Realtime Visualisation of 3D models of terrains and buildings

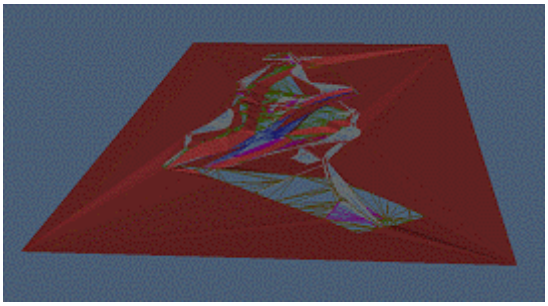
The interactive walk through is a very suitable technique, but also a necessity in order to

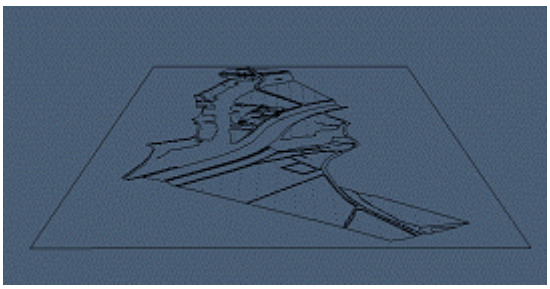
- Verify geospecific data
- Utilize 3D models of terrains and buildings for planning purposes
- Prepare operations for security purposes and military operations
- Utilize geospecific 3D models within simulators

A method is presented which allows to generate 3D models of cities and terrains being suitable for an interactive walk-through, as well as the walk-through itself.

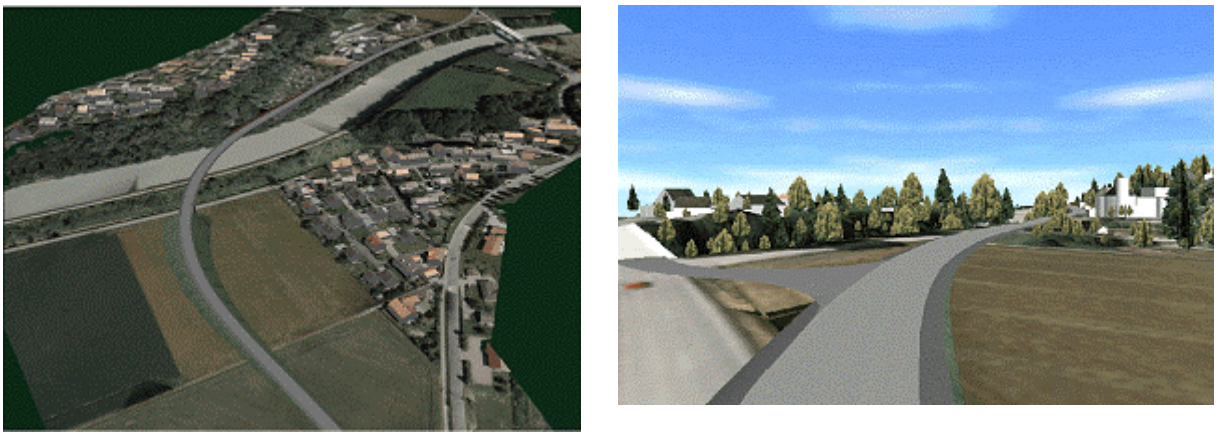
This method is commercially available under the product name “CyberWalk” and comprises:

- Import of buildings models from various sources like CyberCityModeler, and also from sources which produce DXF or VRML files.
- Generation of different levels of details (LODs) for fassades, roofs, roof dormers etc.
- Utilize different data sources for the buildings (ground floor plan, laserscan data, photogrammetric data, terrestric data).
- Generation of 3D terrain models with LODs using DHM and vector data as well as satellite/aerial images or orthophotos
- The viewing software itself
- The link to databases
- Administration software for the 3D data.

