating

systems. The DK-Compact Framework supports Windows Compact Framework 2.0 development with Visual Studio 2005 and Compact Framework 2.0 and 3.5 development with Visual Studio 2008.

Columbus launches navigation solution for emergency and rescue services

USA: Columbus Geographic Systems has launched navigation and GIS solution for emergency & rescue services. The new solution, based on the Company's Smart View product, is

specifically designed to meet the unique needs of police, fire, and other services dealing with emergency events such as accidents, natural disasters, and forest fires.

Key features include:

- Analysis of geographical conditions and topography of the emergency site
- Tracks exact location of all resources involved, contributing to better coordination between all teams police, fire, ambulance etc.
- Supports real-time decision making, including allocating missions to individual teams, vehicles & other resources.

Gaurav Sharma, Sub Editor
gaurav.sharma@GISdevelopment.net

Orange Group chooses Telmap as local search & navigation provider

International wireless carrier Orange Group has selected Telmap, UK to offer a location based experience



"Map and Go" solution by Telmap

to its mobile customers. Orange was already work-

ing with another provider, Webraska, for off-board navigation in France and in the United Kingdom.

The partnership with Telmap is the off-board solution "Map and Go" that has been released as a beta version in France and is free until April 15.

This solution is based on the latest version of Telmap Navigator which offers capabilities such as a free "search box" (type "sushi" to find the nearest Japanese restaurant) and "Location messaging", a feature using text messages to send and receive the name, attributes and location of a place.

Magellan unveils Maestro with Google mobile search

Magellan, US unveiled Magellan Maestro Elite 5340+GPRS personal navigation device that integrates a two-ways connectivity and features Google Local Search. Google's real-time local search enables Magellan's users to search the Web for businesses in a specific neighbourhood, providing detailed internet-based information about those businesses - not just the business name or category.

The new device also delivers real-time traffic infor-



Google local search on Magellan Maestro Elite 5340+GPRS

mation, local weather forecasts, and makes it possible for users to wirelessly send addresses and notes to the GPS device directly from a PC with an internet connection.

The user can send destination addresses to the Maestro Elite in advance of the trip or have someone at home or back in the office send information from the Magellan website directly.

Location ecosystem market to be 900+ units by 2013

While in-car navigation will remain the most important application of GPS technology, the use of GPS in many other consumer, business, and industrial environments such as telematics and asset tracking will continue to grow, says ABI Research.

The GPS modernisation project and the arrival of additional Global Navigation Satellite Systems (GNSS) such as GLONASS, Galileo, and Beidou/Compass will increase the availability, reliability and precision of satellite positioning and stimulate the location ecosystem, expanding the market to more than 900 million units by 2013.

According to ABI principal analyst Dominique Bonte, PNDs for in-car use will be increasingly complemented by converged solutions based on GPS-enabled handsets for pedestrian navigation and Location Based Services. However, he adds that GNSS technologies will have to be combined with other positioning solutions such as A-GPS, Wi-Fi, and dead reckoning to address the indoor coverage issue. Advances in GPS chipset development will enable low-cost integration of GPS technology in all mobile



Personal Navigation device market to grow many fold by 2013

devices by 2013. This will drive new applications such as the automatic geo-tagging of pictures taken with digital cameras. Other innovative applications include road toll systems and tourism. Mobile location-based social networking features will be an important driver for the uptake of GPS devices and applications in the consumer market.

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Destinator launches content platform for PNDs and cell phones

Destinator Technologies, US a navigation software provider, has announced the launch of "tobe", a platform for personalized location-based content for PND's and wireless device users worldwide.



"tobe" homepage

Initially, "tobe" users can access a wide range of services including: major city maps, local search, travel guides, user generated content on the best restaurants, clubs and bars that can be shared with other users, point of interest sharing, buddy-finding, safety camera information, real time traffic alerts as well as local events updates.

Region-specific services will also be featured in tobe. For example, in China, Destinator has developed the Public Transportation Planner, which allows users to find best route for bus and subway travel. In North America, tobe will include a gas price comparison service - automatically searching for the gas stations within the 2.5 kilome-

tre radius for the lowest price. "tobe" will be offered to Destinator's partners in both the PND and wireless market as a value added service.

Network In Motion unveils turn-by-turn navigation via WiMAX

Networks In Motion (NIM), the wireless navigation and location-based services (LBS) company of USA, unveiled a WiMAX connected navigation system solution. This 'proof of concept' is similar to installed auto navigation devices, but with the ability to access real-time location assisted search and travel information.

The AtlasBook turn-by-turn GPS navigation application, which runs on the Azentek in-dash computer running Windows Vista(R); and uses WiMAX for wireless data access, will soon be available on touchscreen PCs installed into vehicles.

The proof-of-concept also integrates NIM's NAVBuilder(TM) platform, which uses a client-server architecture to provide a fast, easy-to-use solution on mobile phones--and now PCs--with 'off-board' data that sends maps, local search results from servers to the device.

The technology also uses

NIM's AtlasBook(TM) product to provide maps, local search and turn-by-turn directions with voice guidance, 3D moving maps, and visual instructions. It also features navigation based on real-time and historical traffic information, automatic trip recalculation, and 3D perspective view. It will also allow users to search for points of interest (POIs), such as restaurants, hotels and ATMs, along their route or around a selected location and will display traffic incidents and weather conditions.

iPhone gets Wi-Fi positioning from Skyhook Wireless

Boston based Skyhook Wireless unveiled a new version of the Map application for the iPhone and Ipad Touch using cell ID and WiFi positioning. With this new version users are able to locate themselves on the map using a combination of WiFi and cell tower triangulation. The cell tower positioning has been provided by Google while the WiFi positioning system is

provided by Skyhook Wireless. Using Skyhook Wireless iPhone's users will be able to narrow their location in a precise way than in using only cell tower triangulation. When the location is requested a Skyhook Wireless server sends back a position. But because in urban area there are many more Wi-Fi access points than cell towers it greatly enhance the accuracy of the position.

By mapping known Wi-Fi signals throughout entire metropolitan areas, Skyhook has built a database of over 23 million Wi-Fi access points with their locations. The patented technology behind WPS leverages that database to provide location information. Skyhook's software-only system offers high accuracy indoors and the ability to make location more precise for users.

Wi-Fi positioning works fine as far as the Wi-Fi hotspots are correctly and



Apple iPhone with WiFi Positioning

extensively mapped. Skyhook is said to have a database that represents over seventy percents of the American population and more than 2,500 cities.

SiRF introduces SiRFInstantFixII

SiRF Technology, USA a provider of GPS semiconductors, introduced SiRFInstantFixII, a software enhancement to its GPS chipsets that is designed to improve the start-up times of portable navigation devices (PNDs) and other mobile navigation devices. SiRFInstantFixII can achieve GPS start-ups in as little as five seconds.

It uses patent-pending algorithms that enable the PND to model the behavior of visible GPS satellites during the day and predict their position in the sky for up to three days in the future. The new enhancement continuously refines its calculations based on the latest data it receives from the satellites being tracked every time the PND is used. It performs these calculations completely autonomously, without ever needing updates of any kind from a network. This technology was initially developed by Centrality now a SiRF's concern.

Via Michelin to stop its PND business

Facing business losses, Via Michelin, France, stop production of its portable navigation systems. In the inner circles of European PND manufacturers it was well known that the brand, subsidiary of the tire maker, was losing money due to the lack of real market share. In 2007 its European market share was below five percent everywhere except in France, its historical market, where the company had a market share of



more than ten percents. Additionally Via Michelin started to sell its products in 2007 in the United States, but its distribution remained limited.

The company would refocus its activities on providing services (real time traffic data, points of interests from the digital edition of the famous Michelin guide, etc...) to other PND manufacturers. However, the company is looking for a manufacturing partner to keep its brand alive on the market.

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APIs and SDKs

What do we do when we are into construction of a house? We get a plan/architecture of the house prepared. Ask for a civil engineer who works out the material requirements. Then we proceed with the construction of the house, for which we start with the procurements of raw materials like iron, cement, bricks, stone chips etc if it is a brick and mortar house. Rarely, we ask for getting the stone custom-chipped and bricks custom-baked as per our requirements.

In short what we are using raw materials which are a processed output other agencies. This process is similar to a software application developer using SDKs/APIs. As the civil engineer does not go around getting the bricks baked or iron ore processed in the blast furnace, similarly the application developer will use software libraries which are designed for performing specific functions, rather than worrying about writing codes for those functions from scratch. Specifically talking about geospatial industry, the custom software application developer will not worry about the core technology to render map or read spatial data files. He will simply use an Application Programming Interface (API) which helps him read spatial data file or render the map on computer screen.

But, as the requirement of raw material, will vary with what kind of construction we want as the end product like: residential house, business complex etc., similarly the APIs are not same for all the vertical segment application to be developed. They are

domain specific most of the time, if we leave aside the APIs from platform developers like Microsoft etc.

Application Programming Interface

APIs are a kind of software libraries which are developed for certain application. Hence an API will not serve the entire gamut of application software development requirements. As mentioned before, for every specific domain of software application development, we would need a set of APIs.

Similarly for the geospatial domain we have specific set of APIs or software library. These APIs will perform certain set of commonly known functions for us. Like map rendering (reading a map from the hard disk and displaying it on the computer screen), zoom in, zoom out pan, etc.

Following are some of the definitions of an API:

- Application Programming Interface or APIs are a set of interface definitions (functions, subroutines, data structures or class descriptions) which together provide a convenient interface to the functions of a subsystem and which insulate the application from the minutiae of the implementation. (<http://www.taggly.com>)
- An API is a set of commands, functions, and protocols which programmers can use when building software for a specific operating system. The API allows programmers to use predefined functions to interact with the operating system, instead of writing them from scratch. (<http://www.iwebtool.com>)
- An application programming interface (API) is a source code interface that an operating system or library provides to support requests for services to be made of it by computer programs.[1] Advanced programming interface is a near synonym with wider application

that predates the current common usage. In the original term the concept is meant to represent any well defined interface between two separate programs. (<http://en.wikipedia.org>)

Need for an API

The benefit of this process is that the person who is making iron rods he keeps on specialising in his domain of making good quality iron rods, continuously taking feedback from the consumers and doing his own research and development to strengthen the product. Similarly in Geospatial domain the application development and the product developer are segregated.

To begin with, if you are a starter with GIS you do not need to break your head with geospatial APIs. But if you or your organisation has been using GIS for some time and you/your organisation understands the set the geospatial functionalities which would be required by the people in your organisation, than you can have a software developed, which would be customised to the needs of the organisation and moreover the look and feel would be in tune with the practise followed by the organisation.

Software Development Kit (SDK)

Continuing the analogy of house construction, SDK would stand for a warehouse which has most of the raw materials required. It is important to know that SDK too are specific for their domain, for which we are going to write the application software. SDKs can also be visualised as a "Swiss Knife", which can perform variety of functions.

By definition:

- A Software Development Kit (SDK) is a set of tools used to develop applications for a particular platform. An SDK typically contains a compiler, linker, and debugger. It may also contain libraries and documentation for APIs. (<http://kyapoocha.com>)
- SDK is a programming package that enables a programmer to develop applications for a specific platform. Typically an SDK includes one or more APIs, programming tools, and documentation. (<http://webopedia.com>)

Usage of Geospatial APIs & SDKs

Some of the platforms where we see the SDKs/APIs being used for are:

Mobile Platform

Usage of geospatial SDKs/APIs are widespread for the mobile platforms. In this segment, last year "Android" was released. It is an open source mobile application development platform, under the umbrella of Open Handset Alliance (OHA).

The OHA has is an outcome of partnership amongst over thirty technology and mobile companies. Android is not an exclusive geospatial mobile SDK. But it has geospatial components and would have an impact on the location based application development.

Few months before the launch of Android, Magitti was launched which is positioned as an intelligent mobile application development platform. Although it will not be there in the public domain for the developers, it does provide an indication of direction where the mobile platform is heading. The traditional geospatial software developers like ESRI, MapInfo, Manifold, Tatuk and others too have SDKs for the mobile platform.

Web Platform

In this segment open source SDKs,

MapServer, from University of Minnesota, and Google Maps API are quite popular. In addition to them we have many tools in the open source and commercial domain. Off late, Mashups have become quite popular which has provided the power to embed the maps into a website even to a general public not into software programming and code writing.

Desktop Platform

Desktop geospatial APIs, had evolved with the APIs themselves. Today more than a decade since they came into existence, they continue to fuel the vertical segment application software. What started with MapObjects from ESRI, MapX from MapInfo etc have been joined by many APIs including

some which comes along with source code in the commercial domain. Which means, you get code to tweak and service assurance along with it.

The SDK tools are further fragment according to the core GIS functionalities, image processing facilities, satellite navigation and positioning receiver tools customisation, 3D image tools, database tools etc. On the application front we have a long way to go before we have large numbers of geospatial SDKs for a specific segment. Also it appears that the geospatial elements along with the vertical segment engineering tools required for a vertical segment available to the software developer would evolve in more tightly equipped manner.

Maneesh Prasad, maneesh.prasad@GISdevelopment.net

A graphic with a blue background and rounded corners. The text is centered and reads: "ATTENTION READERS AND SUBSCRIBERS" in large, bold, white letters. Below that, in smaller white letters: "Please update your contact information to receive the magazine." At the bottom, in yellow cursive font: "Log on to" followed by the URL "http://www.GISdevelopment.net/magazine/subs/index.asp" in white.



Agile Project Management

Agile (http://en.wikipedia.org/wiki/Agile_software_development) refers a set of project management and software engineering practices which focus on reducing project risk by incrementally developing software through a series of iterations. In order to understand many of the Agile concepts, it's worth quickly reviewing how software has historically been developed.

TRADITIONAL SOFTWARE DEVELOPMENT METHODOLOGIES

Since about 1970, traditional software development has been approached from a "waterfall" (http://en.wikipedia.org/wiki/Waterfall_model) perspective.

This set of methodologies, which were inspired by civil and mechanical engineering, approach software development as a series of steps which proceed linearly to completion - not unlike the building of a bridge. These steps are typically broken out into Requirements, Specifications, Design, Coding, Testing, and Delivery. In the ideal waterfall world, a team approaches a project and immediately gathers all the known requirements from the stakeholders at once. The team then retreats for months or years during development and the end of which they have produced working software that meets the initial requirements of the users. While this sounds good in theory, in practice

it has been less than successful. This is illustrated by the set of statistics about software projects (Table-1)

There are several reasons why these waterfall methodologies tend to be challenged or fail outright. One of the primary reasons is that waterfall methodologies do not embrace changing requirements. The waterfall methodology relies far too heavily on up-front requirements gathering and doesn't address the users changing needs as the development project evolves. It assumes that the requirements gathered at the outset of the project will remain constant over the lifespan of the development process. In reality, 35% of software requirements change during a typical software devel-



ent for GIS

opment project. Additionally, nearly 65% of features developed in waterfall projects end up being used rarely or not being used at all. Given that up to 50% of a project budget and schedule is dedicated to requirements gathering in waterfall-type projects, this appears to represent a substantial waste of resources.

AGILE SOFTWARE DEVELOPMENT PRACTICES

In the early and mid-1990's, several different factions within the software development industry began to consider the problems with traditional waterfall methodologies. They began examining the patterns and practices of successful software development

teams to understand what made them different from their peers. What they found was that the successful teams were not following the traditional waterfall methodologies. They were employing iterative development practices that emphasized constant user-developer interaction, self-organizing and self-managing development teams, and that truly embraced the ever evolving nature of software requirements. These ideas these factions uncovered eventually congealed into what we know today as "agile software development" practices.

In contrast to the rigid "big design upfront" waterfall models, Agile practices focus on lean requirements and design up front followed by iterative cycles of developing and releasing software to the end users. The end user stakeholders are actively involved in the prioritization of the requirements to be developed in each iteration. Detailed requirements, design, coding and testing are



It is often said that while agile will not solve all of your problems, it will certainly surface them, because there is nowhere for them to hide



all done in the iteration itself (two to four weeks in length), and the output of an iteration should be "shippable" functionality. These short iterations ensure that the team is always developing what the end user really needs. Should the team get off course, they will be brought back in line with expectations at the review meeting with the stakeholders at the end of the iteration. This is in stark contrast to waterfall methodologies where this divergence is typically found after the software is deployed. In addition, the end user stakeholders may change, add, or remove requirements at the conclusion of each iteration to match their evolving business needs. This helps ensure that the end users receive the highest value for their money. Additionally, since Agile minimizes up-front design, there is no "lost" work should a requirement be dropped and another one added.

Agile Requirements: User Stories

From a requirements perspective, a team can never really collect "all the details" up front (if they did, they would have written the software "up front"). Agile embraces this reality, and only requires high-level requirements at the beginning of a project. These are typically collected and stored as a set of User Stories. A user story is a plain English explanation of what a user of the system wants to achieve. They typically

Table 1

In 1994

- Only 16% of software projects are "Successful" - meaning on time, on budget, and met user requirements
- 52% of projects were "Challenged" - meaning they slipped on time, budget or requirements
- 31% were outright failures

By 2006 things improved:

- 35% of software projects are "Successful"
- 46% of projects were "Challenged"
- 19% are outright failures

Jim Johnson, President of the Standish Group, notes that Iterative Development has helped improve the more recent numbers.

