



JARVIS

DRIVING HUMAN-ROBOT COLLABORATION: EARTH



**Funded by
the European Union**

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Project name

EARTH — Electronic Appliance Recovery using Teams of Humans and Robots

Introduce your pilot project in a few sentences (What problem are you addressing? What is your solution or approach? What makes it innovative or impactful?):

The EARTH pilot tackles a long-standing challenge in WEEE (waste electrical and electronic equipment) recycling: hazardous, repetitive disassembly tasks that are difficult to scale while keeping operators safe and process quality high. Our approach is a human-robot collaborative (HRC) workcell designed for safe disassembly and intelligent sorting of end-of-life appliances. Combining operator expertise with robot precision, the system aims to reduce exposure to risky steps, improve throughput and material recovery, and bring end-to-end traceability to recycling workflows. The innovation lies in a user-in-the-loop design with adjustable autonomy and a replicable “cell” that can be adapted to different product types and sites.

How does your work align with the goals or methodology of JARVIS?

EARTH is fully aligned with JARVIS’s human-centric and industry-driven methodology: co-design with operators, measurable KPIs, and incremental TRL progression. We leverage JARVIS mentoring and tools to guide safety-by-design practices, HRC integration, and data-driven validation, accelerating our path to a scalable, future-proof solution for the circular economy.

Briefly outline the upcoming focus or next milestones in the pilot’s development:

- Finalize use-case scope and baseline metrics with the site team (safety, ergonomics, quality, and cycle time).
- Bring up the integrated lab workcell (perception, shared control, and operator HMI) and reach TRL-6.
- Collect and annotate representative datasets; establish traceability and audit logs for key steps.
- Conduct operator co-design and usability sessions; iterate the workflow and training materials.
- Prepare on-site validation with our partner and define the replication playbook for additional sites.

How does your solution advance Human-Robot Collaboration in a user-centric manner?

- Human in the loop: Operators remain decision-makers; the robot assists in precise, strenuous, or risky subtasks.
- Adjustable autonomy: Seamless transitions between autonomous, collaborative, and tele-operation modes to fit task complexity and operator preference.
- Safety and ergonomics first: Safety-by-design workflow and speed/force limits; focus on reducing strain and improving posture.
- Transparent interfaces: Intuitive HMI with clear system states, step guidance, and traceability to support training and continuous improvement.
- Replicability: A modular cell architecture and documented procedures aimed at scaling across product families and facilities.