Fascination Google Earth – Use in Urban and Landscape Design

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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 are becoming more important, not only among experts in spatial planning. These developments also reach out to the general social, cultural and everyday context. 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 his 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 in all classes of society. User groups which have not been acquainted with geodata, highly specified and complex GIS-Systems (DWORSCHAK 2006), discover that working with these data by using Google Earth is great fun and they recognize, that with the help of the generally understandable visualisation of these data mediation of knowledge becomes very easy. In addition, it is acknowledged that geodata have an added value, if they will be used in disciplines such as the academic world, the financial sector or for private purposes.

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 a 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 difficult to understand and not clear (BESSER & SCHILDWÄCHTER 2000). The essential advantage of a three-dimensional model is, may it be physically real or virtual, that the “model language” and consequently its contents can be made very clear (STREICH 1996).

Many urban planning purpose 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, objects that are accessible multidimensionally and the playful acquaintance with planning variations. (MITCHELL 1999).
Fig. 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, the spatially functional designing practise and on the other hand the better communication between those actors, who are involved in planning and execution process (STREICH 1996).

Fig. 2: 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 midst of the black universe. During Space Shuttle missions, almost all astronauts use their free time, either being scientifically or personally motivated, to take pictures of the earth surface and to document 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, once you are situated in an unknown space. Furthermore, the borders of the scale of a map 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, which 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 he feels like God, (perhaps a small one). This visualisation method was created in 1989 by Peter Molyneux and was first presented in the Game “Populos” (cf. WIKIPEDIA/MOLYNEUX 2005 and STÖCKER 2005).

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 process, 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 in 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, fly in split seconds to another place (Virtual Globe principle) and, besides, take their own GOD-perspective. In addition, it is possible by defining filter rules and Placemarks to adapt the world with geotagged information in a way that they correspond to the personal interests. The user illustrates the world by his 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 examination and visualisation of changes in the landscape as a result of people’s influence, was the main question in this project, which started in collaboration with the Department of Ecological Planning and UVP (Prof. Kai Tobias) and the Department of Computer Aided Architectural Design in Architecture and Urban Planning (cpe). Additionally to this topic, there was another subject for researches which asked 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 was not lucrative anymore, many of the constructions and buildings have fallen into oblivion. Today, only single fragments remind of this epoch [in Project Karlstal in 2005].

In account of 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 are integrated by the image overlay function [in Project Karlstal 2005].

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.

Fig. 4: Overlay: Historical map in the year 1908; Land use in the year 1826, Opaque settings 70%
By the use of the new definition of the element “model”, the so-called Collada files are 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, Photo-realistic representation of buildings and vegetation using the alpha canal method can be used and visualized.

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

New questions appeared increasingly during the work on the project: tourist boards, local politicians and the economy’s representatives demonstrated their interest. Nowadays the touristic industries have discussed a lot about web 2.0, so that correspondingly the subject “Travel 2.0” is now very en vogue. In this context the subsequent project „eNature Karlstal“ was begun in autumn of the year 2006 with a duration of one year.

4 Result

Google Earth offers to all actors involved in the planning process, a tool that serves to raise communication constantly. 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 determining point may not be forgotten: The receiver of each planning which has to be communicated, 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.

References

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