

PRECISE 3D CARTOGRAPHIC DESIGN USING BING-MAPS RESOURCES, 3D BLENDER AND THE SPECIALIZED BLENDERGIS-ADDON APPLICATION

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Abstract: 3D cartographic design is successfully implemented using the modern resources of Bing-Maps, Blender-3D software and the BlenderGIS-addon application. In addition to the quality of the resulting end-models, the performance of these programs and applications is highlighted by its free license and open source. In the present study, a 3D model of a part of a geographical area in Varna, Bulgaria was developed. For the research purposes the geographic area of the Technical University - Varna, comprising a part of the campus is determined. The finished 3D model contains information with the exact positions and names of the selected objects.

Keywords: 3D, GIS, BING, BLENDER, BLENDERGIS-ADDON

1. Introduction

Obtaining quality 3D cartographic models requires the availability of appropriate resources of a different nature. Even if an appropriate methodology, including up-to-date technical and information tools and data, is developed, it is important to keep in mind that keeping up-to-date is of great significance in maintaining a system, including the emergence of new versions of operating systems, especially their interaction. Often, this is accompanied by the passage of a system from a free to paid version or in other cases, the abandonment of the product [1]. In turn, the GIS (Geographic Information System) has its own specific software, hardware, data, training capabilities for creating, manipulating, storing, analyzing, and visualizing spatially-defined data [2 - 5].

2. Materials and Methods

The Bing-Maps [6], Blender-3D [7] and BlenderGIS-addon [8] are methodically supported at this stage (November 2017). For the current study Bing online resources in the Maps section are used within the Blender 3D open source program. This is possible with the support of BlenderGIS-addon. Combining these capabilities into a unified system, the design of 3D cartographic model is fully possible, with the end result being with very good visual qualities. Figure 1 shows the working configuration between the three main components Bing-Maps, Blender-3D and BlenderGIS-addon, emphasizing that work is done in real time without hierarchy.

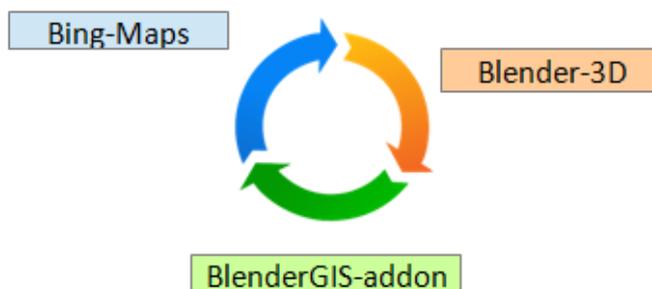


Fig. 1 Interaction between Bing-Maps, Blender-3D and BlenderGIS – addon

Implementation of the 3D cartographic model takes place in a Blender software environment. The program is a powerful free resource that combines a fully-functional and convenient interface with very good capabilities for high-quality finishing images or animations [9-17]. After adding BlenderGIS-addon (the addon is located at: <https://github.com/domlysz/BlenderGIS> and activated in Blender software using File-> User Preferences-> Install add-on from file-> BlenderGis-master.zip) it is necessary to select the Cache folder. The BlenderGIS-addon activates Basemap and Source: Bing; Layer: Map. Directly into the Blender software interface is included Bing-Maps (fig. 2). In order for visualization to be possible, Top View should be positioned in Ortho mode.



Fig. 2 Online Bing-Maps in Top View / Ortho

The map of the Technical University - Varna, Bulgaria is determined by manual or coordinate positioning of the map (fig. 3).

