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LOCATION+CONNECTIVITY IS THE KEY

Kanwar Chadha
 Founder
 SiRF Technology Inc.
 (A CSR plc company)

From GPS to portable location awareness – How is SiRF trying to create this awareness and what is it looking to provide within this?

The focus so far has been just getting the core voice capability into the market and it is only now that data services are starting to become part of the platform. Once that happens, location and navigation will take off much quicker. In general, the Indian market is very slow to take off and then one event suddenly propels it. This situation was witnessed in mobile phones. India was far behind a few years back but now is the second largest user of mobile phones with the highest growth, and it is not that only the cheapest phones are popular. Location is going to go the same way. In India, people lose their way very often, so having the location capability linked to the map capability is going to be very good usage proposition for consumers. In general, Asians are more social networking oriented. The consumer profile for location usage in India is more aggressive than in the Western world. So it is just a question of getting a few early hiccups out of the way. We are working with operators and handset providers on making location an affordable entry point. Even phones without GPS will have the basic loca-



tion capability, with high-end handsets having better accuracy. Once the mapping infrastructure is in place and platform-based location capabilities are available, there will be lot more content and applications. The whole concept is that we are always location aware just like we are time aware, so we know approximately what time it is and approximately what location it is. In lots of applications that is good enough. Time is changing at a fixed interval, and depending on the application, location is changing all the time because even if one is in the office and is moving, location is changing. There are going to be certain applications that are going to be based on indoor location. For a specific purpose users use location and then they start looking at other applications where the concept of location awareness is inherent, like social networking where one's acquaintances might know or may want to know

where they are. In the long run, they would want to have an almost seamless experience where their location is actually adding a context to a number of things they do.

Technology convergence is the norm of the day. What in your view will be the driving factors for LBS vis-à-vis technology convergence?

There is one fundamental shift happening. Location used to be linked to navigation and outdoor usage. Now, as users move towards more and more applications where they share location information, convergence between connectivity and location becomes more important. Also, we are moving away from an environment where the content is resident in the device itself to an environment where content in many cases is on the cloud. In some cases, real time information has to be combined with static information. So there is a clear link between connectivity (including Bluetooth, Wi-Fi or cellular network) and location. The other thing is convergence at platform level. Of late, a smart phone can run a number of applications and a mobile Internet device can fit into the pocket. Convergence at the platform level drives how people start using location into all these devices.

But we see that indoor navigation is still a challenge.

In the last 12-18 months, the market actually has moved in spite of economic downturn and has moved at a more rapid pace in accepting location. There are services, but one part of that whole equation that as one starts moving from navigation being a location application, in many cases navigation may not be used at all. Lots of applications assume that location is available all the time and everywhere. And that everywhere

includes indoor. Most of the time, social networking and search are indoor location applications. Security, workforce management, enterprise logistics can be indoor or outdoor. The challenge is to make sure that location is reliably available in all the environments in reasonable quick time and that is where we have to start thinking beyond GPS or any other GNSS. One has to have a platform with good quality of service for both indoor and outdoor locations and this is where a combination of radio and sensor technologies comes into place.

In many cases, lot of mobile phones, entry level devices may not even have GPS but we still want to give them a certain level of location, slightly inaccurate but reasonably approximate location. Once people start using it, they will realise the need for more accurate location and can upgrade to GPS. So it is important to make location affordable for everybody.

There seems to be a proliferation of GNSS systems. Do you foresee this to give a boost to location enabled applications? If so, how?



At a certain stage, a critical point of infrastructure is reached where there is both a regulatory drive as well as pull from consumer for any particular application. This was earlier witnessed in communication network. Now, GPS has a reasonable footprint, but in most of the urban areas, there are not enough satellites visible. Combining GPS with GLONASS or Galileo will see many more satellites, leading to a reasonable coverage in most of the obstructed environments. Another issue here is that GPS was a US system and many countries are not comfortable linking their critical infrastructure and critical applications through the US network. These concerns can be taken care of with multi-dimensional satellite networks. Also, having more than one network also enables more competitive environment and faster infrastructure improvement. A combination of these three elements - better quality of service, more competition and less dependence on one particular network - will create a greater explosion of those applications.

How has the merger with CSR helped to position SiRF?

