EDITION #1 - August 2023

NEWSLETTER

JOINT FLASH

Cluster of Digital Twin projects sharing research experience, knowledge and outcomes.

The cluster of the four digital building twin projects funded under Horizon 2020 (LC-EEB-08-2020) was created in June 2021 and include **ASHVIN, BIMProve, COGITO** and **BIM2TWIN**, all co-funded by the European Commission.

The cluster aims to share **research experience, knowledge and outcomes** across the projects. During these two years, the partners have organised joint workshops at international conferences and published joint research publications, all dedicated to **research and innovation on digital twin technologies in the construction sector.**

DIGITAL TWIN TECHNOLOGIES IN THE CONSTRUCTION

Now, these initiatives are finalising their research, and it is time, to sum up and share the **key results**. With this new series of joint flash newsletters, we want to showcase the **major technical developments and research** results of each ending project that can benefit the entire European construction sector.

In this first edition, we will spotlight **BIMProve**, ending in August 2023. Also, we will share knowledge and opportunities from the three projects that are still running for a few more months!

Enjoy your reading!

ASHVIN COGITO BIMprove BIM2TWIN

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Build smarter, cleaner, cheaper

WHICH CHALLENGES AIMS TO ADDRESS?

The overall objective of the **BIMprove project** has been to go beyond the static Building Information Modelling and **create a digital thread which acts as a dynamic metrical building model** (digital twin). This will ensure that the situation at **the construction site can be easily monitored, resources can be scheduled, and work planning is enhanced**, offering flexibility, safety and better productivity. BIMprove has focused on building construction sites after the erection process or installation of the framework has taken place.

KEY RESULTS

That objective is achieved by utilising off-the-self ground-based robots and unmanned aerial vehicles (UAVs) to **monitor their surroundings and detect deviations for updating the digital twin and the underlying BIM**. Additionally, **the staff locations at the site could be anonymously tracked**, thus enabling the BIMprove system and the workers' supervisors to **optimise resource allocation, people flow, and the workers' safety**. BIMprove is easily accessible to the target end-users by a set of user interfaces, such as alerts to workers through wearable devices and virtual reality (VR) visualisations to supervisors. BIMprove is a cloud-based service that has a layered structure, which enables the addition of extensions at later stages.

The **main results of BIMprove are a significant reduction in costs, better use of resources and fewer accidents on construction sites**.
The successful demonstration of the Proof of Concept results, followed by the Prototype system results (read more about it in D3.3 Proof of Concept System Description and Test Results) and the Pilot Use-Case demonstrations (read more **D3.6 Benchmarking, Evaluation & Demonstration**) confirm that the execution of the project has progressed well.

