FASCINATION GOOGLE EARTH – USE IN URBAN AND LANDSCAPE DESIGN

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Abstract. Virtual 3D-City-and Architecture models, Virtual Globe systems like NASA World Wind and Google Earth as well as new attempts of immersive technologies become more important, not only among experts in spatial planning, but also many private users are interested in these new tools. These developments cause powerful impacts in the general social, cultural and everyday life. Given the dynamic development of Google Earth, the discussion about the representation and the use of geodata for a wide user group - beyond the planning disciplines - reaches new heights. According to expert's opinion, Google Earth with its computer language KML (Keyhole Markup Language) becomes a 3D-GIS-Standard [Rush in 2006]. By the easy and quick representation of three-dimensional (city) structures and single buildings, Google Earth will significantly influence all groups of society. User groups which have not been acquainted with geodata or highly specified and complex GIS-Systems [Dworschak in 2006], discover that working with this data by using Google Earth is great fun. They recognize, that with the help of generally understandable and easily recognizable visualisation of these data, mediation of knowledge becomes very easy. In addition, it is acknowledged that geodata has great potential to add value, in disciplines such as the academics, the financial sector or personal use.

1. Introduction

Virtual 3D-City-and Architecture models, Virtual Globe systems like NASA World Wind and Google Earth as well as new attempts of immersive technologies become more important, not only among experts in spatial

planning, but also many private users are interested in these new tools. These developments cause powerful impacts in the general social, cultural and everyday life. Given the dynamic development of Google Earth, the discussion about the representation and the use of geodata for a wide user group - beyond the planning disciplines - reaches new heights. According to expert's opinion, Google Earth with its computer language KML (Keyhole Markup Language) becomes a 3D-GIS-Standard (Rush, 2006). By the easy and quick representation of three-dimensional (city) structures and single buildings, Google Earth will significantly influence all groups of society. User groups which have not been acquainted with geodata or highly specified and complex GIS-Systems (Dworschak, 2006), discover that working with this data by using Google Earth is great fun. They recognize, that with the help of generally understandable and easily recognizable visualisation of these data, mediation of knowledge becomes very easy. In addition, it is acknowledged that geodata has great potential to add value, in disciplines such as the academics, the financial sector or personal use.

Urban planning, city development and even landscape architecture are political spheres oriented to society in which analysis, planning, assessment and decision-making processes including the result of a planning cause public interest (Luser&Lorber, 1997). To many citizens, planning theoretical expiries, the professional vocabulary and the abstraction of the third dimension into the planare second dimension are hard to grasp (Besser Schildwächter, 2000). The essential advantage of a three-dimensional model is, may it be real or virtual, that the "model language", and consequently its contents, can be made very clear (Streich 1996).

Many urban planning purposes and images of planning contents are still being discussed in planning committees with hand sketches or outline drawings, although there has been a progress of the CAD-representation and sketching in the third dimension. In times of Gameboys or XBoxes with their perfect graphic arts, all partners in the planning process may expect this comprehensive form of the representation. Regarding static planning sketches, they unambiguously lack a realistic view in the virtual space. If objects are accessible multidimensionally in the virtual space, the users are able to operate in playful acquaintance several planning variations. (Mitchell, 1999).

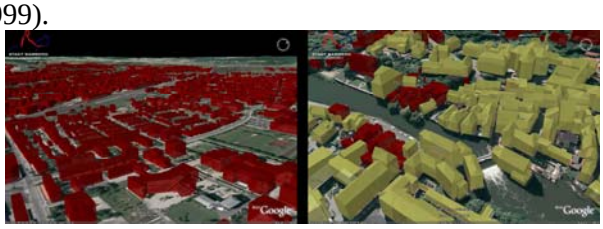

Figure 1. City of Bamberg in Google Earth: Structure model with ca. 50000 buildings; higher level of detail with roof structures

Spatial connections become visible in the 3D model, height developments are clearly readable and the viewpoints and look perspectives are freely eligible by a free navigation in the virtual model. A 3D-model serves, on the one hand, a spatially functional designing practise and, on the other hand, a better communication between those actors, who are involved in the planning and execution process (Streich, 1996).

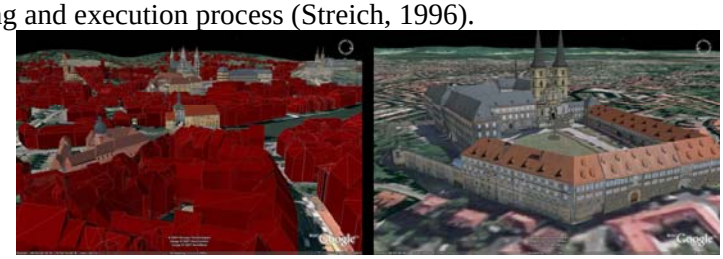

Figure . City of Bamberg: different level of details; model of monastry “Michaelsberg”

2. Fascination

Sokrates said, could we rise above the earth, we would understand that this is the real earth. And only then we would truly understand the world in which we live (Apt et al, 2001). Astronauts report about the earth as a fragile blue pearl in the width of the black universe. During the Space shuttle missions almost all astronauts use their free time, either being scientifically or personally motivated to take a picture of the earth surface and to document the changes of the earth.

