Survival of the Most Adaptable

By Christopher Seepe

Google, a magical kingdom far, far away where the lobby is graced with lava lamps and pianos, where the land is speckled with gourmet cafeterias, washers and dryers, a bowling alley, and video games of every kind, and where its buzzing little busy burghers play roller hockey twice a week in the parking lot.

Google is one of the world's twenty most recognized brand names as well as the world's fastest growing brand. The Google website is in the top five most visited websites worldwide, its search engine receives about a billion search requests per day, and its computing infrastructure includes over 450,000 computers located in data centres around the world.

Google Earth, now just under four years old (June 2005), combines the power of Google Search with satellite imagery, maps, terrain and 3D buildings to put the world's location-related information at the fingertips of tens of millions of users, who have collectively downloaded Google Earth more than 400,000,000 times.

So what does this ten year old, ten billion dollar baby behemoth mean to the geospatial world in general, and to surveying in particular?

The answer really depends on whether you believe the visualization of geospatial information in the third and fourth dimension has any relevance to you.

Google Earth has transformed the geospatial sciences from curious niche professions and industries that many people didn't even know existed and even fewer people understood, into mainstream Information Technology, metamorphosing Geomatics into Geoinformatics.

The difference may seem subtle. The implications and consequences are not.

Maps and most survey plans depict how things were or are. 3D modelling depicts how things could be.

Geospatial organizations which survive this sea change will have learned that they are no longer earth sciences organizations that employ information technology to assist in their business processes. They will have transformed into information technology (I.T.) organizations that specialize in producing and delivering geospatial data, products and services.

The I.T. industry is all about collecting, managing, manipulating and delivering data, whether you are in accounting, surveying, GIS, web development, writing sales proposals or any other part of the geospatial industry. Geoinformatics organizations enable their customers to do the same; manipulate and display photographic and clipart-like images to simulate geographic surroundings.

Most of the geospatial industry's recent business challenges and advances have little to do with the science or the technologies that analyze and interpret geographic information. Rather, the challenges (and opportunities) centre on how high-quality geospatial imagery and other data is collected, processed, manipulated, stored and delivered with precision, in a time- and cost-effective manner.

3D modelling helps to make the real world a better place to live in by testing alternatives without real world legal, economic and social consequences.

In First Base Solution's case, the sea change demanded significant investment in order to be ready for the next generation of geospatial business opportunities; a multi-million dollar twin engine aircraft and digital airborne camera system, a million dollar 200+ terabyte computing infrastructure, extensive in-house research and development to automate auto-triangulation, orthorectification, image alignment and stitching, surface modelling, surface feature identification, stereo imaging, 3D modelling and other feature extractions, web development and the company's internal computer networking.

The inexorable evolution of science and technology, in its most simplistic sense, is measured by advances in the tools that enhance the human experience and quality of life—

from black and white to colour, from coarse to fine, from low resolution to high resolution, shrinking ever smaller (as in microelectronics) or growing ever larger (as in skyscrapers), ever faster, ever further.

Maps and most survey plans are 2D diagrams of how things were or are (allowing for production time lags). 3D modelling allows for the display and analysis of how things and events could be and how they change over time.

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It is inevitable that we will want to measure our world in the third and fourth dimensions, as evidenced by the incredible growth in demand for mass-produced 3D modelling cityscapes. Measuring events over time—the fourth dimension—within a 3D model is equally inevitable.

And if you're thinking this will happen gradually, or that this is something that the next generation of geospatial professionals will have to deal with, you're mistaken.

Within three years, most of the major urban centres around the world will have been modelled. As the building "skins" are completed, the next logical step will be to model the events and activities that take place within the buildings and the overall urban model. We'll want to know where everything is at a particular moment in time; buses, street cars, police cars, trains, ambulances, fire trucks, courier vehicles, taxis, delivery vehicles, etc.

While that's happening, we will want to model in three dimensions every floor of every building; HVAC conduits, floor plans, power grids, emergency equipment and evacuation plans, plumbing, etc.

And also while that is happening, we will model all the assets around and in between the buildings; trees (arguably the number one required model after buildings), fire hydrants, benches, assets on utility poles, etc.

We already want to test contingency plans before bad things happen and what to do when they do happen.

All time components will be animated, borrowing technologies and know-how extensively from, of all places, the online computer gaming industry.

We'll want to continually improve our understanding of the impact that our perpetual construction has on the purposes and value of property and, in the bigger picture, on our environment.

It takes myriad skill sets to achieve the grand illusion of a virtual world; collecting the raw data (aerial photography, LiDAR, survey plans, etc.), correcting the flaws (orthorectification) with geo-referenced precision, creating an accurate representation of the contours of the earth (surface or terrain modelling), putting all the pieces together to create one seamless image (mapping), and delivering it for use by geospatial and non-geospatial professionals—emergency response dispatchers, economic development planners, land developers, tax collectors, educators, emergency response and recovery, the list is endless—and ultimately, every citizen and consumer.

Survival of the Fittest is a misnomer, premised on adaptability. Herbert Spencer's concept might arguably be more correctly called Survival of the Most Adaptable. Those who do not adapt to change in their environment run a high risk of extinction. And the more specialized you are or the more dependent you remain on a particular technology, the greater your risk of failure.

For the most part, Google (Earth) has pulled the geospatial industry, with great reluctance, into the 21st century. Those who embrace the profound changes that will take place over the next few years may not only survive, but they may blossom or even eclipse traditional industry leaders who do not adapt.

Google Trivia

According to Marissa Mayer, Product Manager for Google, the name 'Google' was a spelling mistake made by the original founders, Larry Page and Sergey Brin, who thought they were using 'Googol,' a word coined by Milton Sirotta, nephew of American mathematician Edward Kasner. A googol refers to the value of one followed by a hundred zeros. There isn't a googol of anything in the universe — not stars, not dust particles, not atoms. Google says its use of the word reflects its mission to organize the world's seemingly infinite amount of information and make it universally accessible and useful.

About First Base Solutions

First Base Solutions is based in Markham, Ontario. It is Google's only reseller/integrator partner in Canada and provides end-to-end Geoinformatics solutions including aerial imagery acquisition, 3D modelling, geodata visualization, and fully automated web delivery services.

For more information, visit: www.firstbasesolutions.com.