

Geomatics in Damage Assessment

The Haiti earthquake in January 2010 and the flood that hit Pakistan in August-September 2010 clearly revealed the impact of disaster on manmade objects; thousands of buildings collapsed, and dams, channels, power and oil plants suffered heavy damage. Parts of affected areas became inaccessible, and rail and road networks, power-lines and other infrastructures were put out of service for weeks on end. Media reports provided the general public with some insight into how geomatics can help aid organisations to respond fast and effectively. But the Haiti and Pakistan disasters also made the headlines at scientific symposia such as GI4DM 2010 and VALgEO 2010. Discussing the outcomes of disaster relief, organisations, scientists and practitioners emphasised remaining shortcomings; there is still much room for improvement in the deployment of geo-information. For example, aerial multispectral imagery used in Haiti to evaluate the impact of damage revealed only two thirds of actual structural and infrastructural damage when analysed in monoscopic mode.

Response activities in Pakistan have shown that resurveying the area from the ground, air or space at regular intervals provides crucial information for search and rescue teams, and enables mapping the dynamics of flooded areas. The latter helps aid organisations in logistics planning for humanitarian assistance. It is therefore crucial that multiple types of geo-data be available, as well as technological and human resources in place to extract information from individual data sources and integrate them. The current wide variety of satellite imagery provides valuable sources of geo-data in terms of temporal, spectral and spatial resolution. Their value increases when they overlap such that terrain can be viewed in stereoscopic mode. For damage assessment of rail/road networks and other infrastructure, Lidar and interferometric radar are useful, which data sources also act as a basis for creating Digital Surface Models helpful, among other things, for basin identification. Ground surveys have also to be carried out at regular intervals.

Another valuable source of geo-data should be further exploited, namely the technical teams which, as they are permanently active in the area, can act as non-professional surveyors. These people should be equipped with geo-data collection devices such as mobile GIS systems, and their data collection work be organised jointly with local authorities to enhance any possible disaster-response capacity. Such data may be used to check information derived from satellite imagery, and to provide details on land use, population and other features not visible from air or space. This data can also be used to produce maps in support of logistics such as food distribution and locating warehouses and temporary shelter. Again, it is important not only that data is available, but also the resources essential for uncovering useful information from it. Much of the above mentioned data was available but not fully exploited during the Haiti earthquake and Pakistan flood.