

Partner Invitation Form

Call	HORIZON-EIC-2025-PATHFINDERCHALLENGES-01-03: Towards autonomous robot collectives delivering collaborative tasks in dynamic unstructured construction environments
Call Topic	
Project budget	€400,000 to €5,000,000. The total indicative number of grants for this call is 8.
Deadline	29 October 2025 17:00 Brussels time

Problem and Commercial Need

On-site construction remains one of the least automated sectors in Europe, despite contributing 9.6% of EU GDP and employing 18 million workers. Productivity growth has stagnated, trailing manufacturing by up to 40%. This is exacerbated by the projected shortfall of 1 million workers by 2030 as workers reach retirement age (which for many is before state pension age), combined with a low replacement rate. The sector is also one of the most dangerous, due to its physically demanding work: the sector accounted for 22% of all fatal workplace accidents in the EU in 2019 and 11.8% of all non-fatal accidents. The sector is also a major climate contributor, responsible for 36% of EU greenhouse gas emissions and 40% of energy use. Incremental automation of legacy machinery cannot deliver the systemic transformation needed.

Proposed Solution

A novel multi-robot platform with modular tooling and attachments that can be intelligently and autonomously deployed to assemble modular, load-bearing structures (arches, vaults, wall panels) at human-relevant scale. Robots work with modules designed specifically for robotic handling, incorporating embedded sensors for localisation, alignment, and force feedback.

The robot will help operators in industrial environments where inefficiencies are created due to the need to deploy costly resources and time management systems to protect humans from exposure to repetitive tasks that can cause physical and mental health problems and dangerous environments where there is an elevated risk of injury or even death.

It will significantly improve productivity, efficiency and ROI whilst reducing risk and hazardous exposure to humans.

Demonstrators under consideration include, subject to end-user involvement/approval:

- Drilling and fixing ceiling holders in concrete at height (dirty, hazardous and repetitive).
- Moving construction materials on site or as part of the supply chain (hazardous and laborious).
- Inspecting tunnels in the construction phase (a very hazardous environment for humans).

Partners are invited to propose alternative demonstrators!

To achieve these opportunities, Innvotek envisages working with a consortium of different partners:

- **Innvotek** (SME, UK): System design, control algorithms, hardware integration, prototyping, and TRL advancement.
- **University/RTO**: Robotics team to conduct fundamental research (multi-robot control, swarm algorithms, sensing, simulation, HRI, safety) and independent evaluation.
- **Architecture company** (LE): Defines “design-for-robotic-assembly” principles, modular construction systems, and architectural relevance of demonstrators.
- **End user** (LE?): Ensures industrial relevance, access to sites and materials, validation at realistic scale, exploitation pathways.

Business Opportunity

The autonomous, multi-robot construction market represents a €50–70 billion annual opportunity in Europe alone, driven by labour shortages, low productivity, and rising demand for sustainable construction. Integrating off-site modular production with on-site robotic assembly can reduce labour costs by up to 30%, shorten project timelines by 25–40%, and cut on-site emissions by 20–35%. Collaborative robots handling buildings, infrastructure, and modular elements enable scalable, flexible solutions, unlocking up to 15% additional revenue for construction firms through faster project delivery.

Consortium members will have first access to the technology, steer the operational requirements and understand the business case(s) after demonstrations and confirmation of KPI performance.

Supply Chain partners will have the opportunity to design, own and expand business into novel robotic applications whilst working closely with the end users to develop market-specific products.