

VI. Photogrammetry and cartographic representation systems

3D Cartographic representation systems

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Orthoimage at 1:25 000 in 3D from GeoShow. Area of Organyà.

Cartographic representation systems have changed considerably since the arrival of computerized electronic visualization systems, not only with respect to the ease and speed with which they can be used, but also with respect to the convenience with which they handle and query the cartographic data, obtaining maps on demand, which are frequently unique.

As a result of the constant efforts being made within cartography to portray the world with greater accuracy, with the help of powerful graphic processors and refined data models, it is now possible to view maps in three dimensional environments, varying the perspectives and paths at all times. This is the basis of virtual cartography.

Since 1986, the ICC has been developing software to perform this type of visualizations, which is initially predefined and subsequently completely interactive.

Indeed, in this particular field, the Institute has collaborated in the development of the GeoShow3D software, with which digital terrain models (DTM) may be viewed, superimposing layers of rasterized information by means of an interactive, animated process, in a flight simulator environment.

The main features of this system are:

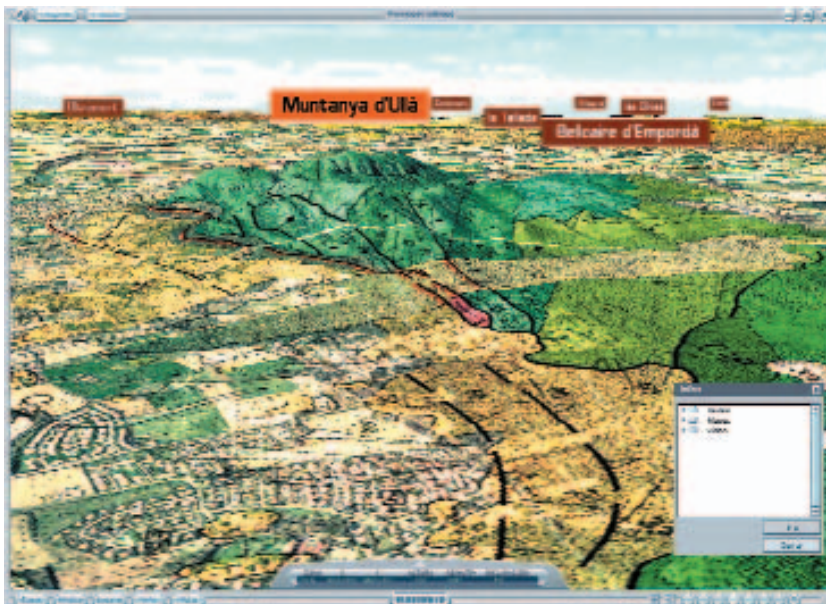
- Considerable management capacity. A vast territory can be represented in high-resolution images. That is to say, thousands of hectares can be presented with photographic texture at 1:2 000-1:25 000 scale in color over a DTM with a grid of 15-30 m or greater detail. The third dimension may be obtained by relating the cartography with the DTM.
- Multilayer. The DTM can be textured with different cartographic raster layers, activated at will, such as orthophotos, topographic maps, hypsometric maps, thematic cartography, etc.
- Attributes. One of the most important features of GeoShow3D is its capacity to manage a variety of information about elements of interest within the territory represented. These attributes are displayed over the virtual territory in the form of pictograms.
- Place names (toponymy). Place names of any element appearing in the territory may be viewed. The observer may also be automatically located (automatic navigation) in a particular spot by selecting the corresponding place name on the control panel. Toponymic labels are duly classified according to size, background colors and letter color, and are subsequently placed at different viewing levels.

- Views. Preset frames can be directly accessed and guided tours can be organized.
- Coordinates. The geographical coordinates, UTM and altitude of any element in the territory can be indicated.
- Videos and other outputs. GeoShow3D supports the generation of high quality videos (AVI format) from virtual navigation over the territory using maps and images. On-screen results can be captured for the purpose of both digital files and print output at the same screen resolution.
- Development of tools for visualization of vectors over the raster layers, and image compression technologies for their visualization on the Internet.

Due to these technical characteristics cartography can be introduced into environments linked to interactivity, thereby opening the door to other applications.

Applications

- TV.
- Tourism.
- 3D Positioning.
- Visualization of engineering projects for their environmental impact.
- Development of transport networks.
- Simulation systems for logistical campaigns in the territory (police, fire services, defense, humanitarian campaigns).
- Virtual reality.



Geological information in 3D from GeoShow. Baix Empordà.



3D satellite image of Cabdella.