Trends that will shape the tomorrow

Geospatial technology is tremendously advancing, and so are the ways and means of collecting, using and sharing data. **M Lorraine Tighe**, Director - Geospatial Solutions at Intermap Technologies, outlines the key trends that will shape the geospatial sector in the days to come

The geospatial industry produces products, services, and information (such as location-based business intelligence) using a vast array of geospatial disciplines such as surveying, geodesy, mapping, cartography, remote sensing, and GIS. Such disciplines acquire, integrate, manipulate, display, analyse, interpret, and disseminate geospatial information and solutions focussing on geographic, temporal, and spatial aspects of the world's environment.

Today, geospatial data and mapping information is more accessible than ever, resulting in an ever-growing audience of both geospatial and non-geospatial users. Convergence and integration of geospatial technology with mainstream technologies, like Internet, telecommunication, and IT, has enabled the harnessing of the true potential of geospatial information and technology for helping people to make informed decisions – from ones as simple as where to have dinner, to ones as complex as where to locate emergency care during the aftermath of a hurricane.

The geospatial industry being so diverse and widespread, the market is growing at an annual rate of almost 35 per cent, with the commercial subsection of the market doubling each year (Geospatial Information & Technology Association). Furthermore, the industry is witnessing rapid change as more and more users, both professional and general, have begun using the technology.

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Awareness of the technology among general public also increased due to the emergence of social media and increased access to geospatial information. Here are a few trends in geospatial industry that will continue to flourish throughout 2012:

Continued growth in geospatial technology application

The global community is today faced with the issues of population explosion,

increase in the occurrence of natural disasters and climate change. These are placing increased demand on food supply, infrastructure and conservation initiatives (e.g. REDD). Geospatial technology plays a vital role in meeting these challenges – from increasing agricultural produce, upgrading and expanding infrastructure to enhancing disaster preparedness. As a result, there will be increased demand for location-based solutions and the industry will witness more of business consolidations and partnerships among geospatial and non-geospatial companies. Geospatial information and related products/services will become an ever increasing asset to organisations and user communities that extend even to the most remote regions around the globe, for gathering data and providing business intelligence.

Providing smart solutions to meet customer demands

With billions of sensors and mobile devices generating enormous volumes of ubiquitous high-resolution geospatial data options, creating new revenue opportunities will be a challenge for the commercial sector. Companies will need to offer accessibility to geospatial data, provide competitive cost structures such as low-cost subscription models paid over time, and be responsive to end-user needs by providing solutions to their requests, rather than just data. Thus, using geospatial data to provide quick, direct solutions to a high volume of customers for a small price tag, will gain momentum in 2012.

Geospatial data standards

Open geospatial standards, such as Open Geospatial Consortium (OGC) consensus in process, will encourage the development and implementation of open standards for geospatial content and services, GIS data processing, and data sharing. Current geospatial standards, like OGC, are mature and effective, and have enabled the effective sharing of geospatial data. However, new standards will be required for new applications and adjacent markets. For example, open platforms that support common processes like situational awareness and emergency response, will surface. These platforms will include mobility and social networking. We see continuing movement towards integration of the sensed environment in a spatial/temporal context for improved situational awareness across many different disciplines. The ability to quickly discover, access, fuse and apply information from a myriad of fixed and mobile sensors 24/7 is poised to dramatically improve decision-making across a range of disciplines and activities, from ocean science and weather, to climate control, environmental monitoring, emergency management and retail services. Standards developed for OGC Web Services and OGC Sensor Web Enablement (SWE) are helping to facilitate this trend.

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Data accessibility and dissemination

Geospatial information can be manipulated, enhanced, and analysed using commercially available GIS software, allowing customers to analyse a variety

of data for use in such fields of interest as vehicle routing, utility planning, land-use planning, wetland and vegetation monitoring, land resources inventory, water management, coastal flood zone monitoring, telecommunications network planning, forest cover analysis, forest harvest analysis, soil erosion monitoring, forest depletion, and forest regeneration planning.

Given the vast array of applications within the geospatial industry, one might ask, are geospatial industries on a global mission to make geospatial information and solutions universally accessible by all? This reality is coming to life thanks to the advances in geospatial technology, in particular cloud computing.

The massive amounts of data storage requirements of the geospatial industry make storage in the cloud an attractive option. In the cloud, geospatial information becomes accessible through simple interfaces that can display, integrate, analyse, disseminate and provide quick location-based answers and solutions. Moving to the cloud, thus, will be the key in 2012.

In 2012 we shall see cloud computing expand as users and vendors sort out the cloud's initial potential. A Web services platform, made possible via cloud computing, will enable users to accomplish such tasks simply by subscribing to OGC-compatible data services. We may see geospatial companies partner with, or offer themselves, some or all parts of cloud services, from infrastructure and platform to solutions and data. In particular, solution-based cloud computing, on any device, is critical to the future success of the geospatial industry. For example, Google has Google Earth Builder and ESRI has ArcGIS.com. Others ought to get on the band wagon or get lost.

