

Welcome to the third edition of "INVERSE insights"!

This is the **third newsletter edition of "INVERSE insights"!**, and we are excited to provide you with the latest updates, insights, and news from our <u>Horizon Europe</u> project focused on advancing long-term robot autonomy and continuous learning. <u>INVERSE</u> aims at enhancing robotic capabilities, enabling them to tackle complex manipulation tasks across various domains, even when training data is limited.

Don't miss a beat from INVERSE! <u>Subscribe to our newsletter</u> for project highlights, event updates, and the latest in human-robot collaboration.

Project Updates

INVERSE Workshop at TU Wien: Advancing Human-Robot Collaboration Through a Human-Centered Approach

On January 30, 2025, the <u>INVERSE</u> consortium gathered at <u>TU Wien</u> for a focused workshop on **Human-Robot Collaboration (HRC)**, bringing together experts from across Europe to explore how cutting-edge robotics can better serve people in real-world environments.



The session, titled *"Advancing Human-Robot Collaboration through a Human-Centered Approach,"* aimed to align technological developments in HRC—presented by each partner—with ethical and user-centered perspectives. The goal was to identify how human factors can be fully integrated into system design and operation, ensuring that <u>INVERSE</u> technologies are inclusive, intuitive, and safe.

A key outcome of the workshop was the initiation of a strategy to define **Key Performance Indicators (KPIs)** related to human factors, ergonomics, and user experience. These metrics will guide future development and evaluation across the project.

A special thank you to <u>Ganix Lasa</u>, <u>Nagore Osa Arzuaga</u>, and <u>Maitane Mazmela Etxabe</u> from <u>Mondragon University</u>, who led the technical discussions and helped set the direction for upcoming work on human-centered design and evaluation.

The event was organized by <u>Dongheui Lee</u> (<u>TU Wien</u>) and enriched by the presence and contributions of partners from <u>DLR</u>, <u>CREATE (Naples)</u>, <u>University of Trento</u>, <u>CRF (Centro Ricerche FIAT</u>), <u>Boğaziçi</u> <u>University</u>, <u>Konecranes</u>, <u>Steinbeis Europa Zentrum</u>, <u>CIVITTA</u>, and <u>VTT</u>.

And finally, a sincere thank you to our coordinator, <u>Matteo Saveriano</u>, for facilitating this collaborative effort and ensuring the <u>INVERSE</u> project continues to move forward with purpose and cohesion.

With workshops like these, <u>INVERSE</u> continues to push the boundaries of what is possible in humanaware robotics—ensuring innovation remains rooted in real human needs.

INVERSE at ERF 2025: Pushing the Frontiers of Mobile Manipulation

At the <u>European Robotics Forum (ERF) 2025</u> (#erf2025) in Stuttgart, the <u>INVERSE</u> project proudly took part in **Workshop #11: Mobile Manipulation of Rigid and Deformable Objects**—a dynamic and collaborative session dedicated to one of robotics' most complex challenges.



Held in the heart of Europe's robotics innovation ecosystem, the workshop gathered researchers, engineers, and project leaders to share their latest advancements and align on shared challenges in mobile manipulation. Topics spanned from **advanced perception and dexterous manipulation** to **machine learning integration and real-world deployment strategies**.

Spotlight on <u>INVERSE</u> One of the highlights of the session was a compelling contribution from <u>Dr.</u> <u>Ganix Lasa Erle</u> of <u>Mondragon Unibertsitatea</u>, who presented on behalf of the <u>INVERSE</u> project. His talk, "Advancing Human-Robot Collaboration through a Human-Centered Approach," showcased <u>INVERSE's</u> vision for more intuitive and effective interaction between humans and robots emphasizing user needs, safety, and practical deployment in real-world environments.

This workshop was powered by an incredible alliance of EU sister and related projects, including: <u>CORESENSE</u>, <u>IntelliMan</u>, <u>Rego</u>, <u>AGIMUS</u>, <u>Sestosenso</u>, <u>Mozart</u>, <u>SoftEnable</u>, <u>PILLAR-Robots</u>, <u>euROBIN</u>, <u>MANIBOT</u>, and <u>HARIA</u>.

Advancing Robotics with INVERSE: Innovation, Sustainability & Impact

On **28 March 2025**, project partners gathered in Stuttgart for a focused **Exploitation Meeting**, held alongside the General Assembly and hosted by <u>Steinbeis Europa Zentrum</u>. The aim of the workshop-style meeting led by <u>Steve Bageritz</u> was to move beyond technical progress and focus on how <u>INVERSE</u> innovations can create long-term value.



The session brought together representatives from across the consortium to strengthen the project's exploitation strategy, aligning on how to transition key outcomes toward industry, academia, and society.

Q Key highlights of the workshop included:

- Core Concepts & Strategic Alignment: A shared understanding of exploitation principles, including definitions around Foreground and Background IP, and the distinction between commercial and non-commercial use cases.
- IP Assessment Exercises: Evaluation of current Foreground IP generated within <u>INVERSE</u>, mapping ownership and relevance for potential use; followed by analysis of Background IP to explore connections with Foreground results and identify synergies or limitations in future exploitation.
- Next Steps & Action Plan: The workshop concluded with a practical roadmap for exploitation, identifying responsible partners and further steps to refine and formalize IP and business strategies. In addition, the consortium will join the exploitation pillars workshop organized by the <u>Horizon Results Booster</u> team by the end of April.