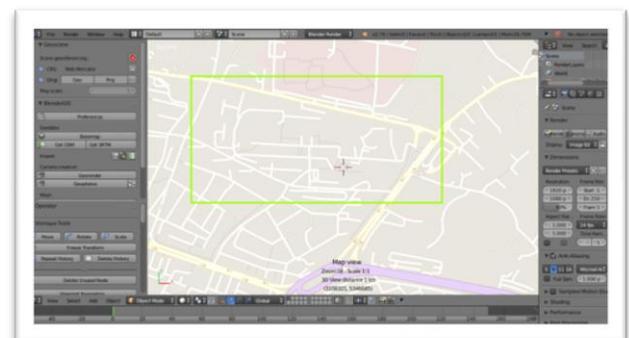


Fig. 3 Selecting the area of the Technical University - Varna, Bulgaria on the map

Once the zone is set, it switches to Satellite Mode (BlenderGIS-addon / Basemap / Layer: Satellite). The satellite visualization in the Blender software of the Technical University - Varna, Bulgaria is shown in figure 4.



Fig. 4 Satellite Visualization in Blender Software in the region of Technical University - Varna, Bulgaria

The BlenderGIS-addon defines 3D design parameters: Get OSM/Ways/building, highway, natural, Default Height: 20, Level height: 3 and Separate objects. In the workspace of Blender three-dimensional models corresponding to the real objects are designed (figure 5 and figure 6).



Fig. 5 The designed 3D model of the region of the Technical University - Varna, Bulgaria and the surrounding sites

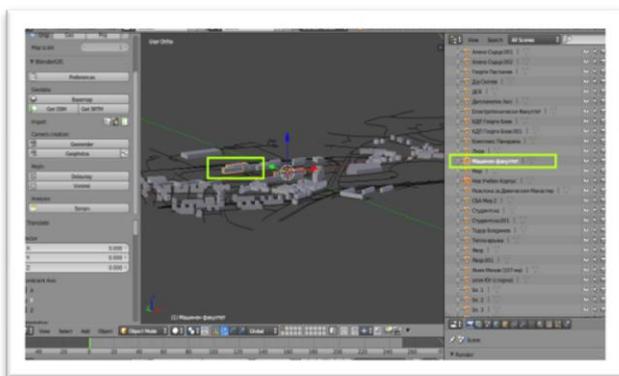


Fig. 6 Exact selection of the Faculty of Mechanical Engineering of the Technical University - Varna, Bulgaria (the selected 3D model and the corresponding name obtained directly online are marked in green)

In figure 7 is shown in isometric view the finished three-dimensional model of a field of Technical University - Varna, Bulgaria and the surrounding objects from the selected zone.

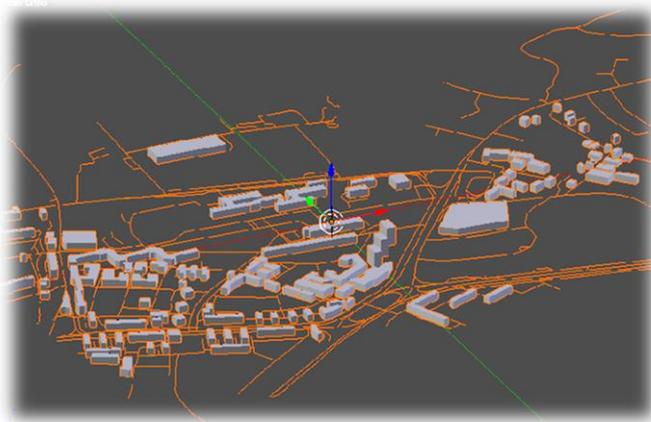


Fig. 7 Isometric view of the finished three-dimensional model of the region of the Technical University - Varna, Bulgaria and the surrounding objects of the selected area

Result: A three-dimensional model of the area including the area of the Technical University - Varna, Bulgaria and surrounding sites is developed through the accessible resources of Bing-Maps, Blender-3D and BlenderGIS-addon.

3. Conclusion

This article details the correct technological pathway for obtaining this model, focusing on the methodological features that contribute to the right design process. The resulting automated design result saves technological time to conventional three-dimensional design according to predefined drawings and parameters. The obtained result is distinguished by the high accuracy of the 3-D model and the detailed accompanying information received in real time..

4. References

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