Grant agreement nº: 101006798

Call identifier: MG-3-7-2020

Deliverable D7.4

Mari4_YARD's Showrooms

Work Package 7

Education and Training

Document type	: Demonstrator
Version	: 1.0
Date of issue	: 08/12/2024
Dissemination level	: PUBLIC
Lead beneficiary	: EWF
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This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement nº 101006798.

DOCUMENT HISTORY

Version	Date	Changes	Stage	Distribution
0.1	26/11/2024	Final Document	Final	EWF
0.2	28/11/2024	Final Document Review	Final	AIMEN
0.3	29/11/2024	Final Document	Final	EWF
1.0	08/12/2024	Final Document. Submission	Final	EC

EXECUTIVE SUMMARY

The Mari4_YARD concept intends to make the technologies developed in Mari4_YARD openly accessible for all interested parties.

For this purpose, are designed the Didactic Factories idea, where RTO's and other industrial partners will be opened as showrooms, targeting to approach the Mari4_YARD solutions to the industry.

TABLE OF CONTENTS

1 INTRODUCTION

The Didactic Factories (RTO's) and other industrial partners will be opened as showrooms, becoming lighthouse technologies for potential adopters, helping industry to approach Mari4_YARD´s paradigms through real onsite demonstration and boosting exploitation opportunities (new R&D activities and customers).

The information about the Didactic Factory network- showrooms, their facilities and the trainings offered are explained in detail in deliverable D7.6, but also accessible publicly in the project website.

2 WEBSITE

Mari4_YARD website will continue online, and it will be the repository for the didactic Factories showrooms information. The link is https://www.mari4yard.eu/ and the website has a tab for training and didactic factories. And here it is possible to find all the information regarding the didactic Factories showroom (see Figure 1).

The Mari4_YARD Didactic showroom facilities (Test benches, Pilot Lines and Research Centres, DIH, etc) will remain open to provide training and skilling-up for given technologies. Their main objectives are to provide upskilling and re-skilling of shipyards workforce, the demonstration of technologies that could be used to advance shipyard processes and to provide infrastructure for third parties to test new technologies and solutions (technology developers and system integrators).

This network will provide training services on a revenue basis (beyond the project) as a way to ensure financial viability for the network long-term operation.

Figure 1. Mari4_yard Website with Didactic Factories tab

The network services promotion and the SME shipyards client attraction will be largely benefited from the supportive partners and the project online community activities.

Figure 2 . Supportive partners and network

3 DIDACTIC FACTORIES SHOWROOM

The didactic factories were developed under task 7.2 and all the information is well reported in the deliverable 7.2 didactic Factories Network and the deliverable 7.6 the update of the previous with the description of all the Mari4_yard project showrooms for the future.

The Project Didactic Factories currently running are 6, mainly linked to RTO's.

3.1.1 Human-Centric Didactic Factory (AIMEN): XXL Pilot Factory

AIMEN Technology Centre is a non-profit private association. It has a strong background of research and innovation covering industrial key areas such as Smart Manufacturing, advanced Manufacturing Processes and High-Performance Materials.

All the technologies are part of the XXL Pilot Factory for the deployment of user-centric solutions in the manufacturing and assembly of large-scale components. This open factory is used to boost and create awareness on the manufacturing companies about the use and benefit of digital technologies and digital centric solutions – i.e., augmented reality, industrial robotics, mobile manipulators, portable solutions…– in the assembly and manufacturing of large components. Within the Mari4_YARD scope, AIMEN will focus on the deployment and testing of technologies in different application environments:

- Steelwork production
- Confined welding operations
- Outfitting and construction supervision

Figure 3. AIMEN Didactic Factory: XXL Pilot Factory

3.1.2 Didactic Factory (TUHH)

The didactic factory at the Institute of Production Management and Technology (IPMT) of the Hamburg University of Technology (TUHH) contains digital assistance systems developed at the institute. The focus is on handheld tablet applications, although the use cases vary.

The aim of the digital learning factory is to (1) demonstrate and illustrate tracking strategies and developed digital assistance systems and (2) test new applications and systems at an early stage. The learning factory is intended to illustrate the possibilities and advantages of digital assistance systems to interested business representatives as well as students.

The applications can be tested by handling tablets with AR applications and demonstrators that are available in the didactic factory. They include an engine for maintenance support and a demonstrator for laying pipes. This is intended to show users possibilities but also limits of digital work support.