From Software Development Times report on the 2006 Standish CHAOS report (<http://www.sdtimes.com/article/story-20070301-01.html>)

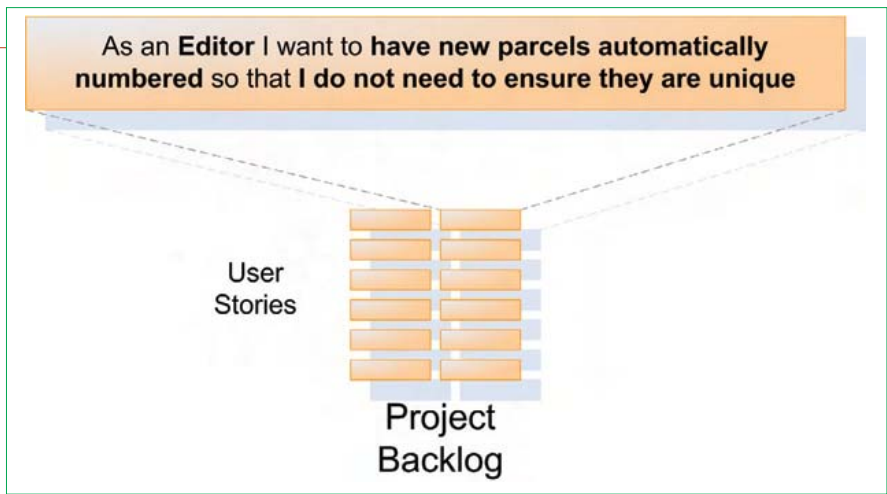


Figure 1. Project Backlog is composed of all the user stories in the system

take the form:

"As a <type of user> I want to <some action> so that I can <some goal>"

For example...

"As a Utility Manager I want to create a map of active work locations so that I can allocate resources effectively."

The nice thing about user stories is that everyone on the project can understand them. As the team nears the time of working on a particular user story, additional details are collected from the pertinent end users. As user stories are collected, they become part of the Project Backlog shown in Figure 1

Managing the Process: Scrum

Scrum is the most widely used of the various Agile practices. It has been adopted by large numbers of teams at Yahoo, Google, Microsoft, Oracle and

IBM, therefore it comes very highly recommended, with a lot of success stories (think Google Maps). In Scrum, all of the user stories for a project are added into a Project Backlog (figure 1). The order of the items in backlog is determined by the priority assigned by the "product owner" (aka end user stakeholders). In this way the highest value items are developed first. At the beginning of an iteration the team picks a set of items off the backlog which they determine they can complete in the iteration. Typical iterations are two to four weeks in length. The team then commits to completing the items they have selected by the end of the iteration. It should be noted that the specific items are not dictated to the team, and work items are not assigned to developers by a manager. An essential element of Scrum

is that the team is self-organizing and self-managing. The internal team commitment is what drives the team towards excellence. Once the items are selected, the team then starts working on the selected items. At the conclusion of the iteration, the team will have completed the backlog items they committed to. Completion is defined at designed, coded, tested, and documented functionality. This is known as a "potentially shippable product increment". At this time the team reports back to the stakeholders and demonstrates the functionality they have created at an informal review meeting. They solicit feedback from the stakeholders, and create new backlog items for things which need to be changed or fixed. Figure 2 illustrates the mechanics of the Scrum process.

No Interruptions

During the course of an iteration, the team is not to be interrupted by other requests for their time - they are 100% dedicated to their current backlog. At the end of the iteration new items can be added to the backlog or team members can be pulled into other projects, but nothing can change.

Daily Standup

In any process where people are self-managed and self-organizing, there

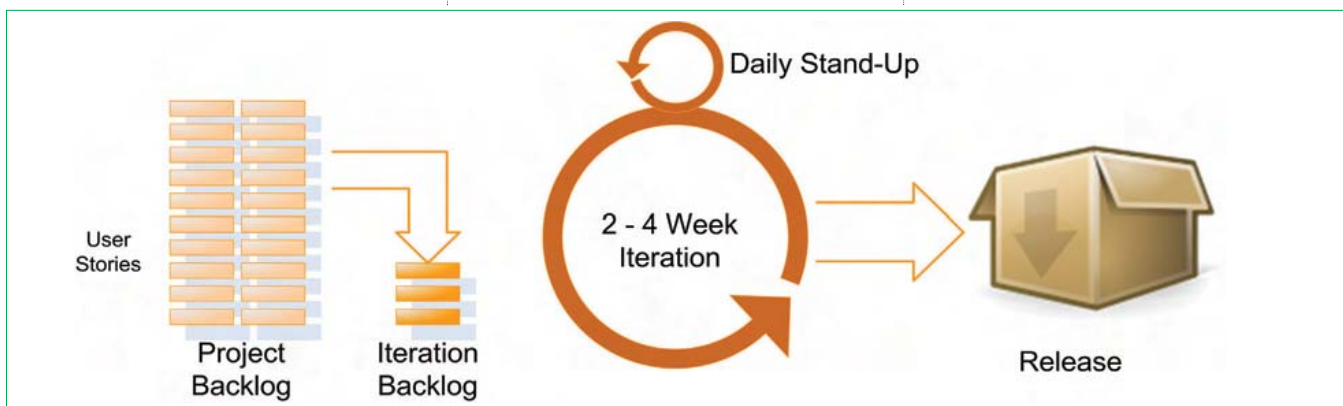


Figure 2. Scrum Process for an iteration

needs to be a lot of transparency. In Scrum, the team meets every day for a 15 minute time-boxed meeting - called the "Daily Scrum" or "Daily Stand-Up". At this meeting each team member answers three questions:

- What did you do yesterday?
- What are you doing today?
- Do you have any impediments?

By answering these three questions, the entire team is aware of the current project status, and issues are brought to the forefront very quickly. It is often said that while agile will not solve all of your problems, it will certainly surface them, because there is nowhere for them to hide.

Constant Improvement

At the conclusion of each iteration, the team conducts an internal team meeting - a retrospective. This meeting is a time for the team to reflect on and improve how they work. They discuss what worked during the iteration, what did not, and anything they want to change in the next iteration. During my team's first scrum project, much of our retrospectives focused on getting continuous integration systems setup.

Applying Agile to GIS Projects

Scrum can and has been applied to much more than just software projects. It can be used to manage anything that involves a team and some sort of deliverables. Thus, it could readily be applied to any GIS project. That said, we believe that GIS development will see the biggest benefit, simply because there are so many tools and techniques developed for mainstream software projects which support agile methods.

TOOLS FOR THE AGILE DEVELOPER

Alongside those working on creating

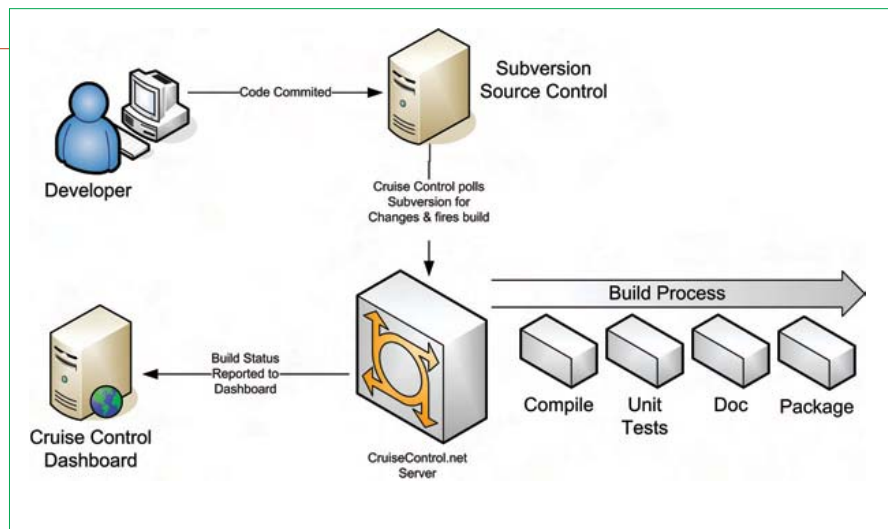


Figure 3. Continuous Integration system

agile project management practices, there were groups of developers refining their development tools and techniques to embrace changing requirements, while at the same time increase efficiency and reduce defects. These techniques are collectively referred to as "extreme programming" (XP). The following is a listing of the common tools and techniques that empower the developer. The list is arranged in the order that teams typically adopt the tools/techniques.

- Use of a Source Control System
- Automated Source Code Documentation
- Use of refactoring tools to ensure clean software design
- Writing Unit Tests
- Creating an Automated Build process
- Utilizing a Continuous Integration system
- Test Driven Development

Source Control Systems

A source control system simply manages the various versions of files used in a development project. These files can be source code, documents, or graphics. I would tend not to put data in a source control system unless it was used in some unit tests. The source con-

trol server allows the team to store successive versions of their source code, as well as orchestrate the movement of changes between the various team members such that no changes are lost or overwritten. Given that Subversion is free, easy to install and easy to use, there is no reason that any developer should not be using source control. Assembla.com takes it one step further - anyone can sign up for a free account, and create as many free public or private Subversion repositories as they want. You can then invite other members to join your project. Additionally, they have tools built into the site that Scrum. Assembla is so compelling that for the time being our team is actually using this service instead of setting up our own local Subversion server.

Source Code Documentation

Also called automatic documentation, this refers to the inclusion of special types of comments within the code base, which are then automatically extracted into a set of documentation of the code. In Visual Studio, this is supported for both Visual Basic and C#. When these comments are present, the compiler automatically extracts them. Additional free tools (NDoc and Sand-

castle) can then be used to generate windows or web help documents. Another tool worth mentioning is GhostDoc. This tool examines the name of the class/method/property and "ghost-writes" the documentation for you.

Refactoring

Refactoring is the process of reworking the internals of a piece of code, while keeping its external behavior the same. In ArcGIS development, there is a tendency to write long blocks of processing code - select a feature, buffer it, select other features, get related records... etc. A common type of refactoring in this case would be to extract blocks of the long function into separate functions. The reason for doing this is that you want to move towards having unit tests for your code - and when creating tests you want to test small parts independently. Doing this sort of refactoring manually can be difficult, but refactoring tools like ReSharper can greatly simplify things.

Unit Testing

Unit Testing simply means writing test code that executes your production code and validates its behavior. Some might ask why this is needed - doesn't the developer test the code as it's developed? In large systems, making a change to one area of the source code could have wide ranging impacts which are not obvious to the developer. Manual testing of a large system can take days or even weeks.

Thus having a set of automated tests can help locate these regressions rapidly. The testing framework provides some functionality to help with the testing - mainly ways to assert that the expected behavior did or did not occur. When writing tests, you should focus

on testing small blocks of code rather than one big block. This helps enforce good object oriented design (low coupling between classes, cohesive design) as well as giving the developer a better handle on where the error actually occurred.

For developers working with the ESRI ArcGIS platform, there are many additional challenges - how to efficiently pass spatial data into a test, how to design code that can be tested, while at the same time correctly integrates into the ESRI platform.

Automated Build Process

One of the big hurdles that most waterfall projects face is the final integration - getting all the parts and pieces of a system to come together at the end of the project. By setting up an automated build process, the team is able to build the entire system at any time. The build box becomes the authority on whether or not some code "builds" - it's not enough for a developer to say "it built on my box!" Once you have the code building, you can then take the build process further and integrate the unit tests, and packaging into an installer.

There are a wide range of tools to facilitate automating builds - MSBuild which comes with the .NET Framework, and NAnt are the two most common systems in .NET.

Both use a declarative Xml syntax which takes some time to get used to, but they are free, and extremely powerful. There are also some GUI driven tools such as FinalBuilder which work with a wide array of compilers and source control systems.

Due to the regular releases in an agile project, an automated build system is almost mandatory for an agile team - it's well worth the investment in time.

Continuous Integration

A continuous integration (CI) system basically ties the automated build to the source control system. When a developer checks in changes, the source control system alerts a service which then initiates a build. If any errors occur, the entire team is immediately notified - there is no waiting for the nightly build to find out whose code "broke the build". Once you start using a CI system, you will not want to work without one. Figure 3 shows how a CI system integrates with the development environment.

Test Driven Development (TDD)

TDD is a development methodology in which the tests are written before the production code. This has a number of benefits. Since the tests are written first, you ensure that the design is testable. Second, you have tests for the entire system. It also helps you to avoid adding in features you "think" you'll need. Here's a good general rule: If you can't write a test for it, you should not build it. TDD is a very common extreme programming (XP) technique and has many vocal advocates. Implementing pure TDD for GIS projects can be very difficult because of the additional complexity of dealing with spatial data types. As more GIS developers start trying to work in this manner, these issues will be resolved through open source projects which will provide the scaffolding required. ■



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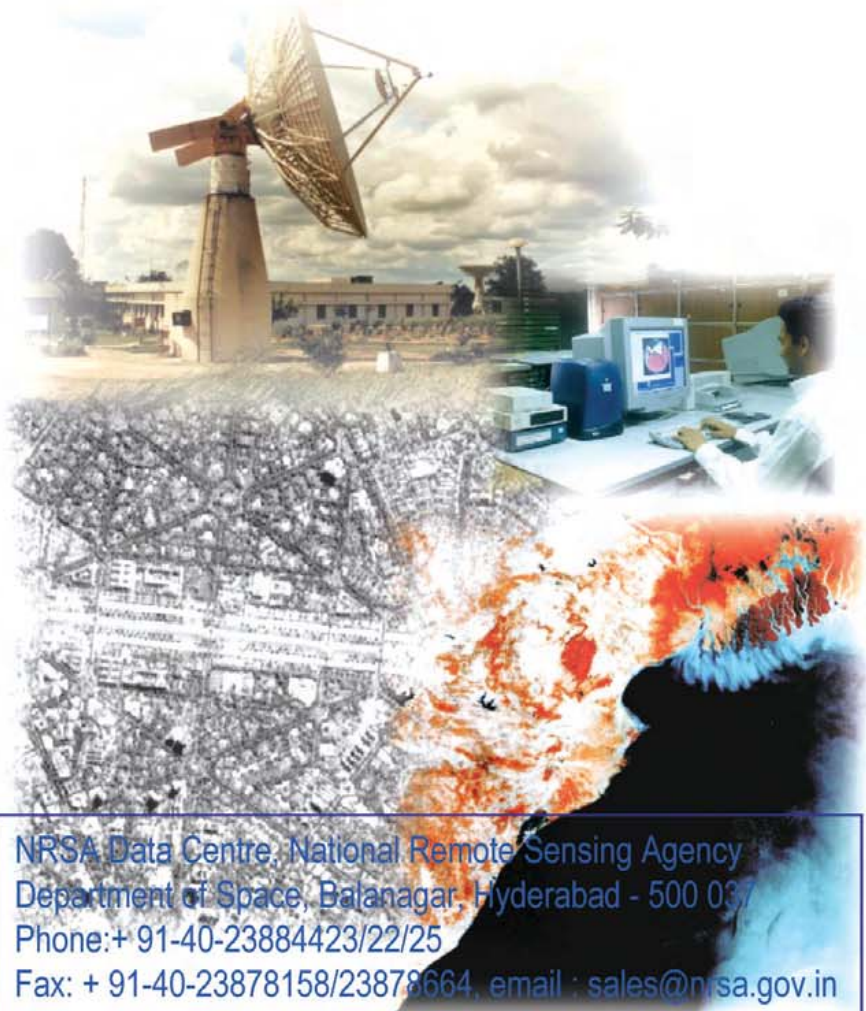
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We always look beyond our immediate

Rolta celebrates its silver jubilee, this year. In the last 25 years, Rolta has grown to have a market cap that exceeds Rs. 5,000 Crores (US \$ 1.25 Billion).

It started in 1980, when Mr. K K Singh came to Mumbai and started an IT company with a group of 15 to 20 professionals with technical and managerial skills and a business model. That time there was a need for data processing jobs and they started with complete turnkey inter-branch sheet consolidation with Bank of Baroda, Central Bank of India, and Union Bank of India. They then entered into development of software, inventory and payroll management, financial accounting, and providing enterprise solutions.

In 1985 they decided to enter the CAD/CAM/GIS market and soon realised that there was ample scope for these technologies, but to sustain it required business associations. In 1986 Rolta partnered with Intergraph to provide geospatial solutions to the government departments.

The first breakthrough came when Rolta supplied digital mapping systems and solutions to Survey of India (SoI) in 1986. This was followed by other major surveying and mapping organizations such as Forest Survey of India (FSI), National Remote Sensing Agency (NRSA), becoming their customers. By 1990 they ventured into the

manufacturing of hardware workstations and also into software development.

In 1993 - 94, Rolta ventured into turnkey projects solution and bagged a \$50 million mapping project for Saudi telecom and later for Hong Kong telecom and many others worldwide. This led to opening up of offices in the US, Europe and Middle East.

Later in 2000, they purchased the licenses for Internet services to create a technology fountain around which they could develop competence for e-enabling all GIS/CAM/CAD solutions. This helped them specialise into security related technology by working into a live environment.

Today, Rolta is into engineering and geospatial technologies, providing end-to-

The man who realised the importance of modern technological tools, sensed the advent of knowledge economy and felt the need of a 'white collar industry' in late 70s

K K Singh

CMD, Rolta Group of Companies





...the opportunity as to what we can do

end solutions and has 70% market of GIS/photogrammetry and around 85% of plant engineering. In the Internet sector, they provide e-security services. Rolta has grown systematically through these years, taking one step at a time.

Acquisitions/ Ventures/ Partnerships

"Currently most companies are associated with providing end-to-end solutions rather than building technologies in isolation and Rolta is no exception",

says Mr Singh. "We focus on customer requirements and have built capacity to do so by joint ventures, partnerships with other industry leaders like Intergraph, Thales, Shaw Stone & Webster and acquisition of companies like Canada-based Orion Technology."

The partnerships have helped Rolta to develop a deep understanding of international markets, continuously evolving technologies, operate at the higher end of the value chain and provide an unbeatable solution to customers.

INTERGRAPH

Rolta's 20-year exclusive partnership with Intergraph Corporation, USA, has provided technology solutions in India with significant value to both partners. Rolta and Intergraph have a long association in the defence sector and has developed an in-depth understanding of the Indian defence requirements. It has committed substantial resources which have enabled Indian defence to fully exploit the capabilities of the solutions, under demanding conditions.

K K Singh shares his views and visions...

