Virtual Leopoldina
German National Academy of Sciences

Michael Pokladek & Detlef Thürkow

Martin-Luther-University Halle-Wittenberg
Institue of Geosciences and Geography
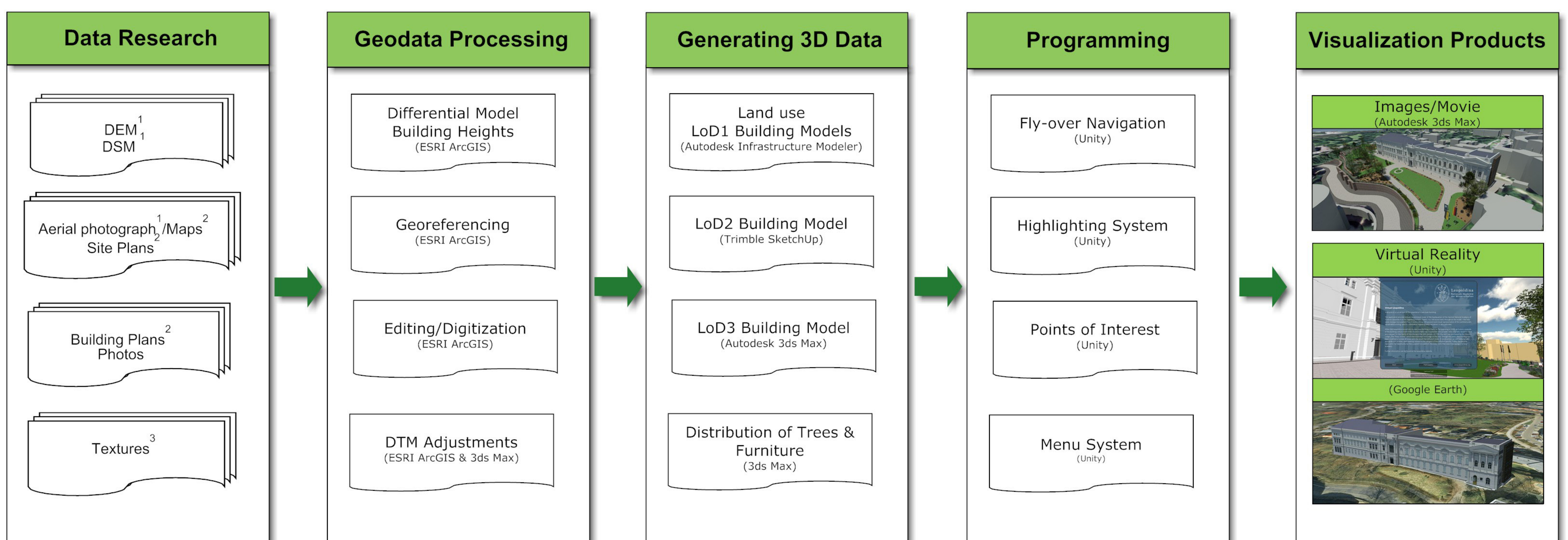Department of Remote Sensing and Cartography

Introduction

The Leopoldina – German National Academy of Sciences is one of the oldest academies of science in the world. Founded in 1652, it is dedicated to freedom of science for the benefit of mankind as well as to shaping a better future. Since 1878, the academy is located in the university city Halle(Saale). With approximately 1500 members the Leopoldina gathers scientists from Germany, Austria, Switzerland and many other countries.

In 2008, the Leopoldina became the German National Academy of Sciences . Its new objectives are to work on themes of social significance with scientific methods, to represent the results to the public and to advise politicians. In order to meet these objectives the Leopoldina moved to its new headquarters on the Jägerberg in Halle (PDANL)

Objectives

- Illustration of the headquarters of the Leopoldina in a virtual 3D model
- Exploration of visual impressions and interesting information of selected details of the new building
- Programming of features to highlight points of interest (POI) and present information
- Construction of two ways of navigation (path constraint fly over controller, first person controller)
- Improvement of the public relations of the Leopoldina and of Halle as a location for science

Method

Data Research	Geodata Processing	Generating 3D Data	Programming	Visualization Products
DEM[1] / DSM	Differential Model Building Heights (ESRI ArcGIS)	Land use LoD1 Building Models (Autodesk Infrastructure Modeler)	Fly-over Navigation (Unity)	Images/Movie (Autodesk 3ds Max)
Aerial photograph[1]/Maps[2] Site Plans	Georeferencing (ESRI ArcGIS)	LoD2 Building Model (Trimble SketchUp)	Highlighting System (Unity)	Virtual Reality (Unity)
Building Plans[2] Photos	Editing/Digitization (ESRI ArcGIS)	LoD3 Building Model (Autodesk 3ds Max)	Points of Interest (Unity)	(Google Earth)
Textures[3]	DTM Adjustments (ESRI ArcGIS & 3ds Max)	Distribution of Trees & Furniture (3ds Max)	Menu System (Unity)	

1: Landesamt für Vermessung und Geoinformation Sachsen-Anhalt; 2: Leopoldina - German National Academy of Sciences; 3: Autodesl 3ds Max Material Libary

Results

Renderings

Fig. 1: Leopoldina (View from the South west)

Fig. 2: Main Entrance (View from the South east)

Fig. 3: Leopoldina (View from the South)

Fig.4: Attics and Pillars above the Main Entrance

Virtual Reality

Fig. 5: Highlighting System

Fig. 6: Fly-over Navigation & Information Box

Fig. 7: Pedestrian Navigation

Fig.8: LoD2 Model in Google Earth

Conclusion

The general methods that were used for the creation of the „virtual Leopoldina" are explained in Pokladek et al. 2012. For this project highlighting methods were used in order to call the user's Attention to POIs. An example is the style variance technique that was applied for the distinction of special rooms like the auditorium from other parts of the building (Trapp et al., 2010). When the user takes a look at one of those POIs the colour overlay changes, a text box appears and the possibility for opening an information box is offered.

The DTM1 came up with too many data while lacking the demanded quality of detail at the same time. First of all, it was neccessary to resample the DTM and create a multiresolution model of the terrain (Deussen et al., 2005) in order to save system resources in the virtual reality. The next step was the manual adjustment of the DTM for the attainment of the demanded quality. For instance, the micro-geomorphological situation had to be rectified due to an inaccurate interpolation of the points from the DTM-grid (Trümpling, 2005).

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Contact:
Michael Pokladek: M.Pokladek@hotmail.de
Dr. Detlef Thürkow: detlef.thuerkow@geo.uni-halle.de