Through collaboration across industry and research, <u>INVERSE</u> is shaping the future of robotics - while keeping sustainability, responsible innovation, and market readiness at the forefront.

Learn more: <u>www.inverse-project.org</u>

INVERSE Kicks Off Ethical Committee and Advisory Board Activities

On March 31, 2025, the <u>INVERSE</u> project took an important step toward strengthening its ethical and societal foundations with the official kick-off meeting of the Ethical Committee (ECee) and Advisory Board (AB). The session also served as an opportunity to welcome the newly appointed Ethics Advisor, further reinforcing the project's commitment to responsible innovation.

The meeting, coordinated by <u>University of Trento (UNITN)</u> and led by Project Coordinator <u>Matteo</u> <u>Saveriano</u>, brought together work package leaders and strategic partners to present the current state of the project and its use cases. The goal was to provide the ECee and AB with a clear understanding of <u>INVERSE's</u> scope and priorities.

Project Coordinator <u>Matteo Saveriano</u> (UNITN) opened the session with a brief overview of <u>INVERSE</u>, followed by a technical update from <u>Tapio Heikkilä</u> (VTT) on the current demonstrator. In the second part, Ethics Advisor <u>Marina Cugurra</u> introduced the roles of the Ethical Committee, Advisory Board, and Ethics Advisor, and outlined key focus areas such as worker impact, AI safety, and human rights in human-robot collaboration. Planned fieldwork will include interviews and workshops to assess user experience and ethical considerations on the ground.

We construct the second second

Partner Spotlight

TU Wien

TU Wien (Vienna University of Technology) is one of Europe's leading technical universities, known for its excellence in robotics, artificial intelligence, and automation. Within the <u>INVERSE</u> project, <u>TU</u> Wien plays a key role in making robots smarter and more adaptable - especially in how they learn tasks from human demonstrations.



As the leader of the work package 'Learning and Knowledge Representation' activities, <u>TU Wien</u> is working on technologies that allow robots to observe and understand how humans perform tasks, then break those tasks down into steps the robot can safely and efficiently carry out on its own.

Using a learning approach called **MoCLE** (Model-Centric Learning and Execution), the team is developing ways for robots to:

- Learn tasks by watching humans
- Understand which actions and tools are relevant
- Recognize when something goes wrong, and know how to react
- Improve their performance over time without constant supervision

The goal is to give robots the ability to adapt to changing conditions, collaborate effectively with people, and operate safely in complex work environments.

Through this work, <u>TU Wien</u> is helping <u>INVERSE</u> move closer to its vision of human-centered, intelligent manufacturing - where robots aren't just machines, but reliable partners on the factory floor.

Upcoming Events

INVERSE team members are set to participate in prominent international conferences to share their latest research findings:

IEEE International Conference on Robotics and Automation (ICRA 2025)

Date: 19–23 May 2025 *Location:* Atlanta, USA *Scope:* ICRA is the flagship conference of the IEEE Robotics and Automation Society, bringing together leading researchers and industry professionals to discuss advancements in robotics and automation. *Website:* <u>https://2025.ieee-icra.org/</u>



INVERSE Contributions:

From **Boğaziçi University** (BOUN):

- 21 May 2025 *Correspondence Learning Between Morphologically Different Robots via* Task Demonstrations" *Correspondence Learning Meta-Testing with Conditional Neural Processes for* Hybrid Meta-Reinforcement Learning"
- 22 May 2025 P "Conditional Neural Expert Processes for Learning Movement Primitives From Demonstration"

From University of Trento (UNITN):

- 20 May 2025 *P* "MeshDMP: Motion Planning on Discrete Manifolds using Dynamic Movement Primitives"
- 22 May 2025 P "Parallel-Constraint Model Predictive Control: Exploiting Parallel Computation for Improving Safety"

European Control Conference (ECC 2025)

Date: 24–27 June 2025 *Location:* Thessaloniki, Greece *Scope:* ECC aims to unite academic and industrial professionals in systems and control, promoting scientific cooperation and knowledge exchange within Europe and globally. *Website:* <u>https://ecc25.euca-ecc.org/</u>



From University of Trento (UNITN):

• 24 June 2025 Plantied talk: "Certified Control Synthesis for Robotic Systems" at the workshop on control synthesis in robotics

For more information and updates, visit our website: <u>www.inverse-project.org</u>

Do you want to learn more about INVERSE? 🧐

Check out the <u>INVERSE website</u> and follow us on <u>LinkedIn</u>.

Stay Connected with INVERSE! Want to keep up with the latest research, events, and insights from the INVERSE project? **Subscribe to our newsletter** and receive updates directly to your inbox.

<u>Subscribe here</u> and be part of the journey toward human-centered robotics and innovation!



©2024 INVERSE - INteractive robots that intuitiVely lEarn to inVErt tasks by ReaSoning about their Execution. All rights reserved. Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Health and Digital Executive Agency (HADEA). Neither the European Union nor HADEA can be held responsible for them. **EU -HE Inverse - Grant Agreement 101136067**.

Newsletter Disclaimer

Despite careful content checks, Steinbeis Europa Zentrum shall not be liable for the content of external links within this newsletter. The operators of the linked pages and sites bear sole responsibility for their content.

We strive to ensure that our newsletter content is always up-to-date and correct and complete. Nevertheless, we cannot wholly exclude the occurrence of errors. Therefore, Steinbeis Europa Zentrum assumes no liability for the up-to-date status, the accuracy of the content or the

completeness of the information provided in this newsletter.