Figure 4. Didactic factory at the Hamburg University of Technology.

3.1.3 iiLab Didactic Factory (INESC)

The Industry and Innovation lab (iiLab) at INESC TEC is a facility designed for the demonstration, experimentation and education of the production systems of the future. From integration of the outcomes of several national and European projects, INESC TEC has deployed the iiLab's Learning Factory, a flexible production and assembly system capable to dynamically respond to customized orders and demonstrates a significant amount of adaptability and resilience. The aim of the Learning Factory is to provide fundamental insights into advanced manufacturing possibilities, applications and associated challenges through a controlled, near-industrial production environment. Humans, robots and production stations share the factory space, which serves as a platform for projects in the areas of collaborative robotics, automation and cyber-physical production systems.

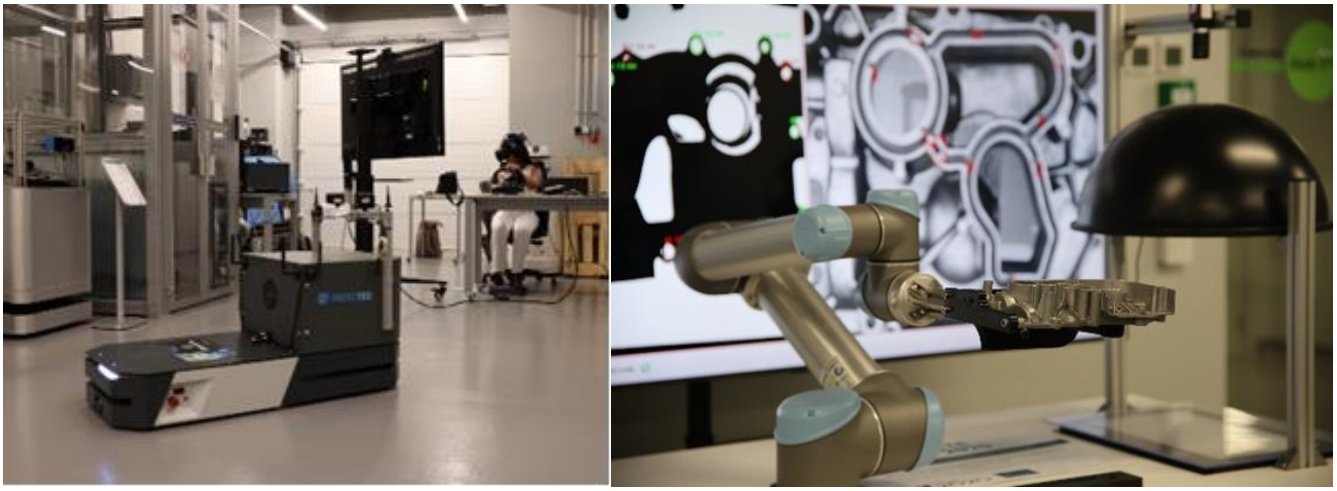

Figure 5. Overview of the iiLab's Learning Factory.

3.1.4 Didactic Factory (SSSA)

The didactic factory at the BioRobotics Institute of the Scuola Superiore Sant'Anna (SSSA, Italy) will be managed by the team of the Wearable Robotics Laboratory (WR Lab). The WR Lab has several wearable robotic platforms, developed for different applications and gained large experience in developing and testing exoskeletons. The focus of the didactic factory at SSSA is on upper-limb and lumbar exoskeletons for supporting workers dealing with physically demanding work activities in the shipyard.

This didactic factory will have the objective of delivering courses and/or organizing workshops directed to stakeholders, with the aim of training specific figures within the shipyard's enterprises about exoskeletons and their potential benefit in supporting workers in the shipyard's activities.

Because of the portable nature of the exoskeletons, the didactic factory will not necessarily need a permanent dedicated space within the SSSA, but courses and workshops may be organized in an "on demand" fashion, when external stakeholders will show their interest in the technology.

