

FORTIS

Horizon Europe—The Framework Programme for Research and Innovation

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Grant Agreement Number 101135707—FORTIS

Multi-Modal and Multi-Aspect Holistic Human-Robot Interaction



Multi-modal and Multi- aspect Holistic Human- Robot Interaction

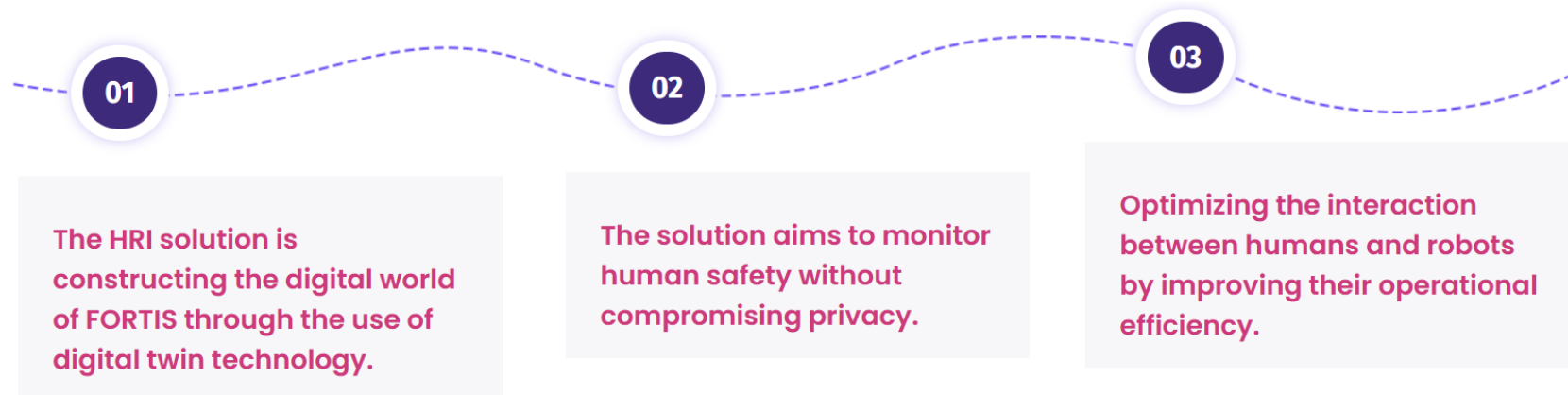
Exploring Human-Robot Collaboration and
Communication. Understanding Trustworthy
Interaction

Objectives and Ambition

FORTIS is an EU-funded project that aims to provide a **solution for enabling robots to interact with humans in a human-like way for long periods**. Therefore, the main objectives are:

- Develop, integrate, and provide a human-centric solution for modelling and analysing humans.
- Develop and provide a flexible and agile multi-robotic-centric solution interacting with humans.
- Integrate and provide the solution where a safe and trustworthy HRI is guaranteed and provides optimized operations for both humans and robots.
- Demonstrate the solution for pilots in construction, infrastructure services and manufacturing.

