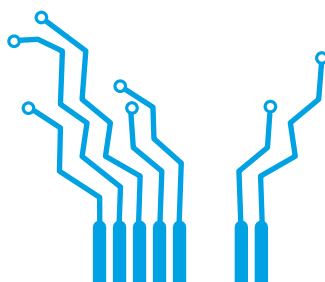
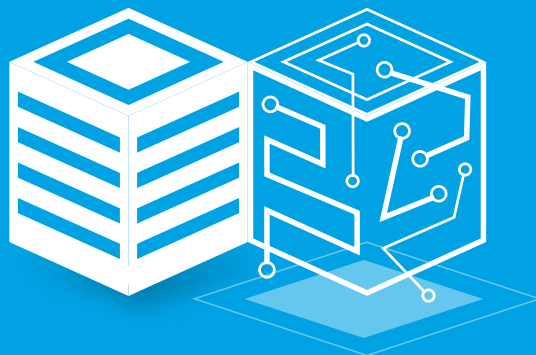


COGITO

COstruction phase diGital Twin mOdel



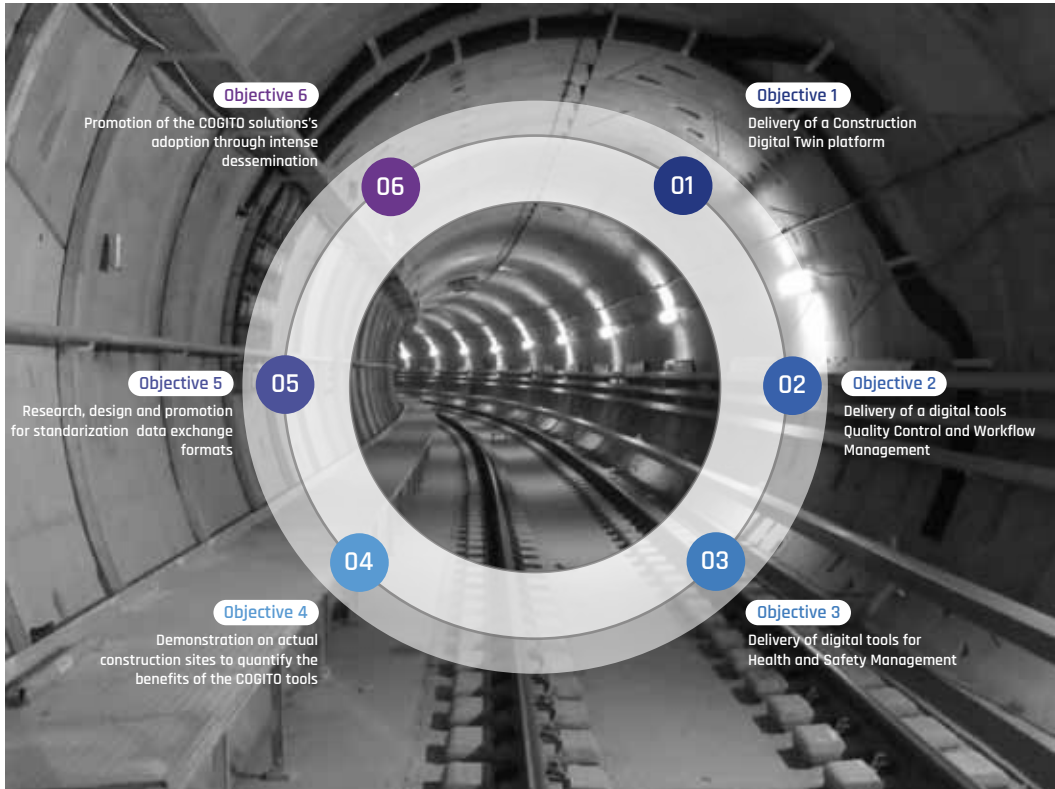
This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 958310



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COGITO Goals



Join us
in shaping the future
of construction
management
with COGITO!

[More about the project](#)



Our primary objectives encompass the **delivery of a Construction Digital Twin Platform**, alongside the development of digital tools dedicated to **Quality Control and Workflow Management**. Furthermore, we prioritize the enhancement of **Health and Safety Management** through tailored digital solutions. To validate the efficacy of our tools, we conducted **rigorous demonstrations on actual construction sites in Munich (Germany), and Murcia (Spain)**, quantifying the tangible benefits they offer. In parallel, we engaged in **extensive research, design, and promotion efforts** to standardize data exchange formats, ensuring seamless integration and interoperability.

Discover COGITO Toolbox 4.0



Experience the innovation of COGITO through our comprehensive set of **14 tools** meticulously developed to address key objectives in construction site management.