Q. How do you feel on the occasion of 25 years of Rolta?

As we celebrate our Silver Jubilee, we are proud of our many accomplishments over these 25 years. From humble beginnings, we have grown to become a leader in the markets we serve, and now have a market cap that exceeds Rs. 5,000 Crores (US \$ 1.25 Billion). 25 years is both a long and a short time in the lifespan of any organisation. It is a short time to fully realise the potential of its ideas; while it is a time long enough to lay the ground work for a great organisation. For us at Rolta, these 25 years have been punctuated by numerous satisfying achievements, while still being insufficient to achieve all our ambitions.

Q. What has been the core philosophy of Rolta that has led to achievement of this milestone?

Our success is based on absolute commitment to exceptional standards of performance and productivity, working together, leveraging core competence and willingness to embrace new ideas. We always look beyond our immediate opportunity as to what we can do.

Q. What have been the factors that led to the growth of Rolta in the geospatial space and what factors could have further enhanced this growth?

We are satisfied with our achievement. When we started out, our challenge was not only to establish ourselves but also to establish the market as well. There was no such thing as geospatial market; there was no awareness about the technology or what can be done. We were in a situation where we were educating the market, creating the market and educating ourselves, it was a very challenging affair! Now, we are very happy of what we have achieved in the

last 25 years, in the Indian environment. We have not only moved forward in India but also internationally. Having said that, what can be done here is phenomenal and what we have achieved is just the tip of the ice-berg.

Q. What are the potential areas of growth for the geospatial industry in India and what initiatives are being taken by Rolta to achieve the same?

An important aspect to note is that we are lagging in the field of mapping and geospatial technologies but in the related fields we have gone forward as a country. For example industry like automobile where in car navigation devices are made available developed but without the basic data like maps, etc.

The reason for this is that such information databases are not yet made available and it is not possible unless there are private agencies which are fuelled to

generate and share such data. To generate such data will require efforts from the entire industry, rather than one single company, as the level of investment and growth potential will be tremendous. We have prepared ourselves by creating the market, spreading awareness, making investments and partnerships with different companies, catering to both- national and international markets and have manpower to assist us in taking the company and the industry forward.

Q. What policy reform does Rolta expect in the Indian scenario, to harness the potential of geospatial industry?

The Government of India is aware of this situation and we hope that the Policy reforms help us establish an open environment for the creation of databases and utilisation of the information with appropriate licensing rights.

ROLTA ACADEMY...

The Academy provides an intense three months training program, as per requirements of the company using various leading software packages and Rolta domain expertise to enable one to jump-start the career and be a professional with distinct difference in skills.

Mr Singh says, "We are one of the few companies that have taken steps to mitigate the increasing gap between the demand and supply of the capacities for delivering the high tech solutions. For this we have set up our own academy, and this academy is for our in house - Roltaites! We enrol people from different industry or fresh graduates and give them the required training that focuses on tools, software, best practices and everything else associated with the industry. After the training they are also sent for on job training and then are finally assigned full time, for specific projects."



This academy is an investment in line with Rolta's corporate philosophy to enhance employee profile and skills



Recognitions

STONE AND WEBSTER JV

Rolta's joint venture (JV) with Shaw Stone & Webster, USA, provides engineering design services for Stone & Webster projects globally and engineering, design, procurement and construction management projects for large refineries and petrochemical companies in India. The JV is very well placed to capture the huge opportunities from the emerging nuclear power sector.

THALES JV

Thales, France JV with Rolta provides Command, Control, Communications, Computers, Intelligence, Surveillance, Target Acquisition and Reconnaissance (C4ISTAR) systems for Defence, Aerospace and Security markets in India and overseas.

CA, MICROSOFT AND ORACLE

Partnerships with Computer Associates

(CA), Microsoft and Oracle have enabled Rolta to execute over 500 local and international projects with specific focus in the areas of eSecurity, network management, enterprise applications and software development.

ORION TECHNOLOGY

The acquisition of Orion Technology, Canada, enables Rolta to own technologies for taking its GIS offerings to the next level of sophistication. Orion employs technologies that allow users to connect to and integrate geospatial and non-spatial data from disparate sources and provides Rolta with a capability for turning existing GIS investments of customers into an enterprise solution.

GROWTH STRATEGY AND FUTURE

Mr K K Singh summarises Rolta's growth strategy in the foregoing para-

" Ranked amongst the '200 Best Companies in the world' (sales under \$1 Billion), three times in a row, by Forbes Global

" Conferred with the 'GeoSpatial Leadership in India' award, ranked amongst 'India's most investor friendly companies' by Business Today

" Listed amongst the 'Top 10 Wealth Creators' in the mid-cap segment, in India, by Hindustan Times

graphs, in consonance with the country's economic growth model. To sustain India's GDP growth of over 9% per annum investments in India's infra-



structure are expected to exceed US \$ 1 trillion. A majority of these investments will flow into core sectors like, oil, gas, conventional power, airports, ports, highways, utility distribution, town planning, etc. Rolta is very well placed to take advantage of these vast opportunities, due to its leadership position in the GeoSpatial &

“

We are lagging in the field of mapping and geospatial technologies but in the related fields we have gone forward. Car navigation devices are developed but without the basic data like maps, etc.

”

Engineering Design Automation segments.

Over the next few years, in addition to exponential growth in oil, gas and conventional power, it is envisaged that almost 40,000 MW will be added through nuclear power in India. This is expected to generate investments of over US \$ 100 billion. Rolta is strongly positioned to capitalise on these large opportunities through its Joint Venture with Shaw Stone & Webster.

The Indian Defence and Homeland Security sector has emerged amongst the biggest buyers worldwide and is expected to spend over US \$ 100 Billion in the next 5 years. There is increasing encouragement for the Indian private sector to participate in defence production and to assume the role of suppliers of advanced technology. Rolta's JV with Thales puts it in a formidable position to address this huge opportunity as well.

With its acquisitions and joint ventures, Rolta's revenue is expected to rise more than 40% in 2008/09, while

Vision Statement

Rolta will be the preferred choice for providing knowledge-based IT solutions through pioneering efforts to meet market demands and exceed customer expectations achieved by an empowered team of Roltaites, for maximising value to its stakeholders.

both profit and revenue are estimated to rise 38 percent. Rolta's goal is to be a \$1 billion company by 2010/11, with an employee base of 12,000 from the present 4500, with its unique position in the markets like geospatial services, defence and engineering. ■

CARBONTOOLS PRO

Geospatial Interoperability for Software Developers

Digital mapping has been the exclusive domain of professional GIS users until recently when Google released a friendly mapping system named "Google Maps". Google Maps gave Web developers the ability to add mapping to their websites without consulting the mapping specialist. Suddenly GIS was both a cool and indispensable feature of websites.

Not to be outdone, Microsoft quickly followed suit with "Virtual Earth" and mapping is now a mandatory component of nearly all Web sites. Though this kind of simple "mash-up" mapping opened new possibilities for developers, it didn't change the way geospatial software is designed, developed or applied, and it did little to help programmers use the growing number of geospatial content sources like KML, GML, Web Map and Feature Services and others in their desktop applications. However, The Carbon Project, a

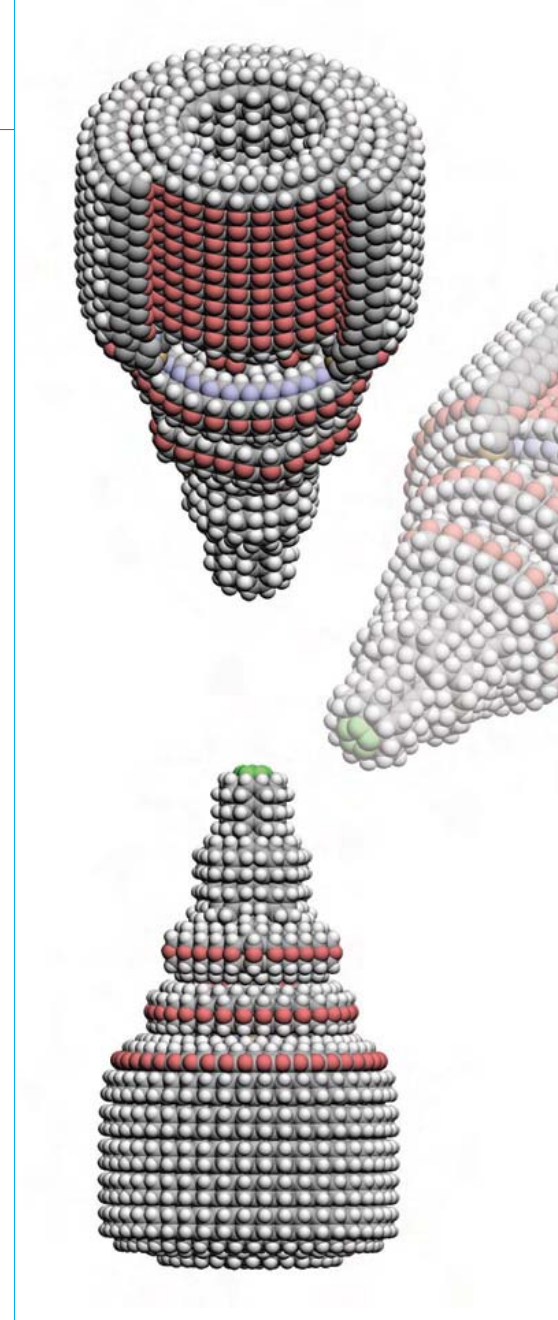
world leader in geospatial interoperability, responded to this challenge with a software development framework called CarbonTools PRO™.

THE "COMFORT ZONE" OF PROGRAMMERS

The need for this type of interoperability is clear to anyone who has been tasked with creating a software program. This practical approach of applying a software solution to geospatial interoperability is the core motivation behind CarbonTools PRO™, and a new generation of geospatial interoperability that's fast becoming reality.

As an example of the role of CarbonTools PRO in software development consider how programmers use a common graphics format found on the Internet, in Word documents, and in digital cameras, the Joint Photographic Experts Group format (better known as JPEG).

The JPEG format is far from simple; it uses sophisticated mathematical algorithms to support data compression. Would JPEG be in common usage if a developer needed to regularly refer to



instruction manuals about compression techniques? The answer is clearly "No". It is the ability to develop applications using common tools, such as Visual Studio and frameworks such as Microsoft .NET that have become intuitive to developers, that makes the JPEG format both viable and ubiquitous.

The Carbon Project® developed CarbonTools PRO with this very concept in mind. Looking through the eyes of the developer, the goal was to provide all the tools necessary to add complex geospatial data types and services to their applications using a language



that's in the comfort zone of the programmer rather than the GIS professional - much the same as JPEG is handled by non-mathematicians using the .NET Image class. CarbonTools PRO accomplishes this task by extending the Microsoft .NET framework rather than merely providing a stand-alone toolkit.

The concept of extending the framework also means more than just publishing software libraries. It means providing documentation that looks and feels like the mainstream framework user guides programmers are familiar with, providing code samples in popular coding languages and even a licensing structure that doesn't limit the application developer in distributing their work (Imagine the horror and global outrage if Microsoft demanded a "per-seat" fee on software developed using the popular Visual Studio!).

Handling the many varieties of content found in the geospatial market isn't as simple as manipulating a JPEG. It is a fact of life that geospatial content and services come in many varieties and formats. A minimal "must interoperate" list then would include:

- Tile-based mapping services (Google Maps, Microsoft Virtual Earth, Yahoo! Maps etc.)
- Region-based mapping services (OGC WMS, WCS etc.)
- Features-based services (OGC WFS, Google's KML network links, Yahoo!



The goal of this project was to provide all the tools necessary to add complex geospatial data types and services to their applications using a language that's in the comfort zone of the programmer rather than the GIS professional



Traffic Web Services, GeoRSS feeds etc.)

- Features files (ESRI Shapefiles, Google Earth KML, GML, MIF, DXF etc.)
- Raster files (JPEG, TIFF, GeoTIFF etc.)
- Metadata sources (catalogs, OGC Capabilities etc.)

It's somewhat daunting that the GIS and mapping community produced such a diverse range of data formats and service types over the years. These varying standards and formats has created a nightmare for the software developer and while there are significant efforts at trying to converge to a unified standard or platform (like the OGC SDI 1.0 specifications) none actually aims to do for geospatial content what the Image class in .NET does for JPEG - allow programmers to spend more time meeting software requirements rather than dealing with the tedious low level details of providing a working system.

A NEW ARCHITECTURE

To construct a framework for geospatial interoperability, CarbonTools PRO takes a fresh design approach called the Source-Handler-Data™ architecture. This design makes working with many types of complicated geospatial content a task that can be easily handled by most software developers. For example, if a programmer wants to add

maps from a Spatial Data Infrastructure Web Map Service to an application's map control, the C# code snippet will look something like this:

To add features from an OGC Web Feature Service the same Source-Han-

dlar-Data™ coding pattern is used. In this example the GML features layer will be a "Hospitals" from a Spatial Data Infrastructure service:

To add a Shapefile layer to the map control we can use the following C# code snippet:

Map tiles from Microsoft Virtual Earth may be added the same way:

What these examples show is one of the principals of true interoperability -

```
// Set the source object
SourceWMS source = new SourceWMS();
source.Address = new
Uri("http://server.com/WMS");

// Set the layer to read
source.Layers.Add(new WMSLayerType
("DigitalOrthos", ""));

// Set the handler object
HandlerWMS handler = new
HandlerWMS(source);
multiMap1.AddLayer(new GeoObject(handler));
```

that the data format, form or even the way it is served is not as important as the ability to use it in a common software framework. CarbonTools PRO applies this principal to geospatial interoperability with a framework that

```
// Set the source object
SourceWFS source = new SourceWFS();
source.Address = new
Uri("http://server.com/WFS");

// Set the layer to read
source.Layers.Add(new WFSLayerType("Metro-
Stations"));

// Set additional query parameters
source.MaxFeatures = 50;
source.Format = CarbonTools.Content.OGC.GML.
GmlVersions.GML3;

// Set the handler object
HandlerWFS handler = new HandlerWFS(
source );
multiMap1.AddLayer(new GeoObject(handler));
```

addresses multiple formats and forms, while exposing a unified language that feels like a natural extension to the

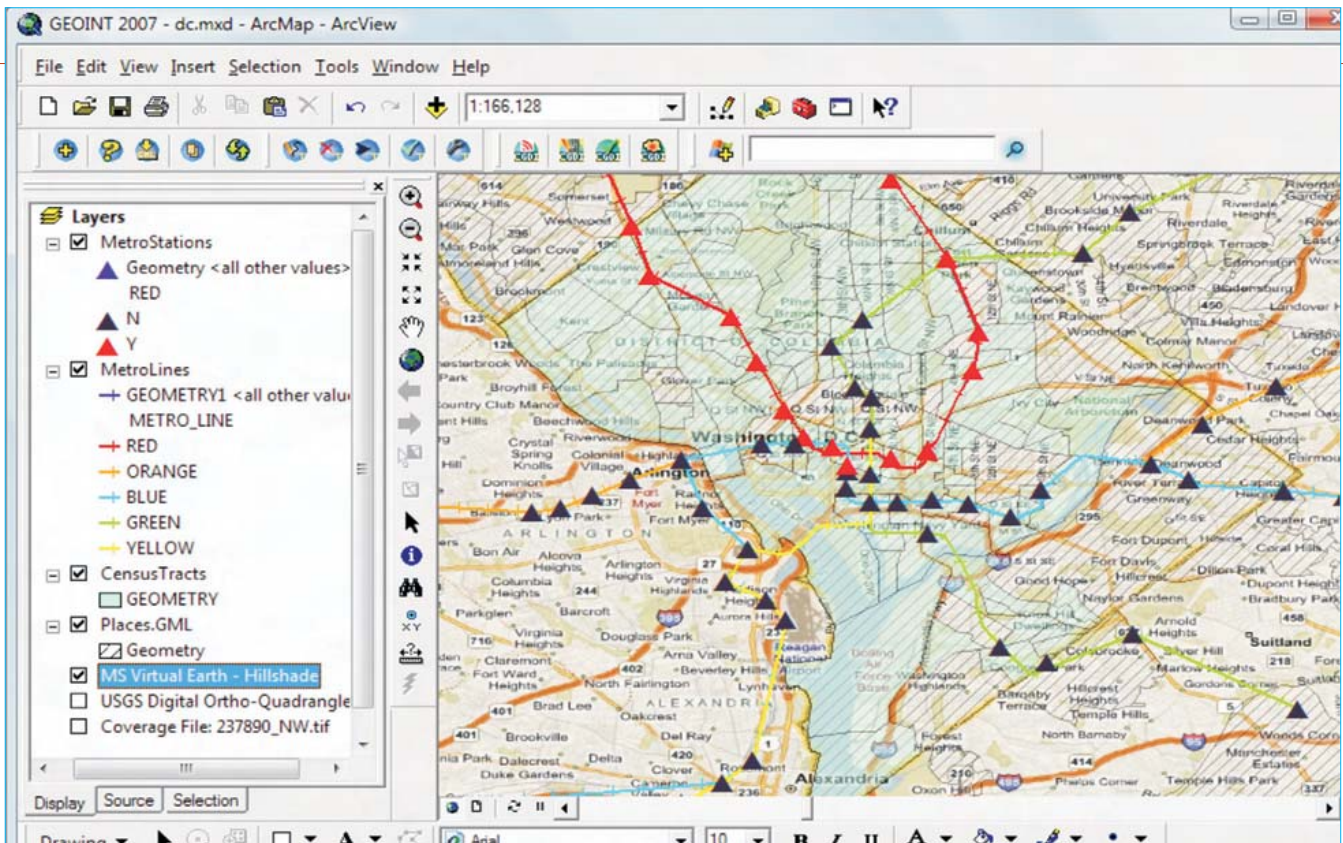


Figure 1. CarbonTools PRO makes it easy for software developers to use all types of geospatial content and services in their applications - including WMS, WFS, GML, Shapefiles, Microsoft Virtual Earth and more

```
// Set the source object
SourceVirtualEarth source = new SourceVirtualEarth();
source.MapStyle = MapStyles.Hillshade;

// Set the handler object
HandlerVirtualEarth handler = new HandlerVirtualEarth(source);
multiMap1.AddLayer(new GeoObject(handler));
```

Microsoft .NET framework to software developers. But this is just the begin-

```
// Set the source object
SourceVirtualEarth source = new SourceVirtualEarth();
source.MapStyle = MapStyles.Hillshade;

// Set the handler object
HandlerVirtualEarth handler = new HandlerVirtualEarth(source);
multiMap1.AddLayer(new GeoObject(handler));
```

ning of geospatial interoperability and where the real fun begins!

