Three Dimensions of Integration

I would like to hoist to the zenith of the present 'Pinpoint' the term 'integration'. Integration is a word of Latin origin. Its meaning is to combine things or take things together. In today's complex society 'integration' is a popular term, allocated to many processes and activities. It also enjoys intensive use in geomatics. I remember times when integration was not at all enjoyable. On the contrary, it was associated then with some awful mathematics; triple integrals, for example. How glad we often were, once having passed examinations! Nonetheless, 'integration', in the non-mathematical sense, has for some time now been enthusiastically embraced in at least three dimensions.

Wish for Automation

A first dimension of activities within which high integration occurs is at the level of sensors and systems. An example is laser-altimetry. Here, an airborne platform carries a laser sensor, a GPS receiver and an Inertial Navigation System. These systems are integrated in order to collect accurate, dense sets of irregularly distributed points in their full three spatial dimensions, often called Digital Elevation Model (DEMs). This domain originates, without doubt, in the general tendency towards automation of the acquisition of geodata. The photogrammetric community and industry, for example, have always done well in incorporating the opportunities offered by cutting-edge technology.

Geometric Problem

These efforts have resulted, for example, in matching techniques to automate triangulation and DEM and orthophoto generation. Also the AutoCap system, developed by researchers at the Laval University - and presented in the present issue - fits within these developments. At the hardware level a digital camera is integrated with a total station, while at the software level it is integrated into the widespread AutoCAD system. The integration of sensors and systems - at least as far as geomatics is concerned - is mainly a problem of a geometric nature. The data in digital format stemming from various instruments is stored in a computer. Next, smart software carries out complex computations to combine the data such that one arrives at accurate information. The integration of the data is based on clear-cut mathematical models. The main problems to be solved are related to synchronisation, different sampling intervals and different accuracy levels.

Databases

The geomatics community has been very successful in the integration of sensors. Is this also true for the integration of different databases, e.g. a medium scale topographic database and a large scale base map of the same area? This type of automatic merging is high on the list of demands of an ever-expanding number of user communities. The endeavour seems at first glance simple; it is just a matter of matching. However, matching pre-assumes that the different datasets have been acquired using the same data collection rules.

Pinching Shoes

And this is where the shoe pinches; here we face the crux of the problem. The mapping rules differ! A building can have thousand different meanings. The meaning depends on the application domain. Buildings can also be mapped in a thousand different ways. For example, on the medium scale map, two buildings between which the mutual distance is smaller than three meters may be merged together to form one building. On the large scale base maps these buildings are stored as separate objects. So the difficulties lie at a much deeper level than geometry. They lie at the level of the meaning of things and how we interpret and experience the world. The associated problems are therefore extremely difficult to solve.

Partnerships and Alliances

The above two integration dimensions - the one posing more problems to solve than the other - are situated on the technological side of the road. A third dimension is largely concerned with socio/economic issues. Many firms today are in a merging process or are beginning strategic partnerships and alliances. It even appears that this tendency is gaining momentum. The rationale governing these processes is the belief that integration will allow both partners to continue to expand their core products while becoming more able to address the wide spectrum of customer needs and to operate successfully through vertical markets.

Global Phantom

Will it really work this way? Studies carried out by university researchers demonstrate that 85 percent of the mergers eventually bring no benefit at all to the firms involved. Why then all the strain of merging ? Is it because at the moment a global phantom seems to stalk which whispers into the ears of financial analysts that mergers are beneficial; that firms which stand aside of this trend will no longer deserve attention as long as they belong to a past economy? And should a merger indeed be profitable, whose profit will that then be ? Will it be the profit of the shareholders, who have a short profit horizon?

Cosmetic Operations

I may be wrong, but it is my strong belief that many of the alliances presently undertaken are actually just cosmetic operations; a mascara against the fear of operating in a global market economy which is becoming increasingly aggressive and competitive. Standing alone on these 'wuthering heights' makes for uncertainty and cheerlessness. I hope that integration in this dimension will not give us the feeling we once had when trying to master triple integrals.

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