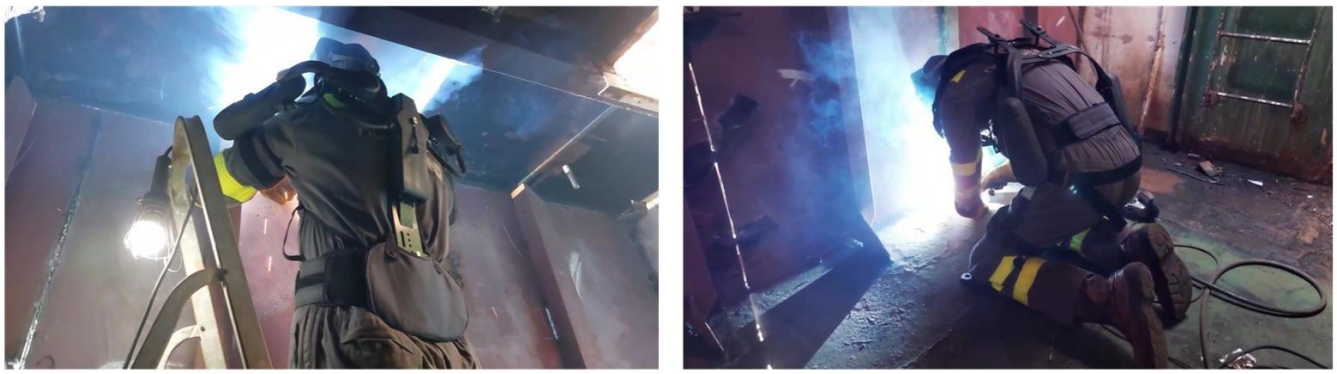

Figure 6. Wearable robotics. Exoskeletons supporting operator in welding activities.

3.1.5 Didactic Factory (LMS): Open Pilot for the use case "Parts Assembly using Welding Process"

The didactic factory at the Laboratory for Manufacturing Systems and Automation (LMS) in University of Patras contains the technologies developed in WP2 regarding HRC tools for high-payload robots and WP4 perception developments for human action perception methodologies. The focus is on assembly and welding processes of common steel parts in shipbuilding sector, using safe and flexible collaborative tools.

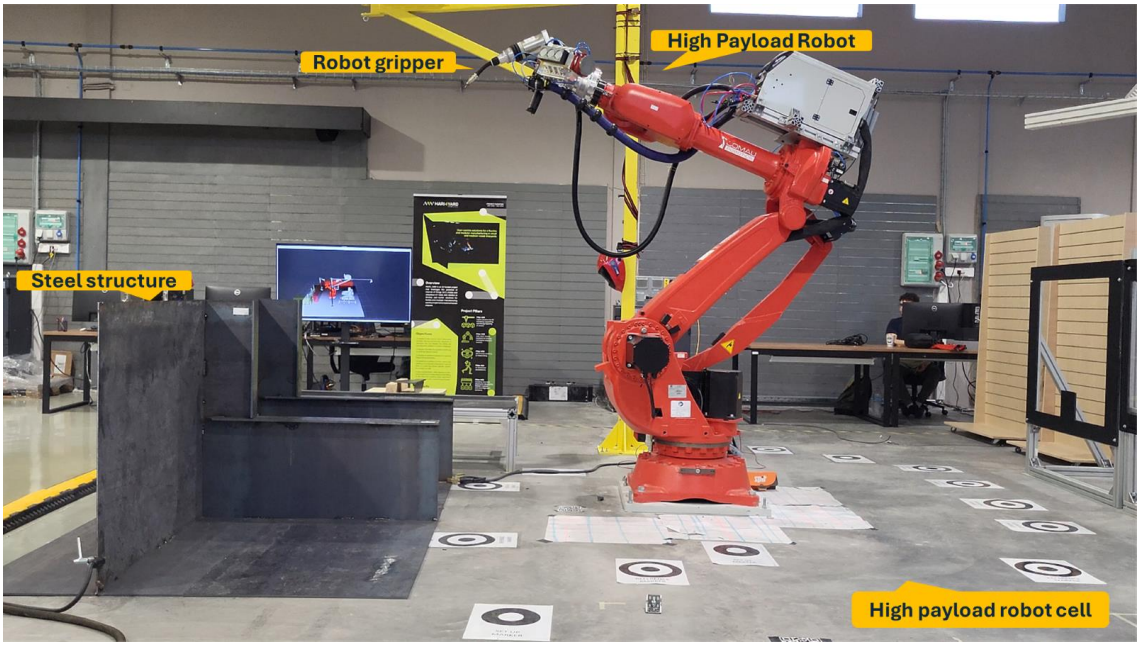

Figure 7. Didactic factory of LMS.