MORE THAN A MASH-UP

So what can developers do with a prod-

uct like CarbonTools PRO? A good example is CarbonArc PRO, an extension for ESRI's ArcGIS 9.2 software created with CarbonTools PRO. CarbonArc PRO wraps content and services from OGC SDI 1.0 and Microsoft Virtual Earth into a set of tools that are easy to use right from the ArcGIS desktop. By plugging into ArcGIS, CarbonArc PRO lets people use any OGC SDI 1.0 Web service and Virtual Earth as an integral part of the GIS, including Hillshade Maps, Aerial Maps, Road Maps, WMS, WFS, WFS-T, WCS, Filter Encodings, Gazetteer, GML, GMLsf and Catalog Services (CS-W). CarbonArc PRO eases existing GIS into all these new geospatial content types and services with minimal expense and disruption because it's based on a software framework for geospatial interoperability - CarbonTools PRO.

CarbonTools PRO not only includes tools for access to new geospatial con-

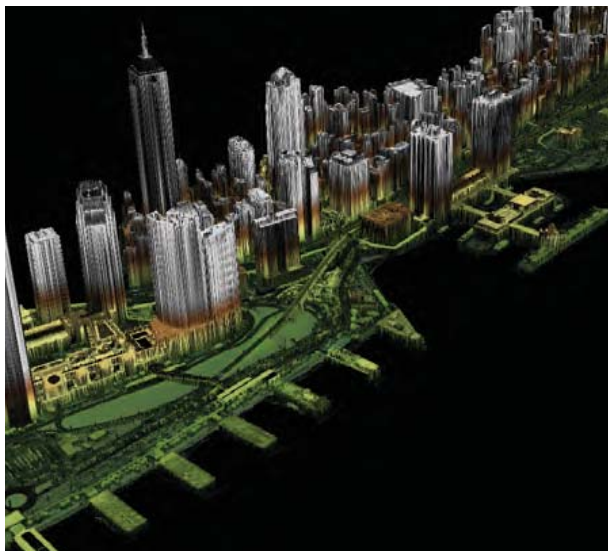
tent types and services it also wraps very complicated standards into tools that are easy for programmers to use. For example, OGC SDI 1.0 has some pretty complicated concepts, like WFS Filters, that would be pretty hard for programmers to figure out without the advances provided by CarbonTools PRO.

WFS Filter is one of the most powerful (and least understood) technologies in OGC. The basic concept of a Filter is to provide a SQL-like spatial and logical language to make advanced data queries possible in a web services environment. Filters do this by employing a series of logical ("AND" this, "OR" that), comparison (is this "Equal To") and spatial (does that road "Intersect?") operators. When wrapped up into easy to use tools like CarbonTools PRO, the Filter Encoding (FE) specification lets programmers quickly add complex and

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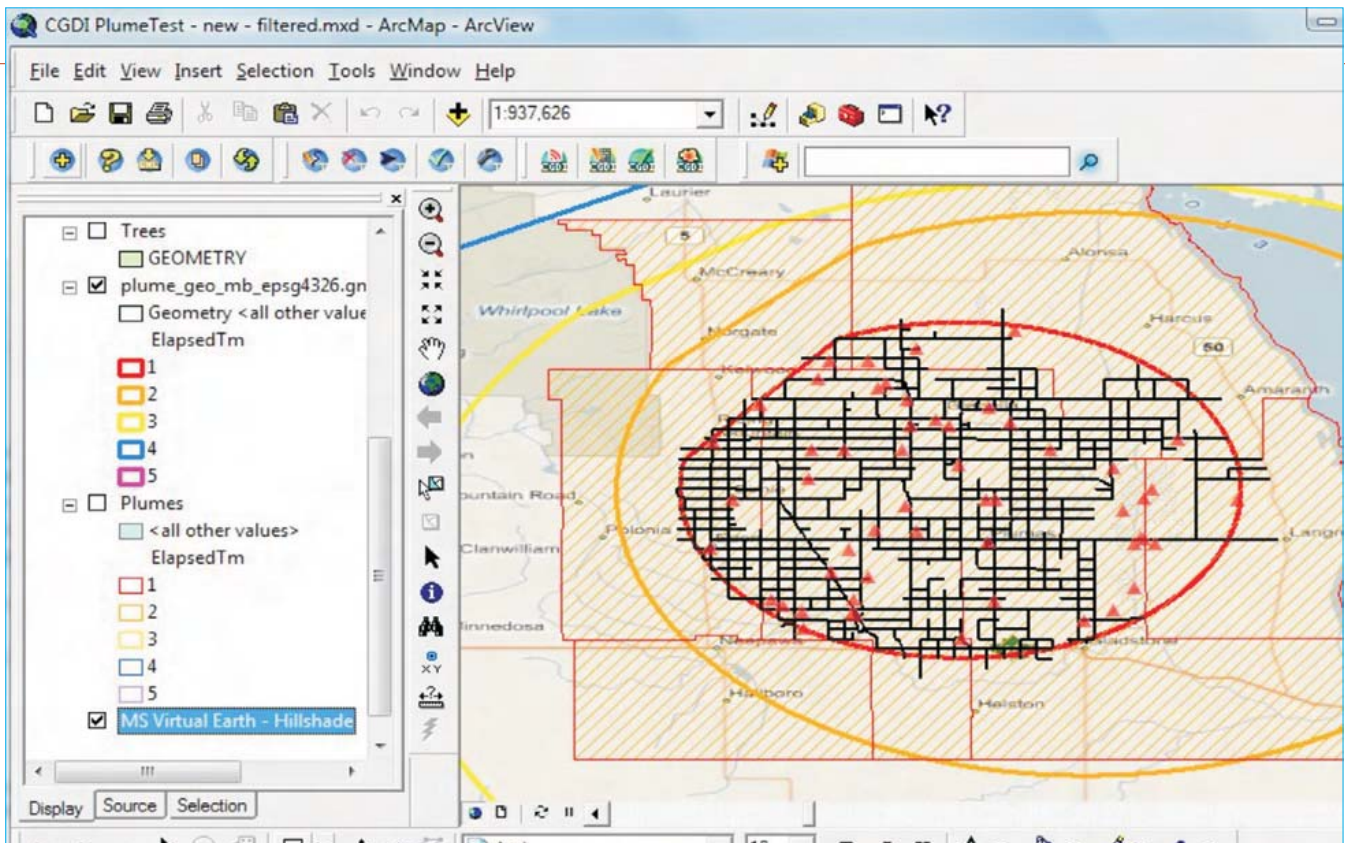


Figure 2. CarbonTools PRO not only includes tools for access to new geospatial content types and services it also wraps very complicated standards, like OGC Filter, into tools that are easy for programmers to use

powerful geospatial web service queries to their applications. This means is a quantum leap in technology from the days when geospatial content was delivered as files and CDs - and a big step beyond simple "mash-up mapping" like Google Maps.

One example of how Filters and a framework like CarbonTools PRO can be used by programmers to create new applications was demonstrated at the recent Canadian Geospatial Data Infrastructure (CGDI) Interoperability Pilot, viewed by over 500 online attendees, on November 30, 2007.

One part of the demo illustrated how emergency analysts would employ OGC Filters, WFS services and data from CGDI - for analysis. The project had the requirement to use a simulated release plume polygon to construct new features such as impacted roads and places. This involved intersecting

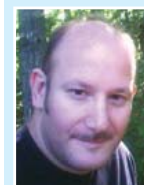
release plume polygons with impacted areas, but the project wanted to show how the online CGDI service could be used to do the analysis, instead of using the traditional approach of doing the analysis on the desktop GIS.

Here's how it worked - we used CarbonTools PRO to quickly create an application to run in the ArcGIS desktop. With this application a user could select an existing GML or Shapefile feature (a release plume polygon), construct an OGC Filter Encoding request using Spatial Operators (in this case it was the Spatial Operator "Intersect"), send it to CubeWerkx Web Feature Service, and acquire impacted roads and places from the WFS in GML. Finally, the results were overlaid on top of a CGDI WMS or tiles from Microsoft Virtual Earth.

The application was showed working "live" in front of an online audience of

500 people after just a few hours of development with CarbonTools PRO, and it worked flawlessly.

CarbonTools PRO is already in use around the world and changing the way geospatial software is developed, and helping programmers use the growing number of geospatial content sources like KML, GML, Web Map and Feature Services in their desktop applications. Obviously, there's a lot more that can be done by innovative programmers but we hope this article has given you a taste of the new generation of geospatial interoperability made possible with CarbonTools PRO (www.CarbonTools.com). ■



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GeoServer: A Geospatial Server for Everyone

If asked to sum up GeoServer in a single sentence one could say that it is 'an open source server for publishing geospatial data'. However this definition hardly does justice, as there are a variety of different aspects to the project. Depending on where one is sitting, GeoServer can look like something different.

To the geographer it is a system which provides mapping functionality. To the data provider it is a technology used to publish geospatial data onto the World Wide Web. To the programmer it is a Java Enterprise (J2EE) web application deployable into any J2EE application server. To the standards body it is the implementation of a number of open web standards such as Web Feature Service (WFS) and Web Map Service (WMS).

THE GEOSERVER PROJECT

The GeoServer project was started in 2001 by The Open Planning Project (TOPP), a small non-profit company based out of New York. The initial target for the project was to enable access to the data behind maps, to utilize it for analysis and modeling. However it evolved quickly. At around the same

time the Open Geospatial Consortium (OGC), an organization made up of industry experts who define geospatial web services, published the Web Feature Service (WFS) specification. WFS defined the protocol of a web service for serving geographical data in vector format. TOPP felt that while an open source implementation of WFS applied directly to their needs, it could also have an immediate value to other organizations as well. This in turn could help to improve spatial data infrastructure in the United States.

Since then GeoServer has grown significantly. GeoServer 1.0 was released in October of 2003. That month SourceForge tracked approximately 500 downloads of the GeoServer package. In August of 2007 GeoServer 1.5.3 was released, with the number of downloads for that month at approximately 8500. As the download count and general activity around the project grew, so did its community of users and developers. It is the strength of this community which has made GeoServer a success. The project has always been open not only in terms of source code, but also in terms of process. Management of the project has always been delegated to the wider community and not driven solely by the agenda of a single organization. While it is true that TOPP

has been the primary source of funding for day to day maintenance, the project is managed by the greater community made up of individuals from a number of organizations. The Project Steering Committee (PSC) is made up of experienced developers and users from six different companies spread world wide.

It is this type of open process that has led to the contributions and development which have made GeoServer what it is today. GeoServer 1.0 was mainly the work of TOPP funded by the OGC to implement the WFS specification. Shortly after the 1.0 release, a programmer working for a Spanish commercial company implemented WMS support with funding from the Basque government. GeoServer 1.2 saw a contribution from Refrations Research, a Canadian based company well known in the open source world for developing PostGIS. Refrations built a data validation engine and also developed a web based administration tool. In 2005 GeoServer saw the addition of a Web Coverage Service (WCS) and full raster support, a contribution made by an Italian company known as GeoSolutions.

SUCCESS STORIES

One of the biggest GeoServer success stories has been The Office of Geographical and Environmental Information of the state of Massachusetts, known as 'MassGIS' (<http://www.mass.gov/mgis/>). They are using GeoServer to serve base map data for the entire state of Massachusetts. Saul Farber, a technical lead at MassGIS Web Services, is also an active GeoServer developer. Saul's interaction with the project really shows the power of a successful open source community. He started off as a normal user who decid-



ed that GeoServer could potentially be a good fit for his organization. After a few months of being active on the mailing list and submitting patches, Saul was granted full GeoServer commit status. Currently he sits as a member of the Project Steering Committee and is regularly submitting improvements and bug fixes. This is the perfect model of how an every day user can become part of the community and have a voice in project management and overall direction. A various number of other organizations are also using GeoServer in production systems. The Great Lakes Commission (<http://www.glc.org>) is using GeoServer to publish data on their Great Lakes Information Network. They have made a variety of layers available including elevation/bathymetry, hydrography, geodetic control, cadastral, transportation, administrative /governmental boundaries, and orthoimagery. Landgate (<http://www.landgate.wa.gov.au/>) maintains the Western Australia State's official register of land ownership and survey information and is responsible for valuing the State's land and property for government interest. They are currently using GeoServer to serve their data as WFS and KML, including layers with building footprints, acid sulphate soil risk, bush fire services districts, apiary sites, cadastral,

forest disease risk areas, public drinking water source areas, and more.

It is these 'real world' uses that validate GeoServer as a true competitor in a GIS world dominated primarily by proprietary software. Beyond the advantages that come with being purely open source, GeoServer comes out ahead of the proprietary counterparts in a number of other areas as well. Being built on open standards like WFS and WMS means that any service offered by GeoServer speaks an 'open' protocol. The benefit of such a protocol is that any organization wishing to implement it can do so. This means that any client that supports the protocol can talk to any server that also supports it. The upshot of this interoperability is that GeoServer can communicate with a variety of clients, both proprietary and open source. This gives the end user a choice instead of being locked into a single solution based on software which communicates over a proprietary or closed protocol.

ENHANCEMENTS

Something that users have continually commented on is the ability of the GeoServer project to quickly adopt new innovations and technologies in the web mapping world. GeoServer was one of the first products to provide KML output with Google Earth and Maps. Which to this day remains superior to any other servers capability of producing KML. Shortly after the Web Map Service Tiling recommendation was released, GeoServer implemented tiled rendering for WMS. Formats like GeoRSS and GeoJSON, which have been increasing in popularity, were implemented shortly thereafter. This type of rapid feature support pays tribute to the agility of the project and its ability to stay on the cutting edge. The

best part of all is that users get these features for free, instead of having to pay a fee that comes with proprietary software packages.

While new and exciting features are always the focus of development, so is constant work on improving system stability and performance. The GeoServer 1.6.0 release came with some significant performance enhancements. A talk at the 2007 Free and Open Source for Geospatial (FOSS4G) conference, presented benchmarks of GeoServer against other WMS software. To the surprise of much of the audience GeoServer came out as being a faster than the competition.

GEOTOOLS

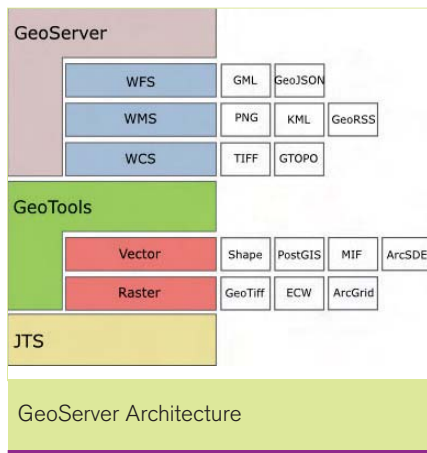
Being written purely in Java, GeoServer has a strong relationship with other open source Java based GIS projects. Much of the 'hard work' that is done inside of GeoServer such as reading and writing of various spatial data formats, coordinate system transformations, and rendering are provided by other libraries. Many of the GeoServer core developers are also active developers and contributors on these other projects. The most notable of these is Geotools, which predates GeoServer by a few years. Geotools is a general purpose GIS toolkit which provides much of the functionality that is fundamental to any GIS.

Geotools is an extensive library. For those readers who may be familiar with open source GIS toolkits in the C world, Geotools is the equivalent of PROJ, GDAL, and OGR all lumped into one. Support for geographic coordinate system transformation is very complete, including shifts between spheroids and datums. The library also provides the low level drivers for a wide variety of spatial data formats. The list



At the time of GeoServer 1.0 release in October 2003, SourceForge tracked approximately 500 downloads and the number grew to 8500 by the release of GeoServer 1.5.3 in August 2007





of supported vector formats is extensive and includes many file based formats like ESRI Shapefile, Geographic Markup Language (GML), MapInfo (MIF), Vector Product Format (VPF), and GPS Exchange (GPX). In addition is support for spatial databases such as PostGIS, Oracle Spatial, MySQL, DB2, and ArcSDE. A more recent addition to the toolkit has been raster support. This includes common formats like Geotiff, World Image, Ascii Grid, Network Common Data Form (NetCDF), and USGS DEM (GTOPO30). Furthermore are tools for building image mosaics and pyramids for high performance raster access. Currently under development are the drivers for the Enhanced Compression Wavelet (ECW) and Multi-Resolution Seamless Image Data (MrSID) formats, which are geared toward efficient access of extremely large volumes of raster data.

JTS

At the heart of Geotools and GeoServer lies the Java Topology Suite (JTS). JTS is the core geometry engine used for representing geometric objects and the relationships among them. It contains robust implementations of all the spatial predicates including intersection, containment, and touching to name a few. The term 'robust' in this context is

used literally. The implementations of the various spatial predicates handle all corner cases involving 'strange' coordinates which often lead to failures in other libraries and implementations. This property of robustness is something that is unique among similar products, both proprietary and open source. So much so that a C++ port of JTS was created. Named GEOS, it serves the same function to many GIS applications which are written in C.

LIBRARY INTEGRATION

The relationship to other open source projects is not limited to geospatial. GeoServer makes use of a number of other open source libraries. The most notable being the **Spring Framework**, a full-featured framework for building Java applications. Over the last few years Spring has become one of the most widely used frameworks in the Java world, particular in the enterprise. Anyone who has done any non-trivial Java enterprise programming can attest to the fact that the components of a J2EE application can become quite complex. JSP, JMS, JTA, and JDBC are just a few of the many technologies that can make up a single application. One of the advantages of Spring is that it simplifies all of that. Spring provides support for the wide variety of Java enterprise technologies while at the same time providing an abstraction on top of them. This in turn provides a much simpler programming model for building applications which does not require a programmer to learn the entire J2EE stack.

