

PlanningTwin

Visualizing the future of Vienna

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Keywords: *planning twin – urban planning – planning process – Digital geoTwin – digital urban twins*

Introduction

Urban planning processes can be very heterogeneous. The size of the planning area varies between large areas like former cargo railway stations to individual parcels and, thus, more or less planning stages might be applied. They might cover master plans, zoning plans, architectural competitions up to BIM models. Nevertheless, in the course of the process they get more and more detailed in geometry as well as in attributes and information. Depending on the planning stage and the complexity of the models different software products and different 3D data formats are used. Some planning stages, especially the last detailed plans, are mostly done in local coordinate systems and, thus, are difficult to combine and integrate with georeferenced 3D city models. Simulation and analysis of planning data on existing city environment can be limited due to this.

Within the city administration different departments are involved in different planning stages and sometimes urban planners and architects in these departments lack software and tools to work with this variety of 3D data formats. Furthermore, the planning data is sometimes only stored locally or within the department. Databases are rarely used due to the different formats and data models in use. Thus, cross-divisional work is often limited and hindered.

(Figure1)

The PlanningTwin, compared to the Digital geoTwin (Lehner and Dorffner, 2020, pp. 63–75), which is a virtual replica of the city, shows the city's future from an urban planning perspective. In this contribution, we want to discuss the goals of the PlanningTwin project, which was supported by the innovation management of the department MA 23 – Statistics of the City of Vienna. The goal was to develop prototypes and concepts in order to digitally support the urban planning processes and overcome current limitations. Next to a database and easy access via 3D web tools also a 3D story map was set up in order to show the potential to inform and communicate urban development of the city to interested citizens by visualizing 3D planning data integrated into an existing 3D city model.

Methodology

The aim of the project is to continuously digitally accompany the urban planning process across all planning stages and all departments and units of the city administration involved. For this purpose, four key aspects were defined within the project.

To achieve an overview of the whole planning process, a data journey was set up in order to define data points. The aim was to see where and when planning data is being generated. For each data point the quality and quantity was investigated as well as the details, objects and attributes of the

specific data point. In the end it was evaluated whether domain models can be generated for several data points.

(Figure 2)

Additionally, user rights on the different data points were evaluated. Based on these results a central database for planning data was set up, where different data formats and the definition of individual attributes were supported. A role-based access management controls the data usage of individual employees during the planning process.

In order to support cross-divisional work, a 3D web application was set up to support urban planners and architects of different departments. Via connection of the 3D web application to the central planning database, the data sets can be visualised together with a 3D-model of the city. Furthermore, simple editing and analysis like the shadow cast are implemented in order to enable users to work with the data in a common environment.

(Figure 3)

Informing about the future development of a city and communicating with citizens starting at early planning stages is crucial in order to get public understanding and support. Thus, a prototype of a 3D story map was set up for a public relation relevant urban planning area within the City of Vienna. The goal was to show possibilities, benefits and added value when introducing the technology to public relation and participation processes.

(Figure 4)

Summary

The goal of the project "PlanningTwin" is the continuous support of the urban planning processes across all planning stages and departments of the City of Vienna. Therefore, an analysis of the planning process focussing on data points and including the potential for improvement was carried out. Furthermore, a central database for planning data including a role-based access management and a 3D web application including relevant tools for easy access to planning data, integration with a 3D city model and analysis have been set up. Additionally, the value of a 3D story map for public relation and citizen participation has been shown based on a prototype for a specific urban planning development site.

References

Lehner, H. and Dorffner, L. (2020): 'Digital geoTwin Vienna: Towards a Digital Twin City as Geodata Hub', PFG – Journal of Photogrammetry, Remote Sensing and Geoinformation Science 88, pp. 63-75. DOI: 10.1007/s41064-020-00101-4 <CHNT_References>