

Three Decades of Progress

Around the year 1980 mobile phones, car navigation systems, personal digital assistants (PDA) and virtual globes - technologies now all commonplace - existed only in the fantasy of visionaries and dreamers. Around 1980 computers were used but rarely to analyse noise pollution in airport environs, determine areas endangered by river floods, and assess earthquake damage. Around 1980 GIS systems were only just beginning to be deployed by government agencies and private firms. Around 1980: that's just three decades ago...

In the meantime, Global Navigation Satellite Systems (GNSS), laser scanning, digital cameras, space technology, hardware miniaturisation and wireless telecommunication have revolutionised the capture, processing and use of geo-data. Access to location-specific geo-data has been dramatically enhanced through satellite imagery, aerial photos and maps being incorporated into search engines, particularly those of Google and Microsoft. Maps and aerial images have become part of the standard content of many government portals at all levels. We are seeing rapid growth in the number of companies developing marketing strategies based on location-based search and cartographic visualisation. And all around the world the GIS system has become the invaluable business tool of property broker, retailer, local government agency and delivery service.

So have we reached geo-information Nirvana? I don't think so. The long list of challenges awaiting resolution not only still exists, but grows longer by the day. One such challenge relates to the mass production of data in a split second, while we still lack the technology to process it within a reasonable period of time; the level of automation in data acquisition far exceeds that for translating captured data into meaningful information. One obvious example is terrestrial laser scanning. A single scanner can produce up to a million 3D coordinates per second. How, in the absence of high-level automation, to process the huge point-clouds generated in a few hours of fieldwork? Another challenge emerges from the production of geo-data at different levels of detail. It's most likely the available level of detail will not be best for the task at hand; the scale, resolution or level of detail has to be adjusted, introducing the problem of multi-scale or multi-resolution. This is the fifth dimension of geo-data, time being the fourth. It may be readily assumed that the dimensionality of geo-data will increase as need and research progress, reaching up to the sixth, seventh and even eighth dimension.

The overriding challenge at non-technological level is to ensure that enough specialists are trained in geo-science and geo-information technology, and to prepare them well enough to climb on the shoulders of those who accomplished the impressive progress of the past three decades.