National Archaeological Museum of Naples

National Archaeological Museum of Naples, Naples, Italy

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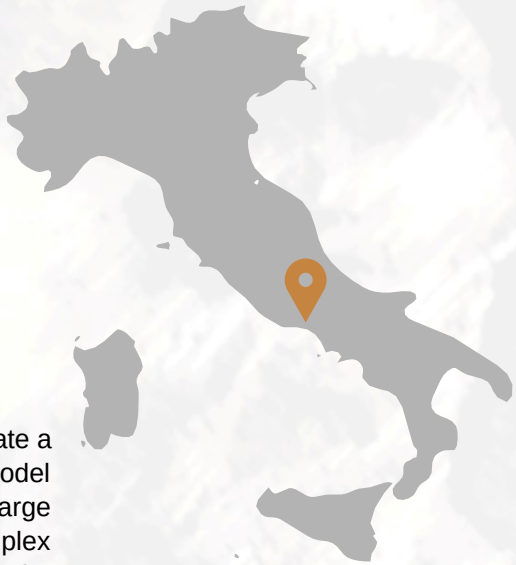
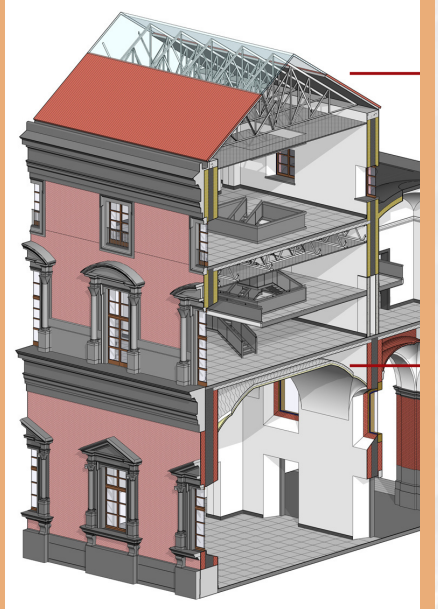




The aim of the digitalization project is to create a centralized Heritage Building Information Model (HBIM) to optimize the management of the large amount of information that such a complex building entails, linked, on the one hand, to the comprehension of the building and, to the other hand, to the collections contained therein. The advantages of the model will be the simplification and effectiveness in handling the museum complex, its deposits and collections, and also in supervising the conservation, restoration, structural and HVAC system interventions it constantly undergoes, while ensuring the permanence, consultation and implementation of data, accessible and understandable even by experts from different disciplines.

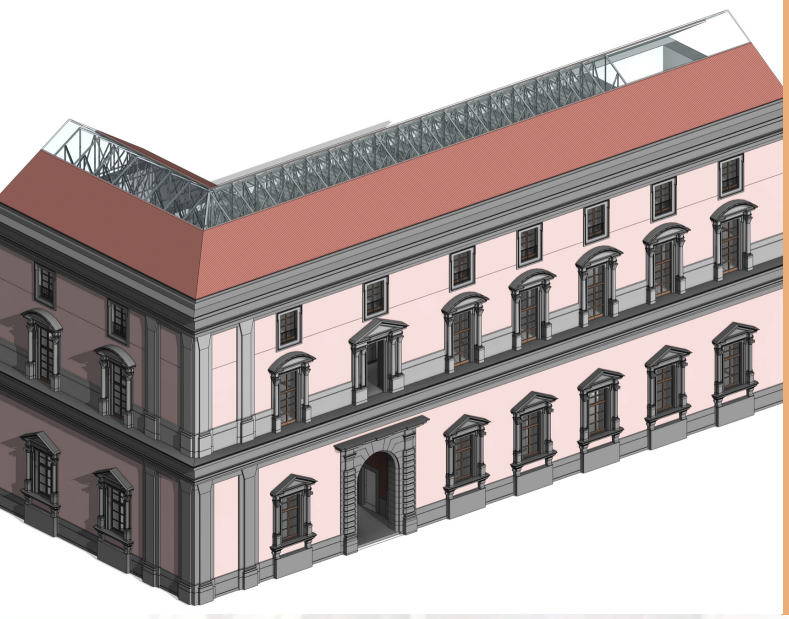
Methodology

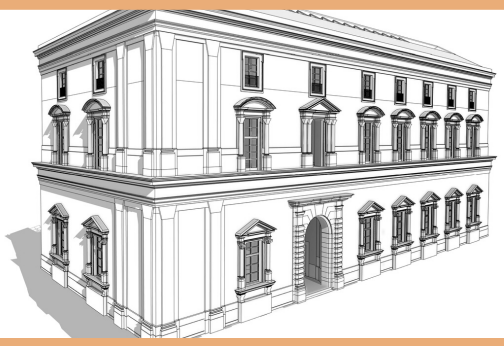
Hardware instruments and software used in the project

- Geometric survey: hardware Leica Laser scanner P50, Leica Viva GNSS GS15, Leica TS60; workstation HP Zbook17, HP Z840 - software: Leica Cyclone, Leica Trueview, 3dReshaper Hexagon, Autodesk Recap - exchange file format .e57
- HBIM model: software Autodesk Revit 2020 - Revit Server 2020 - acquisition file format .rcp - model format .rvt - exchange format .ifc
- Common Data Environment: Acca usBIM
- The hardware and software for geometric survey were selected for their accuracy, reliability and computational power.
- The software for HBIM model was selected because it is the most used in the field, with a high flexibility in representing complex, non standard elements typical of built heritage, and with a high support for collaboration. Common Data Environment has been selected for its ease of use, very important for the day-to-day management needs of the building's owners, managers and operators.

What method of dimensional control was used to confirm the accuracy during the data acquisition stages?Was there professional certification to the measurement?

191 measuring stations were distributed along the perimeter of the building at ground level and elevated with telescopic poles or on surrounding structures; 200 specific targets facilitated the coupling of adjacent clouds from different measuring stations. Scanning step was between 6.2 mm @ 10 m to 0.8 mm @ 10 m.





Were there any factors that limited the accuracy of the acquired data?

Accuracy limitation in the acquired data were avoided as much as possible; however, the presence of scaffolding and materials for maintenance and conservation works limited the acquisition of some architectural elements.

What method of dimensional confirmation was used during the post-processing process?

For the point cloud, target superimposition and redundancy in acquired data ensure a high accuracy. The assembly and filtering of the point clouds were carried out in parallel with the progress of the survey, in order to have an up-to-date feedback on the completeness and reliability of the measurements made.
For the HBIM model, according to model uses, extreme geometrical accuracy was not a critical factor, as it is already provided by the point cloud, while the correct representation of construction system was the paramount factor guiding modeling; therefore, no specific dimensional confirmation was employed.

Were there any problems encountered during the data acquisition stage and post-processing production process?

As the museum is undergoing constant transformation, the geometric survey had to face and sometimes collide with continuous restoration and maintenance activities, visitors' flows, exhibition set-ups.
During the modelling process, the huge file size of the point cloud rand the lack of RGB information for the interior surfaces rendered Scan to BIM activities challenging.

Deliverable Outputs

The output of the process was a HBIM model of the National Archaeological Museum of Naples, in the native format .rvt and the exchange format .ifc, that represent a centralized information system for the management and production of information for setting the design and maintenance activities of the building, including through tender, ensuring the permanence, consultation and implementation of the data, accessible and understandable even by experts from different disciplines.
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