GeoServer was not always based on Spring. The move to Spring occurred in 2006 and was driven from the desire to make GeoServer less monolithic and move to a more component oriented architecture. The end goal of this was to

lower the entry barrier for new programmers wishing to join the project. The idea being that a component based architecture would allow developers to get up and running quickly by extending GeoServer via simple and isolated plug-ins, rather than having to learn the inner works of the entire system. When evaluating various frameworks to use in the implementation of a new modular GeoServer, it became evident that something non-invasive would be needed. While application frameworks are nice in that they provide much base functionality out of the box, they also come with the price of having to implement a number of interfaces and routines used by the framework. If a wealth of code is already in place, as was the case with GeoServer, this price can be quite high. This non-invasive nature coupled with a very rich set of API's led the project to choose Spring.

One of the biggest benefits of the move to Spring was a complete security subsystem. Called 'Acegi', it is a security framework which works seamlessly with Spring applications.

It supports a wide variety of authentication schemes such as basic and digest based authentication, LDAP, and more. To this day the issue of security has been largely ignored in the world of geospatial web services. Security remains a gaping hole in open source and proprietary products alike. While it is still in its infancy as part of GeoServer, Acegi has a lot of potential and is something that will be a focus of development in the future.

Also among the popular libraries used by GeoServer is **Freemarker**, an open source 'template engine'. A template engine is a tool which takes data, runs it through a series of rules and logic (the template), and produces a presentation of that data based on those rules. One of

the problems with open source software like GeoServer is that sometimes an application can be too generic. It may provide 95% of the functionality a user requires, but is missing that last little bit. The answer to this dilemma is a template. A template puts the control in the hands of the end user by allowing them to specify what the presentation of the data should look like. One of the more popular uses of templates in GeoServer is with KML, the data format used by Google Earth and Maps. The KML format has the notion of a 'placemark', which is used to signify the location of some object.

A placemark also provides a description of whatever is at that location. The description can be anything from raw text, to an image or graphic, to some HTML. The contents of a placemark description are something that is unique to that specific dataset so it makes sense to have the user design the template themselves. Creating a template is as easy as opening a text editor like Notepad, writing the template which follows a simple markup syntax similar to HTML, and saving the file to a special location. The user developing a template has the full power of the Freemarker library at their disposal allowing them to perform tasks from simply filtering attributes to creating some elegant HTML.

FUTURE

The future for GeoServer continues to look bright. With the community and interest around the project continuing to grow 2008 should prove to be a great year with some exciting new developments on the horizon. People can expect continued work on the versioning extensions for WFS. Data versioning has always been something only available with expensive 'high-end' solutions like Oracle and ArcSDE. The prospect of providing versioning out of the box with GeoServer is a constant source of excitement among users. Also of much anticipation is the integration of an embedded transaction aware tile cache. Codenamed 'GeoWebcache', this feature will address the static limitations of conventional tile caching when working with data that is constantly being updated. These are a few of the many innovations that have yet to come. Readers are encouraged to visit the GeoServer home page (<http://geoserver.org>) to find out more about what is happening. Or send a message to the mailing list (geoservers-users@lists.sourceforge.net) to voice an opinion about what features and improvements they would like to see in the coming future. ■



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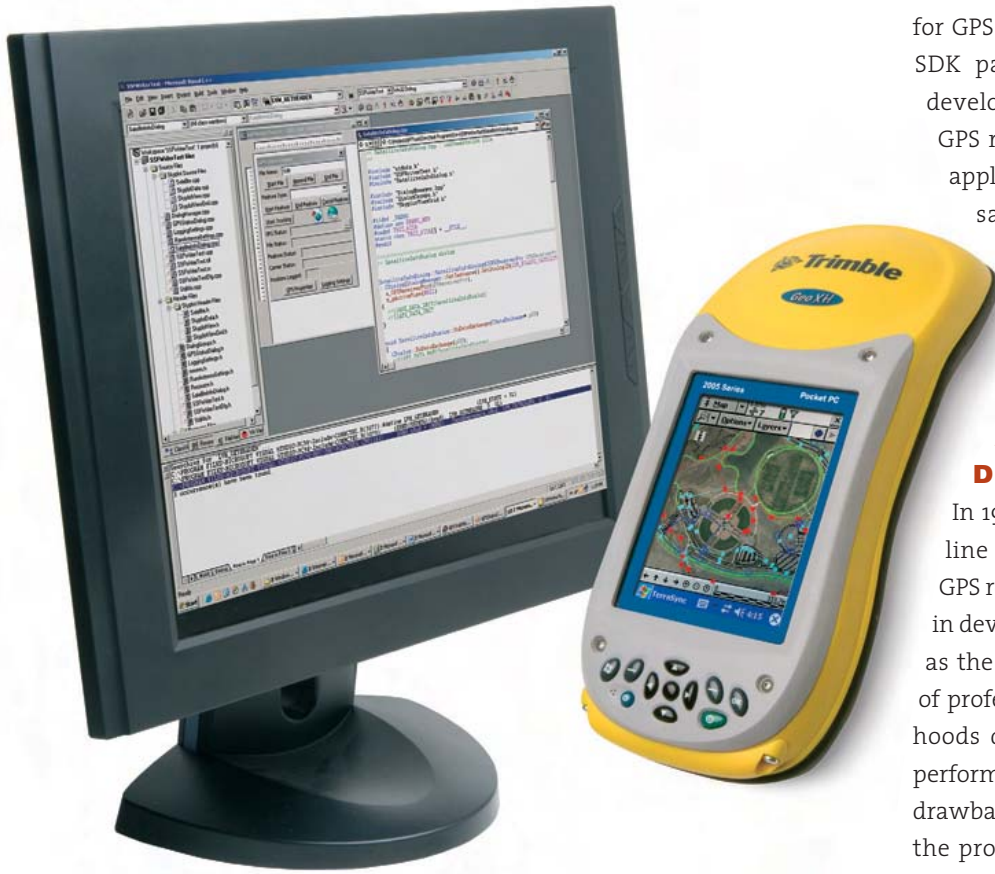
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GPS industry-by stimulating demand for GPS technology. Availability of the SDK package has enabled software developers to add value to the basic GPS receiver and rapidly expand its application in hundreds, if not thousands, of vertical user markets that now rely on GPS for mapping, navigation and tracking on a daily basis.

SIMPLIFYING APPLICATION DEVELOPMENT

In 1998, Trimble's highly successful line of ruggedized GPS Pathfinder GPS receivers had played a major role in developing what is now referred to as the mobile GIS market, comprised of professional end users whose livelihoods depended on the high-quality performance of their GPS receivers. One drawback to successful development of the professional surveying and mapping market was the standard NMEA

Trimble GPS Pathfinder Tools SDK

Leveraging full GPS capabilities

A decade ago, Trimble Navigation recognized the need to make interfacing to GPS easy for professional software developers. Trimble realized that a toolkit was necessary for geologists, surveyors, utility engineers and legions of other users to have GPS capabilities integrated into the software applications they needed to do their jobs.

Trimble created the GPS Pathfinder® Tools Software Development Kit (SDK)

to enable developers to seamlessly integrate GPS into existing applications or build entirely new field productivity packages. The ultimate goal of GPS Pathfinder Tools SDK was to empower developers and end users to fully leverage the flexibility and accuracy of GPS mapping within a familiar software environment.

The introduction of the Trimble® GPS Pathfinder Tools SDK has significantly benefited the worldwide community of mapping and GIS users-as well as the

protocol, which was and still is used by most GPS receivers. NMEA did not accommodate the coding capabilities for programmers to open the receivers up to the level of performance and functionality.

Without a toolkit and without using the NMEA protocol, the primary option for developers was to write code using the proprietary binary protocol for each GPS receiver. But this was not a practical alternative because the developers would find themselves re-writing the



software code every time a new or upgraded model was introduced. Even in 1998, GPS vendors were updating their receivers about every 18 months, making it impossible for developers to keep their applications up to date.

Trimble saw the limitations of developing using the NMEA protocol as one of several weaknesses that had to be overcome for widespread professional deployment of GPS to occur. To accomplish this, the GPS Pathfinder Tools SDK had to be developed with the programmer in mind. Specifically, Trimble wanted its SDK to allow software developers to write their code once without having to worry about future GPS hardware releases. In other words, custom applications developed with the SDK would accommodate any Trimble device, past, present or future.

Today, this remains the hallmark of the Trimble SDK. It provides seamless compatibility with the full line of rugged GPS receivers and handheld devices offered by the Trimble Mapping & GIS division, including the Trimble GeoExplorer® series, Trimble Nomad™, and Trimble Recon™ handhelds and the GPS Pathfinder series receivers.

ADDING PROFESSIONAL CAPABILITIES

Trimble introduced the SDK originally as an ActiveX® toolkit in 1998 and upgraded it to Microsoft® COM in 2004 to work seamlessly in the Microsoft Visual Studio® environment. In addition to providing multi-platform and receiver compatibility, the GPS Pathfinder Tools SDK overcame three critical NMEA weaknesses.

The **first weakness** was that the NMEA protocol offered users very limited abilities to configure their GPS receivers beyond what the outside buttons and dials could. The SDK opened

the receivers up to the developers so they could access the inside of the devices and maximize the performance to meet the needs of specific end user applications and ensure they were collecting the most accurate data possible. For the first time, users could fully manage the set-up, control and status of their units.

By packaging the diversity and complexity of GPS functionality into ActiveX and then COM objects, the kit made it possible for developers with little or no knowledge of GPS or mapping to tap into advanced functionality. This in turn gave the end users a greater selection of settings and configurations to control real-time differential sources, establish radio and cellular communications links, and set accuracy thresholds.

Another NMEA drawback overcome by the GPS Pathfinder Tools SDK related to post-processing. NMEA doesn't allow for logging of raw data points for post-processing with base station or other correction points back at the office. Even today, this is a potentially devastating problem for mobile GIS users because real-time differential correction sources are not always readily available or economically viable in all parts of the world. And even if they are, the professional GPS user typically wants to collect post-processing data while still in the field to ensure uniform data accuracy in case of data drop outs or errors. The SDK gives users the ability to log their raw data points and check their accuracy in the field.

The **third major NMEA** problem that the SDK was built to address is the issue of coordinate conversions. Because NMEA was originally intended for maritime applications, it only operates in latitude/longitude coordinates. For most mapping and GIS users, this



Trimble SDK provides seamless compatibility with the full line of rugged GPS receivers and handheld devices offered by the Trimble Mapping & GIS division



means the data must be converted into a local coordinate system.

Although making this conversion is a relatively straight-forward process, Trimble found that many software developers unfamiliar with geodesy introduced errors into the calculations because they did not fully understand the impact that even the smallest errors could have on the overall conversion. To eliminate this problem, Trimble included a library of more than 900 local coordinate systems into the SDK along with on-the-fly calculation capabilities, resulting in extremely accurate coordinate conversions in real time.

LEVERAGE CRITICAL GPS CAPABILITIES

The Trimble GPS Pathfinder Tools SDK supports industry-standard Windows® operating systems, including Windows Mobile® software. Its use of the COM interfacing technology means that most experienced developers work with it seamlessly in Visual Studio. COM has also enabled Trimble to create a wide variety of programming objects the programmers can access to integrate complex GPS capabilities into their applications with minimal GPS familiarity.

Integrated as standard features into many professional applications, these GPS capabilities extend tremendous

advantages to SDK developers and their end users. The following is a summary of the key capabilities made possible by the GPS Pathfinder Tools SDK.

Full GPS Accuracy Control-For most GPS users, the ultimate goal is to collect location coordinates with accuracy that meets the needs of their specific application. These accuracy parameters vary from one industry-and often one project-to the next.

The SDK allows the developer to give the end user the ability to easily define the accuracy thresholds of their project so the receiver can essentially configure itself and eliminate the guess-work and some of the decision making from the end user.

Control over Differential Correction Sources-As noted above, accuracy is the ultimate goal, and for many mobile GIS applications, differential correction plays a role in data collection. Because differential correction can be quite complicated and require on-the-spot decision making by the end user, the SDK simplifies the process to put the user in control over this aspect of configuration.

The end user's selection of differential correction source is usually dictated by financial considerations and availability within a specific geographic region. Most users will select the free alternative when it's available. But these options vary with location, and the user typically wants to make that decision. The decision may also involve selection of which communications method (cellular, WiFi, etc.) will be used.

The GPS Pathfinder SDK allows to take this into account by setting up simple interfaces where the end user can enter their correction preferences, including access numbers and passwords. In the field, the user can quickly select the best option from an interface list so the

most accurate and most affordable one is used during that session. The developer can also program in a set of rules as a default by which the receiver can choose the correction source according to user specifications.

Raw Data Logging Control-As noted earlier, the majority of mobile GIS users want to log their raw data in the field so they can perform post-processing later. Even when they don't plan to utilize post-processing, the procedure may be necessary if errors occur. With this in mind, SDK gives the end user the ability to select whether raw data will be logged or not. Most organizations choose to enable data logging during the initial receiver set-up and then forget about it. That ensures the data is there if it's needed.

H-Star Data Collection-Trimble introduced the H-Star™ data collection technology for subfoot accuracy in 2006 for the line of GeoXH™ handheld and GPS Pathfinder ProXH™ receivers. With three base stations operating within 125 miles/200 kilometers, this technology enables the devices to easily and quickly acquire location data from one foot down to less than an inch, the desired accuracy for most GIS mapping today. The SDK allows programmers to integrate this capability directly into mobile applications.

In the subfoot mapping environment, the correct setting of certain GPS parameters, such as selection of appropriate differential correction sources, become exceedingly important. The GPS Pathfinder SDK toolkit gives developers and end users the ability to access H-Star technology to maximize efficiency and minimize cost. This makes the Trimble Mapping & GIS receivers the easiest devices to use for collection of subfoot GPS data without transitioning to survey-grade equipment.

APPEALING TO DEVELOPERS

The Trimble GPS Pathfinder Tools SDK has become known as the toolkit developed by programmers for programmers. Its ease of use and excellent support along with its royalty-free terms have made the SDK extremely popular among worldwide third-party developers of mapping and GIS packages. Trimble estimates that nearly 80 percent of active SDK purchasers are using the product to create outside applications for re-sale, mostly within vertical market segments. The remaining 20 percent are developing customized in-house applications.

The vast majority of third-party packages are being built for mobile applications running on handheld mobile GIS devices with integrated GPS hardware. Trimble believes that many of these applications serve users in the utility, government and architectural/engineering/construction markets, which are the major segments of the company's overall client base.

When asked why developers chose the Trimble GPS Pathfinder Tools SDK over other products, they typically responded that they like the fact their code is compatible with all Trimble GPS receivers and platform.

Secondly, developers appreciate that COM hides the complexity of GPS inner workings and coordinate conversions in simple objects so they can focus on creating the application without having to keep up with latest GPS technical minutiae. ■



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gmlSDK

G

*eo*graphy
Markup Lan-
guage (GML)

has emerged in the past several years as a primary means for the exchange, sharing and aggregation of geographic information. This is true increasingly for vector based data and we can anticipate will also be true for imaging data in the near future.

GML application schemas exist for most of the traditional GIS data formats such as S57, VPF, DAFIF, Tiger/Line. In addition, some GML application schemas have become standards in their own right such as cityGML, AIXM, XXML, and GeoSciML.

With the increased understanding of spatial information infrastructures as a means of sharing geospatial information in real time or near real time, we anticipate increased use of GML for incremental updates to geospatial databases, achieved in most cases through Web Feature Service (WFS) interfaces.

This increased use of GML demands better tools for creating and editing GML, and for reading GML into in memory objects for data manipulation and analysis. Since XML Schema on which GML is based is not truly object oriented and makes use of constructs like choice groups and substitutions, working with GML (or even XML) may be foreign to some developers. This is made all the more complex, by the fact that GML is also a schema definition language, so that while there are many concrete object types defined in GML

itself, users define entire new sets of objects in GML application schemas. For these reasons, GML may present a steep learning curve for the average developer. For these reasons Galdos developed the gmlSDK, a comprehensive and portable class library written in C++ for the creation of in-memory objects from GML and for writing GML from in memory representations of geographic objects.

To illustrate the use of the gmlSDK we consider a few simple tasks and how to use the library to accomplish them. We start with traversing a GML object.

TRAVERSING A GML OBJECT

A GML object for our purposes is an XML element whose content model is described by a schema component (XML Schema type declaration) in a suitable GML application schema. GML objects are always elements whose children are the properties of the object. We might for example have a road

object of the form:

```
<app:Road xmlns:app="http://sdkexample/road"
  xmlns:gml="http://www.opengis.org/gml">
  <gml:name>Cambie St</gml:name>
  <app:numOfLanes>4</app:numOfLanes>
  <app:shape>
    <gml:LineString>
      <gml:posList>4800 1234
6578 9012</gml:posList>
    </gml:LineString>
  </app:shape>
</app:Road>
```

Here the properties are clearly gml:name, app:numOfLanes and app:shape.

To traverse this GML fragment, the gmlSDK provides a number of functions including

- getAllProperties() (returns all properties of the object),
- getProperty(propertyName, propertyNamespace),
- getPropertyList(propertyName, propertyNamespace) and
- getPropertyByValueType(objectTypeCode) and
- getPropertyListByValueType(objectTypeCode).



The later functions return the properties with specific names and with specific types.