The aim of the didactic factory is to

1. Demonstrate HRC methodologies and developed HRC systems
2. Test new applications and devices at an early stage.

The training to be performed through the didactic factory is intended to highlight the advantages of using human robot collaboration in the shipbuilding industry to companies, students and any other technology enthusiast interested in the sector.

Within the Mari4_YARD scope, LMS will focus on the deployment and testing of technologies in application environment:

- Steelwork production
- Retrofitting and maintenance

These are centred on the pre-fabrication and fabrication stages, with the handling and welding of steel parts to assemble blocks and subblocks structures.

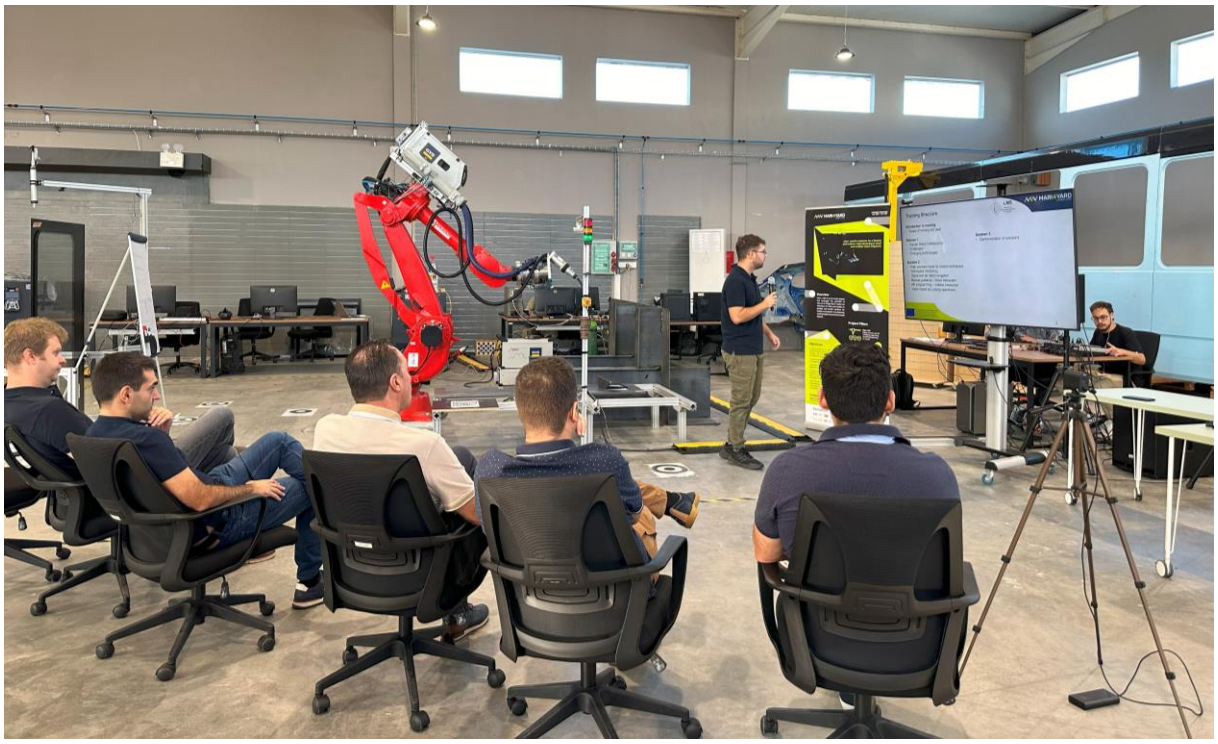

Figure 8. LMS didactic factory during hybrid training**.**

The didactic factory at LMS premisses offers the opportunity to provide physical and online trainings exploiting audio and visual technologies for both on-site and online trainees. For physically attending trainees' opportunities for hands on experiences are provided for the various technological modules included.

Figure 9. Hand guiding technology teaching and hands on experience.

Figure 10. AR-based robot programming teaching and hands on experience.

3.1.6 Didactic Factory (GHENOVA) – Providing services on-site.

Services related with 3D scanning and drones can be provided based on previous agreements directly in the client's facilities.