Cloud-based data access coupled with web-based mapping tools will help to expose patterns and to extract actionable information from a huge, chaotic volume of data pouring out of many stovepipes. Such cloud computing will change business models of geospatial companies by creating revenue streams based on data and solutions accessible through any device using APIs. This creates a standard for use in many applications (e.g. professional GIS products, hand-held devices, games) and expands the customer base beyond geospatial users to include non-geospatial users.

Data aggregation

Data aggregation (also referred to as data fusion or data mining) services will continue to grow as end-users tighten budgets, reduce spending associated with newly acquired data, and look for ways to aggregate their data from multiple sources and acquisition times to provide complete coverage of their area of interest. Aggregation or fusion services that will provide a common data layer for which other analysis can be performed will thus grow in 2012. This cost-effective solution which allows the customer to take advantage of existing datasets will result in geospatial companies developing ways to support customer aggregation or fusion requests.

3D visualisation

There will be an increase in the ways we visualise geospatial data, moving from a mapping-environment view to a view that demonstrates how the user would experience a location as if their feet were on the ground, e.g. street views in Google Earth. The creation of geospatially accurate 3D city models and flythrough software that allow users to view a journey may possibly increase. Examples include in-flight simulators, real-estate viewing, and gaming. Three-dimensional building models will continue to grow and help to create realistic views of our landscape. Geospatial data is critical in helping to supplement 3D views of other geo-coded information to provide 3D business intelligence. Three-dimensional visualisation will be fed by new semi-structured data from mobile devices, geo-tagging of existing enterprise structured data, and tapping into new streams of location-aware unstructured data.

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Location-based business intelligence

At the end of the day, large volumes of data are just data; they are not answers yet. Customers are increasingly asking for solutions to real business problems, especially in the commercial market sector. Solving business problems with geospatial data and cloud computing will become increasingly important in 2012. More and more geospatial solutions and 3D business intelligence services that provide customers with "answers" rather than "data" need to be developed. Increasing complexity of geospatial solutions, and the continued growth in the geospatial technology industry, will lead to both business consolidation as well as increasing partnerships.

Smartphones and social media

In 2012, the majority of mobile phones will know the users' spatial location. Mobile devices will continue to become strategic platforms for consumer, commercial, and enterprise information technology. As computing for geospatial 3D business intelligence is pushed further out to mobile devices, the use of location-specific technologies and geospatial data will expand and become invisible. This will lead geospatial organisations in finding ways to providing insights and value to users.

A prime example of this was in the State of Alabama. In April of 2011, a disastrous set of hurricanes rolled into the north-western part of the state causing millions of dollars of destruction in its path and causing system failures at the state's emergency response team's building which had been hit. Social media, driven by mobile cellular telephones, became a saving grace for emergency response teams. Using current aerial photography uploaded to the cloud, in addition to feet on the ground driving and uploading photos using cellular telephones, they were able to identify what the streets looked like in the aftermath of a hurricane. From this data, geospatial analysts were able to delineate access routes that were clear of large amounts of debris.

"Crowdsourcing"

In an increasingly connected world, volunteered information will become more and more important. In 2012, we will see "Crowdsourcing" begin to dominate our decision cycles. Information created in this way will be increasingly important for government and business, and may radically challenge traditional approaches to geospatial data generation and maintenance.

One incredible example of crowdsourcing is a project in the Borneo rainforest in Kalimantan, Indonesia. Here, software giant Microsoft has teamed up with TakingITGlobal to back 15 young 'eco-warriors' in the jungles of West Kalimantan, Borneo in an effort to curb deforestation, on a project called DeforestAction. The eco-warriors are getting assistance in this cause through crowdsourcing. They have reached out to thousands of school students throughout Asia Pacific, helping drive awareness and calling for more students to join the initiative as Action Agents. Using a groundbreaking new software tool called EarthWatchers, students monitor patches of the forests (in the shape of a hexagon – as they did not wish to be "square"), and provide usable intelligence to stop deforestation. Utilising Microsoft SQL Azure database technology, Silverlight technology for engaging and dynamic interactivity, as well as Bing Maps and the latest in satellite imaging and monitoring technology, EarthWatchers provides a new approach for education by involving students directly in conservation efforts by allowing them to monitor real data interactively.

Geospatial companies are responding to this type of activity by providing data and training to assist in the recognition of deforestion. For example, Intermap Technologies has supplied cloud-free radar imagery over a section of the hexagon patches in Kalimantan. Next, Intermap will provide training on image interpretation that will assist the eco-warriors and high school students in identifing deforestation. For more information on this project, check out http://dfa.tigweb.org/.

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Closing remarks

Despite the global economic crisis, geospatial technology is advancing at rapid pace. As result of convergence of technologies enabled by the continuing advance of standards, many extraordinary trends are emerging, and the list of these is certainly not limited to those described above. Perhaps the mega-trend to note is that there will be increasingly tight connections between social media, ubiquitous amounts of remotely sensed and GIS data, and geospatial and non-geospatial entities to solve many global issues facing us today. There still is more to do. The geospatial industry will change how they do business in the years to come, primarily due to the advances in cloud computing, social media, and satellite imagery.

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