Three important factors drove this merger. Both SiRF and CSR saw a convergence between location and connectivity. SiRF's strength is on the location side, while CSR's is on the connectivity side. Both realised that it is difficult to catch up to the leaders once the market has reached a certain stage and it was better to combine the two leaders rather than have leadership in one and catch up on the other technology. Secondly, lots of our customers are looking for one vendor to provide multiple technologies. With the merger, we have a broad portfolio of technologies. The third reason is scale. In a market which we believe has huge opportunities to grow, scale becomes important. ■

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Stanley NG

CEO
MapKing

What in your perception would be the trend in the growth of LBS in the next few years in the region MapKing caters to?

The combination of China, India, Taiwan and Hong Kong constitute about three billion population. The pace of development varies as some of the countries like Singapore are aggressive and very positive to treat GIS infrastructure as one of the basic investments. Because of this, we see huge demand in the region as a whole. However, the progress of each country varies.

In the next 3 - 4 years, the market for personal navigation devices will be promising. Firstly, the awareness of GPS, the awareness of personal navigation, the falling prices of PND hardware and mobile phone hardware is making GPS navigation an affordable solution for most of the general public. If we look at the region collectively, it will continue growing in double digits in spite of the slowdown in the economy. Moreover, we see a sharp upturn in the economy in Q2 and Q3 this year. Economy of Asian countries like Singapore and Hong Kong is picking up. We see positive response from our corporate clients and hardware vendors. POs have started coming in again.



While availability of data is a problem in many countries, some countries want dynamic data. As a map data provider, what do you think are the institutional and technological bottlenecks to get real time data?

Quality of base data varies a lot in the region. I expect most of the governments to have GIS infrastructure as part of the basic IT infrastructure for the e-community. If this can be achieved in the coming five years, most of the citizens in the region can enjoy better route, better navigation and better tracking solutions. To achieve real time navigation in the region, I believe lot of efforts need to be put in.

One of the major enabling institution could be the Asian organisation with all the major countries as members. In Europe, after the formation of European Union, countries started working together. Today, they share their navigation infrastructure and bring very good penetration

and good consumer satisfaction in the navigation as well as general geospatial industries.

If you put a cargo on a truck in London, you can deliver it in Austria without a stop, without any border and without any customer check. So you see that the benefits are multi-fold. At the moment, efforts to form such an Asian organisation are not very forthcoming. But I see with the formation of free zones coupled with the tightening up of communications, we can expect to achieve borderless Asian countries in the coming years.

MapKing is now the distributor of Pitney Bowes MapInfo products in Hong Kong and Macau. How do you see this arrangement as supplementing and complementing MapKing's activities in the region?

MapKing is basically a consumer navigation company. And MapInfo is the leading GIS application company. MapInfo products are strong in telecommunications and business intelligence. We see that both product lines are complementary. This is an advantage for our company.

What in your view are the future trends in the consumer use of geospatial data?

Geospatial data will become more affordable and more accessible. And you can see more applications coming up. When you look at the solutions today, all of them are still Europe-based or western-based solutions. This means they will have difficulties to cope with the three billion population and more than 500 languages/dialects in the region. MapKing is trying to bring solu-

I expect most of the governments to have GIS infrastructure as part of the basic IT infrastructure for the e-community

tions that are more suitable to the work and culture of the region. We have just launched a competition to encourage university students and university graduates to evolve in a GIS environment. We hope that when such initiatives become popular, there will be more local content, solutions coming from young people. This will achieve business and academic solutions with local support. ■

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G. (Jake) Jenkins
Senior Vice President
GeoSAR Services
Fugro EarthData, Inc.

What do you envision for geospatial in the future?

I see geospatial becoming fully integrated into everyday decision making. Not just by government agencies and engineering firms, but by the public at large.

Look how far we have come already. When I started my career in the 1970s, geospatial data was mostly depicted in printed map format. Cartography was applied to photogrammetric data on scribe-coats, peel-coats, and various other cronaflex sheets. These 'layers' were thematically-based, colour-coded and included symbology, but you couldn't isolate an individual feature class (roads) within a theme (transportation). There were other obvious limitations as well.