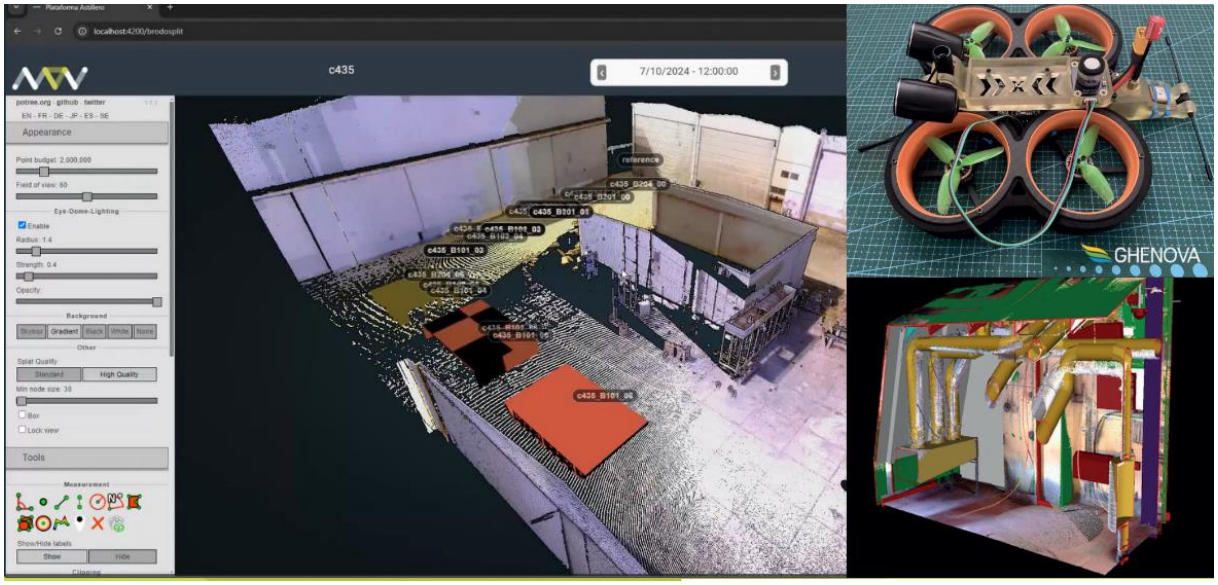

Figure 11. Drones-based 3D scanning for modelling, production and advanced control

4 ONLINE INFORMATION OF THE SHOWROOMS

The online Didactic factories technologies and showrooms are easy to find and use in the Mari4_yard project website.

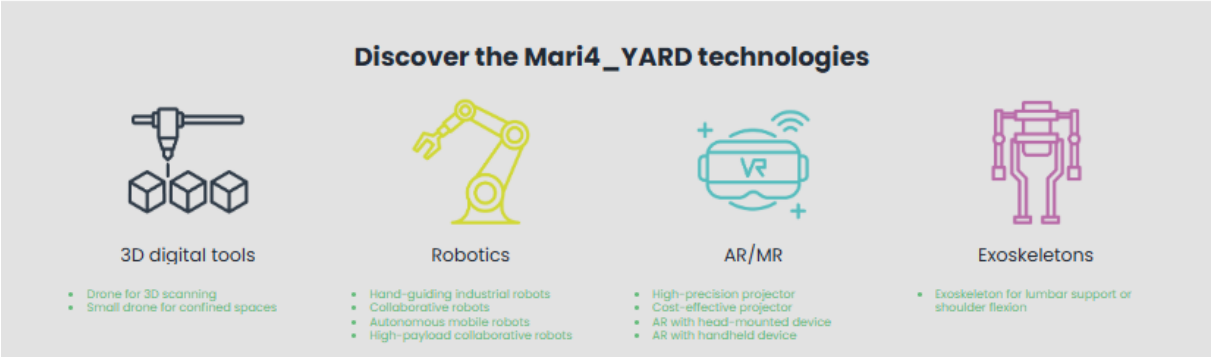

Figure 12. Mari4_Yard Website technologies and showrooms

The portfolio of services and trainings provided within the scope of the Mari4_YARD can be grouped in four main blocks of technologies and are easily accessible through the website.:

- Drone for 3D scanning
- Small drone for confined spaces
- High-precision projector
- Cost-effective projector
- AR with head-mounted device
- AR with handheld device
- Hand-guiding industrial robots
- Collaborative robots
- Autonomous mobile robots
- High-payload collaborative robots
- Exoskeleton for lumbar support or shoulder flexion

For each technology, the detailed information is available. And also a catalogue of Mari4_yard solutions is available for download here.

Figure 13 – Didactic Factories and showrooms information online

All the Materials are available for download, as well.