Preparation of 3D-data for HSR-Game with Motion

Introduction

In this project we evaluated different methods of creating a 3D model of an area with several buildings. Aim was to create a realistic environment for a game. The workflow of the different methods should be transferable, meaning that other users can easily adapt the workflow and use it for their area.

Approach

As an initial situation there is a neighbouring Institute (ICOM) which owns two 6DOF Motion-Simulators. Some games have already been integrated there. It is also ready to use the Unreal-Engine which combines motion-data (from any object) with the simulators. Next to that there exists OpenStreetMap (OSM) data which can be also used for 3D scenes. For example the research centre of HSR campus is mapped in a very detailed way. What is missing there (and in OSM in general) is the texture. As an alternative approach to that, there are very powerful photogrammetry tools like Agisoft Photoscan. Therefore, the focus of this thesis was to evaluate these two approaches: The first is using purely open data and open source software, such as OSM and OSM2World. The other approach uses commercial photogrammetry software with and without the help of a drone. The progress of the implementation of the first approach (OSM) was faster than expected. Given that additional time it was decided to spilt the photogrammetry approach into two parts: primo a manual approach with camera and secondo using a drone with another commercial software (Pix4D Mission Planer). These (sub-)approaches have no dependencies and could be evaluated and documented separately.

Results

The three approaches have been evaluated. And all three approaches could be completed and created a 3D model of the HSR research centre. A workflow for all approaches was established and documented. As expected using photogrammetry creates a more realistic and detailed model than the one generated from OSM data. On the other hand, the photogrammetry approach is more expensive with all its software, tools and hardware (camera/drone) involved. Either way, it takes a considerable amount of time to create a realistic 3D model of buildings. But in the end both approaches produce a 3D model which is fit for use for the purposes of a game. Depending on the available time, tools and the requirements, one or the other approach is more suitable. The results of this project are the basis for a follow-up project called "HSR-Game with Motion”. Two 3D models are available now as a starting point, ready to be integrated into a game-engine.