Geo-data, Disasters, and Beyond

Disaster risks stem from sudden energy release in one of the three basic environmental compartments: air, water and land. Today risk assessment, mitigation, preparedness, response and recovery are of major concern to governments at all levels: national, state, provincial and municipal. The availability of sound geo-data is crucial for fighting disasters in all above five stages. The choice of a data type or mix depends heavily on the spatial and temporal extent of the disaster. For example, Airborne Lidar is very well suited for the generation of DEMS of river areas, urban conglomerates and coastal zones, both pre and post-disaster. In any case, the importance may be underestimated of a prerequisite for any effective disaster management system: permanent or semi-permanent maintenance of the database.

Base-map As Basis

A geo-data type the significance of which can hardly be overlooked is the base-map. The function of a base-map is twofold. First of all the base-map acts as the geometric infrastructure to which all other geo-datasets are referenced in order to match a certain spot or feature in the dataset to its true location in the real world. A second function of the base-map relates to its thematic content. Topography, buildings and so on provide information on the pre-disaster stage of the real world. By comparing the base-map with post-disaster data, an inventory of the damage can be made and decisions taken on appropriate action. The presence of a base-map, accompanied by its proper use, may thus rescue people and save goods of economic worth. It is a general observation that combination of datasets is crucial when examining remotely sensed data. In this context it is appropriate to note that geo-information should be made available free of charge for disaster management purposes.

Fast Interpretation

The experience of end-users faced with using geo-information in a disaster management context may vary from great to negligible. But in general they will be unaware of the special characteristics and limitations of such data. The approach to geo-data that takes into account its quality â€“ by now second nature to the surveying and mapping community - is an unknown line of thought for the layman. This is why not only delivery of the dataset should be at issue, but also its proper use. A good understanding of the nature and magnitude of errors present in the data is essential for every user. Another need involves easily understandable visualisations. Since end-users are operating under super-stress, presentation of derived information should be simple and straightforward to understand; end-users in an emergency should be able to interpret a map in seconds. It is thus reasonable to assert that presentation is more important than content. To sum up, in addition to his role in making geo-data available, the analyst has another: equipping the end-user for its optimal use. This means disaster managers being familiarised with GIS and remote sensing capabilities, without going too deeply into technological issues.

GIS analysts are used to processing data in a vector environment, therefore they often underestimate the importance of raster data. They often use remote-sensing data just as visual backdrop, without fully utilising the wealth of information present in digital reflectance values. This is one of the lessons learned in the aftermath of the US Twin Tower disaster. The multiple uses and the analytical potential of raster data thus need to be promoted.

An Invisible Disaster

Both authorities and disaster managers increasingly acknowledge that acting without accurate, detailed and timely geo-information results in human suffering and huge economic loss. Todayâ€™s geo-information technology is able to provide the fundament upon which disaster managers can found their vital decisions. Unfortunately, however, during the 1990s an invisible disaster blew through management land. The geo-data providers of the past were mainly authoritative and respectable government agencies, which worked on a non-commercial basis. Since the early 1990s, and by common consent, geo-information has become classed as a commodity like any other. As a result, government organisations have taken a significant step backwards in their provision of geo-information to citizens and organisations. Privatisation and commercialisation has brought much geo-data to a diversity of commercial firms. A user may buy geo-data off the shelf and physical delivery of the dataset may go via the internet. As a result, such non-centrally-collected data is stored at distributed locations, whilst the quality may be heterogeneous.

The Three Manifestations

Today, professionals who are managers by training run surveying and mapping organisations. And, irrespective of the direction in which they gaze, they seem to see just one steering parameter: currency. This appears in three manifestations: return on investment, cost-efficiency and profit. Using such a business-centred approach these organisations will offer contracts to the company whose tender shows the lowest production costs, and not to that offering the best quality. However, short-term gain may be converted into huge losses in the longer run, when the misuse of geo-data demonstrably results in wrong decisions the effects of which are costly or impossible to repair.