

## ON SILENT WINGS THROUGH THE WORLD HERITAGE

### *The Virtual Town Model of Bamberg*

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**Abstract.** The picturesque World Heritage city of Bamberg is the ideal choice for a virtual city model. Visitors can fly through the streets on the computer, admiring the buildings from every angle, zooming in on detail or discovering hidden gardens. Visitors are not only limited to the present but can embark upon an exciting journey into the past because the model is linked with historical maps and images. Users can also travel into the future by adding plans for new buildings, thus facilitating decision-making.

This unique model, on which staff members of the city administration have been working for three years, is complete in central areas of the World Heritage site and can be visited from all over the world via Google Earth. It is an impressive innovative tool for imparting the “spirit ” of the World Heritage city of Bamberg both to interested adults and youths.

Finding the spirit of place – isn’t it almost a mission impossible? How can we grasp, for example, the “genius loci” of a town?

There is no doubt, that cities – some more, some less – have that “spirit of place”, often called the character or the personality of the town. Munich, for instance, clearly has another “character” than London or Quebec. But in trying to define it, the answers will be endlessly complex and can bring only partial approximation.

But there are some aspects, which it is helpful to analyse, for example

- the actual situation of the town,
- its history and
- its appearance.

The “essence” of a town depends firstly on its geographic situation, its size, the structure of its population and similar facts. But you cannot discern the distinctive “character” of a town with these data alone. Like the personality of human beings it was essentially shaped by what the town lived through, by its history. Part of that history, still very evident today, has been preserved and stored in the appearance of the town, in its structures, the monuments, the silhouette and the landmarks. All those points are important steps on the way to defining the “spirit of place”.



*Figure 1. The silhouette of Bamberg*

A very useful instrument for researching them is a virtual town model. The city of Bamberg is now creating - in close cooperation with the Bavarian State Office for the Preservation of Monuments - such a three-dimensional virtual town model, one that goes beyond a “normal view”, enabling a special degree of visualization. What is

new about this model, and how it differs from others, is that it allows a reconstruction of the development of the city since the time of the first map on the basis of valid facts. A journey into the past, as near to then reality as possible, is achieved.



*Figure 2. The silhouette of Bamberg – virtual town model*

### **Bamberg and its virtual town model**

Bamberg, a town of 70,000 inhabitants, lies right in the middle of Germany and is considered the epitome of a “beautiful city”. One almost does not realize, that behind that beauty is hidden the most important employment centre in Upper Franconia with 46,000 jobs, a centre of public authorities’ administration, shopping, education for 21,000 pupils and 9,000 students, and a magnet for the arts with a lot of libraries, theatres, museums and art galleries, antique shops and the world-famous Bamberg Symphony. One of the most important economic factors meanwhile is tourism, which has been increasing for decades. In 2007 there were 400,000 overnight visitors and 1.7 million day visitors.

But what do those numbers tell us? As the “Little Prince” used to say: “C’est pour les grandes personnes. Ils aiment les chiffres. Elles sont comme ça.” They are not more than mere statistics to help categorize the town. History will tell us far more of the special “essence” of Bamberg, which is more than a 1,000 years old. It began

with a castle which overlooked two important trade routes and a crossing point over the river. There, in the year 1007, Emperor Heinrich II and his wife Kunigunde founded a bishopric to which they gave rich possessions. From the endowed territories developed the episcopal principality of Bamberg which existed until 1802. Then it was secularized and integrated into the State of Bavaria. Through all the centuries Bamberg as capital of the ecclesiastic principality was richly furnished with splendid buildings, representative of both church and nobility. Fortunately most of them were spared the ravages of World War II. But the special charm of Bamberg comes from the fact that the famous highlights – churches, monasteries and palaces – are embedded in an intact surrounding area, one of many small and big private houses, which were not sacrificed to modernization in the last 60 years, but were, for the most part, lovingly and professionally restored. The Old Town ensemble was put on the UNESCO World Heritage-List in 1993, as “an outstanding example of a central European town with a basically early-mediaeval plan”.