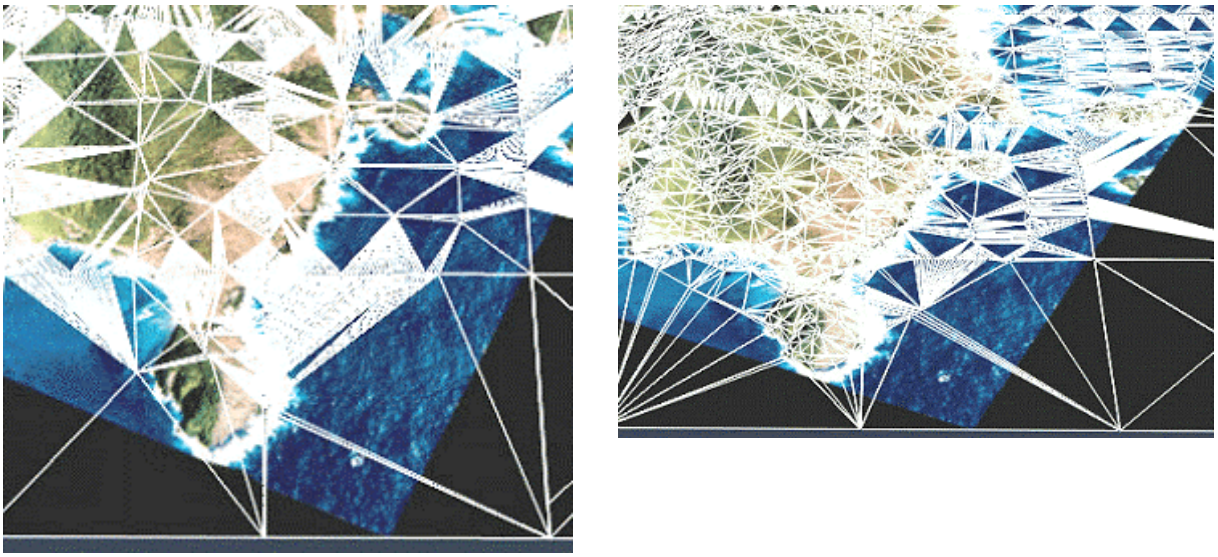




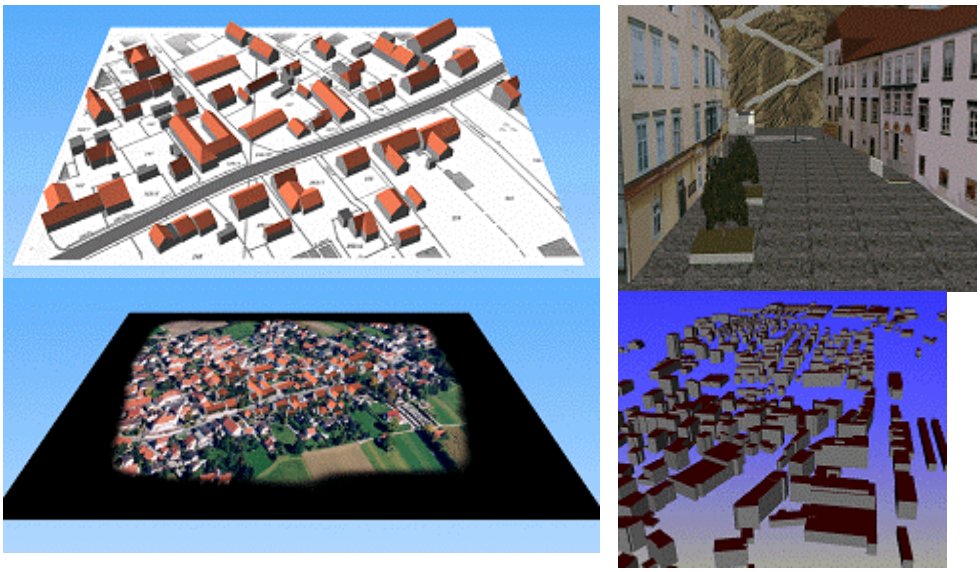
Using DHM and vector data for the triangular mesh model, textured with an orthophoto



Photorealistic representation of terrain, buildings, and vegetation, for planning purposes



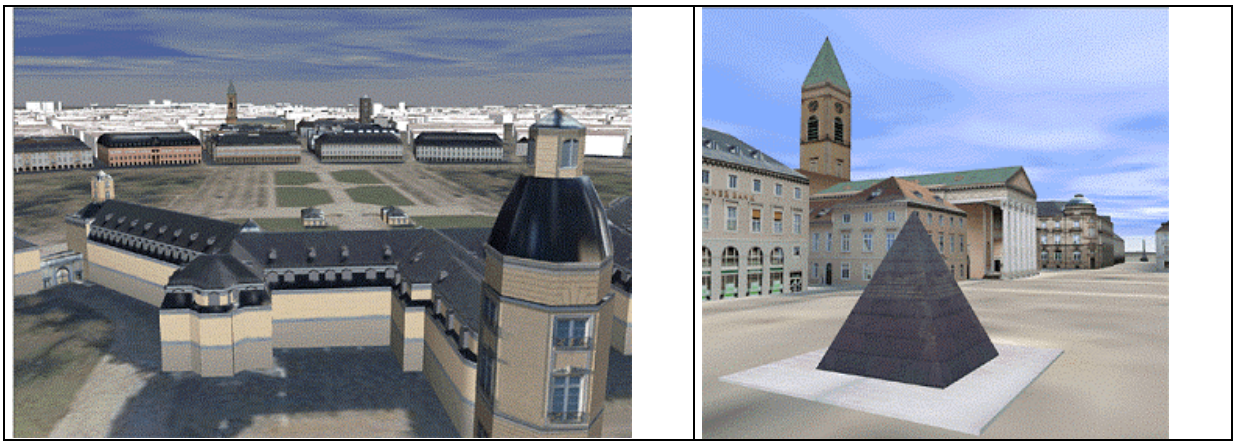
Representation of the terrain model in different levels of detail



Representation of buildings from different sources: ground floor plans, photogrammetry, laserscan data. The terrain is also represented in different forms.

For the visualisation it is important, to provide a photorealistic view with a high degree of details. This is achieved simultaneously with the interactivity.
The interactive walk through allows, to

- Move in 3D space above the terrain, with or without terrain following
- Access specific points of interest
- Record and replay a walk through path and optionally produce a video sequence. (The well known technique is “rendering”, where an animation path is defined based on the geometry, and the animation is done in a time consuming process. In contradiction to this, the CyberWalk concept is, to interactively walk-through the geometries, to record the routes and later use them for presentation purposes.)
- Interactively switch-in/-out different objects of interest such as new buildings.



Scene photos from an interactive walk-through, with the kind permission of the city of Karlsruhe. 40000 buildings are presented for an interactive walk through. Due to cost reasons, these buildings were produced fully automatically from building floor plans. A small part of the city was modeled using photogrammetry, and a manual modeling of details like coloumns, stairs etc. of very important buildings has been applied.

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