



Capturing improved TLS data of Maulbronn Monastery and integration of the mesh into the existing UNITY visualization

This Master Thesis is improving the existing 3D visualization of the Maulbronn monastery. On one hand the texture of the different rooms has to be improved because there are areas with excess brightness that are produced by the windows. On the other hand, a 3D model from the church of the monastery must be included in the final visualization in UNITY.



Figure 1. Tiled model of the church

To achieve this purpose, the old scans that were part of an existing FARO SCENE project have been analysed. After this process, those areas that had to be repeated to improve texture were detected.

Additionally, tests have been done to find out which parameters are best suited to improve the quality of the HDR images. Afterwards, different scans were taken with the best parameters.

This data has been processed and recorded with the data from the previous scans, resulting in the creation of a mesh for each room of the monastery, along with the position file of every scan and HDR images. Geomagic Qualify has also been used to improve mesh geometry.

Then, the images have been edited in Photoshop to represent a better texture for the mesh. Some objects that were removed from the mesh, were also removed in the HDR images. Furthermore, masks were created to apply only those areas of the images with good quality. In order to reproject the images on the mesh, the Agisoft Metashape software has been used, resulting in a tiled model. Once is obtained, only the last level of the tiled model has been used to incorporate the new meshes into UNITY.

Finally, the tiled models were incorporated into Unity project, and loaded in run-time by using a script. The texture parameters and some parts related to walkability have been also improved.



Figure 2. Comparison between the old model (left side) and the new tiled model (right side) using the HDR images in Innenhof (upper images) and Herrenprefektorium (Bottom images).

Regarding the memory-consuming in UNITY, the used of the tiled model increase the quality of the visualization, since only the meshes that are close to the player are loaded with high definition.