

November 2006

Obliques – Every Angle Covered

Revolutions come and go. In a world beset by the more violent political kind, often those of a technology nature go generally unremarked by the wider populace.

GIS is, to many, a revolution that falls into this category. A technology step change that made huge amounts of geospatial data easily accessible but which has become part of the IT landscape largely unnoticed. The launch of Google Earth and Microsoft Local Live have rekindled some of that early revolutionary spirit and broadened mass-market awareness in geographic data, especially imagery. Even Tony Blair is reputed to have commented that Google Earth is a 'remarkable innovation'.

So with this rekindled demand for new and better imagery from aerial and satellite sources comes the next revolution - oblique aerial imagery.

Like so many IT revolutions before, this imagery is not new (there are some excellent examples from around the time of the First World War) but its integration into a cost-effective and usable format is the basis of revitalising this imagery format.

Oblique imagery offers a different view on the world from that gained from the more widely used vertical. It offers context of features in a more easily understood 3D perspective, with side-on views that are more familiar to many users. The images have many of the features that users expect with vertical imagery such as the ability to take overlapping images and create stereo views, while at the same time providing additional detail.

The difficulty has until recently been the cost of capturing film based obliques and georeferencing these for use in a GIS environment. The advent of digital cameras for aerial platforms has overcome one of the major hurdles.

New data capture techniques have been developed that allow multiple obliques to be captured (often in association with verticals) as a plane flies along parallel flight lines in the same way as a traditional vertical survey is undertaken. The camera solutions vary from the relatively expensive five camera Pictometry solution which gives a vertical and four compass point oblique views for every imaging position, to the innovative and cheaper single rotating camera that provides four different angles of view in a single 360 degree rotation developed by Getmapping.

With digital camera technology changing so fast, in particular the image array size and therefore the area of capture and consequential data transfer to storage issues, there are bound to be many new solutions on the market over the next few years.

The second part of the revolution is the development of viewing software where the oblique imagery is linked to a map or vertical aerial base for reference. This requires some clever geo-referencing of images that have a variable scale/resolution. In the example image shown below the pixel resolution in the foreground is about 10cm, in the mid scene about about 12.5cm and in the far ground about 18cm. The actual resolutions are a function of the angle the image is taken at, although 45 degrees seems to be the common standard at present.

The most innovative solutions such as that generated by MultiVision or Pictometry allow the obliques to be georeferenced based on the aircraft INS and linked through the vertical image or map base to a terrain model. Each feature on the vertical image is viewed through 4 windows showing the obliques from four respective orientations (see the example from the Cities Revealed Obliques™ solution created in partnership with Getmapping using the MultiVision software).

By doing this it is possible to make measurements. All the solutions allow building or feature heights to be measured relative to the ground model, and most allow horizontal measurement

and area calculations. The software allows the user to create wire frame or building block models from the obliques (as shown in the example).

In the MultiVision solution this can be taken a step further, with image thumbnails being extracted from the obliques and rectified to fit the extracted building block.

There are many obvious applications and no doubt many more that have not been considered yet.

Initial interest has, not surprisingly, come from the police and security services. The ability to view a building from all sides and calculate information such as distance between two buildings and angle of view from one roof to another, are clearly very valuable for many operational needs. Likewise fire brigades have a keen interest in potentially dangerous sites such as chemical works or oil depots. The ability to use obliques to manage incidents like that at Buncefield in December 2005 are obvious.

But there are many other applications focusing on regeneration, maintenance and management of key features and sites. Individual buildings, prestigious developments from office complexes to shopping centres, urban centres both old and new, motorway interchanges and complex junctions, airports, harbours, mining and landfill sites which would all benefit from having a regularly maintained oblique survey.

So are obliques a new revolution? They certainly have the potential to be so. How innovative those involved in the capture, in the development of software solutions and how they integrate with other geospatial data will determine their eventual impact on the GIS user.

Seppe Cassettari
CEO, The GeoInformation Group