The following code snippet returns all geometry properties of the road feature as shown above.

```
//get geometry property from the "Road" feature object

PropertyIterator* geometryPropertyIter = roadObject->getPropertyListByValueType(GMLObjectType::GEOMETRY_TYPECODE);
```

Note that the value of a GML property can be a simple value, a GML object, a list of GML objects, or even a list of arbitrary XML elements. It is thus necessary to provide additional functions (through the property interface) for accessing property value components such as illustrated by the following example.

```
// retrieve the value of the geometry property "shape"

GMLPropertyNode* shapeProperty = roadObject->getPropertyByValueType((GMLObjectType::GEOMETRY_TYPECODE);

GMLObjectNode* geometryObject = shapeProperty->getComplexValue();
```

GML schema developers build application schemas using the rules for application schemas and the set of primitives for geometry, topology, coordinate reference systems, coverages, etc that form the core of GML. We refer to these as core objects. The gmlSDK provides a set of accessor functions for getting the property values of these core objects since these are used very frequently in GML applications.

The SDK provides a set of these functions to make it easier and more convenient to deal with GML core objects.

Note that these access functions can be used even in the case where the user

derives an object from a GML core schema object's content model (by restriction or extension). For example, one might create a derived GML object AverageTemp from the GML core object RectifiedGridCoverage by restriction, and then use the built in accessor functions getRangeSet() and setRangeSet() on this derived AverageTemp object to get the values of these properties.

Application (user defined) or core domain objects can be constructed using the SDK. For GML core objects a set of built in object factories (e.g. gml:Polygon, gml:Grid, gml:RectifiedGrid, gml:Feature etc) are provided. For objects not yet supported in the SDK, you can use the provided constructors. Users can thus construct domain objects for all GML core objects and all objects derived from GML objects by restriction using the factories provided in the SDK. A variety of means are provided to simplify the task of object construction. To create an object declared with a type derived from a GML predefined object type, you simply reference the schema that defines the type as follows:

```
GMLObject* object =
GMLObjectFactory::makeGMLObject(typeName,
qualifiedName, namespaceURI, gmlSchema);
```

For data with types derived from GML predefined types by extension, the additional properties defined in the extended types can be accessed via the underlying GMLObjectNode interface which you can obtain using the toGML() method on the domain object. An alternative way to handle the user-defined data is to develop your own domain objects and object factories. The GMLObjectFactory class provides a method registerFactory(...) that allows clients to register their own object fac-

ories so that their own objects can be created from the GMLObjectFactory in the way in which the domain objects are created from the GML object factory. Of course traversing GML is just the starting point, and the SDK can also be used to read, write and manipulate GML data. Let's look at reading a GML "document".

READING GML

We have seen how to traverse GML data fragments. Now we look at reading GML documents such as the content of GML files or the GML within WFS transactions or WFS data requests.

The SDK provides two approaches, one a tree builder, the other a combination of a tree builder and a streaming reader. Note that the SDK supports switch controllable validation of the GML instance being read relative to the application schema.

The tree builder is intended for fast in memory navigation of GML objects (the document root must be a GML object) and thus is suited only to small GML fragments such as would typically be found in WFS requests and some classes of transactions.

```
GMLDocument* gmlDoc = docBuilder->build(dataSource);

GMLObjectNode* rootObject = gmlDoc->getRootObject();
```

The tree builder provides document constructors. Once the document is constructed you can then freely traverse the document using the accessor functions such as those discussed in Traversing GML.

For larger GML documents, a streaming reader, based on a pull parser that implements most of the StAX (Streaming API for XML) API, and which additionally provides direct GML object sup-

port is provided. This streaming reader overcomes many of the limitations of traditional streaming approaches in that it combines both the "read and discard" and the "build and navigate" approaches in a single API. This allows the programmer to optimize the reading process with respect to their particular application. In particular, the streaming reader enables the programmer to construct sub-trees for those GML objects of interest, and pull them from the parser without reading the whole document and constructing an entire tree in memory. Furthermore, since the pulled GML objects are represented in a tree structure (GMLObjNode), you can access these with the navigational methods (as we have discussed). Finally, you can construct domain objects from the GML object nodes and access them with setter and getter methods supplied in the SDK.

All of this gives the developer greater freedom to control memory. You can keep the pulled GML objects in memory for later use, or discard them as you wish. To understand the use of the streaming reader in practice, consider its application to the extraction of features from a WFS response. The basic steps would then be:

First, you create a stream reader from the input data source.

Secondly, you write a loop to iterate through the input source and retrieve all features. Within each loop, you need three steps to get a feature object,

```
GMLStreamReader* reader = GMLReaderFactory::createGMLStreamReader(dataSource);
```

- Pull an event with next() method;
- Determine whether you encounter a GML object and particularly a feature object.
- Pull the feature object.

This is illustrated by the following code fragment:

```
while ( reader->hasNext() )
{
    // get the next token
    reader->next();
    // if the pulled token is a GML feature, then pull
    // the feature object and perform further operations.
    if ( reader->isStartObject() && reader->isGMLTypeOf(featureTypeCode) )
    {
        GMLObjNode* featureNode = reader->pullObject();
        PropertyIterator* geometryProperties = featureNode->getPropertyByValueType(geometryTypeCode);
        // perform further operations on geometry properties.
        ...}
}
```

It should be clear that only a few lines of code are required, and that the code fragment can be applied to any feature collection regardless of the concrete feature types that might appear in that collection. Let's now look at writing some GML examples.

WRITING GML

The SDK provides a number of different ways to write GML from an in-memory representation, namely:

- Serialize a GMLObjNode or a domain object to a string in memory;
- Serialize a GMLObjNode to a file, standard output or memory buffer;
- Writing GML data directly to an output in a streaming manner

These different methods are provided to allow the developer the maximum flexibility and simplicity in dealing with GML for different applications.

GMLObjNodes can be serialized to string XML representation by calling the toXMLString() method. Domain objects can be similarly serialized by first creating a GMLObjNode using then the toGML() method and then invoking toXMLString(). Thus converting back and forth between XML string and object representations for both core

and user defined objects is a very simple process. For relatively small GML files the SDK supplied functions for file serialization can be used.

For larger files the streaming writer should be employed. It provides a variety of specific methods for writing an element, a GML object, an attribute, namespace declaration etc. The writer automatically escapes characters such as less than sign (<), greater than sign (>) and the ampersand (&). The writeEndElement() method selects the appropriate element to close, you don't even need to specify the element to be closed. More over, the writer takes care of the namespace declaration and can automatically produce a prefix if you did not provide the right one for a given namespace. The streaming writer imposes no limit on the size of GML data stream that can be written.

SUMMARY

The Galdos gmlSDK provides a comprehensive and very flexible approach to dealing with GML data that can provide good performance over a range of applications and a range of memory resources from small to large memory and CPU environments. With the SDK, handling GML is no more complex than other routine programming tasks, and the programmer is largely freed from having to have a detailed understanding of XML Schema or even GML. The SDK has been employed in a variety of applications including image processing (GML JP2), coordinate reference system handling, WFS transaction processing and data format conversion. ■



GIS fills the gap left by CAD systems

"CAD is a drawing and GIS is Intelligence."

Rakesh Verma, Managing Director, MapmyIndia

Although automated map drafting & general management of map information has delivered significant benefits to government & private organizations, general-purpose, spatial data management requires a database structure & software technology beyond the graphic functionality offered by CAD solutions. This is where a GIS scores over CAD Technology.



ArcGIS Integrates All Types of Data and "Abstracts" Knowledge into Five Basic Elements



Maps & Globes



Geodata Sets



Work Flow Models



Data Models



Metadata

Together they represent geographic knowledge!

"In ArcView and ArcEditor we get perfect blend of CAD and GIS. Right tools for every Job."

Sanjay Shrivastava, Asst. Vice President, GIS, Reliance Industries Limited

CAD and GIS can both make maps and work with spatial data. But CAD and GIS come from very different perspectives.

CAD is a replacement for drafting, and is used mostly in the manufacturing and engineering fields. On the other hand, GIS had its early origins in large scale (state- and national-level) spatial data collection for work on projects such as infrastructure development, data development, town planning, data development for overseas projects...

When you need to do more than just store lines (and the associated text) and their precise relation to each other CAD software is insufficient. The minute you need to store information over these lines GIS becomes your choice of software.

ArcGIS Desktop - Create, edit, and analyze geographic data
 ArcView,
 ArcEditor,
 ArcInfo.

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STAY CLOSE TO THE CUSTOMERS' NEEDS



K C M Kumar
Co-founder, Chairman & MD,
Speck Systems Limited

KCM Kumar is an Electronics Engineer with over three decades of experience in geomatics and imaging. His contributions to the company lies in the area of strategic management and consolidating the gains of its technical and marketing endeavors with professional managerial inputs and commercial practice. He shares his experiences with GIS Development in an exclusive interview

Q. How has Speck Systems evolved over the years? What have been the milestones for the company?

Speck Systems started 25 years back. The initial four years went into the process of getting into an organized company structure for a part-

nership firm. Our meetings with National Remote Sensing Agency (NRSA) officials played a major role in our getting into the remote sensing business. It was mostly the products that were developed and available elsewhere in the world which NRSA had successfully indigenized and transferred the technology to

us. We started with R&D activities improving these products, making sure those products are market worthy.

We learnt a few lessons through the initial sale of the products. Initially we thought that once we make these products people would buy them; we over-

looked an important aspect of the business - 'the marketing infrastructure for these products'.

We studied the market and developed the products to meet client's needs. At that time, PCs were just about to enter the market and also the people were used to photo interpretation only. We realized that we should produce a niche photo interpretation device to give true photographic outputs to make an impact on this potential market. Thus the main stay products came into being. Later, we proceeded in developing products which enhanced the services to the client. This image interpretation became a gateway for GIS to become an integral part of our business. The same process took us into map-making activities.

Q. What has been the corporate philosophy underlying the success story for Speck Systems?

There are two, I would say.

First, staying close to the customers' needs by understanding their complete business cycle and second, developing end to end solutions through indigenous efforts.

Q. What is the role played by the geospatial technology in the infrastructure development in India?

Productising Experience...

The geospatial technology is the first step for the infrastructure development. Prior to planning process, availability of quality data is very important for the planners to make the project happen. Most of the times we have seen projects getting delayed due to non availability of the data.

'Mandatory' is when the government has to implement something through policies. But I think before our government can reach the state of making use of geospatial tools a mandate, they should at least initiate or enable the use of these technologies as an integral part of the planning process. Ironically, the infrastructure industry is missing out on the geospatial technology; whereas it should be the one that should drive the geospatial industry forward by using GIS for its own development.

Q. Would you like to share your experience on some of the major projects Speck Systems has executed in India?

Out of the few companies in the geospatial industry that have chosen the domestic market as their main area of business, I can say that we have played pioneering role in the domestic market in areas like, Land Information Systems (LIS),

For 25 years, Speck has acquired competencies in the field of electro-optics, systems integration, communications, remote sensing, image processing, mapping, geospatial information services, UAVs, communications, mobile shelters and software application development. With strong technology roots, absorption of technology from pre-eminent institutions and partnerships with leading companies,

Speck looks to continuously broaden its customer base and increase the product and service range to its valued customers.

Today, Speck Group of Companies comprises of Speck Systems Ltd. (SSL)- an ISO 9001 and ISO 27001 accredited and DGQA approved company. and its subsidiaries - Speck SpatialTech Ltd. (SST) and Spectrum Mapping LLC (Spectrum).

Speck believes that for survival in the domestic industry they cannot rely on products that have been produced elsewhere as they will not meet the entire needs of domestic customers. And the way these products are priced is a deterrent to the overall growth of the domestic market as well. Considering these two aspects, experiences gained from the projects done by Speck have evolved in the form of Products and Tools that improve their next project.

Land records and land administration

Having realized the critical importance of land records and land administration, Speck SpatialTech (SST) worked with the land administration departments and local bodies to bring their practical solutions in computerization of land records, cadastral resurveys employing modern technology and maintenance of land records, all leading to

integrated land administration. At the core of all their LIS solutions is SpeckKadaster, a comprehensive, open systems compliant product that helps administrators in all the land administration functions and many more. It has all the required functionality to create and maintain such comprehensive databases, with necessary data ownership and security provisions through access control.

Utilities

Speck SpatialTech with its skilled domain experts combined with the expertise in RS/GIS Technologies has developed GIS applications for Power, Telecom and Water & Gas. SpeckElectric is one such application developed exclusively for Power. SpeckElectric is a highly scalable, full functional GIS offered in desktop/client-server/web-based architectures.

SpeckElectric integrates the core GIS

functionality with new customer management, network analysis, energy audits and asset management-modules. SpeckElectric has built-in interfaces for SCADA, billing systems and call centre.

Speck SpatialTech have also introduced concepts like InWIS, GIS-based IT application that supports activities concerning reclamation, utilization, monitoring and management of wastelands and InWaMS, the end-to-end solution to plan, manage and monitor land and water resources development on watershed basis.

Photowrite Systems

Commencing with a technical know-how from the Dept of Space, Speck has been developing and continuously improving the photowriting and imaging technology and its products which are tailored for specific requirements of its customers. Photowrite systems manufactured

by Speck are precision optoelectronic equipment that writes high resolution, continuous tone images from digital data on B&W and color photographic film and paper media.

Aerial Imagery Work Station (AIWOS)

Aerial photo interpretation involves examining photographic images for the purpose of identifying objects. One of the most widely used tools is the stereoscope which allows the interpreter to study photographs in three dimensions.

Aerial Imagery Workstation (AIWOS), precision opto-electronic equipment comprising of mechanical, electronic and optical components with a CPU and controlling software has been indigenously developed by Speck and BEL. Zoom Stereoscopes indigenously developed by Speck serve the needs of image analysis, forensic and medical applications.

A project meeting the local needs will be of much more importance than any other international product, mainly due to the fact that it will be cost effective, customer focused, locally developed and, importantly, its source code is available

Power distribution, revenue collection for municipalities, etc. Experiences from the aspect of learning and also for future business have been exciting. It includes learning the "hard way" of dealing with the government machinery and developing our own skill sets.

The experience with the project related to LIS with the government has made us realize that if appropriate policy initiatives are taken, the geospatial industry and the associated vertical segments will benefit tremendously. Taking the case of our LIS project, we have learnt that a citizen has the right to property and the government has an obligation to fulfill this obligation. And this property information should be shared by the government in a transparent manner, no matter what the security issue is.

This will also lead to economic development of the country. The money locked in land can be released by way of rural credit, where it is important to have land ownership and the title for land. As of today the government is only the witness to the title, but is not guaranteeing the title. If the database generated for the LIS is made available, the policy issues will mould themselves in favour of the development of rural region.

Q. What are the Geospatial market trends you see in India and how they are different from other markets?

Presently the trend is of Service Oriented Development. The governments are not just looking for software products but for cost effective solutions for specific requirements. Apart from departments

dealing in land information, the utility segment and infrastructure development segment too require both technological and policy upgrades.

As far as defence sector is concerned, we are focusing on developing solutions that enable gathering real time information by a front line soldier. Based on our experiences with the defence sector we are strategically placed to indigenously develop such software for them.

At present we are more focused on the domestic market. We have worked in Middle East and Africa also, but we do not see much difference in these markets as compared to the domestic market.

Q. Do you think there will be productisation in verticals/ products e.g., in agriculture, environment, etc over a period of time?

Why not! Two of our

important products are SpecKadaster and Speck-Electrik that have been developed in-house and are successfully used for our own projects related to LIS and power segment. We simply believe that these products have now matured over the period of time and have been tested at all the levels for utilization in the domestic market.

If you take up any project which meets the local needs then the product will be of much more importance than any other international product, mainly due to the fact that it will be cost effective, customer focused, locally developed and, importantly, its source code is available facilitating further growth and development possible. And I think this is going to be the order of the day as these software oriented products will be backed by the giant and successful Indian IT industry.



Q. Do you foresee that after you productise your experiences in the LIS, utility or infrastructure domain that you will be selling these products in Global market?

There is a large requirement in the domestic market. Hence as a strategy we will be looking at partners from the global market to further develop these products within the domestic market. It is not yet right to say that these products are ready for international market till they are successfully deployed in India.

Q. What are the R&D activities taking place at Speck Systems apart from the development of products necessary for the projects at hand?

Most of the R&D focus is from the customer's experience itself and the driving factor is the need. We believe that development is best done while taking along the customers - by understanding the end requirement and productise it to have a solution that is much closer to the reality.

Therefore the application development and thinking in isolation was never attempted. Nonetheless, we have been involved in extensive R&D in the defence sector as we have 15 to 20 years of close working relationships with it. We have an aptitude and an appetite that we have devel-

oped for this business and our product and application developments are focused on geospatial intelligence and are driven within the domestic market. For this we have not only absorbed technologies from the industry but have also invested in indigenous development of our own products, services and solutions.

Q. Is SPECK associated with education institutions for R&D?

So far none, but the option is not ruled out as it is the right way forward. I say so because we are still in the initial phase where we are gaining experiences in-house. Definitely the growth plan of the industry relies heavily on the academia and we would want to be a part of it in the times to come. We have associations with a Chennai-based company, which is developing software for the education institutes and we hope to continue our association for its further development. It is a good strategy to involve the academic institutes and research scholars along with developing indigenous software.

Q. What is your view on the growth of an organization through acquisitions?

We believe in end-to-end solutions and in order to achieve this we have to understand the entire cycle of the customers' requirements.

Our product and application developments are focused on geospatial intelligence and are driven within the domestic market. We have not only absorbed technologies from the industry but have also invested in the indigenous development

In cases where this requires services from a third party vendor, the process should not affect our business policies. Keeping in mind acquisitions of such requirements becomes essential and is much more cost effective than to developing it indigenously.

One such requirement for Speck was in the LiDAR segment which led to the acquisition of Spectrum Mapping LLC (USA), as it was a complete world class geospatial survey company that adds value to our existing services portfolio.

Q. Where do you foresee Speck Systems by 2012 in terms of activities and revenue?

We would like to see Speck Systems as,

- A globally recognized player, indigenous technology supplier & solutions provider.

- An important indigenous player in product development

- Over Rs.500 crore company in the next 4-5 years.

- We believe to embed GIS into common man's lifestyle.

Q. What is your message to the young entrepreneurs that wish to enter this industry?

People entering in this industry should know that it is a niche market and it calls for tremendous amount of focus and end to end development and only the niche player who would like to work on the technology, would succeed.

