



# PENELOPE

**How digital technologies  
would impact traditional  
manufacturing companies?**

Félix Vidal

PENELOPE Project Coordinator

AIMEN Technology Centre

2024 Manufacturing Partnership Day



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 958303





WEBSITE

[www.penelope-project.eu](http://www.penelope-project.eu)



TWITTER

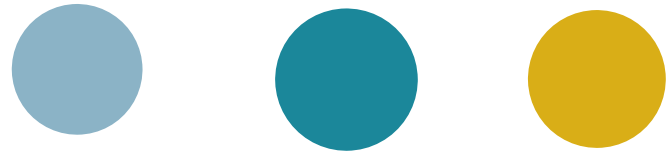
@PenelopeEU1



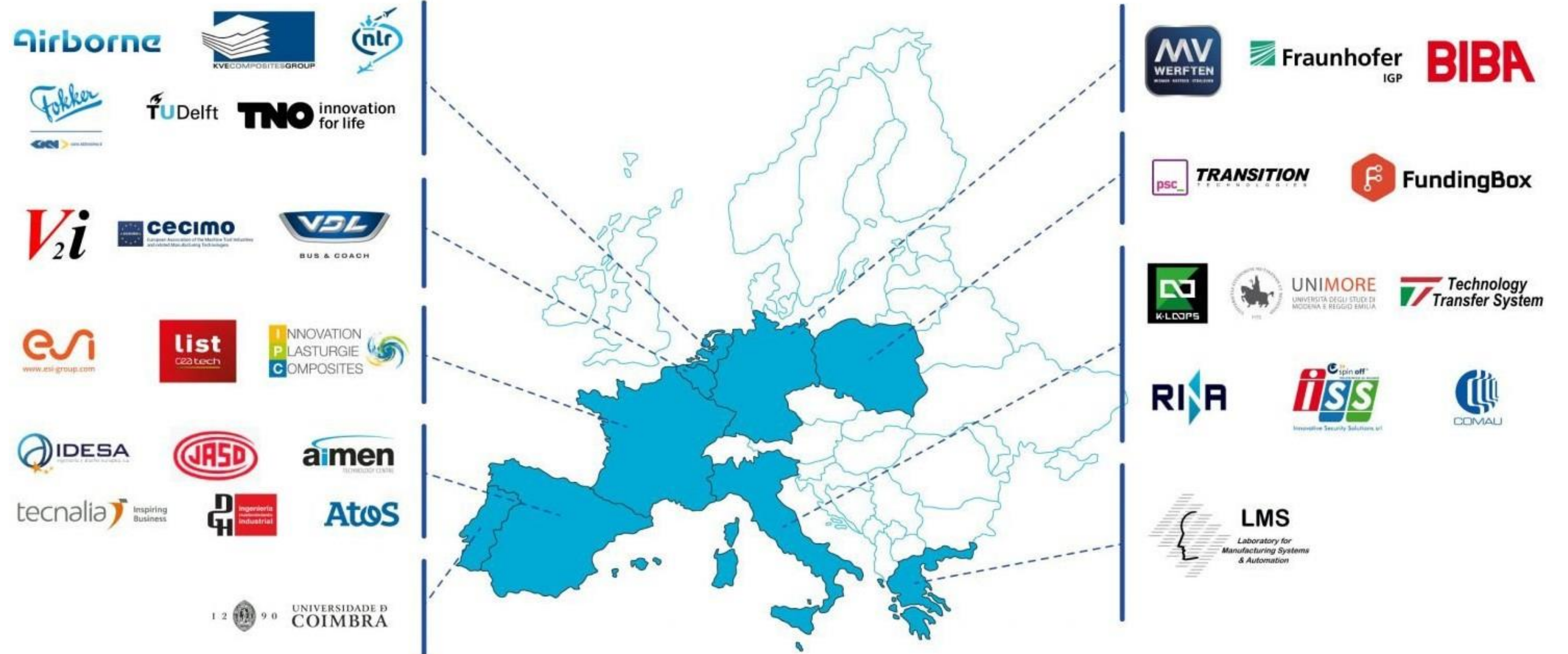
LINKEDIN

/penelope-eu

2



# Penelope's Consortium



31

EUROPEAN PARTNERS

9

DIFFERENT COUNTRIES

DT-FOF-10-2020

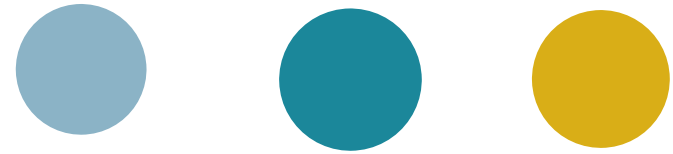
Pilot lines for large-part high-precision manufacturing (IA 50%)

€ 20.125.750

OVERALL BUDGET

€ 14.722.029

EU CONTRIBUTION



### CHALLENGES:

**Manufacturing and repairing of large-scale components is complex, highly manual, time-consuming and imprecise/inaccurate processes:**

- Design and construction preparation: 20-25% of total costs of one-of-a-kind components.
- Tolerances, deformations... impose constant reconfiguration and adaptation of the work.
- Subassemblies are being manufactured and assembled involving a sequence of different manufacturing processes.
- Preserving industry-specific knowledge and skills.