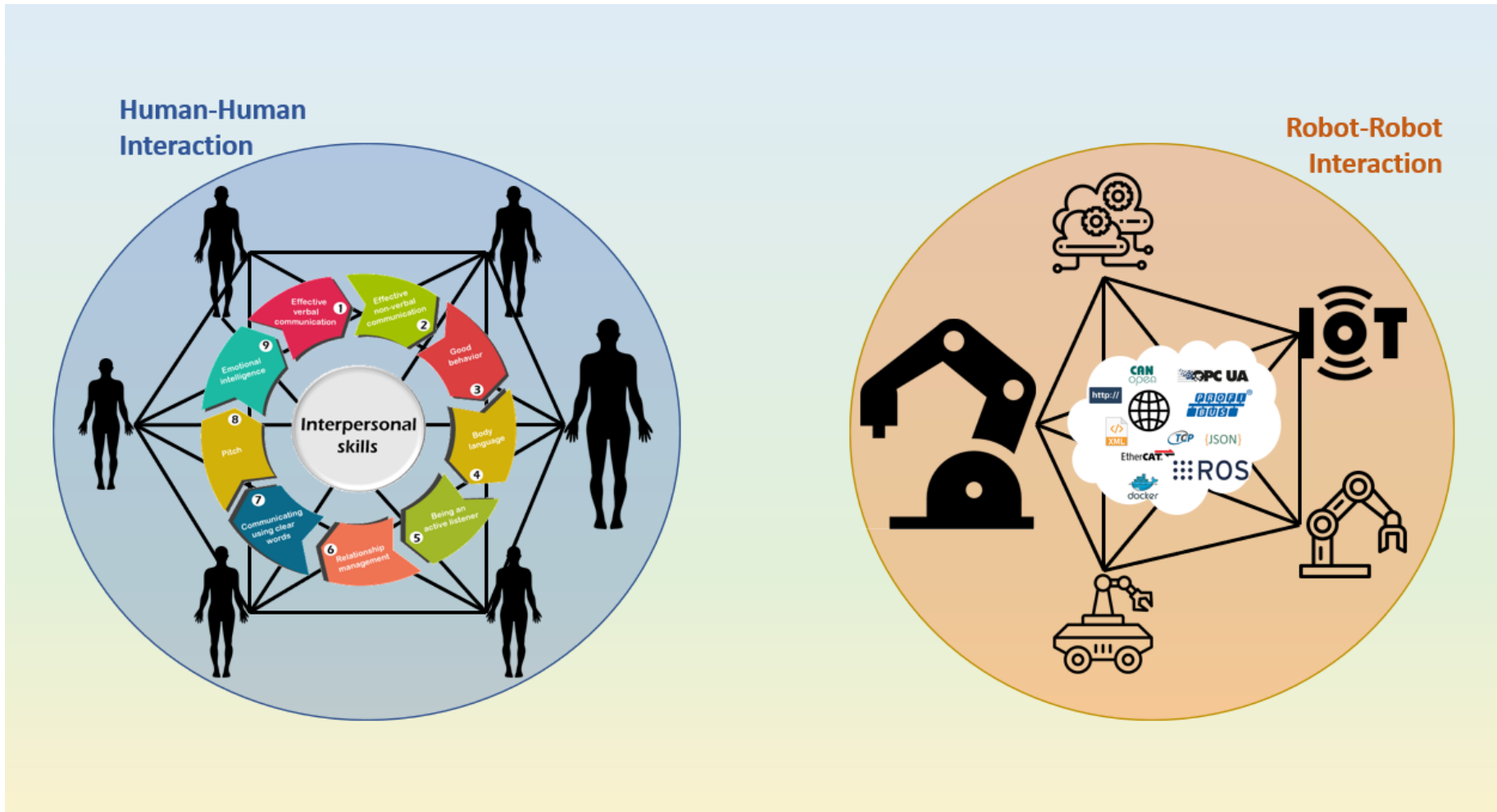
To implement the FORTIS solution, three main steps need to be accomplished:



