

Project Acronym: CONVERGING
Grant Agreement number: 101058521 (HORIZON-CL4-2021-TWIN-TRANSITION-01-01 – Innovation action)
Project Start Date: 1st September, 2022
Project Full Title: Social-industrial collaborative environments integrating AI, Big Data and Robotics for smart manufacturing



Funded by the Research & Innovation Programme of the European Union

DELIVERABLE

D6.2 – Smart HMI and autonomous learning - Initial prototypes

Dissemination level:	SEN
Type of Document	DEM
Contractual date of delivery	M30
Deliverable Leader	IPK
WP / Task responsible	WP6 - T6.1, T6.2, T6.3, T6.4, T6.5
Keywords:	Safety, human-robot interaction, collaborative robotics, planning, orchestration, autonomy, mechatronics

Executive Summary

This deliverable, D6.2, presents the progress and results of the development of the WP6 modules for smart Human-Machine Collaboration in the time period from M18 to M30. WP6 has the following goals:

- Ensure human safety by design of the interactive scenarios and online monitoring.
- Enable flexible interaction with the operator during execution through interfaces.
- Allow the operator to teach new tasks, and the robot to continue to improve on these tasks after they are taught.

To achieve these goals; WP6 develops several technical modules:

The **Design Risk Assessment (DRA)** module is responsible for the execution of the risk assessment for each of the pilots of CONVERGING, identifying the main hazards and risks, and implementing risk reduction measures. The **Safety Assessment and Monitoring (SAM)** module is capable of monitoring the status and behaviors of the safety-related parts of the control system (SRP/CS) of the CONVERGING system.

Significant strides have been made in the development of the **Multi-Actor Contextual Interfaces (MACI)** and **Teaching by Demonstration (TDM)** modules, enabling natural language commands, multimodal interaction, and task teaching capabilities. The first prototype of the **Autonomous Robot Behavior Adjustment (ARBA)** module has been developed to enable robots to adjust their behaviors autonomously based on feedback.

This deliverable presents the development of the prototypes of these modules since D6.1. An initial evaluation of their performance is included, and the outlook to D6.3 at M36 is summarized in the conclusion.