Then came digital mapping in the 1980s where map features not only had colour and symbology, but also a theme and a feature code. Paper maps were still delivered with the cartography intact, but now customers also received the supporting digital data, which could be queried and reviewed with singular or thematic searches. In the 1990s, we saw further sophistication in the map-making process along with the beginning of a vast array of value-added products that had not existed 20



years earlier. And here we are today, operating in a fully digital environment where data is acquired, processed and delivered in record time and with unprecedented accuracy and detail. Our data is colour and feature-coded, thematically organised, symbolised, attributed and linked to external databases so that multiple users from multiple disciplines can access and manipulate the source data simultaneously. We utilise the data on our desktops, in our automobiles and on our smart phones. All this was accomplished in the last 30 years, and within one generation.

But there's more to come. I think in the next decade we are going to see a deeper connection to geospatial data from institutions and individuals alike. Cloud sourcing is a good example. With this technology, the general public is starting to voluntarily update public geospatial datasets online; I find that extremely exciting. Given the richness of data content

and the range of GIS tools now available and soon forthcoming, geospatial won't just be about location anymore. It is going to be way more embedded, helping to solve the world's critical problems, such as climate change, poverty and pandemics. I see a future where geospatial is fully incorporated into policy, business, finance, healthcare, environment, agriculture-you name it. And as a result, all of the critical components of our lives will function at a higher level.

What role will Fugro play in achieving this vision?

Fugro has a long and accomplished history of innovating to meet the changing needs of our customers within their varied market sectors. This includes LiDAR innovations, the commercialisation of GeoSAR for dual-band airborne IFSAR mapping and most recently a panoramic mapping system that enables production of vertical and oblique orthoimagery from a single flight. For us, it is a simple equation. We listen to our customers, we partner with the very best technology and research firms and we empower our

managers and technical staff to find new solutions to problems so that we can fill technology gaps and develop niche markets. As a global company with capabilities that include satellite, airborne, marine and terrestrial services, we have at our disposal an incredible pool of talent from which to draw. It is a situation unique to the industry and it is a position that we highly value and thus will continue to cultivate.

What would be the most conducive environment for your vision to fructify?

I think we are there. It may not be the best economy, but with electronics continuing to evolve and Web based services becoming more sophisticated, businesses, governments and average citizens are increasingly using geospatial technology in their everyday lives. Consider the rapid growth of Google Earth. What started out as an extension of Google's search services has quickly become a high-demand tool for business and government users through its professional and enterprise versions. We see this increased use of geospatial

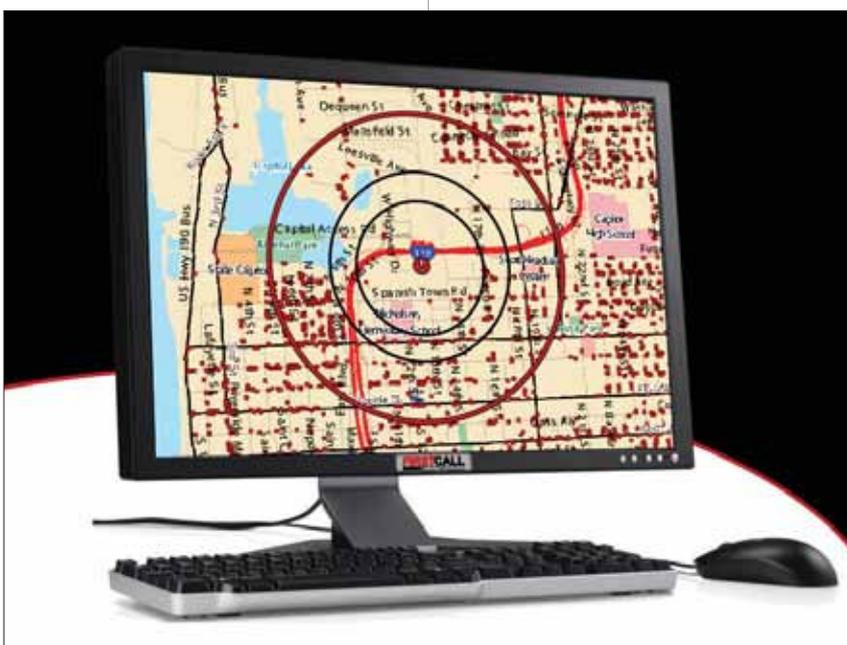
data continuing in the near term and are working with our customers, technology partners and researchers to maintain our leadership advantage over the next decade.

