LINKING TECHNOLOGY TO LAND MANAGEMENT

Stig Enemark, President of the International Federation of Surveyors (FIG), explains the importance of suitable infrastructure and sustainable land administration systems for the future wellbeing of land tenure, value, use and development.

Sustainability is a key component of land policies and land-administration institutions. In your opinion, which technologies play a key role here and why?

Stig Enemark. The management and administration of land is a crucial issue. Land administration systems (LAS) provide the infrastructure for implementation of land policies and land management strategies in support of sustainable development. The infrastructure includes institutional arrangements, legal frameworks, processes, standards, land information, management and dissemination systems, and technologies required to support allocation, land markets, valuation, control of use and development of interests in land.


Stig Enemark

The key technologies in support of land administration systems can be divided into GIS tools and modern measurement tools. Modern GIS tools support e-Government in terms of designing and implementing suitable spatial data infrastructures and implementing a suitable IT-architecture for organising spatial information that can improve the communication between administrative systems and also establish more reliable data due to the use the original data instead of copies.

In recent years the discussion has very much focused on these issues of geo-information while the development of positioning technologies has perhaps not received the recognition that it deserves. In coming years, positioning infrastructure will become the fifth infrastructure after water, transport, energy and telecommunications. This positioning infrastructure will increasingly be seen as a critical component for achieving sustainable development in terms of the triple bottom line of economic, social and environmental sustainability.

How is technology development changing the face of the spatial information world? How are new technologies revolutionising traditional surveying disciplines?

SE. I focus here on positioning infrastructures. The primary components of the positioning infrastructure are the GNSS satellite constellations themselves, GPS being the best known to the public. GNSS could be considered as one of the only truly global infrastructures, in that the base level of quality and accessibility is constant across the globe. A stand-alone GNSS receiver has a typical accuracy of a few metres and under

the wrong conditions, accuracy can be worse than 10 metres. Therefore, many GNSS users require improved accuracy or improved reliability with many requiring both.

Improving accuracy and reliability requires so-called 'augmentation systems' using ground infrastructure such as Continuously Operating Reference Stations (CORS). Modern positioning infrastructure (including both GNSS and CORS) can be grouped into three main categories: geodetic datum in support of surveying and mapping activities; stable geodetic reference frame for precise measurement and monitoring of global processes, such as those associated with climate change and disaster risk management; extension to the concept of a true infrastructure that underpins the explosion in industrial and mass market use of positioning technology such as interactive road maps and other real-time positioning.

What role is GNSS technology playing in particular?

SE. Land administration has evolved to become the core component of land management that includes the functions of land tenure systems, land valuation and taxation, land-use planning and land development. These functions are supported by comprehensive and updated land information organised through the concept of Spatial Data Infrastructure (SDI).

This has changed and extended the role of geodetic datum accordingly, GNSS technology being the main tool. Recent trends have seen the emergence of more efficient and cost effective solutions for cadastral and other surveys. These can often be enabled only by GNSS/GPS and its ability to work directly in the geodetic datum.

The growing use and propagation of CORS based on GNSS has enabled a revolution in the ability to measure and monitor global processes, for example, changes in sea level due to global warming; prediction of greenhouse gas concentrations or ozone depletion; changes in the planet's overall water storage; assisting disaster monitoring and management including earthquakes, tsunamis and floods. These issues represent the key challenges of the new millennium.

The ideal way to transport the data required in modern real-time precise positioning is to link the positioning infrastructure to a modern telecommunications infrastructure (broadband internet and wireless mobile phone technologies based on internet protocols). This will tentatively revolutionise the space-based data.

What place does imagery have in the surveying profession? How is this developing?

SE. In many countries the role of national mapping agencies are changing into providing core datasets rather than map series. Traditional topographic maps are then replaced by databases available for various applications to be designed and marketed by private business. In the professional world, such as the surveying profession, images play a key role in terms of integrating data from various sources and for a range of purposes.

Modern technologies have changed the use of satellite images and photogrammetry. They have changed both the way of producing maps and even how images are used for monitoring land-use changes, environmental degradation and preventing natural disasters, for example. The use of modern photogrammetry in surveying work depends, of course, on the work that individual surveyors are doing. They offer advanced tools to those surveyors that are involved in planning or geo-business.

More generally, the concept provided by Google Earth and similar web products has changed the perception of images to be something available at your fingertips. The full impact of this invention is still to be seen.

In your opinion, what is the future direction for geospatial technology? What are your focus areas for 2009/2010?

SE. The current situation is dominated by the financial crisis. Of course it affects the surveying discipline and geospatial industry throughout the world, but it also presents opportunities for the surveying profession in terms of arguing for the need and benefit of having sustainable cadastral infrastructures and land governance serving as a backbone for mortgage and systems for complex property commodities. Until the last couple of years, the developed world often took land administration for granted and paid little attention to it. However, the recent global economic collapse has sharply focused world attention on mortgage policies and processes and their related complex commodities, as well as on the need for adequate and timely land information. Simply put, information about land and land market processes that can be derived from effective LAS plays a critical role in all economies.

Another opportunity is in the building of public infrastructures that are likely to be initiated as an incentive to boost the economy. This would be money well spent, giving the economy a boost and giving profits in the coming years.

To summarise the FIG agenda for the next couple of years, the key challenges of the new millennium are climate change; food shortage; energy scarcity; urban growth, environmental degradation; and natural disasters. These issues are all related to land governance and are going to be the core area for surveyors; the land professionals. To effectively deal with this requires high-level geodesy to create the models that can predict future changes and modern surveying and mapping tools that can control implementation of new physical infrastructure and provide the basis for the building of national spatial data infrastructures. Sustainable land administration systems that can manage the core functions of land tenure, land value, land use and land development as well as facilitate a 'spatial-enabled society' will be the key issue for the coming years. ■

ABOUT FIG

FIG is an international non-governmental organisation that gathers professionals from government, local authorities and the private sector to discuss technology and professional issues with researchers and academics. This multi-stakeholder approach brings people together whose joint knowledge can benefit the development of the geospatial industry.

FIG is promoting the concept of a 'spatial-enabled society', where a government uses 'place' as the key means of organising information related to activities ranging from health, transportation and the environment to immigration, taxation and defence, and when location and spatial information are available to citizens and businesses to support these activities