Reconstructing immersive spaces by contemporary 3D scanning workflows

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Shaping the ideal scan-to-BIM (Building Information Modeling) workflow has been an ongoing goal in the Architecture, Engineering, Construction and Facility Management (AEC/FM) domains.
This innovative workflow autonomously processes raw data to usable 3D models for virtual environments that can be directly utilized. In this case study, several reconstruction techniques were explored such as a high-end laser scanner as well as a relatively low-cost LiDAR integrated Tablet.

Both hardware solutions also differ in portability, proving advantages and disadvantages depending on the scan environment.

For reconstruction we chose a renovated building, part of the University of Antwerp city campus. This location consists of reference spaces such as offices, classrooms, multifunctional rooms, auditoria, hallways, and stairs. Depending on the incoming light, visual noise, and usage in the final integration, different settings need consideration. Scanning larger workspace areas brings different attention points that are best considered beforehand. These include time of day, reflective surfaces, and visual noise (intensely crowded areas with many and or complex objects).

Processing scans brings several challenges. During the scanning process it is important to maintain overview. Not only check the scans on their quality after each individual scan but evaluate the physical surroundings and making sure they change as minimal as possible.

Finally, the transfer to VR integration is highly dependent on the processing work and the flexibility of the data export configuration. Dependencies are textures, file size, reduction capabilities and plug-in compatibility.

As a result, this case study is the base for constructing a workflow method for the industry on similar architecture as guidance for 3D scanning and showcasing best practices, these are taken from several logged workflows within this case study.