What in your view is the responsibility of stakeholders-be it government, users or the research community to make geospatial stronger?

We see the stakeholders as an extension of ourselves. Any senior manager in any organisation will tell you that as the organisation grows, communication and intelligence integration become increasingly critical to success. I see the geospatial community in the same light because, really, we are in this together. If we want geospatial to get to that next level, then we need more collaboration, more partnering, and more truth among the users, providers, and academics/researchers. Our future is going to have to be more about value than costs. It is every stakeholder's responsibility to demand greater value and stop accepting the 'good enough' or 'better than nothing' solution. It is a level of compromise that doesn't serve the end goal. If we want to make data more affordable, then we must apply it differently to impact more problems and streamline more processes.

Is GIS Development meeting the aspirations of the stakeholders? What more can we do?

GIS Development magazine and website are part of my normal workday ritual. I need to keep abreast of developments in some of Fugro's largest markets and *GIS Development* helps me do that. Your focus on the stakeholders of South East Asia, Africa and the Middle East is valuable. My only suggestion would be to expand your reach to include South America. ■



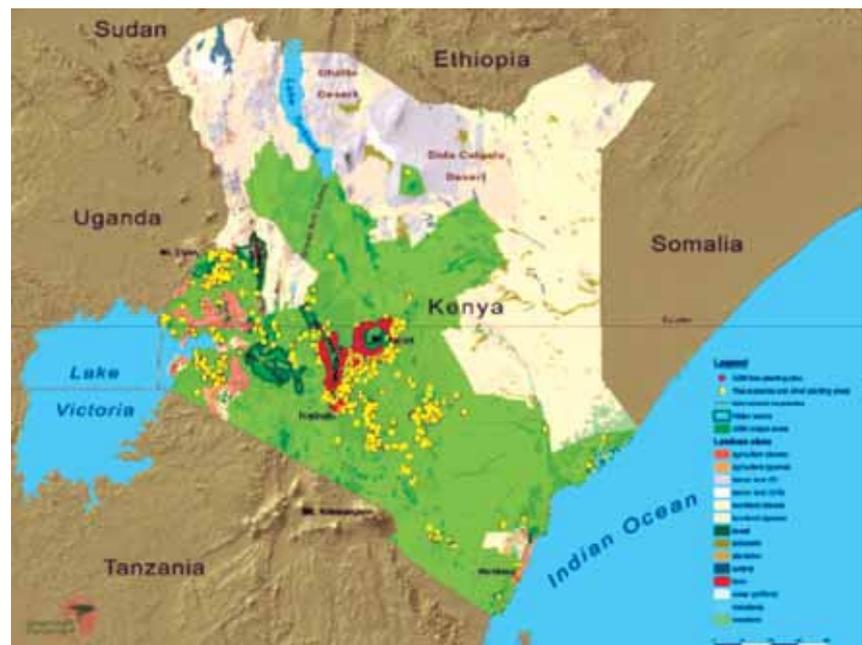


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GIS IN GRASSROOTS SOCIAL MOVEMENT



Tree nurseries and associated tree planting sites (in yellow) in Kenya maintained by BGM communities

The Green Belt Movement (GBM) was founded by Dr Wangari Maathai in 1977 as a development and community empowerment grassroots social movement comprised and led mainly by women. GBM empowers people and builds their capacity to restore the environment, promote good governance and develop sustainable livelihoods.

The organisation supports more than 600 community networks across Kenya that care for over 4000 tree nurseries. So far, more than 40 million trees have been planted in private and public land, protected reserves, sites of cultural significance and in urban centers by the GBM-supported communities since 1977.

The past three years have seen many organisational, technical, data acquisition and analysis advances in GBM. GBM has established a state-of-the-art GIS lab that has allowed the organisation to cope with the increasing demand for reliable data for decision making to support its tree planting, conservation and community development projects in Kenya. Kenya has suffered enormous forest loss. Originally the country had about 30% of its surface covered by closed canopy forest. Today, it is down to less than 2%. The United Nations recom-

mends that a nation should have a minimum of about 10% forest cover to deliver the vital ecosystem services these forests supply to support sustainable development— such as fresh water for its people, agriculture and wildlife. The reforestation needed to achieve 10% cover in Kenya is enormous.