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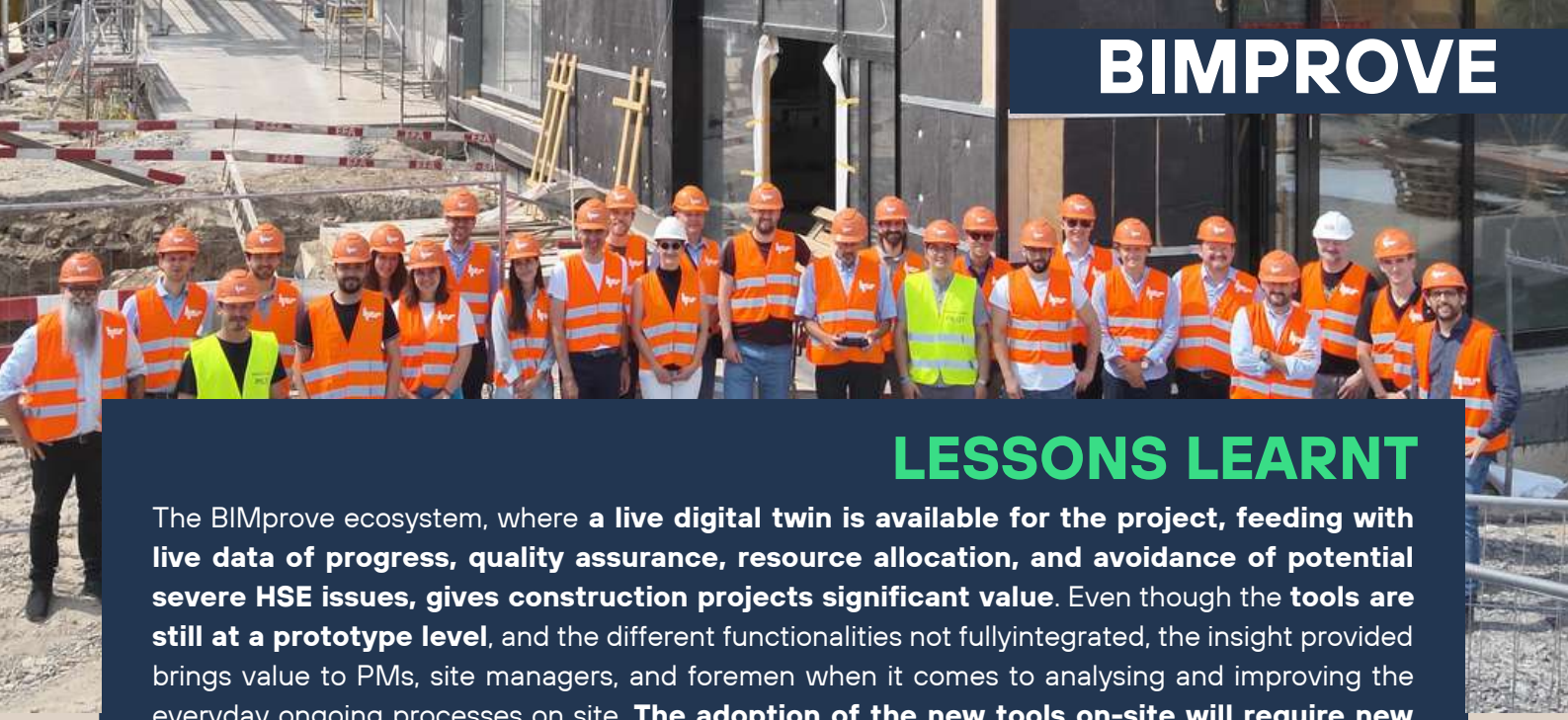

BIMPROVE

LESSONS LEARNT

The BIMprove ecosystem, where **a live digital twin is available for the project, feeding with live data of progress, quality assurance, resource allocation, and avoidance of potential severe HSE issues, gives construction projects significant value**. Even though the **tools are still at a prototype level**, and the different functionalities not fullyintegrated, the insight provided brings value to PMs, site managers, and foremen when it comes to analysing and improving the everyday ongoing processes on site. **The adoption of the new tools on-site will require new roles** as well as a shift of the traditional processes in a construction project. The main improvements would be to **automate more of the processes** and **integrate the different insights in a live updated dashboard.** Also, both the data-capturing process and the analysed data should be made more easily accessible.

BIMprove has been designed as **a service platform**, where different improvements will be needed to make it more user-friendly, with a higher degree of automatisation, as well BIMprove has laid the foundation for future developments related to safety.

BIMprove project is especially focused on capturing data, mainly the point cloud, to compare it against the BIM model. The three **use cases are scheduling, safety and fire**. Nevertheless, we have seen that the development of the project doesn't provide big changes to fire security. However, there is **a big potential for another use case, which is the "Quality Control"**. A bad quality control may have very important consequences on the planning, the economy and the results of the construction process. Same extra functionalities could be easily added on BIMprove to provide an added value to the product and be more oriented to a use case that needs to improve its efficiency.

