Vision

The ambitious vision of CONVERGING is to develop a human – robot collaborative social–industrial environment by bringing together the advances of Big Data, AI, Robotics, and Social Sciences and Humanities for safer, more flexible, reconfigurable, and modular production environments.

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CONVERGING

Social industrial collaborative environments integrating AI, Big Data and Robotics for smart manufacturing

Discover CONVERGING

The CONVERGING project aims to Develop, deploy, validate and promote smart and reconfigurable production systems including multiple autonomous agents (collaborative robots, AGVs, humans) that are able to act in diverse production environments.

The diversifying factors will be a multi–level AI–based cognition system that takes advantage of the collective perception (Digital Pipeline) of the resources, enabling them to interact seamlessly coexist with humans under a “social industrial environment” that ensures trustful, safe and inclusive user experience.

The systems will have five key features:

1. **Perceive:** The ability to identify and understand processes, resources, and environments and their status through the use of Big Data, Real Time Integration & Communication Architecture, Digital Twins and Human in the Loop techniques.
2. **Reason:** Analyze the production system status and independently form plans using AI, Planning and Reconfiguration Algorithms as well as Resource Autonomy solutions.
3. **Adapt:** Automatically modify hardware and control systems to implement formulated plans using Robotics and Autonomous Systems, Smart Devices and Adaptable Mechatronics.
4. **Collaborate:** Work seamlessly with humans or other resources, creating a social industrial environment which exploits Smart Human Machine Collaboration, User experience assessment and User centric workplace design.
5. **Innovate:** Expand its capabilities and Openness via an Open Pilot Network as well as links to local and international innovation ecosystems.

Partners

The EU-funded CONVERGING project brings together 16 high-profile partners from several EU and Asian countries consisting of 5 research organizations and eleven industrial partners.

KAWADA Robotics · COMAU · Prima Additive · VISUAL COMPONENTS · Electrolux · Fraunhofer IPK · ITERA MOBILITY ENGINEERING · Cranfield University · LMS Laboratory for Manufacturing Systems & Automation · netcompany intrasoft · Ford · PILZ THE SPIRIT OF SAFETY · Teaching Factory · CIAI · aimen TECHNOLOGY CENTRE · tecnalia MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

Pilots

The CONVERGING results project will be demonstrated in 4 industrial full-scale pilots running in actual production environments of each sector:

Automotive Sector

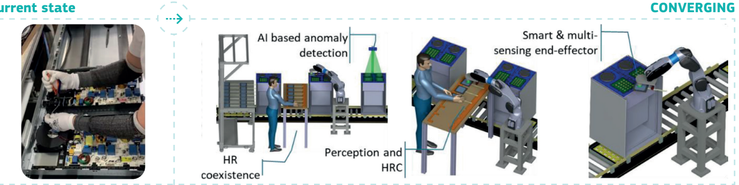
Automation of the entire process of mold inspection and polishing process with the use of a smart mobile manipulator.

Current state → CONVERGING

White Goods Industry

Human and robot coordination of their actions through an AI station controller, and the system will improve the repeatability of cable routing, reduce ergonomic risk factors, and deal with variability in coil supply.

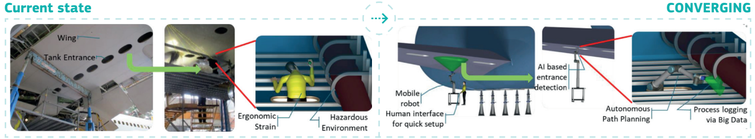
Current state → CONVERGING



Aeronautics

Improve the efficiency and safety of inspecting and repairing fuel tanks through the use of robotic technology, AI-based systems, and augmented reality tools by reducing the necessary precautions and complete the work more efficiently.

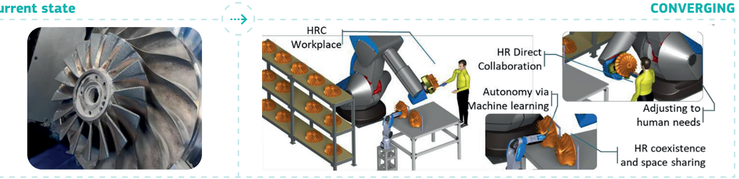
Current state → CONVERGING



Additive Manufacturing Sector

Implement robots to perform support removal and surface finishing operations in collaboration with humans to maximize efficiency.

Current state → CONVERGING



Benefits

Contribution to the Automotive Sector

- Robotization of manual applications using novel robot solutions to compete with lower wages market.
- Enablement of fast reconfiguration by exploiting the mobility and ICT interconnection of products and resources.
- Involve new young engineers, students and research institutes in the problems that the automotive sector faces and provide innovative solutions.
- Greatly improve operator working conditions who will be tasked with nonphysical demanding tasks which are designed to be intrinsically safe and pave the way to a more highly skilled and value adding work content.

Contribution to White Goods

- Enhance and adjust the overall system to changes in the work cycle, reducing the time required for cobot programming, fine tuning, and commissioning.
- Use the real time data to simulate cobot behavior and to replicate activity for monitoring and control purposes.
- Increase the workers’ ergonomics (the OCRA- NIOSH index will turn from Purple to Orange and, at the same time will keep the advantage of a human workstation in terms of flexibility).
- Improve collaborative operations allowing cobot installation also in workplaces where currently this is not feasible.
- Shorten time and cost to launch a new product, since the robot will simply need to be reprogrammed.

Contribution to Aeronautics

- Reduction of the time cycle of inspection as the robots will be able to work continuously.
- Productivity will be increased as fewer workers will be needed.
- Prevention of working inside hazardous areas and exposure to chemicals.

Contribution to Additive Manufacturing Sector

- The use of AGVs will allow to shift time-dependent handling into data-driven based handling.
- The AI planning will ensure the distribution of effort based on the current load of the AM station.
- Data analytics and AI will enable the robot to simulate the human arm as much as possible, reach difficult points and speed up operations of surface finishing.
- The digital pipeline will propagate field data to the DT and inspection modules for process monitoring and optimization.
- Easy robot programming will enable the efficient handling of low volume and large variability.