For some years now one can explore this unique town in a new special and informative way. Anyone who has Google Earth on his computer can beam into the city of Bamberg, look around, fly through the streets, slip over the roofs and peep into hidden gardens and then swing high above to see the whole town lying beneath – all this possible with the aid of the virtual town model of Bamberg.

### **What is a virtual town model?**

A virtual town model tries to reproduce a town in the computer as realistically as possible. The idea for such a model came to me – it was about 1995 – when watching my sons playing computer games. In some of those games the heroes run or fly through cities on their adventures. Consequently I imagined – very naively, I must admit - that it should be possible to create just such a model for a “living” city, too. Our project group managed to convince the city fathers that a virtual town model is more useful and more seminal than a wooden town model, as was planned at that time.

However, at the beginning there were high technical obstacles in realizing the plan. Initially, implementation of the enormous amount of data which accumulated, was a problem. In fact it was equally difficult to gather the necessary data at all. For each house you need hundreds of measurement data, not only the height, width and depth of the building, but also the pitch of its roof, decoration, projections, windows etc, etc. Using them, you first have to build a skeleton of the

building on which you then mount the photos of its external appearance. Then you have to create a model of the topographical location and to insert the virtually built houses into it. Particularly in Bamberg, with its seven hills, buildings do not stand on an even level, but the altitude of their site varies considerably.

All that takes a lot of time and so it is expensive, too. In Bamberg there is only a small amount of money available for the project, so that the constructors - a highly motivated employee of the town planning office and his small staff – need a lot of imagination to accomplish their task. Thus the model *is* growing, slowly, but steadily. Up to now 1,500 houses in the centre of the city have been made, as well as the cathedral, St. Michael's, the Upper Parish Church and the Old Town Hall.

But visualization of the present-day town is only the first step. In order to get to the “essence” of the town, to the “spirit of place”, we thought it absolutely necessary to include the past. And so we added a fourth dimension to the 3D-model – namely time.