To scale up to this level required GBM to develop a landscape scale approach to planning, monitoring and analysis. The application of GIS in GBM introduced a new way of thinking, planning, project monitoring and creating solutions for sustainable development.

GIS has brought the ability to answer the questions 'where', 'how', 'what' and 'why' in GBM. For example, now GBM staff and communities have the ability to know 'what' kind of tree species to plant and 'where' to plant them, 'what' is the extent of deforestation in the five major mountainous forests in the country, 'why' some areas are more critical than others [highly threatened ecosystems such as the watersheds] and 'how' these projects are making a difference and changing the lives of hundreds of thousands of households in the country.

Climate Change

GBM has been actively engaged in the conservation of Kenya's five forested mountains namely Mount Kenya, Aberdares, Mau Forest, Mount Elgon, Cherangani Hills. Through mobilizing the grassroots communities to plant trees and protect the standing forests, GBM has been actively engaging with the communities to reduce emissions of green house gases and enhance carbon sinks. GIS provides the highly needed capacity to monitor and measure the amount of carbon stocks in these community projects in Kenya.

GBM is working with World Bank on a BioCarbon Fund Project to rehabilitate 1,800 hectares of degraded forest land in the Aberdares and Mt. Kenya region as part of the Clean Development Mechanism (CDM) programme under the Kyoto Protocol and Marrakech Accords. Based on the maps and information from the mapping exercises and baseline surveys, GBM has been engaging the community groups living around these ecosystems to establish tree nurseries and plant trees in the identified sites. GBM is now using GIS to validate and monitor the status of these BioCarbon projects in Aberdares and Mt. Kenya.

GIS has brought the ability to answer the questions 'where', 'how', 'what' and 'why' in GBM



Improved efficiency and effectiveness in project implementation

GIS has enabled the development of extremely valuable tools that are making it easier for field staff to capture and analyse data describing the location of tree planting sites, tree species, status of the young trees in the forest and other critical data.

Before the introduction of GIS in GBM, field data collection was carried out using booking-sheets, sketches and notes on paper maps. The results had been that the data had often not been current or as accurate as it should have been. However, now GBM has trained more than 100 staff who are posted in various regions in the country to work with the communities, on how to use handheld GPS devices and various techniques of data collection in the field, project site mapping, baseline survey procedures, community participatory mapping and project monitoring. These new skills are tremendously improving the accuracy and quality of data received from the field to support the implementation and management of community

projects. In addition, GBM recently introduced the use of high-end GPSes from Trimble to improve efficiency and effectiveness in project monitoring and reporting. The introduction of these mobile GIS technologies has enabled the monitoring and evaluation team to take project information and conservation targets into the field as digital and interactive maps providing field access to vital records for project monitoring.

Related applications that are currently being developed at GBM will add near real-time field information related to each tree planting site and tree nursery to GBM's database and speed up analysis and decision making by using up-to-date and accurate spatial data.

Enhanced analytical capacity

ESRI's ENVI and Leica's software have added a whole new layer of analytical sophistication to GBM work by automating the process of change detection, which is critical for understanding what's happening with Kenya's forests. With the added capabilities, GBM has initiated a project to map and identify forest cover change over time, identify high priority tree planting areas in the country, and monitor the growth and survival of the planted trees

in the forest. GBM staff are now able to accurately keep track of detailed vegetation changes in the tree planting sites and plan for periodic field visits to respond to any detected unfavorable changes. With the ability to visualize individual tree crowns and a more accurate portrait of the forest cover in parts of the five 'water towers', GBM has tremendously increased its effectiveness and efficiency in planning and monitoring tree planting projects.

Supporting environmental advocacy

The GIS capacity has provided GBM and Professor Maathai with a powerful environmental advocacy tool. Using both ESRI software and Google Earth, GBM started developing valuable tools for visualising and communicating environmental issues in Kenya.

KMLs and ArcGIS ArcGlobe movie files developed from field data have provided powerful 3D digital maps that are being used to educate and visually inform local communities, government leaders, and the international community about the status of forests, the devastating effects of forest change in critical watersheds and to visualise GBM tree nurseries and tree planting sites on the globe. ■

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