



“Digital Cultural Heritage Twins Connections: Bridging Documentation, Analysis and Education from Satellite to Ground (HerOn)”

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The project aims to study, combine and disseminate the multiple possibilities offered by Digital Twins (DT) applied to architectural, archaeological and natural Cultural Heritage (CH).

Its objective is to address and resolve issues focused on scientific and social analysis and dissemination jointly through the different types of satellite, aerial and terrestrial remote sensing systems for the dissemination of CH.

Our proposal faces a growing problem in CH of technological saturation and the inability to combine, organize and disseminate all its possibilities. Therefore, our objective will allow the development of a multidisciplinary work team between various scientific branches of architecture, archaeology, engineering, education, legal framework and geomatic sciences that jointly analyzes using different types of examples of DT from each of the partners of this project. This aims to consider the connection possibilities that allow analyzing and disseminating CH through DT to promote the development of UNITA research community.

The European context has made progress in technical aspects of digitization, conservation and prevention of CH but not in the combination from multiple points of view that allow connections to be established between different actors who are dedicated to CH from four points of view: Multi-Scale and Multi-Temporal documentation, Multi-Range application techniques and scientific and social web diffusion based on Multi-Platform. In this sense, the use of the concept of DT and its social and scientific use from a broad integrative

point of view that can range from UNITA Project - *Digital Cultural Heritage Twins Connections: Bridging Documentation, Analysis And Education from Satellite to Ground (HerOn)* satellite Earth Observation to terrestrial documentation of real estate plays an essential role.

For the execution of this project, an innovative multidisciplinary scientific partnership has been formed to develop an innovative methodological approach.

Università di Brescia | Participants

DICATAM – Department of Civil, Environmental, Architectural Engineering and Mathematics

DIGI – Law Department

Irene Giustina (Team Leader) – DICATAM

Elisabetta Fusar Poli - DIGI

Fausto Minelli – DICATAM

Paolo Borin - DICATAM

Barbara Scala – DICATAM

Giorgio Vassena - DICATAM

Luca Facconi – DICATAM

Paola Morandi - DIGI

Elisa Sala - DICATAM

Università di Brescia | Contributions to research

Architecture and built heritage, along with their historical, theoretical, and technical knowledge, will play a fundamental role in the project.

Università di Brescia DICATAM and DIGI will be in charge, with Irene Giustina as team leader, in relation to the study, preservation and rehabilitation of architectural heritage in urban environments as well as to the legal framework regarding the digitization of cultural heritage. The research will follow a digital-based multidisciplinary approach, focusing in particular on the development and use, in web based applications, of Heritage/Historical Building Information Models (HBIM) from multispectral sensing techniques and of advanced geometric and structural modelling, paired with database of historical documentation.

The main roles are:

- Multidisciplinary approach to the architectural studies, with a specific focus on the history of modern and contemporary architecture and historical building techniques.
- Explore the complexity of historic buildings and their study using HBIM, advanced geometric modelling and other digital methods to establish links between structural engineering and architectural restoration.
- Propose and test innovative approaches for slam-based MLS on cultural heritage and Digital Twin sharing on the web.
- Consideration of the legal framework regarding the digitization of cultural heritage and its online dissemination, particularly focusing on copyright regulations within heritage and also taking into account the history of legal protection of cultural heritage.
- Increase awareness of architectural, urban, and heritage knowledge and protection through alternative methods of social dissemination.