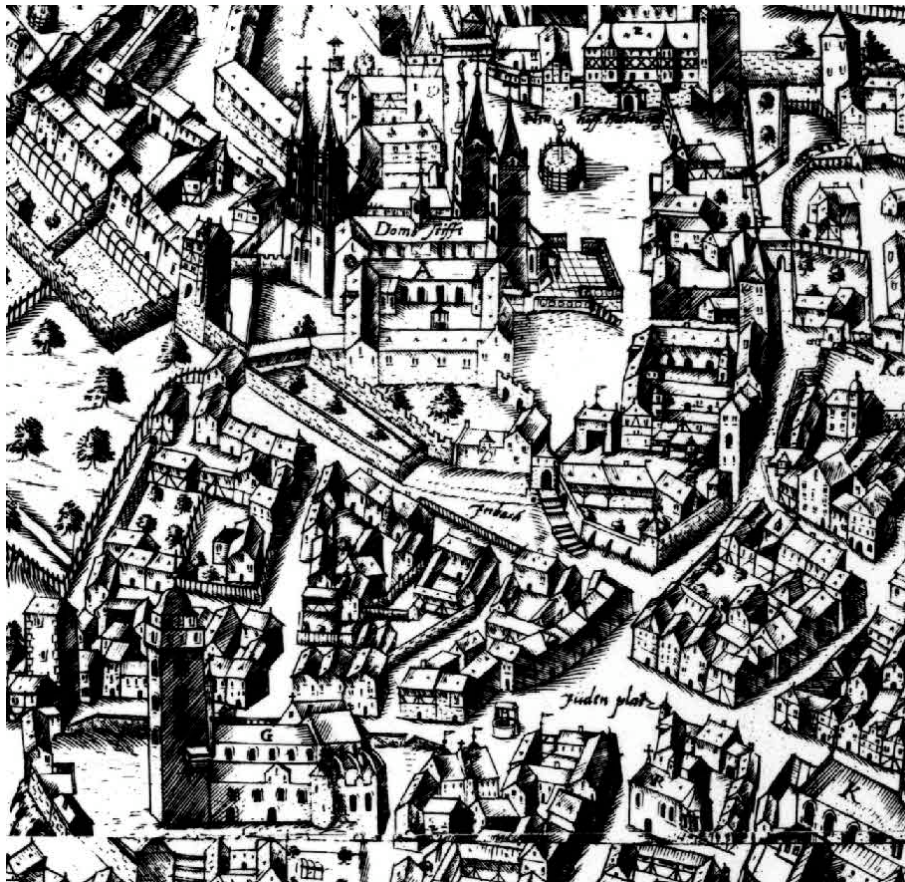


*Figure 3.* Bamberg of today grown out of a plan from 1822 – change of the city's structure

With a few simple movements of the mouse you can glide back into the past. You can let the city of today grow out of the first cadastral plan of Bamberg from 1822 and thereby watch the town growing in the 19th and 20th centuries. But one can go even further



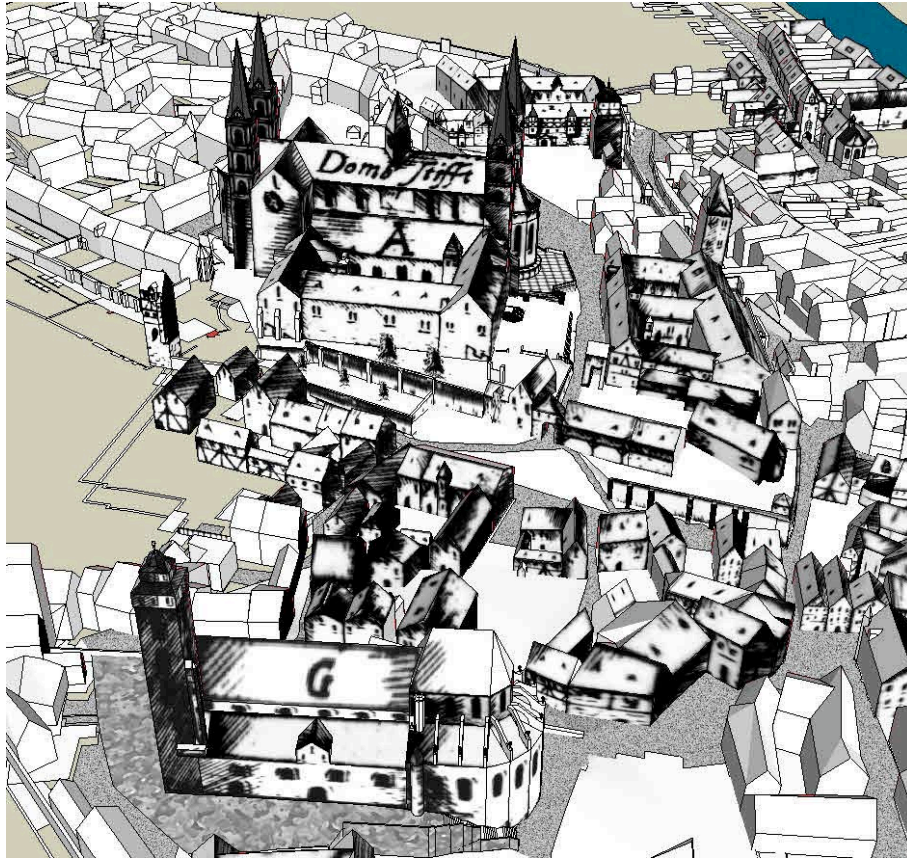
back, right to late-mediaeval times, and recognize one of the characteristics of Bamberg - the fact, that the main structures of the town have been maintained since then. These structures are easily discernible in the bird's-eye view map of 1602, made by Petrus Zweidler. The Zweidler map was redrawn by the Bavarian State Office for the Preservation of Monuments in a complicated operation to make a ground plan, compatible with a modern cadastral plan.