Not only planners succumb to aerial and satellite pictures fascinating power. The large scale overview of the physiognomy of a scenery, the analysis of organic and geometrical structures within a space changed and developed by people, as well as the discovery of small details in the city space, who by themselves represent only edge notes, but, indeed, make out the appeal of these pictures.

The development from analogous to digital maps, in connection with the Global Positioning System (GPS) (Zeile, 2003) and Location Based Service (LBS) (Bartoll, 2001), has made navigation easier when situated in an unknown space. Furthermore, borders scales of maps disappear. In the past, maps were designed as an accurate scale map only for one special use or representation. Today, these borders of sketching a map have blurred by using level of detail (LOD).

Beside books, who show pictures of the earth from an aerial perspective (cf. moreover Betrand, 2003), a lot of real time strategy games are very successful by using the so called GOD-Perspective. This perspective dissolves the viewer of the real world. He recognises and understands the processes. And, consequently, may feel like God (perhaps a small one). This

visualisation method was created, 1989 by Peter Molyneux and was first presented in the Game "Populos" (cf. wikipedia/Molyneux, 2005 and Stöcker, 2005).

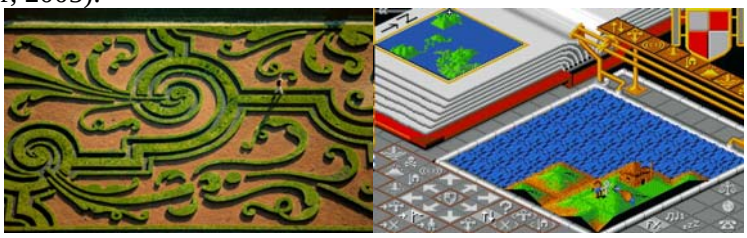

Figure 3: GOD Views: Earth from above by Bertrand 2003 and Populos by Peter Molyneux 1989

Another important factor of the post industrial society transforming to the information society is the dematerialisation of data and knowledge by the World Wide Web which transports information with, until recently, unknown speed and volume. Therefore, the Internet can be regarded as a metaphor for globalisation: it is cause, result and indicator at the same time. Communication, trade, decision-making processes, culture/ pop culture are all virtualised by the medium “Internet”: The location of the information is irrelevant: data is delocalised.

Against the described background, the phenomenon of the Digitally Globe Systems has to be seen as following:

By browsing Google Earth, the information tagged on the virtual globe is tracing back to its origin. The users can navigate without any scale on the globe (“no boundaries”), fly without boundaries to another place in split seconds (Virtual Globe principle) and, besides, take their own GOD-perspective. In addition, by defining filter rules and Placemarks it is possible to mark the globe with geotagged information corresponding to one’s personal interests. The user illustrates the world by his integrating wishes, like a real time strategy play surfing at the same time as usual through the WorlWideWeb.

3. Karlstal – Landscape and Culture in Change

The key assignment in this project were the examination and visualisation of changes in the landscape as a result of people’s influence. The project started in collaboration with the Department of Ecological Planning and UVP (Prof. Dr. Kai Tobias) and the Department of Computer Aided Architectural Design in Architecture and Urban Planning (Prof. Dr.-Ing. Bernd Streich). Additionally, there was another subject for researches asking how a “classical project” could be supported by an interactive internet portal and,

furthermore, asking for ways to present the results with the help of Google Earth technologies.

Karlstal in Trippstadt in the Palatine wood, is one of the most dense cultural landscapes in Germany. Forestry, charcoal burning and iron industry have been flourishing at the middle of the 18-th century by the influence of the families Hacke and Gienanth. Baroque Trippstadt castle was built in 1766/1767, whose garden has been formed by Friedrich Ludwig von Sckell in 1781. At the end of the 19-th century, the iron industry's profitability diminished and many of the constructions and buildings have fallen into oblivion. Today, only single fragments remind of this epoch (in Project Karlstal, 2005).

Given the short project duration, the main focus is based on meadowland, field and forest development. Furthermore historical maps and charts were digitized, integrated into Google Earth and the so-called "Placemarks" were positioned for single object information. Digital maps and aerial Pictures were integrated by the image overlay function (in Project Karlstal 2005).

