

BIMERR

Newsletter # 6

June 2021 (M30)

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This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement no. 820621

Call identifier: LC-EEB-02-2018



BIMERR PRE-VALIDATION: LESSONS LEARNED

The conclusions reached during the pre-validation phase provided feedback for better planning of the demo activities to follow. The valuable lessons learned for each BIMERR tool, during the pre-validation phase are:

- **Scan-to-BIM**

The use of different Terrestrial Laser Scanning (TLS) devices for the digital documentation of buildings results in varying outcomes (i.e., point clouds). A number of parameters, either chosen by the user (e.g., resolution) or intrinsic to the device (e.g., accuracy, precision), impact the quality of the cloud delivered by the scanning system, and ultimately the scan-to-BIM algorithm performance. The strategy followed in the Scan-to-BIM tool for identifying openings is challenged in the case of windows or doors that are not opened or occluded.

- **BIM Management Platform (BIM-MP)**

During the pre-validation activities, modifications were applied on BIM-MP's GED tool to handle cases where openings were not exported correctly (the opening volumes were extended beyond the internal or external surfaces of their wall). The development of the embedded 3D model viewer helped the designer identifying the geometric errors more easily. The multiple files that BIM-MP produces for each model checking and geometric checking are better organized in different file repositories per revision and not per project. The naming of the generated files is based on ISO 19650 for better management of the local copies.

- **Augmented Reality Enabled in-situ Building Feature Annotation (ARIBFA)**

The registration accuracy for large buildings could benefit by splitting the 3D model to floors and using an image target per floor. Keyboard functionality that can be tedious to the user was minimized. A strong Wi-Fi network is needed to perform the object detection functionality of the ARIBFA tool, since the HoloLens are paired to a local computer on the same network. The object detection functionality can also be affected by the speed of the user's



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movement since there is already latency in the procedure due to pairing of the Hololens to a local machine. Since the application runs on a device with relatively small CPU and RAM specifications (Hololens), the IFC editing functionality is challenging.

- **Renovation Decision Support System (RenoDSS)**

Mapping missing building material properties is sufficiently supported by the BIMERR material and component database. Mapping missing building components was not a straightforward process as components differ a lot depending on their release year and the market that they were launched in. Financial data of existing material and components for the LCA/LCC module (maintenance cost and disposal cost) were hard to obtain. While RenoDSS provided renovation measure materials out-of-the-box, renovation measures components had to be added for the specific buildings (e.g., a heating system that fits the building). The automated renovation scenario generation and KPI calculation compensate the effort of the initial data gathering required by RenoDSS, compared to manual or semi-automated scenario generation and KPI calculation.

- **BIMERR Process & Workflow Modelling and Automation (PWMA)**

The PWMA For Managers deemed to be sufficient and effective as a general tool for managing workflows, workorders, and users.

In the PWMA for Workers, the workorder loading and execution worked fine without any apparent problems. The notification system also didn't expose any design or implementation flaws and provided a seamless and effective usage. Overall, the lesson learned is that both the worker's application and notification system are sufficient for the work in the field, provided that the users are introduced to them and taught the work routines within them.

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your feedbacks and
ideas
on this page.**

The mission of the BIMERR project is to design and develop an ICT-enabled Renovation 4.0 toolkit comprising tools for Architecture, Engineering & Construction (AEC) stakeholder support throughout the energy efficiency renovation process of existing buildings.