Objectives and Ambition



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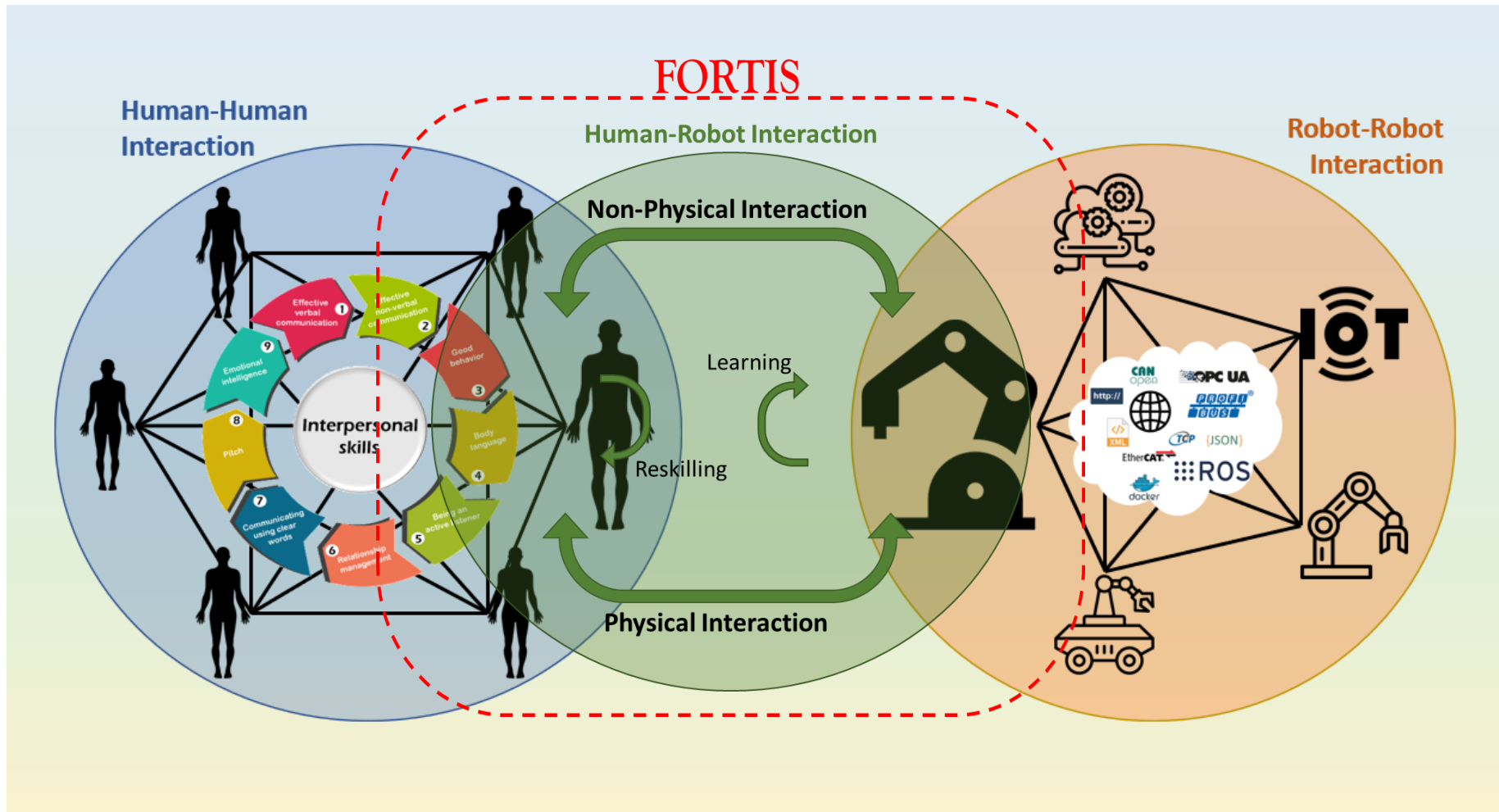


Varying levels
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Objectives and Ambition



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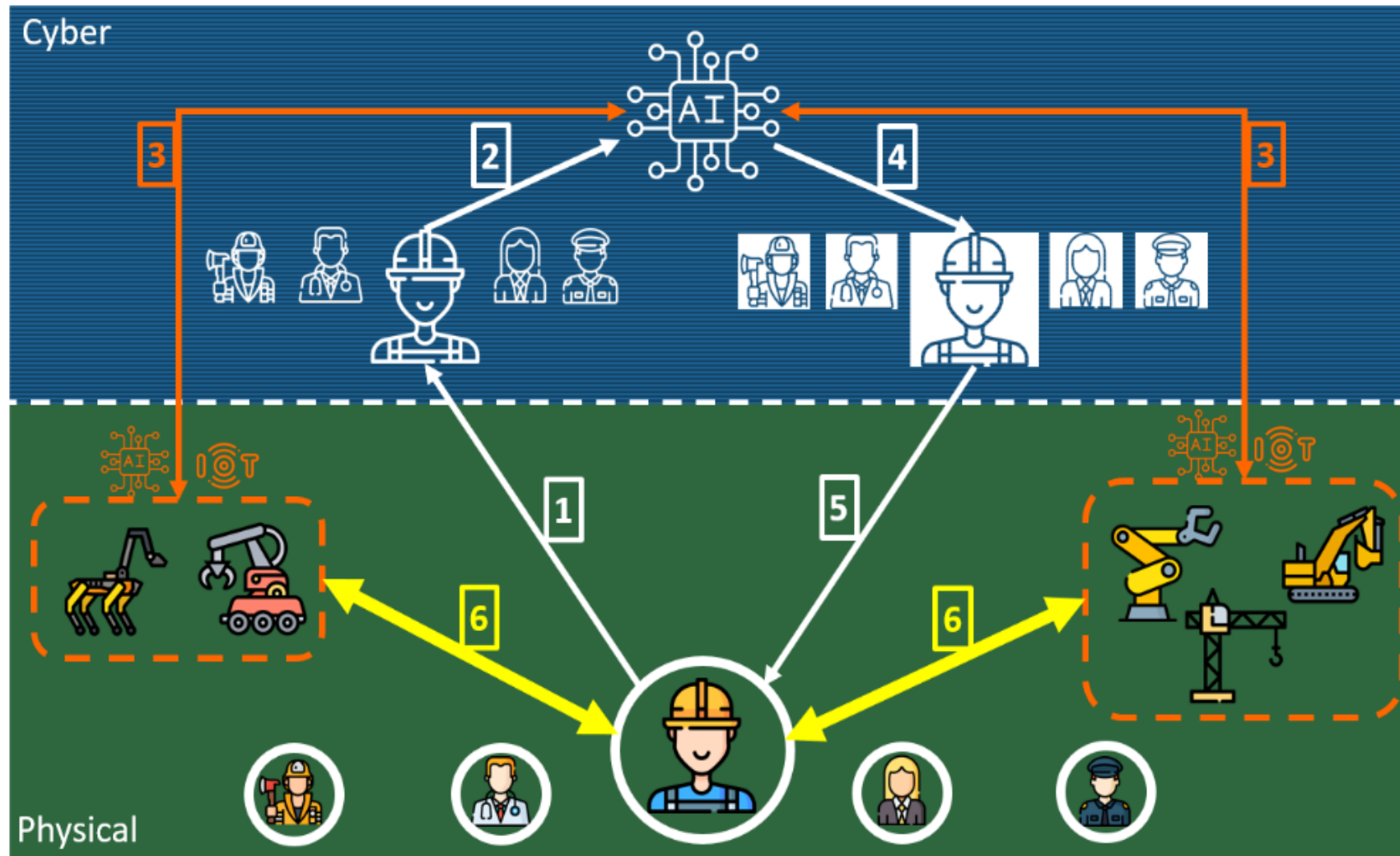