*Figure 4. The Zweidler Plan*

In this map the first buildings and streets of Bamberg, as Zweidler depicted them around 1600, are just emerging. Those parts of buildings not included in his drawing, have been made discernible (left white without texture) in order to enable a scientifically and authentic interpretation. Questions and problems that arose during

realization of this work led to astonishing new findings concerning the situation of the town in the period around 1600.



*Figure 5. Zweidler's Bamberg in Google Earth*

**For what purposes can the virtual town model be used?**

First of all – and that is the main purpose – the model is an extremely important instrument in the planning of today's town. In future the decisionmakers can see in a simple way how a planned new building, the shaping of a square or similar objects, will look in the existing surroundings. Models until now could, at the most, only show the immediate neighbourhood, but optical axes and distant views, for example, could not be simulated and these in fact are often a deciding factor in the appearance of a town.





*Figure 6.* 1822 – 2008: The virtual town model as a tool for planning and for studies on the city's development



A recent case, in which the virtual town model was used in Bamberg, concerned a planned new hotel building (the winner of an architectural award) on a very prominent site in the heart of the city. With the help of the model it became clear that the proportions of the building were quite overdimensional. As a result the town council stopped realization of the project.

But there are further possibilities for using the virtual town model: private builders and their architects also find easily available help in their planning, town planners can simulate possible dangers, for example the spread of flooding, fire, smoke or noise and it can also be used in the production of navigation systems, in the marketing of real estate and in advertising.

In addition there are a number of unanticipated uses have already been put into practice.

For example a model in bronze to help blind people explore the structure of the town, was cast with the forms of the virtual town model. The director of the Municipal Theatre has written a play based on a tale by E.T.A. Hoffmann for Christmas 2008, in which the town, bit by bit, is turned into one made of sugar, using the virtual town model to show this magic change with a film on stage. The university of Bamberg took it for a research project for automatic photo identification. During the last "World Heritage Race", when thousands of runners chased through the streets and over the hills of Bamberg, it was possible to follow some of the runners, with the corresponding technical equipment, on the monitor. These are only a few of the little mosaic pieces that make up the manifold possibilities of the virtual town model. There are no bounds to our imagination.

### **What is planned for the future?**

Although three years' work have been put into it, the virtual town model of Bamberg is still, in a certain sense, at the teething stages. It still has to be added to and building completed. So far only 1,500 buildings out of a total of about 10,000 have been finished. Besides, the technology of hardware and software is steadily and rapidly developing further, continuously opening up new possibilities for the virtual town model. The constructors of the model learn new things with every new building, that they begin. The virtual copy of the cathedral, for example, that was one of the first to be produced is not as detailed and sophisticated by far as that of the Upper Parish Church.



*Figure 7. Cathedral (left) an Upper Parish Church*

An extremely important goal for the future is the interlinking of information. It should be possible for the user, clicking on a building, to receive not just pictures, but a lot of other data, too. For example he may call up details as to history, art history, preservation of monuments, restoration measures, listed buildings, but also information concerning tourism, hotels and restaurants, traffic and navigation tips and so on. Only with this wealth of information will the virtual town model reach the full scope intended by its planners. And this is of course true for the historical levels of the virtual town model, too.

#### **“Homo ludens” and the virtual town model**

As has been shown, the model has many useful features. But it is also, if we are honest with ourselves, one large fascinating game. And that is, in fact, its best quality perhaps. Perhaps only the “homo ludens” can really get hold of such a fleeting thing like the “spirit of place”. And a virtual town model with its manifold possibilities for interaction and creativity is an excellently fitting playing field. When used in close cooperation with scientific research, it is a good way – along with others – to find the “spirit of place”.