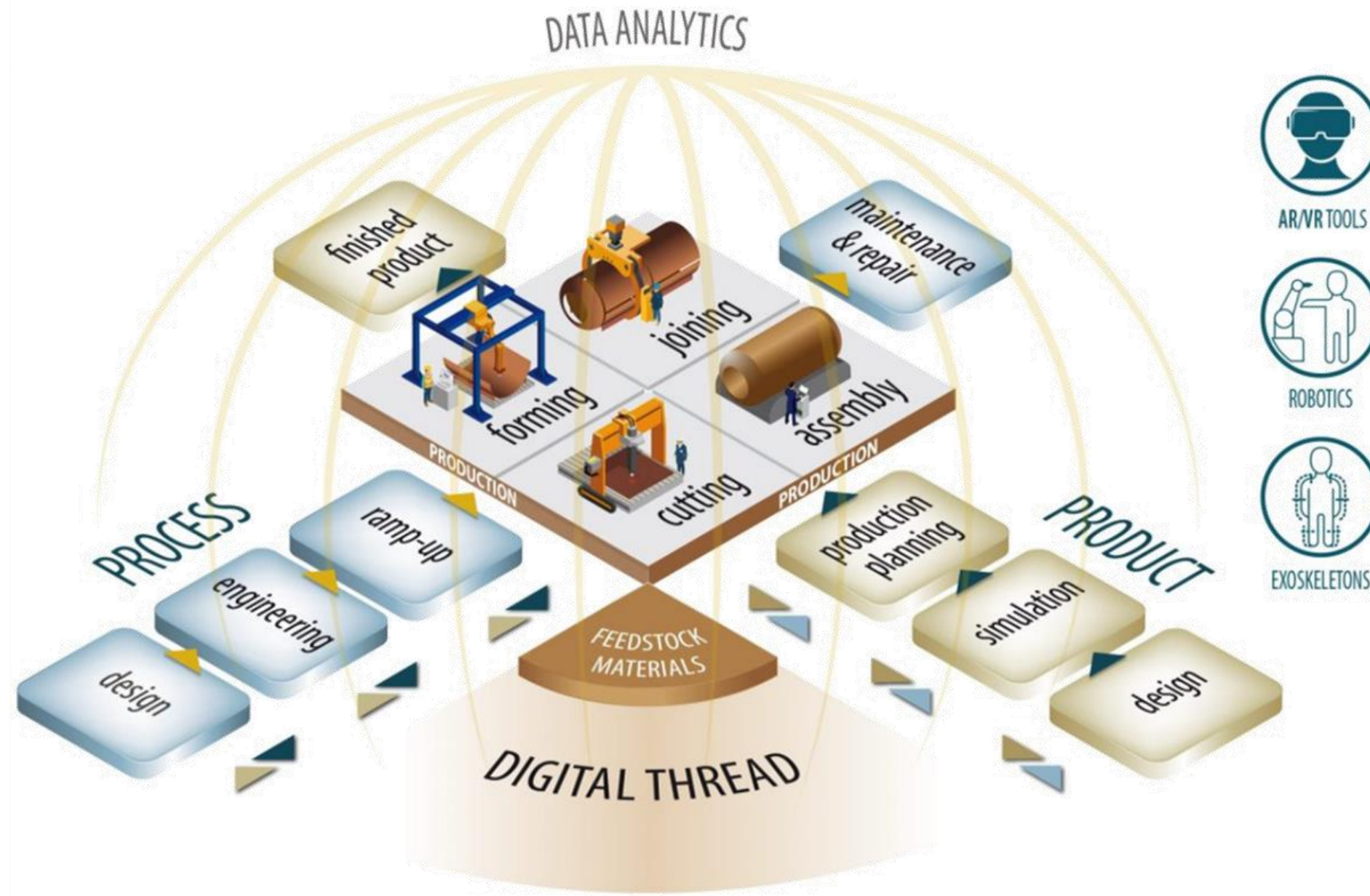


Novel integrated methodology linking ***product-centric data management*** and ***flexible and reconfigurable production planning***.





# PeneloPe's Vision



## 01

### A CLOSED-LOOP DIGITAL PIPELINE

End-to-end digital manufacturing solution.

- Product-centric data management
- Modular and reconfigurable production

## 02

### WORKER-CENTRIC SOLUTIONS IN SHARED WORKSPACES

Industry-specific workers' knowledge and skills are preserved.