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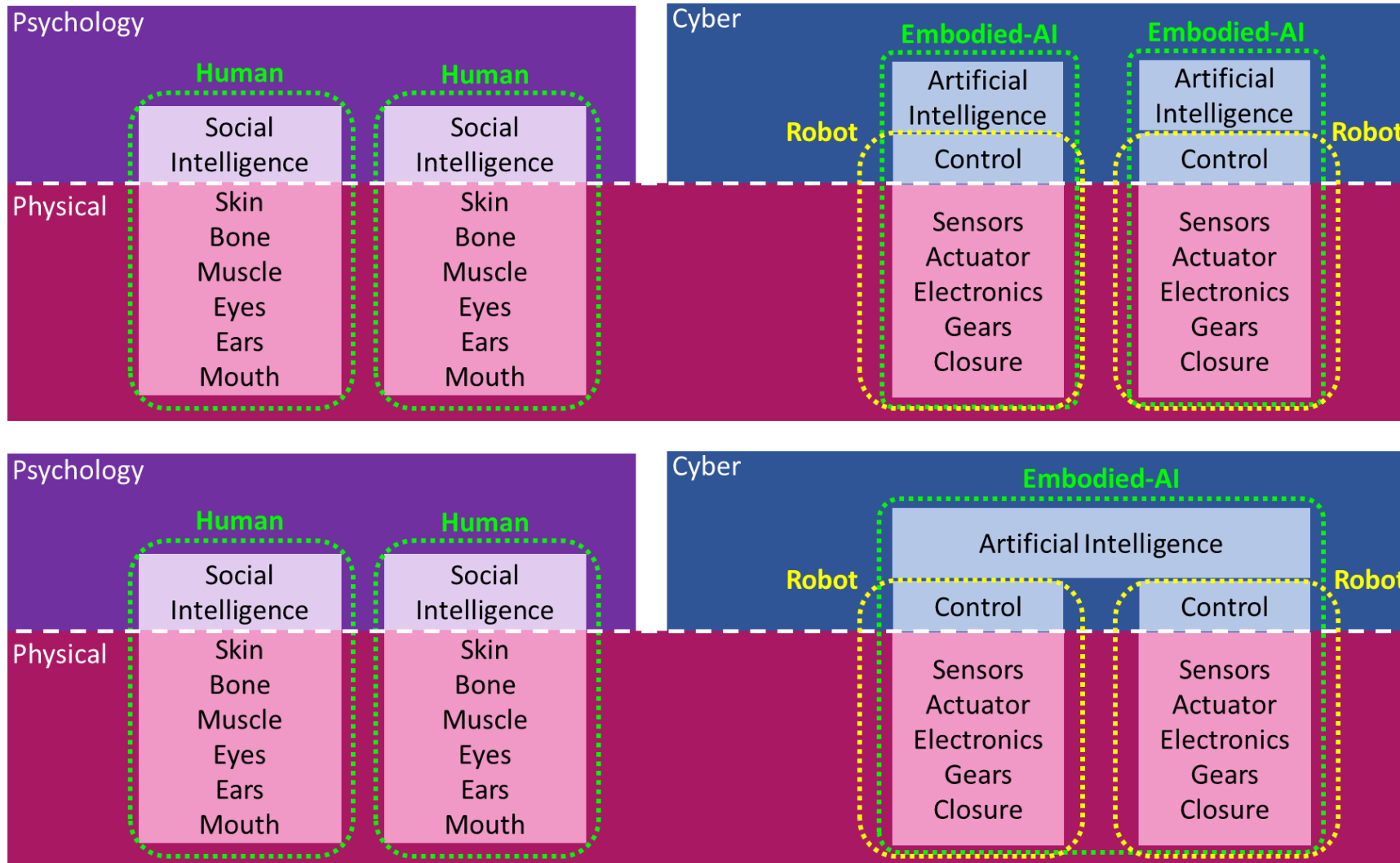
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Objectives and Ambition



