

DISCOVER – Digital, autonomous, Intelligent and Synchronous system for Continuous identification, Optimization and Value Extraction of Resources from the end-of-use built environment

Summary

The DISCOVER (GA101129909) project is funded by the European Union and gathers a list of 14 partners from 7 EU countries (Figure 1), aiming to revolutionise the construction and demolition (C&D) sector by leveraging autonomous robotics, intelligent data acquisition, and circular economy strategies. It seeks to transform existing buildings and infrastructures into material banks, enabling greater reuse, recycling, and reduction of construction waste. DISCOVER responds to pressing needs for reducing C&DW generation, improving data-driven decision-making, and enhancing the safety and efficiency of deconstruction processes.

Specifically, DISCOVER's mission is articulated through 4 pillars (Figure 2):

- Autonomous robotic solutions for data collection of buildings and identification of materials, during the pre-demolition phase.
- Interactive digital twins (BIM-based models) updated with real-time data.
- Decision-support tools for stakeholders to plan deconstruction processes and end-of-life scenarios for C&DW, with sustainable and traceable products.
- Educational tools and guidelines, including MOOCs and best practice handbooks. Marketing and social-impact assessment.

These innovations target environmental, economic, and social objectives, supporting the EU's green and digital transitions and aiming to increase the reuse of materials, reduce injuries, and improve working conditions.

IST leads Work Package 4, which focuses on the strategic assessment of demolition techniques to maximise material recovery and minimise environmental impact. Its key objectives include:

- 4.1. Analysing selective demolition strategies through stakeholder surveys and expert input, based on different building types and conditions.
- 4.2. Developing a database evaluating demolition methods based on technical, economic, and environmental criteria, which aims to support informed decision-making on demolition strategies.
- 4.3. Defining sustainable deconstruction plans informed by multi-cycle life cycle (LCA) and cost (LCC) analyses.

This framework will provide the construction sector with tools to make deconstruction more efficient, optimise the use of resources, improve the environmental footprints and enhance the circularity of construction, unlocking the potential of built works to become material banks.



Figure 2. Overview of the DISCOVER project.



Figure 1. First General Assembly Meeting event, in Athens (Greece).



Project Reference

Grant agreement ID: 101129909

Leading Institution

UPC – Universitat Politècnica de Catalunya (Spain)

Partners

IST – Instituto Superior Técnico (Portugal), TU Delft – Technische Universiteit Delft (Netherlands), IMT – Institut Mines-Télécom (France), TECNALIA – Fundación Tecnalia Research & Innovation (Spain), VITO – Vlaamse Instelling voor Technologisch Onderzoek N.V. (Belgium), C5Lab – Sustainable Construction Materials Association (Portugal), H-ZERO – Hercal Zero SL (Spain), DTT – DigitalTwin Technology GmbH (Germany), TREE – Tree Capital Sp.Z.O.O. (Poland), PEDMEDE – Panellinia Enosi Diplomatouchon Michanikon Ergolipton Dimosion Ergon (Greece), HIC – Holcim Innovation Center SAS (France), TRACIMAT vzw (Belgium)

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CERIS

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Project website

<https://discover-horizon.eu/>