The industry has a lot to offer and they will be greatly benefited. As the younger generation is tech savvy, the future area to invest in would be the location based services with software oriented innovation in retail sector. ■

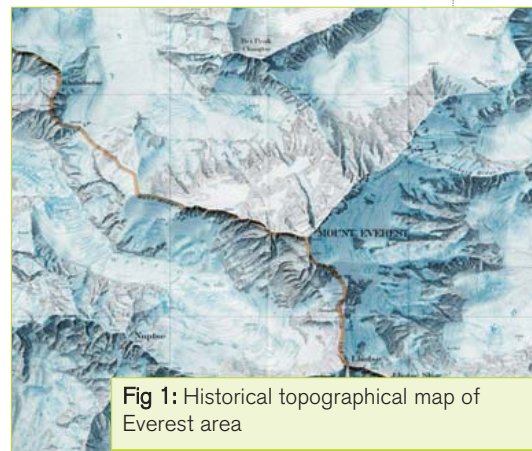
Cartographic & Remote Sensing Perspective of Mt Everest

Each of us has been personally tied to the Himalayas. For who of us has not dreamt about going there, and being there - if only for a while? Who of us has not been inspired and humbled by the Himalayan ethos so overwhelming, so much beyond us, and so much calling us to measure ourselves against it?

Hence those celestial mountains serve as the ultimate point of reference of the greatness of our visions. We define ourselves and our projects in terms of their magnitude and grandeur. The discovery of Mt. Everest is closely associated with the mapping history of India which dates back to the 18th Century. In 1802 Captain Lambton a trained officer in Geodesy in North America began the Great trigonometrical survey in India from Mount St. Thomas near Madras. The great trigonometric series measuring location and elevation of points spanning the country from South to North and East to West are some of the best geodetic control series available in the world.

Colonel George Everest Surveyor General of India from 1830 to 1843 extended the great work started by Lambton to the Himalayas and recorded the location of the highest Mount in the Himalayas. The highest Mountain peak was discovered after years of precision trigonometrical survey work carried out

by groups of unsung Indian Surveyors and porters working amidst great danger and discomforts in the deserts, mountains and jungles, some meeting violent deaths due to hostile terrain and non-availability of medical care. The discovery of the highest Mt peak in the world measuring 29,002 feet was announced by Survey of India in 1956 and named as Mt. Everest to honour Colonel Sir George Everest. Mt Everest earlier known as Peak XV is Chomolungma (Meaning Mother Goddess of the Universe) in Tibet and Sagarmatha

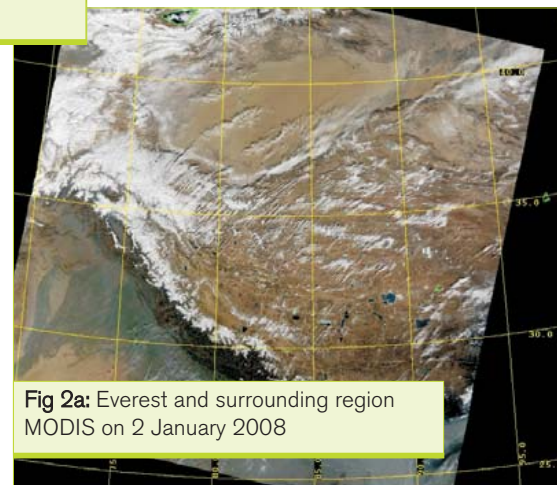


(Meaning Goddess of the sky) in Nepal. The elevation of Mt Everest, with respect to Indian mean Sea Level was subsequently adjusted to 29, 035 feet (8850m), rises a few millimeters each year due to geological forces. The location of the peak is at Latitude 27° 59' and Longitude 86° 56' in the northern hemisphere. In 1907 Natha Singh an

Indian surveyor entered the Mount Everest region from the Nepal side and mapped the Dudh Kosi valley which is the gateway to the southern route up the mountain to the end of the Khumbu Glacier. The dedication, hard work and onerous task of exploring the unknown by Indian surveyors accompanied by unskilled Khalasis and porters for the mapping of the nation has been best illustrated by Colonel Kenneth Mason in his book titled "Abode of Snow" which is quoted below:- "The world's altitude record, as far as we know, was held for about twenty years by a Khalasi, engaged by the Survey of India on a salary of six rupees a month, who carried a signal pole in 1860 to the top of Shilla in the Zaskar range east of Spiti, 23,500 feet above the sea. He did not know its height and we do not know his name!"

CARTOGRAPHIC PERSPECTIVE OF EVEREST

Radhanath Sikdar, an Indian mathematician and surveyor from Bengal, was the first to identify Everest as the world's highest peak in 1852, using trigonometric calculations based on measurements of "Peak XV" made with theodo-



lites from 240 km away as part of the Great Trigonometric Survey of India. Peak XV was found to be exactly 29,000 feet (8,839 m) high, but was later declared to be 29,002 feet (8,840 m).

More recently, the mountain has been found to be 8,848 m (29,028 feet) high, although there is some variation in the measurements. The mountain K2 comes in second at 8,611 m (28,251 ft) high. On May 22, 2005, the People's Republic of China's (PRC's) officially announced the height of Everest as 8,844.43 m ± 0.21 m. This new height is based on the actual highest point of rock and not on the snow and ice that sits on top of that rock on the summit. The Chinese also measured a snow/ice depth of 3.5 m, which implies agreement with a net elevation of 8,848 m. In May 1999 an American Everest Expedition, anchored a GPS unit into the highest bedrock. A rock head elevation of 8,850 m (29,035 ft), and a snow/ice elevation 1 m (3 ft) higher, were obtained via this device. (Wiki Encyclopidia-2008).

EVEREST DEGRADING ECOSYSTEM

Himalayas are among the most dramatic and visible creations of plate-tectonic forces, which stretch 2,900 km along the border between India and

Tibet. The Himalayan mountain system is the planet's highest and home to the world's highest peaks, including Mount Everest and K2. To comprehend the enormous scale of this mountain range consider that Aconcagua, in the Andes, at 6,962 m, is the highest peak outside the Himalayas, while the Himalayan system has over 100 mountains exceeding 7,200 meters. The Himalayas stretch across six nations: Bhutan, China, India, Nepal, Pakistan and Afghanistan. They are the source of three of the world's major river systems, the Indus, the Ganga-Brahmaputra, and the Yangtze. Approximately 1.3 billion people live in the drainage basin of the Himalayan rivers. The flora and fauna of the Himalayas varies with climate, rainfall, altitude, and soils. The climate ranges from tropical at the base of the mountains to permanent ice and snow at the highest elevations. All this makes them hot spots from climate change and environmental protection perspective. Glaciers in the Himalayas provide the water source for one-sixth of humanity. Now that water source is threatened by climate change. It's never too late to avert the catastrophe but start acting now not as individuals.

RATIOCINATION

The Himalayas are referred locally in Tibetan as playground of Gods. If Gods did not exist, people gazing at the Himalayas would have been bound to invent them such is the majesty, grandeur and power emanating from these peaks. Tom Hornbein, member of an Everest expedition, describes his own feelings on the summit: "We felt

the lonely beauty of the evening, the immense roaring of silence of the wind, the tenuousness of our tie to all below. There was a hint of fear, not for our lives, but of a vast unknown which pressed in upon us. A fleeting feeling of disappointment -- that after all those dreams and questions this was only a mountain top -- gave way to the suspicion that maybe there was something more, something beyond the three-dimensional form of the moment. If only it could be perceived."

The Mount Everest region, and the Himalayas in general, are thought to be experiencing ice-melt due to global warming, which has been shown by historical records and current satellite observations. Any land degradation and climate change in these mountains will cause heavy flood in downstream areas and rapid melting of its glaciers. Therefore we need to join hands in preservation and sustainability of these young mountains and its people. ■

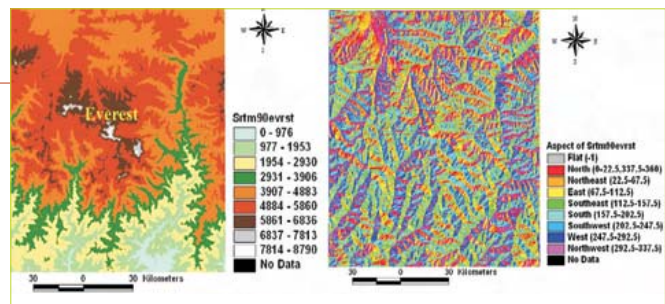
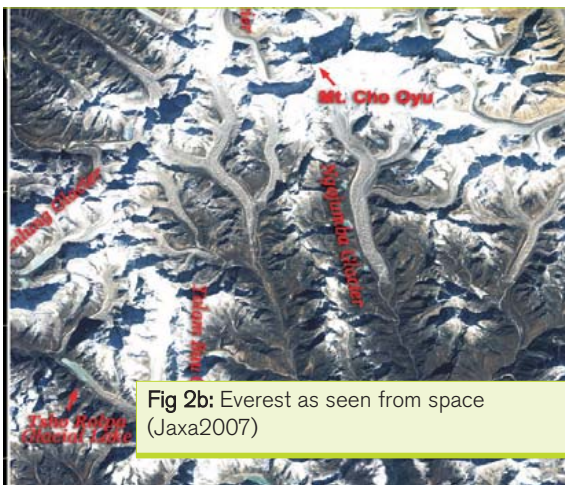


Fig 2c: Classified DEM of Everest area Fig. 2d: Aspect map of Everest area.



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Mark Steele
Chief Operating Officer,
Tele Atlas Asia-Pacific Pte Ltd.

Dynamic content is going to be the thing next

Q. What has been the business philosophy of Tele Atlas?

Our philosophy is to produce a map which you can rely on completely for your navigation purposes. It is fully updated and takes into account changes taking place on regular basis. We invest our money with that purpose only. In a map across the world 15-30

percent of the road network changes on an annual basis. You can imagine how fast things can come up to us such as name has changed, restriction regarding one way has changed, new streets have come up and so on so forth. In order to implement our core philosophy that is, to create the best navigational map available in the market, we have to get all these infor-

mation about changes occurring in the field and incorporate the same in our system faster than anybody else.

Towards this direction our technology is geared like the mobile mapping vans. These vans drive in the streets with all the sensors, cameras etc and capture the attributes like speed limit, one way restrictions etc. All this information is channeled to our processing unit in India where they are geopositioned onto the map. This technology enables us to move very fast and provide updated maps.

Q. What is your industry presence in the Asia-Pacific region?

We have expanded our footprint substantially in this region and now we are the leaders in terms of Asia-Pacific operations. We have introduced our mobile mapping vans in Singapore and Taipei. We have also set up a 3D production unit in India to produce 3D map, not just for

Asia-Pacific region but for the whole world.

There are lot of activities in the region in the past year, not only in terms of geographic coverage but also in operational footprint. Hopefully, our first major task in the coming six months is to bring India into our mapping/geographical coverage.

Q. What kind of strategy you have for Asia-Pacific region?

The initial strategy was to support customers in the region who are focusing on the North America and European market. Lots of our big customers are here like Mitac (Mio), Samsung, Japanese companies like Pioneer. Our initial focus was getting in place the customer support and coverage before we could bring out the map of Asia.

Now we are in a position to operate a comprehensive Asia-Pacific offering. We are now covering lot of geography and lots of customers not only that are in Asia but also the North American and European customers that have started looking at the market opportunity here to launch their products in this region. For example, Garmin has launched its product in Asia-Pacific with Tele Atlas products. Mitac has started its focus on Asia-Pacific particularly in Indonesia and South-East Asia. TomTom has moved

into Asia and is establishing its footprint here.

Q. What changes have taken place in Asia-Pacific region in the recent past, in terms of usability of Tele Atlas data?

From the product standpoint we are seeing changes in the marketplace. It is moving from traditional in-car systems where customers only look for navigation to customers looking for different features apart from navigation. Say, for example, in pedestrian navigation, the user desires to find things in different ways where maps has to be scaled with different content.

Another major thing coming to the map now is multi-modal navigation. We now have devices that offers assistance to pedestrians who may have to walk a little, take a bus cross a building skip a flyover and so on. We offer them a map that tells them where they can get a bus, where to take a turn and so on.

In the in-car system space



The focus of Tele Atlas has been and would continue to be providing best digital maps which are intelligent, fresh and navigable.



dynamic content is going to be the thing next. In this data on a map is going to change by the minute, hour or day. Say for example, you are driving down a street and your car needs refueling. Your system will know of this and it will highlight all the gas stations in the vicinity on the map. And through our relationship with the company Shell, the gas prices will be indicated on the monitor. Similarly if we are passing by a parking garage, the system will display the number of parking spaces available in the parking garage through transmission from the parking garage.

Tele Atlas is moving towards fully textured 3D maps where the actual image of the building is textured on the base map. This year we will have one or two cities done in Asia.

Q. What challenges and opportunities do you foresee in this region?

The biggest market opportunity in this region is going to be the wireless handset environment. If you look at the market, in just ten years, the mobile phone market in China and Indonesia have grown very fast. This is going to be a big game in coming five years. Coming to the challenges, the Asia-Pacific region has a diverse geography. Countries in the region have diverse environment and



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In last few years the mobile phone market have grown very fast in Asia-Pacific. The biggest market opportunity in this region is going to be in the wireless handset environment resulting in growth in LBS.



definitely it is quite a task to work in this environment.

The challenge here is to develop a map through our model of going to different countries and form relationship with the best establishments in the mapping field and bringing their products in our common format that is

usable to our customers like TomTom, Garmin, etc. who are eyeing this market.

Q. In the Asia Pacific region will you create a new set of data which is in the lines of the core philosophy of Tele Atlas or are you going to look at or partner people or companies having the information?

We will do both. The most significant model will be going to a geography where we are not. As every country has a handful of mapping companies. We will analyse those companies, meet and evaluate their offerings and pick those we feel is the most capable and has the best product and will result in fruitful partnership. Sometimes these partnerships are through acquisition but more common is through joint venture, i.e., we invest in the resources like mobile mapping van as we did in Taiwan. In Taiwan we had a joint venture with SNT last

July. Once we have the partnership we enhance the database to bring to the quality of the product with what people expect from Tele Atlas.

Q. How will Asia-Pacific leverage upon being the second mover?

I think it is going to happen very fast. It has the largest consumer base for the mobile phone handsets. As of now all the high end mobile handsets are GPS enabled. In the coming years the mobile handset companies will include this technology in all their offerings.

Though its very early, but we have seen a tremendous amount of interest not only among mobile handset manufacturers but also operators in various geographies. We have made an announcement about a month and half ago about our plans to work with Indosat in Indonesia in conjunction with Garmin to offer map enabled LBS on RIM blackberry device. Be it China, or Korea or India, the LBS market is seeing a lot of activity. Right now the companies are in the process of finalizing their strategies, that is, how they want to turn out, what application they want to develop and how often they want to deliver that or what their business model is going to be?

I think we are still at a very early stage.

But coming hand to hand with mass market adoption of GPS enabled mobile devices, you need to have an LBS ecosystem, an environment that support that. In my opinion, digital mapping will be a major part of that. That is where Tele Atlas is.

Q. With the companies like Google and Nokia eyeing at this market opportunity, how do you foresee this market to grow in future and what would be the strategy of Tele Atlas and TomTom with regard to the competition in market space?

Tele Atlas is going to continue to be a digital mapping company. We have invested a huge amount, close to a billion dollar, in the last 20 years in this field and we feel that right now we have the best digital maps available in the market.

Our important characteristic is that our product is fully navigable. It's the key. It is one thing to tell where a place is, but how to get to that place.

That is where we differentiate. So I would say that Tele Atlas is not in the space of competing with content companies. We are going to do what we do best, that is produce digital maps. ■



Mobile Mapping Van for capturing attributes

Laser Scanning and Digital Aerial Photography-Today and Tomorrow

Moscow, December 6 - 7, 2007

The 7th Annual International Conference and Exposition 'Laser Scanning and Digital Aerial Photography. Today and Tomorrow' was held in the President Hotel, Moscow, December 6-7, 2007. The event was attended by 250 participants, including 170 seniors and high-rank officials, from 19 countries. This year delegates from Uzbekistan State Committee for Land Management, Geodesy, Cartography and Cadastre as well as delegates from Azerbaijan State Committee for Land Management and Cartography attended the conference. CIS countries are making huge strives to improve economic situation in their regions and they are currently facing quite a number of really burning issues that are to be solved on a state level: land inventory, facilities planning (industrial and urban), environmental monitoring. In

7th International Conference on Laser Scanning and Digital Aerial Photography-Today and Tomorrow

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this respect up-to-date geospatial information is the key factor for implementation of the above tasks and sustainable development of any region. The conference provided a platform for knowledge and experience sharing - delegates presented their reports bringing up the most up-to-date issues in Geodesy, Surveying, Mapping and Topography.

This year ISPRS Council members participated in the conference. Orhan Altan, Secretary General, John C. Trinder, First Vice President, Stanley Morain, Treasurer made their speeches. Dr. Franz Leberl's presentation came to be a real surprise for the conference attendees. The

founder of Microsoft Photogrammetry announced the development strategy of Virtual Earth Project. Presentations were made by Miles Taylor (Aerodata International Surveys), Anders Ekelund (Airborne Hydrography AB), Dr. Miklos Gross (Eurosense), Hannu Korpela (Terrasolid), Nikolaus Studnicka (RIEGL LMS), Dr. Hans Joachim Hellmeier (Rollei GmbH), Dr. Sergey Kadnichanskiy, (Geokosmos), Valentin Zaitsev and Mikhail

Druzhinin (Leica Geosystems) and many others. Another feature of the 7th Conference was the participation of satellite imaging companies. It demonstrates a good tendency of potential convergence and interaction of the two segments of geodetic market that were formerly opposed to each other, i.e. aerial surveying and RS. The



Participants at the Conference

Conference hosted an exposition demonstrating the latest innovations on the geodetic market, up-to-date equipment for aerial and terrestrial survey, software products. Among the exhibiting companies were Russian commercial, scientific and educational organizations as well as well-known overseas companies such as Airborne Hydrography AB (Sweden), Terrasolid Ltd. (Finland). ■



NEOGEOGRAPHY: Goodbye to GIS?