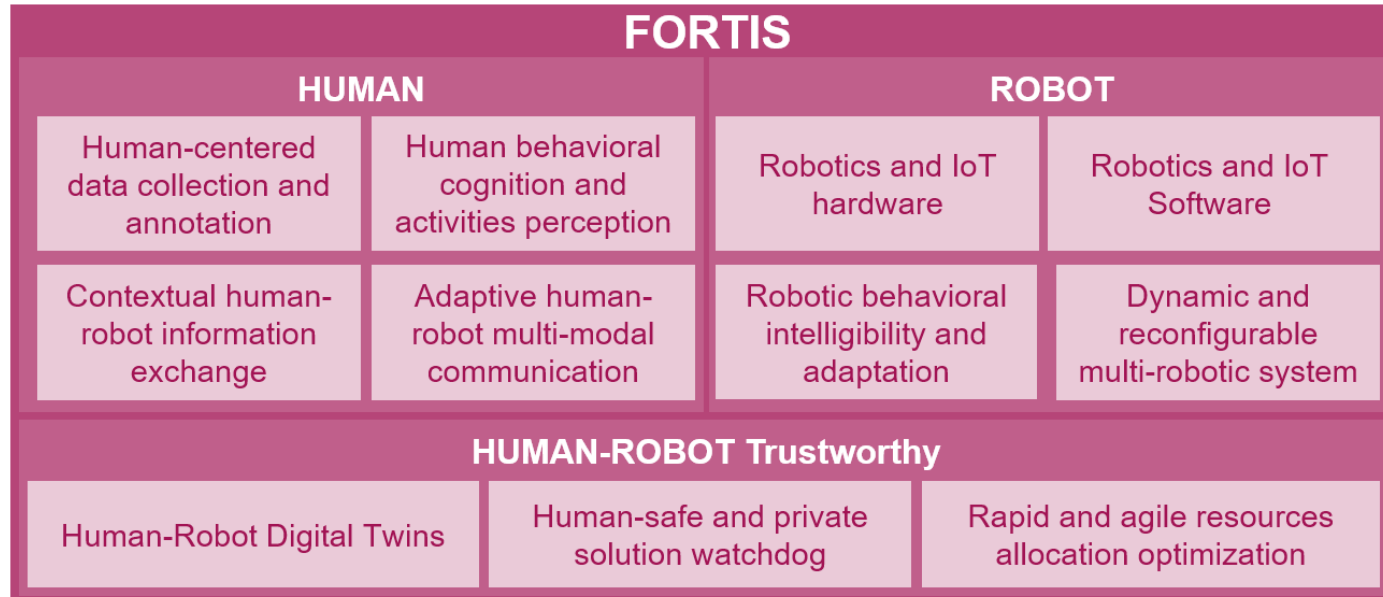
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Varying levels of interaction and communication, dependent on the current state of the task