Figure 4: Overlay: Historical map in the year 1908; Land use in the year 1826, Opaque settings 70%

Since the implementation of KML 2.0 into Google Earth, two new interesting features have been made available: the element "time-primitive" with its categories "TimeSpan" and "TimeStamp" and, in the geometry layer, the „ model" category. With the help of "time-primitive", a point of time or a time period can be assigned to each element . It is now possible to create and visualize time studies. The model of Karlstal, modified for this Paper, presents this technology. In one case, the land use is shown in the period from 1963 to 2005, but once the timeline approaches the year 2005, the map will be updated automatically. The by now invalid map of 1963 is fading out accordingly. Furthermore, the Placemarks are also faded in, depending on time of origin and will consequently be visible until present time.

By the use of the new definition of the element "model", the so-called Collada files have been integrated in Google Earth. Till KML2.0, only plain geometries were able to be represented. Now, textures can be mapped on the surface of the model. In analogy to classical 3d modellers, using the alpha canal method, photo-realistic representation of buildings and vegetation can be used and visualized.

Figure 5. Textured model of Trippstadt castle; Integration of a wood area, by using linked textures, the file size for one tree is as small as for 1000 trees

New questions appeared increasingly during the course on the project: tourist boards, local politicians and the economy's representatives demonstrated their interest. Nowadays, the tourist industry has discussed a lot about web 2.0. Correspondingly, the subject "Travel 2.0" is now very much en vogue. In this context the subsequent project „ eNature Karlstal" was begun in autumn of 2006 with a planned duration of one year.

4. Uni 3D

In order to show how to use these new features, Department of Computer Aided Architectural Design in Architecture and Urban Planning, cpe, set up the Project „Uni 3D". Students of urban Planning and architecture from the University of Kaiserslautern modeled in 3D-Model and set up the textures on the surfaces. As a result, the flat view of the University could be changed into a realistic landscape.

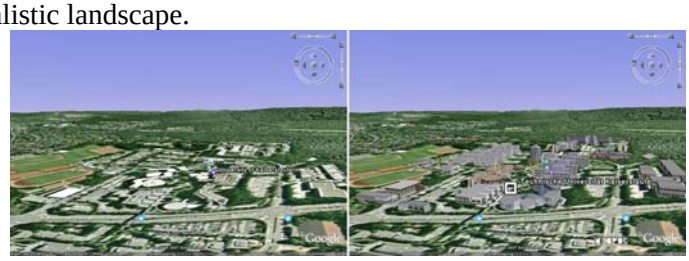

Figure 6. Satellite photo and 3D-model - University of Kaiserslautern

Furthermore additional information was tagged to different buildings and spots. Also, in the map, the two main bus lines are shown as coloured lines.

The step into the next level of details consists of the possibility to build up 3D-models in Google Earth. Now, visitors are not only able to browse through satellite based photos, but also to explore the campus by flying or just walking through the buildings by using a browser. This is a key improvement targeting unexperienced users, because, now, they are able to move in a familiar environment.

Figure 7. Textured model and use map - University of Kaiserslautern

5. Results

Google Earth offers a tool to all actors involved in the planning process, which serves raise the levels of communication. All principles of a successful visualisation (cf. moreover Appleyard, 1977, Sheppard, 1999 as well as Mach Petschek, 2006), the representative character, the exactness, the optical clearness, the reveille of interest, the legitimacy, as well as the suitability for the Internet and just the "fascination" are given unambiguously.

In addition, regardless of the discussion about technical progress of visualisations, a quite determining point may not be forgotten: In order to the statues in Germany the planning has to be communicated to several people. And the receiver of each planning, , is not an expert but a “normal” citizen. Therefore, the main requirement for every system, which wants to communicate any kind of knowledge, should be usability.

We discussed the Use in Urban and Landscape Design related to the technical platform of Google Earth. Other platforms like World Wind raised in the last months. Due to the sustainability of knowledge Google earth is a good but not the best solution. The UNESCO (UNESCO, 2005) World Report “Towards the Knowledge Society” postulates that knowledge societies will have to be societies of shared knowledge. Free access to knowledge is a precondition for a democratic participation in public life and furthermore the prerequisite to generate new knowledge. Naturaly the requirement of free access is contrary to the need of a company – like Google – to earn money. The ownership of the standard infrastructure for virtual maps, 3D-models and linked informations is a very powerful business model. Therefore the private ownership of this new infrastructure is not the best way, from the UNESCO World Reports point of view. But on the other hand the financial and technical power as well as the expert-knowledge of companies like Google is needed to build up this infrastructure. Hence the best way seems to be the private ownership combined with control by organizations like the UNESCO, universities or public institutions.

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