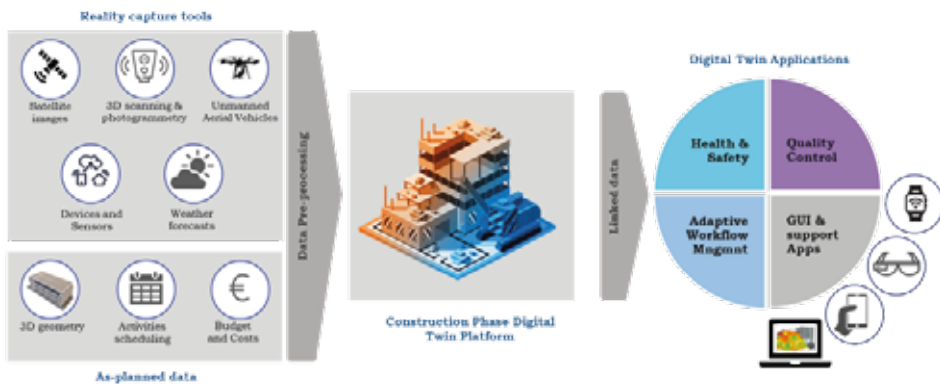
Benefits?

- **Timely detection and mitigation of safety hazards**
- **Swift identification of quality defects**
- **Real-time workflow management**

Our tools are designed to **enhance efficiency and safety on infrastructure construction sites.**

At the heart of the COGITO architecture lies our **Digital Twin platform**, incorporating advanced methods and technologies to ensure seamless integration among all tools.

Our ecosystem boasts harmonized interfaces, standardized data structures, ontologies, communication protocols, and data formats, delivering a reusable and extensible construction digital twin that sets new standards in the industry. Experience the future of construction management with COGITO!



More about the tools



COGITO Data Management, Interoperability and Visualisation

Cloud-based Digital Twin Platform - DTP
Web-based Digital Command Centre - DCC
Visual Data Pre-Processing Tool
IoT Data Pre-processing Module

A Digital Toolset for Automated Construction Quality Control

Scan-vs-BIM Enabled GeometricQC Tool
Machine Learning Enabled VisualQC Tool
QC Visualisation with Augmented Reality - DigiTAR

A Digital Toolset for the Elimination of Construction Site Accidents

H&S Prevention via Design & Planning - SafeConAI
H&S Risk Monitoring & Detection - ProActiveSafety
Safety Education and Learning - VirtualSafety

A Digital Toolset for Trusted, Up-to-date Construction Workflow Management

Process Modelling and Simulation - PMS
Blockchain Enabled Work Order Monitoring - WODM
Work Order Execution Assistance - WOE
Blockchain & Smart Contracts & Blockchain SLA Manager

More about the tools usage and tests in real construction site conditions are available in COGITO [Report on best practise examples of COGITO use](#)



Explore the groundbreaking innovations within the COGITO project, meticulously assessed and categorized into four main technical advancements featured on the EU Innovation Radar platform:

1

Cloud-based Digital Twin Platform: Revolutionizing nD BIM and IoT Data Management in Planning and Construction Phases, enhanced with Off-site Data Visualisation for comprehensive project oversight.

2

Automated Construction Quality Control Toolset: Supported by an On-site Digital Twin Visualisation with Augmented Reality, aimed at minimizing project time and cost overruns through streamlined quality assurance processes.

3

Construction Site Safety Enhancement Toolset: Focused on eliminating accidents through Health & Safety Prevention by Design and Planning, proactive real-time risk monitoring and detection, and personalized safety education and learning initiatives.

4

Trusted Construction Workflow Management Toolset: Providing up-to-date workflow management with integrated interfaces for Project Managers, Foremen, and Workers, ensuring smooth project execution and communication.

More about the innovations



Construction site in Karlsruhe

COGITO tools underwent pre-validation on a medium-scale infrastructure construction site in Karlsruhe, Germany. Engaging directly with end-users in the field, we garnered invaluable feedback from those poised to benefit most from our innovations. Leveraging this firsthand experience, we meticulously crafted user manuals and supporting documents, including comprehensive requirements and guidelines. These resources were continuously updated to streamline the deployment of the COGITO toolset and empower unsupervised utilization by professionals in the AEC industry.



High Speed Railway Station (Murcia-Spain)

Discover the second construction project in our validation phase: the Underground Station construction and adaptation of the current railway corridor to accommodate High-Speed services while ensuring compatibility with other types of traffic.

With an estimated cost of 239 million euros, the project boasts impressive features such as 30.3 million cubic meters of reinforced concrete, 197.3 thousand square meters of retaining walls, and 734 thousand cubic meters of excavated volume. Notable aspects include the burial of the railway track along a 2,503-meter route, featuring a platform for high-speed double track assembly.

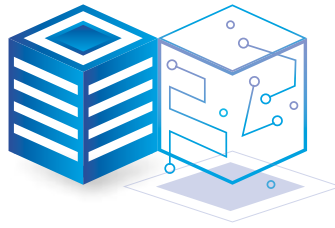
The project also entails the construction of an Underground Station spanning 2,830 meters, entirely underground, with an execution period of 36 months. An intermediate phase is planned to facilitate the underground arrival of the AVE to the station at the -8m level, while the rest of the underground components are executed.



Construction Site in Munich, Germany

The construction project involved the underground switch field conversion between station Sendlinger Tor and Goetheplatz. With an order amount totaling 1.8 million Euros, the project focused on upgrading the switch field located in the tunnel under the Munich city area, consisting of three switches. The project spanned from June 12, 2023, to July 31, 2023, encompassing various tasks including ballast renewal (approximately 580 tons), renewal of wooden sleepers, renewal of rails, and renewal of conductor rails (approximately 1950 meters).





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Project Partners



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