The **Tangible Expected Outcomes (TEOs)** related to the objectives of the FORTIS project will be:

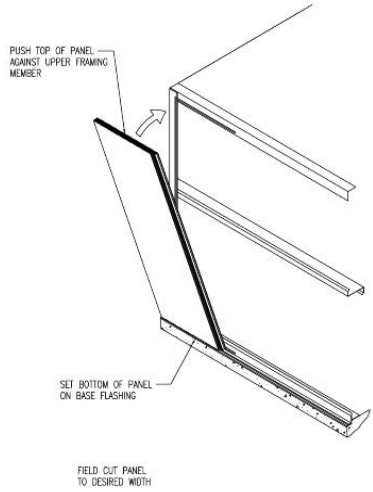
- TEO 1: FORTIS **Human-Centric Toolkits** (Obj. 1). Toolkits for modelling the human's status.
- TEO 2: FORTIS **Robot-Centric Toolkits** (Obj. 2). Toolkits for building a multi-robotics solution that can interact with humans.
- TEO 3: FORTIS **Human-Robot Trustworthy Interaction** (Obj. 3). The Holistic solution of the FORTIS project.



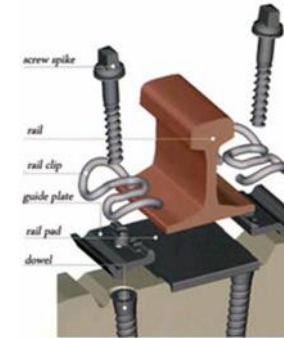
Pilots



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Pilot 1: Construction sector



Pilot 2: Infrastructure services



Pilot 3: Manufacturing

These pilots will provide 5 use cases where the Human-Robot Interaction will be demonstrated:

Use case	Sector	Communication mode	Interaction aspect	Demonstration Goal
Sandwich Panel Assembly	Construction	Verbal, haptic	Physical, non-physical (cultural, social, psychological)	Demonstrate the multi human-robot interaction in an outdoor controlled environment where construction machine is robotised.
Material transportation		Visual	Non-physical (social, psychological, well-being)	
Maintenance of the fixtures of the rail ways	Infrastructure Services	Verbal, visual	Non-physical (social, psychological, well-being)	Demonstrating the multi-human- robot interaction in a remote outdoor and uncontrolled environment with high risk and high noise.
Maintenance of the <u>rails</u> ways		Verbal, visual	Non-physical (social, psychological, well-being)	
Smart AGV Fleet with Collaborative Cargo Robots	Manufacturing	Verbal, vocal haptic	Physical, non-physical (cultural, social, psychological, well-being)	Demonstrating the FORTIS solution in an in-door and controlled environment.

IMPACT 1: Human-Centric

- Enrich the knowledge in a wide range of fields by understanding and modelling human behaviour.
- Bring new collaborative robot generations, more human-status aware and adaptable, able to provide more intuitive and user-friendly interfaces tailored to the cognitive capabilities of their users.
- Develop HRC and HRI systems that are more effective, user-friendly, and context-aware, leading to improved collaboration between humans and robots.
- Develop AI systems that are more effective, context-aware, and user-friendly, user satisfaction, and business outcomes.

IMPACT 2: Robot-Centric

- Providing a platform for testing and experimenting with new human-robot collaboration and interaction scenarios.
- Reduce development time and costs; increase market demand; improve product differentiation; enhance productivity; and create opportunities for innovation.
- Expansion of product portfolio, improvement of user experience, and meeting the increasing market demand for AI-embodied systems.

IMPACT 3: Human-Robot Trustworthy Interaction

- Better understanding of the factors that influence human trust in robots.
- Improve the efficiency of manufacturing and production, allowing multiple robots to work together in a coordinated manner.
- Reduce the need for expensive physical prototypes and testing and reduce the risk of accidents and injuries in the workplace.
- Can enhance business processes, integrating AI and ML in cobots.
- Enhanced HRI architecture to endure both internal and external workplaces.
- Improve the quality of the work and the safety of workers.



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Financial Support for the Third Parties (FSTP)

- + 5 Million Euros
- 2 Open Calls
 - 1st in 2025, 2 M€
 - 2nd in 2027, 3 M€
- Support goes to SMEs and Start-ups
- Continuous Technical Support



Thank you for your attention



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