RECOMMENDATIONS FOR RELATED PROJECTS

For the final stretch of our sister projects, we **recommend paying special attention to three aspects**: (i) **increasing the visibility** of the project by attending industry events where to share the outcomes of the project and collect stakeholder feedback, (ii) **reinforcing the exploitation strategy** of the project, exploring several pathways to give continuity of project development, (iii) **deploy a robust dissemination campaign around the project results**, including interviews, videos and articles giving publicity to the results of the project.

From our perspective, teamwork and internal communication are indispensable qualities every project should acquire. In BIMprove, we are very proud that these two have accompanied us during the project's lifetime.

To meet the team behind BIMprove and learn about the project directly from them, take advantage of the **video interviews**. Other videos about BIMprove are accessible on its **YouTube channel**.

ASHVIN COGITO BIMprove BIMTWIN Funded by the European Union

Digitising and transforming the European construction industry

WHAT'S ASHVIN?

The **ASHVIN project** is developing a toolkit of **10 smart building applications** connected to a variety of IoT sensors collecting data from construction sites and infrastructure assets. The collected data is **analysed and visualised on a digital twin platform**, with **the aim to support the construction projects, improving notably their productivity and safety**.

ONGOING RESEARCH IN DIGITAL TWINS

ASHVIN collects data from **10 demonstration sites** across Europe, enabling to validate the developed system in three different construction phases; **design, construction and maintenance of buildings and infrastructure**.
In addition, several new demo sites are being onboard to collect even more data to finetune the data analysis models. Find more about the newly onboarded stakeholders' demo sites in this **article**.

ASHVIN measurements of the demo site 6 Office Building in Spain

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ASHVIN

OPPORTUNITIES

Learn more about how ASHVIN deploys Digital Twin technologies to:

- **Support construction with a Digital Twin Platform** - **ASHVIN Technical Webinar #1**
- **Enhance maintenance of Infrastructure assets** - **ASHVIN Technical Webinar #2**

ASHVIN will be running until March 2023, and in the coming months we will propose you new webinars - stay tuned!

PODCAST

At the start of July 2023, our ASHVIN team released a new podcast series entitled **ASHVIN Innovation Stories**. This podcast **presents the technological, technical and societal innovation arising from the project's research on digital twin technologies.** We aim to showcase the great minds behind ASHVIN and their innovation pitches that could benefit the entire stakeholder community in the European construction sector.

The episodes are short, around. 5 -10 minutes, and focus on addressing challenges, offering **digital solutions and methodologies that help transform the construction industry safer, more productive and more sustainable.**

Finally, **check out ASHVIN team's recent research publications:**

- **A Combined Digital Twin and Location-Based Management System** published at IGCL Conference 2023
- **Requirements And Challenges for Infusion of SHM Systems Within Digital Twin Platforms**, published in **Structure And Infrastructure Engineering Journal**, the 28th of June, 2023,

Stay tuned to the progress of ASHVIN by following our social networks **LinkedIn**, **Twitter**, **YouTube** and subscribing to our **newsletter**.

ASHVIN COGITO BIMprove BIMTWIN Funded by the European Union

COGITO

COnstruction phase diGItal Twin mOdel

WHAT'S COGITO?

The EU-funded **COGITO project** introduces **a real-time digital representation (twin) of a construction project**, using methods to ensure interoperability among the different components and technologies constituting the digital twin ecosystem, **following the lean construction principles**.

COGITO aims to materialise the digitalisation benefits for the construction industry by harmonising Digital Twins with the Building Information Model concept and to establish a digital Construction 4.0 tool-box.
The **COGITO toolbox** consists of:

- Construction Phase Digital Twin Platform
- Reality capture tools & Multi-source Data Stream Pre-Processing
- On-site Workers' Health & Safety Assurance Tools
- Geometric and Visual Quality Control Tools
- Adaptive Workflow Modelling and Management Tools

ASHVIN COGITO BIMprove BIM TWIN
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COGITO

ONGOING RESEARCH IN DIGITAL TWINS

Join us as we unravel a treasure trove of recent project news, each piece of information paving the path to the most important outcomes. **Don't miss out on this opportunity to be part of a revolution** – come, grab a bunch of news, and be captivated by the tools that the COGITO project has in store for you!

