

# SMART HANDLE



## **D6.2** **SMARTHANDLE technologies for intelligent workpiece handling and line reconfiguration – performance assessment**

<b>Project Title</b>	Resilient manufacturing lines based on smart handling systems
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<b>Name of the Deliverable</b>	SMARTHANDLE technologies for intelligent workpiece handling and line reconfiguration
<b>Number of the Deliverable</b>	D6.2
<b>Related WP Number and Name</b>	WP6: System integration and AI-based multi-level performance optimization
<b>Related Task Number and Name</b>	T6.1: Testbeds design and adaptation – Integration of Software and Hardware architecture T6.2: Variform large part packaging – Metal production pilot case T6.3: Delicate and deformable part handling and inline logistics – Consumer goods production pilot case T6.4: Disassembly of multivariant and hazardous workpieces – Battery disassembly production pilot case T6.5: Quantification and comparative analysis – Technology and SSH perspectives
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<b>Reviewer(s)</b>	MENICON

### Keywords

Integration, testing, human-centric design, usability, trustworthiness.



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### **Abstract**

This deliverable will report the technical performance of SMARTHANDLE solution as well as the activities and findings of Human Centric design through its demonstrators. This deliverable builds on D6.1 which described the pilot's demonstrator setups and early pilot activities. This deliverable summarizes the integration and testing activities carried out under the SMARTHANDLE project.

The report focusses on two main parts: a) piloting activities and the adaptation of technologies for integrating enabling technology prototypes in the use cases, and b) human-centric design activities aimed at ensuring technology usability.

Testing and integration activities were performed across three industrial use cases: a) Packaging of variform aluminum profiles, b) Human-aware assistive contact lens manufacturing, and c) Electric vehicle battery disassembly.

Prototypes of dexterity, reasoning, and reconfiguration enabling technologies were integrated into pilot demonstrators. Concurrently, an extensive study evaluated the human-centricity of these integrated technologies, assessing their ease of use, overall usability, and trustworthiness. Testing validated the working principles of each block, and the resulting remarks established a clear integration roadmap for the final phase of the project.

### **Executive summary**

This document reports the activities performed in Tasks 6.2 till 6.4 while taking into account the results of the technical WPs. It documents the design and integration activities of the SMARTHANDLE technologies on the three pilot cases, namely:

- Variform large part packaging - Metal production pilot case: This case deals with the packaging of aluminum profiles on pallets based on personalized customer orders. Details will be provided in section **Error! Reference source not found.**
- Delicate and deformable part handling and inline logistics - Consumer goods production pilot case: This case deals with the manufacturing and handling of highly customizable contact lenses. Details will be provided in section **Error! Reference source not found.**
- Battery disassembly pilot case: This case deals with the recycling of EV batteries. Details will be provided in section **Error! Reference source not found.**

The document is organized around the distinct integration activities that are described in section **Error! Reference source not found.** For each pilot case a description of the test scenario, or scenario's in some of the use cases, is given, followed by a description of the specific test setup and the integrated SMARTHANDLE technologies and technological modules.

Section **Error! Reference source not found.** is oriented towards the evaluation of the human-centeredness of the integrated system.