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CONVERGING

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DELIVERABLE

D5.3 – Social industrial environment – Final version

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Executive Summary

Deliverable D5.3 concludes the work of Work Package 5 (WP5), which focused on developing and validating human-centred, safe, and socially sustainable industrial environments within the CONVERGING project. It builds on earlier reports (D5.1 and D5.2) and presents the final results of contextual user interfaces, and inclusive workplace design. Additionally, some updated done on the operator training interfaces are also added in this deliverable.

Across all activities, operator engagement played a central role. Through co-creation workshops, VR training sessions, and demonstrator piloting, the workforce directly shaped the technologies and provided feedback that guided their design. This participatory approach ensured that the developed solutions responded to real needs, particularly around safety, usability, and trust.

Key findings include:

- **Training and confidence-building**: Immersive AR/VR tools successfully helped operators familiarise themselves with new robotic systems, reducing anxiety and preparing them for safe collaboration. However, face-to-face training and ongoing access to experts remain essential.
- **Contextual interfaces**: Multi-actor contextual interfaces (MACI) showed the importance of personalisation and simplicity. Operators preferred clear visual guidance and adaptable levels of assistance to reduce complexity and support inclusivity.
- **Workplace design and safety perceptions**: Operators consistently emphasised visible safety zones, transparent robot behaviour, and repeated demonstrations of reliability. Robots were welcomed when they reduced physical strain and unsafe tasks, but trust depended on gradual familiarisation and proof of consistent performance.

The work carried out in WP5 provides the methodological and practical foundation for the next phase of the project. The acceptance training programmes, VR validation tools, and inclusive workplace design methods developed here will be further tested and scaled in WP7, where full human factors validation on the use case shopfloor will take place. Also, the training tools are being used during the WP7 training sessions, involving external companies, and will be further used during the last phase of the Project for external and internal training of operators and engineers.

In summary, WP5 has shown that human–robot collaboration can be designed in a way that is safe, inclusive, and trusted by operators. By combining technological innovation with operator participation, the project has created solutions that not only improve efficiency but also support wellbeing and long-term acceptance.