- Recent publication! **'Ontologies in digital twin: Methodology, lessons learned and practical approach'**: On 22nd June new joint publication of 4 EU-funded (COGITO, ASHVIN, BIMprove, BIM2TWIN) projects was released on Ontologies in digital twin, was released on the Open Research Europe platform.
- The newest webinar on the "Work Order Execution Assistance tool' is released on **COGITO YouTube channel**: The Work Order Execution Assistance tool (WOEA) is an app for smart glasses supporting work order execution and reporting. The worker is guided via smart glasses through the work order, which enables immediate reporting of the results of the work. WOEA can work online or offline and provides hands-free operation support. The app also enables Remote Assistance through video calls with remote annotations.
- COGITO's outcomes are available for you with a single click on the **Public Deliverables** site!
- Interested in COGITO tools? They were presented live during 3 webinars organized for end-users, stakeholders, and construction market representatives:
- **Webinar Practical Tools for the Construction Sector in Digital Twin**
- **Digital tools for Health & Safety on the construction site**
- **Digital Tools for Workflow Management**

OPPORTUNITIES

We would like to invite you to our next webinar on the COGITO's **"Integrated Digital Twin Platform"** which will be organized in **October 2023 online** on the BUILDUP platform. Stay tuned with our news on the COGITO website, and follow us on our social media channels to catch the exact date and agenda details:

- **Facebook**
- **Linkedin**
- **Twitter**
- **YouTube**

ASHVIN COGITO BIMprove BIM2TWIN

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Building a Digital Building Twin platform for construction management to reduce operational waste of all kinds

WHAT'S BIM2TWIN?

The **BIM2TWIN** Project builds **a Digital Building Twin (DBT) platform** for construction management that implements lean principles t**o reduce operational waste of all kinds, shortening schedules, reducing costs, enhancing quality and safety and reducing carbon footprint**. BIM2TWIN proposes a comprehensive, holistic approach. It consists of a (DBT) platform that provides full situational awareness and an extensible set of construction management applications. It supports a closed loop Plan-Do-Check-Act mode of construction.

CHALLENGES CONSIST OF:

- The Developing automated monitoring techniques for all stages of construction.
- Managing multiple streams of monitored data from site and the supply chain.
- Representing the current status of products and processes through a Project Status.
- Model Developing predictive analytics for construction progress using simulations.
- Building a decision support dashboard for forward planning and real-time control.

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BIM2TWIN

ONGOING RESEARCH IN DIGITAL TWINS

During the 30 months of the ongoing project, **a first version of the DBT platform has been developed to be tested on real environments;** this real demonstration will cover different typologies of buildings and construction methods and will be located in 3 different European countries: Spain, Finland and France. The results of this intermediate demonstration round should support the DBT platform developers and project's technical partners in refining the work accomplished so far, considering the improvement requests and feedback from the construction industry represented by our three pilots. To be updated on the latest progress of the project we would like to point out to you:

- **The recent journal publications:**
  1. **Situational Awareness in Construction Using a Serious Game**
  2. **ConSLAM: Construction Data Set for SLAM**

- **Two demo videos**, which have been published in **BIM2TWIN YouTube Channel** in order to present a prototype system for predicting how a construction project will progress in future production cycles, and recommending favourable changes to the production system to planners.

- **BIM2TWIN's outcomes**, which are available on the **Public Deliverables** site.

OPPORTUNITIES

To be kept up to date on upcoming events and news follow us on our social media channels:

Linkedin
Twitter
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4
PROJECTS

UP TO
42
MONTHS

53
ENTITIES

1 MISSION

Working for the new wave of a digital European Construction

ASHVIN COGITO BIM prove BIM TWIN

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