SKILLS FOR THE FUTURE

SURVEYORS WILL NEED TO DEVELOP AND REFINE NEW SKILLS IF THEY ARE TO ADAPT TO FUTURE TRENDS. ROB SARIB EXPLAINS WHAT FIG BELIEVES MODERN SURVEYORS NEED TO KNOW AND WHAT IT'S DOING TO HELP THEM IN ASIA AND THE PACIFIC REGIONS

Governments have begun to appreciate geospatial information management and its vital role in decision-making, developing policies and sustainable growth. In particular, they now view geospatial reference systems (GRSs) as essential parts of a spatial data framework that represents the reference layer for land, marine and space based information.

This has progressed with the formation of the United Nations Committee of Experts on Global Geospatial Information Management (UN-GGIM), the UN resolution on Global Geodetic Reference Frames, and the UN's endorsement of the use of geospatial data to measure the success of its Sustainable Development Goals.

With encouragement from FIG, emerging and developing economies in Asia and the Pacific regions have used these UN initiatives to establish, maintain or improve their GRSs, and develop the capacity of surveyors for GRS modernisation.

FIG describes capacity development as a process of identifying the challenges or obstacles that impede anyone from accomplishing their objectives, and then developing the necessary abilities to achieve them. FIG also considers that capacity development involves learning to adapt to change, how decisions are made, and that change management is supported by resources and the political commitment to achieve results.

Geospatial activity and the capacity development of surveyors will be influenced by economic, social and technical challenges and trends. By 2050, rapid urbanisation will cause two-thirds of the world's population to live in 'mega cities' serviced by smart technology. This will occur primarily in Asia, along with an expanding middle class and increased economic activity in numerous sectors, and it will influence the way government departments or private sector groups:

- Evaluate and implement urban and land-use planning
- Manage sustainable development of finite resources and the environment
- Administer utilities, services, public infrastructure and assets such as power generation and distribution, water reticulation, waste treatment, and transport
- Provide affordable and efficient housing
- Generate, supply and deliver sufficient food for the population

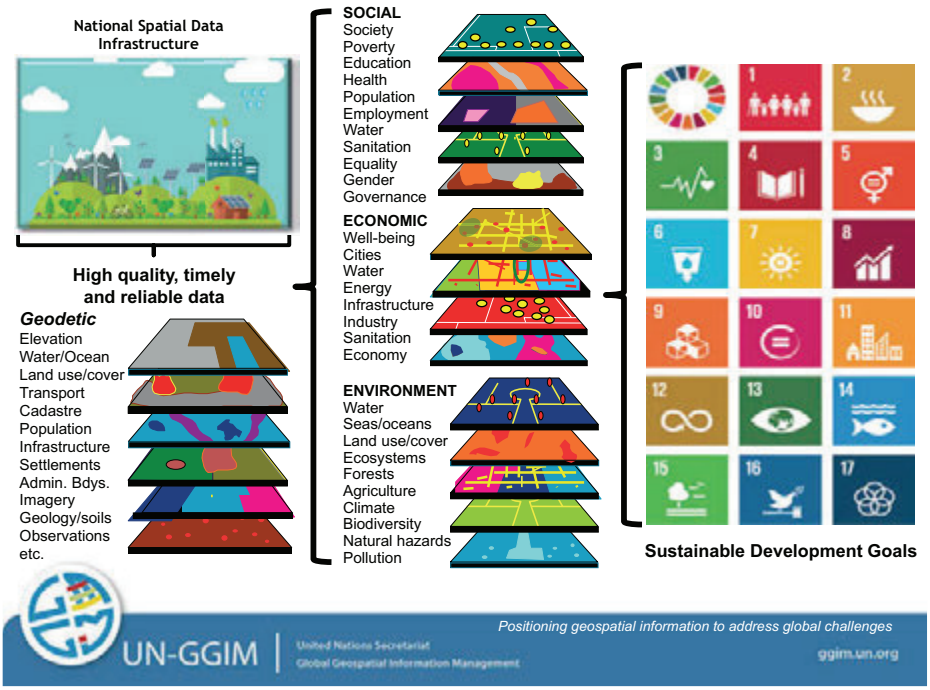
'Disruptive' technologies are also a challenge that will affect the capacity development of surveyors. These technologies will transform the way we do our normal business and affect our lifestyle patterns. Those likely to affect the world economy the most by 2025 are:

- Mobile internet-enabled low-cost computing devices
- Automation of tasks using artificial intelligence
- The Internet of Things – networks of internet-connected sensors that collect data to assist with processing, analysis, monitoring and decision-making
- Cloud technology for provision of services or applications using the internet or networks
- Advanced robots or robotics that can perform delicate procedures or help with everyday life
- Autonomous vehicles

It is expected these disruptive technologies will influence the geospatial industry in several ways. They should enable greater connectivity and access to geospatial data in real-time thus enabling real time monitoring and analysis. They will create business opportunities and innovation that will improve productivity and revenue. They will foster more location-based applications or services and embedded intelligent systems. They will change the way surveyors generate digital information, and visualise and interact with multi-land and geographic systems, in sectors relating to building information modelling, asset management, inventory, tracking, emergency management, and computational and visualisation software.

The FIG Asia Pacific capacity development workshop, held in Malaysia in October

The FIG Asia Pacific capacity development workshop, held in Fiji in November



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Environmental impact

It is also important to recognise the significant effects of environmental phenomena, such as climate change, rising sea levels, earthquakes, tsunamis, and cyclones. For example, in 2015, 346 disasters affected 98.6 million people, with an estimated economic damage of US$66.5bn. Furthermore, Asia and the Pacific are at greater risk of experiencing more natural disasters.

The quality of critical infrastructure, such as communication, transport and utility systems, will determine the effectiveness of disaster response. Consequently, the geospatial industry will be vital to the management and outcomes of disaster relief, reconstruction and the building of resilience, by supplying information for such systems.

From FIG's perspective, the trends and challenges mentioned will reshape the future role of the professional surveyor. Surveyors can be prepared by transforming their attitude towards change, be progressive in their thinking, and consider diversifying or refining their knowledge and ability to:

- Collect, process and deliver reliable, accurate, interoperable, 24/7 geospatial information to decision-makers in real-time using a combination of 'disruptive technologies' and crowd-sourcing techniques
- Convey professional advice and services to assist in design, risk assessment, investment analysis, asset management and resource deployment.
- Innovate in multi-disciplinary teams to effectively manage diminishing resources and increased data volumes, and resolve legal data matters such as privacy, custodianship, sharing and liability
- Actively lead, negotiate, influence, and permeate collaboration
- Understand and balance commercial influences
- Advocate and communicate relevance to influence leaders, decision makers and politicians, and attract a diverse group of new professionals
- Form and administer strategic plans with a focus on outcomes and output
- Form and administer qualitative and quantitative monitoring and evaluation frameworks
- Sustain 'development' to balance consumption of resources with environmental needs, and ensure a self-reliant and self-determinate community.

It is imperative for surveyors to have several specific capabilities. They should be able to assess the status and condition of their agencies' GRS infrastructure, systems and data, and identify the role and responsibilities of their agencies in the various elements of GRS infrastructure and data management.

They should also be able to strategise and implement operational plans that are aspirational but realistic, achievable, address challenges, and are flexible enough to accommodate a rapidly changing industry.

In addition, they should be able to derive and maintain technical components of modernised GRS infrastructure such as:

- A network of GNSS Continuously Operating References Stations that contribute and are aligned to the International Terrestrial Reference Frame or the subset Asia Pacific Reference Frame
- 'Fit for purpose' survey control networks that are a hierarchy of rigorously propagated coordinates and uncertainties
- Geoid model or defined height system to integrate vertical surfaces for land, water and intertidal zones.

Lastly, they should be able to ensure the GRS or modernised geodetic infrastructure: underpins their nation's fundamental or foundation datasets; adheres to international standards, guidelines and practices (including metadata); uses the multi-GNSS environment and space-based measurement technology; aids interoperability and unification amongst geospatial information and systems via location intelligence; aligns with new mass-market positioning (real time) technology and applications delivered by satellite, digital communications and the internet; exploits the benefits of quality imagery and satellite data, as well as new mapping technologies and products; and supports global observing systems for scientific research modelling, such as tectonic plate deformation, sea level monitoring, climate change and atmospherics.

To guide and assist countries in Asia and the Pacific region to develop surveyors' capacity to modernise and sustain their GRS, FIG has formed the Asia Pacific Capacity Development Network. For more information about this network, please visit https://www.fig.net/organisation/networks/capacity_development/asia_pacific/index.asp

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