Pitney Bowes Software president, Mike Hickey statement that "the explosion of Neogeography is driving awareness [and] collaborative data consolidation [but it] isn't GIS", at Korem's Geodifussion conference and Joe Francica's post "Neogeography is not GIS; not LI" which generated lot of discussion, instigated me also to have a look at the term "Neogeography".

Googling the term referred to almost 194,000 pages!, a significant number considering the fact that term was coined only few years ago by Di-Ann Eisnor, co-founder of Platial.com. Before getting into the definition of the term

and discussions going around on several blogs, let's have a look at its origin.

Di-Ann Eisnor says she and fellow creator Jason Wilson got the idea to create a site for sharing their information on the map through web, after returning from an extended stay in Amsterdam, the Netherlands. They wanted to share their created hard copy maps detailing local sight-seeing points (pinned for a way to keep them in a more permanent fashion), which were otherwise useless when they returned to USA. At that point they hoped that the site will grow into something with millions of interest plotted by thousands of users around the world, and they did not realise that this would lead them to

some new terms like "mashups", "push-pins" etc. However, they termed it as "Neogeography" and this remained more in oblivion and other terms caught-up fast on the internet. So, is "Neogeography" is the merging of user data and experiences with online mapping technologies (<http://www.mcwetboy.net/maproom/2006/04/neogeography.php>), another term for "mashups"?

Let's look at different definitions being floated around in the geoblogosphere. According to Wikipedia Neogeography means "new geography" and consists of a set of techniques and tools that fall outside the realm of traditional GIS, the Geographic Information Systems. Where historically a professional cartographer might use GIS software like ArcGIS, MapInfo, etc., talk of Mercator vs Mollweide vs Lambert Conformal Conic projections, and resolve land area disputes or prepare disaster management plan or analyses the store sales data, a neogeographer uses a mapping API like Google Maps, talks about GPX versus KML, and geotags his photos to make a map of his summer vacation. Essentially, Neogeography is about people using and creating their own maps, on their own terms and by combining elements of an existing toolset.

Andrew Turner defines (<http://high-earthorbit.com/neogeography-towards-a-definition/>),

neogeography [nē-ō-jē-ōg'ī-fē]
geographical techniques and tools used for personal activities or for utilization by a non-expert group of users; not formal or analytical.

[Greek, from neos, new. and Latin ge?graphia, from Greek ge?graphi?]
neogeographer ne'ō-ge-og'ra-pher n.

Andrew Turner in his book "Introduction to Neogeography" (published by



O'Reilly Media), says Neogeography combines the complex technique of cartography and GIS and places them within reach of users and developers.

Bret Taylor, product manager for Google says, "We provide the map, and the other people put in the pushpins". This trend has been dubbed as Neogeography, and some enthusiasts predict, it could spur a revolution in "electronic cartography". (http://news.nationalgeographic.com/news/2006/04/0425_060425_map_blogs.html)

To my understanding (I am no GIS guru, like people commenting on this topic on the blogosphere), Neogeography is born when the GIS has matured.

Before explaining this, let's have a look at "Nolan's Growth Model" (first published by Davis and Ohlsen for the IT industry in 1987) and later modified by Hans Bestebreurtje in 1997 for his MSc UNIGIS thesis on GIS Project Management (<http://www.unigis.nl/downloads/msc/Hans%20Bestebreurtje.pdf>). The model (shown in Fig-1) has four stages of growth.

These four stages of the growth apply to every technology. When the technology reaches to the saturation level, it moves into the background, becomes acceptable to the masses and proliferates to the lowest user level. It is then when new solutions start being built.

GIS also has reached to its saturation

level (not in all regions of the world, although) and derivatives of this technology has started coming in. The term "Neogeography" is one such derivative of GIS. Similar thoughts, albeit in a different

manner, is shared by Paul Bisset (<http://blogs.weogeo.com/pbissett/2007/04/28/supersaturation-in-neogeography/>), who suggests that this field - geography, mapping, whatever you want to call it - may be approaching a point of supersaturation.

Software developers, hobbyists and others (may or may not have the understanding of the intricacies of GIS) have started developing tools and applications built around the available data and maps. This phenomenon is being termed as "Neogeography".

Dave Smith (<http://surveying-mapping-gis.blogspot.com/>) defines Neogeography as, "geographical techniques and tools used for personal activities or for utilization by a non-expert group of users; not formal or analytical". He even goes on to the extent of saying "Is there

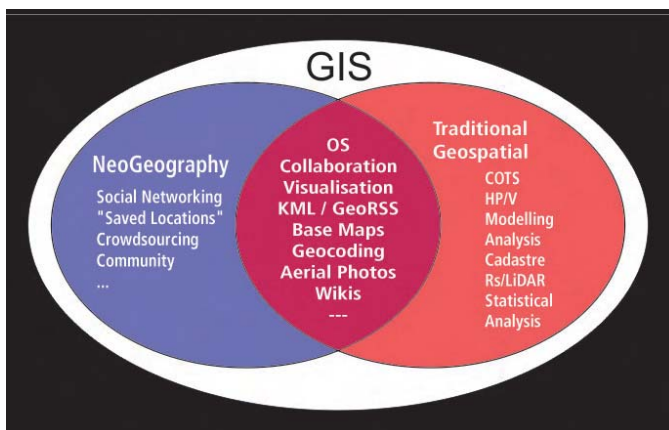


Fig. 2. Comparison between traditional geospatial and neogeography

traditional geospatial community? The GIS World magazine (www.geoplac.com), for their annual "Industry Outlook" article for the Dec 07 issue asked their industry advisory board members "Does neogeography help or hurt the geospatial industry?" Responses were generally positive, except from David Maguire (ESRI) and Carl Reed (OGC)!

So, GIS and neogeography, both are here to stay as geography has survived alongwith GIS and other sciences. Yes, neogeography has helped the GIS and mapping professionals being recognised by the masses (largely thanks to Google and their API) and new tools and application being developed which can be used by all and sundry and is not restricted to a closed and specialised group. This will further help in maturing the GIS technology.

Lastly, I would like to share a Visio diagram (Fig-2, <http://surveying-mapping-gis.blogspot.com/2007/12/neogeo-wars.html>), which summarises the comparison between traditional geospatial and Neogeography.

It is for you to decide, whether this signals an end to the GIS or towards more mature GIS?

Does neogeography scare the

Dr. Satyaprakash
satya@GISdevelopment.net

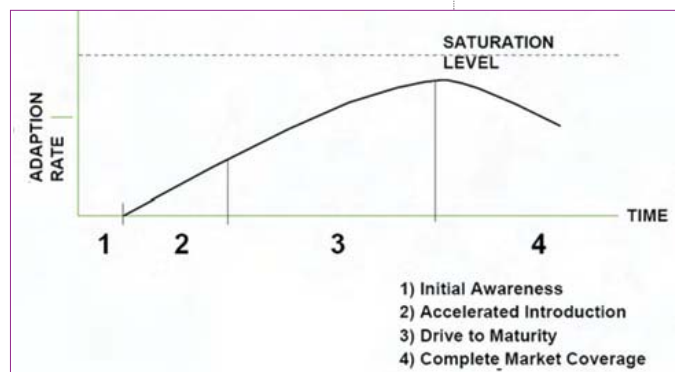


Figure 1. Nolan's Growth Model

Geospatial Publications



Print & Online

Print Publications

GIM International (January, 2008)
(<http://www.gim-international.com>)

SDI as Holistic Framework- Integrating Natural and Built Environments

Monitoring and controlling the environment requires its natural and built components to be integrated within an inclusive model. Integration of multi-sourced spatial data plays an important role here. The authors argue that a Spatial Data Infrastructure (SDI) can provide this.

Customising GIS- Intrinsic Programming or Object-oriented Methods

GIS software is usually customised using intrinsic programming and writing scripts in conventional programming languages. The author uses case-studies to compare the two methods and illustrates the importance of OOGC in integration of GIS with other information systems.

Turkish Cadastral Organisation- Registry and Cadastre under One Roof

Cross-control may eliminate errors but also creates the danger of inconsistencies; information might be stored redundantly, while two authorities, each charging their own fees, continue to function disjointedly. In describing the Turkish Cadastral Organisation the authors show the benefits of 'one organisational roof'.

GeoWorld (December 2007)
(<http://www.geoplance.com>)

Industry Outlook 2008 - Peering through the Looking Glass

GeoWorld magazine celebrated its 20th anniversary in 2007. Ten years ago, this magazine asked its Editorial Advisory Board members to predict what the industry would be like in 2007. Impressively, many of the predictions were rather accurate. So this year seemed the perfect opportunity to revisit this exercise, peer into the future and see where our board thinks the industry will be in another 10 years.

Image-Processing Progress - New Tools Automate Labor-Intensive Techniques

With satellite imagery becoming more accessible and affordable in recent years, GIS professionals now use it for diverse applications ranging from scientific research to resource management and urban development.

Geo: Geoconnexion International (January 2008)
(<http://www.geoconnection.com>)

A Web Application Deployment Model

The EDINA National Data Centre at the University of Edinburgh provides the Digimap Service, serving the primary UK national geographic dataset - OS MasterMap - to the whole higher education community in the UK.

Reaping the Rewards of Satellite Navigation

Eric Fumat of NAVTEQ wonders if businesses recognize and understand the benefits of using satellite navigation, which are provided by independent surveys and numerous reports and research.

GIS Development- Global Geospatial magazine (Dec. 2007)
(<http://www.GISdevelopment.net>)

An introduction to Enterprise GIS

Geospatial information is increasingly becoming a part of the information needs for the daily operations of an enterprise. The enterprise could be a business like a department store, a utility like a power company or a local government entity like a municipality or even a government department like roads and buildings.

Building an Enterprise GIS

The enterprise model is a multi-purpose system that is part of the operational framework of an organization. It is defined as a GIS that is used by multiple agencies within different organizations. The objective of Ras Al Khaimah GIS Project (RAKGIS) is to utilize GIS technology to support several local government departments (Town Planning and Survey Administration, Building and Engineering Administration, Public Works and Services Department, Sewage Authority, and Land Department).

GEO TIMES (January 2008)
(<http://www.geotimes.org>)

Out of Africa: Following the Arabian Trail

New geoaerchaeological evidence indicates that early modern humans may have ventured out of Africa and through southern Arabia, instead of the Levant.

Tectonic Hypotheses of Human Evolution

New evidence from the Blue Nile and other locations in Africa suggests that the main formation of the East African Rift Valley coincided with major turns in human evolution, suggesting that tectonics played a major role in evolution.

American Surveyor (January 2008)
(<http://www.amerisurv.com>)

Point to Point: Compromising Positions

With the advent of electronic measuring devices, most of the quantitative differences from surveyor to surveyor have decreased to trivialities. Is there any disagreement on that score? We simply do not encounter vast observational differences between modern surveys these days. This is not to say that disputes wholly surrounding measurements will never be seen again- after all, small magnitudes can still generate big controversies, especially in densely populated areas..

Rendezvous 2007- Celebrating the Most Renowned American Surveyor

His life story simmers in the stew of fable, history, scholarship and legend. At any one point during his life, George Washington was a militarist, diplomat, distiller of spirits, statesman, innovative farmer, legislator, but most importantly to our mutual interests, a surveyor of property.

Online Publications

Directions Magazine (Dec. 2007, Jan. 2008)
(<http://www.directionsmag.com>)

GPS Pioneer Addresses LBS Market Fundamentals

Kanwar Chadha of SiRF Technologies speaks to Joe Frasca about the ongoing hyperbole in the location-based services marketplace..

Mobile Today becomes What Tomorrow?

Writer Chris Andrews takes a few minutes to imagine futuristic uses of geospatial technology and wonders how far off these kinds of applications really are..

Creating an Extensible GIS with SOA and Web Services

Ross Smith and Andrew Sheahan from PA Consulting advocate a SOA/Web services approach to your GIS environment..

Sea Changes and Ripple Effects of 2007

Number of industry insiders and executives to Directions Magazine discussed the big sea changes and the ripple effects they saw in 2007, and where they expect those to take us next year.

Vector 1 Media (Dec. 2007, Jan. 2008)
(<http://www.vector1media.com>)

Top 10 of 2007

Jeff Thurston and Matt Ball look back at the Top stories of 2007. Making the list are policy changes, industry consolidation, newer technologies and products..

Ten Predictions for 2008

Advancements in virtual reality and GIS Modeling, integration that will make infrastructure design-creation and maintenance- more efficient..

Source of Truth: Is the IT Community prepared for Spatial Data Infrastructures?

The term Spatial Data Infrastructure (SDI) is described in Nebert's SDI Cookbook as "the relevant base collection of technologies, policies and institutional arrangements that facilitate the availability of and access to spatial data." But is the IT community prepared for SDI?

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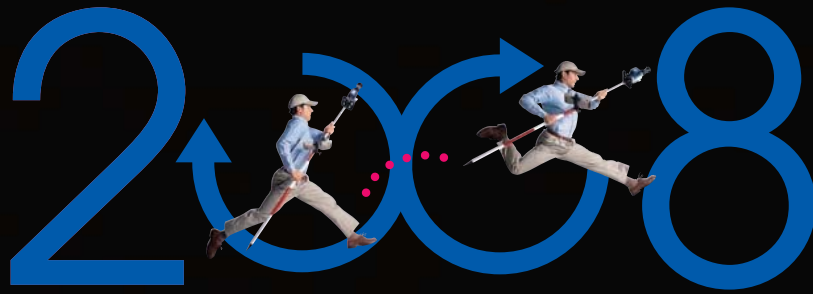
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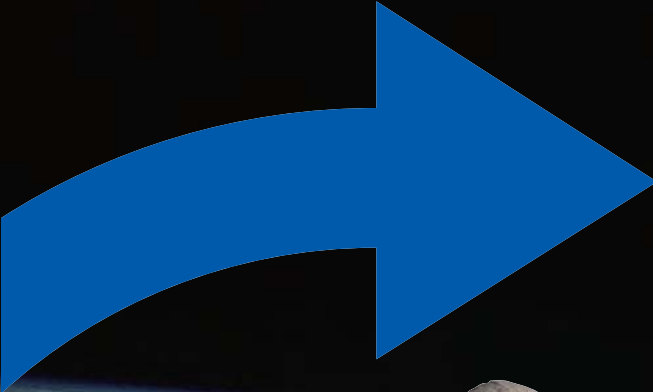
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www.mapindia.org

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Location India 2008
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www.location.net.in/india

8 - 8 February

GIS MARE 2008
Carrara, Italy

<http://www.carrarafiere.com>

16 - 17 February

Digital India 2008
Hyderabad, India

www.gisindia.in

18 - 20 February

INTERGEO EAST 2008
Belgrade, Serbia and Montenegro

www.intergeo-east.com

19 - 21 February

Munich Satellite Navigation Summit 2008
Munich, Germany

www.munich-satellite-navigation-summit.org

19 - 20 February

2008 Indiana GIS Conference
Indianapolis, USA

www.in.gov/igic/conference/index.html

21 - 22 February

International LiDAR Mapping Forum 2008
Denver, USA

www.lidarmap.org

25 - 28 February

12th Annual GIS / CAMA Technologies Conference
New Orleans, USA

www.urisa.org/gis_cama

25 - 29 February

GSDI 10
Trinidad and Tobago
www.gsdio.org/gsdio/index.htm

March 2008

9 - 12 March

GITA's Geospatial Infrastructure Solutions Conference
Washington, USA
www.gita.org/events/annual/31/index.asp

11 - 14 March

MicroRad 2008
Florence, Italy
www.microrad2008.org/index.asp

17 - 20 March

TUGIS 2008
Maryland, USA
www.tugis.towson.edu

April 2008

5 - 8 April

Spatial Analysis for Business 2008
Redlands, CA USA
www.spatialconference.org

8 - 10 April

Map Middle East 2008
Dubai, UAE
www.mapmiddleeast.org

15 - 19 April

Association of American Geographers Annual Meet
Massachusetts, USA
www.aag.org/annualmeetings

16 - 18 April

Remote Sensing - The Synergy of High Technologies
Moscow, Russia
www.sovzondconference.ru/eng

May 2008

28 - 2 May 2008

ASPRS 2008 Annual Conference
Oregon, USA
www.asprs.org/portland08

June 2008

10-12 June 2008

GIS/SIT 2008 - Swiss GI Forum: Added value by Geoinformation
Zurich, Switzerland
www.akm.ch/gis_sit2008

July 2008

1 - 4 July

Geoinformatics Forum Salzburg (GI_Forum2008) Salzburg
Austria, Europe, Salzburg
www.gi-forum.org

21 - 25 July

GeoWeb 2008
Vancouver, B.C., Canada
www.geoweb.org

August 2008

4 - 8 August

6th International Conference on Case Histories in Geotechnical Engineering
Washington, D.C., USA
www.6icchge2008.org

5 - 7 August

GEOBIA, 2008
Calgary, Alberta, Canada
www.ucalgary.ca/geobia

19 - 21 August

Map Asia 2008
Kuala Lumpur, Malaysia
www.mapasia.org

25 - 26 August

Map Africa 2008
Cape Town, South Africa
www.mapafrica.gisdevelopment.net

September 2008

8 - 11 September

10th Int'l Symp on High Mountain RS Cartography
Kathmandu, Nepal
www.icimod-gis.net/news/showDetail.php?id=193

22 - 24 September

1st Int'l Conf. on Remote Sensing Tech in Disaster Mgmt & Emergency Response in the Mediter. Region
Zadar, Croatia
www.earsel.geosat.hr/index.shtml

October 2008

29 - 3 October

FOSS4G 2008
Cape Town, South Africa
www.foss4g2008.org

30 - 2 October

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