- Product-centric data management
- Modular and reconfigurable production

## 03

### ZERO-DEFECT MANUFACTURING STRATEGY

AI-powered digital twins.



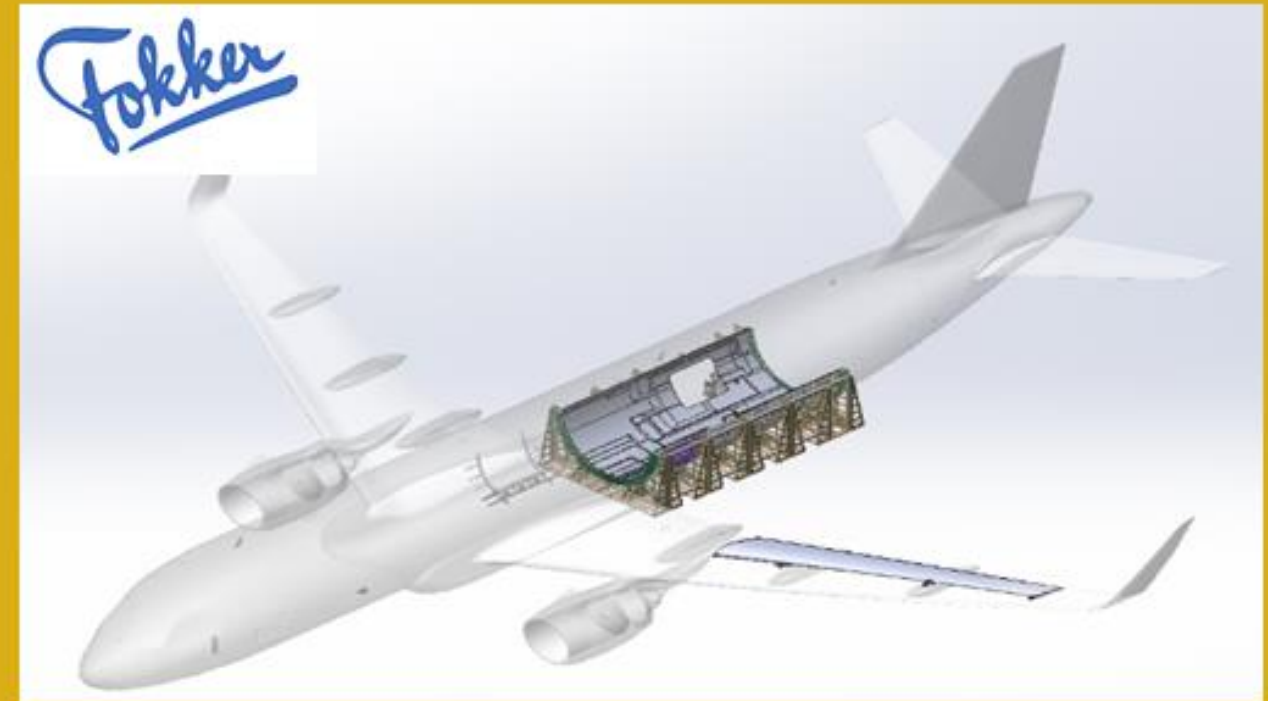
**PRODUCT-SERVICE  
FACTORIES**





# INDUSTRIAL ADOPTION

One-of-a-kind



Low-volume



**Penelope**  
CLOSED-LOOP DIGITAL PIPELINE



# PENELOPE

## PENELOPE DEMONSTRATORS



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# PENELOPE DEMONSTRATORS BOOKLET



BUS & COACH PILOT LINE



AERONAUTICS PILOT LINE



SHIPBUILDING: SUPPLY TRAYS DEMO



OIL&GAS PILOT LINE



SHIPBUILDING: FITTING PIPE DEMO



## AERONAUTICS PILOT LINE

### ABOUT GKN FOKKER AEROSPACE

Today we are truly global, with 25,000 employees in 25 manufacturing locations in 12 countries around the world. All major aircraft and engine manufacturers rely on our advanced technologies. Our structures, engine systems and special products improve the performance of more than 100,000 flights every day.

By working closely together with universities, knowledge institutes, suppliers and customers, we lead the industry in developing new technology to improve aircraft efficiency, lowering aircraft cost, weight and emissions.

Company Name: GKN Fokker Aerospace B.V.  
Address: Anthony Fokkerweg 4, Papendrecht  
Industry: Aerospace  
Technology: Lightweight Composite Structures  
Contact details: [lee.reyniers@fokker.com](mailto:lee.reyniers@fokker.com)  
Website: [www.gkn-aerospace.com](http://www.gkn-aerospace.com)



### MAIN ADVANCES

- Reduction of processing time
- Precision improvement
- Reduction of scrap costs



### ABOUT THE AEROSPACE PILOT LINE

The Aerospace Pilot Line will integrate, simulate and demonstrate multiple assembly and quality inspection methods. A "digital thread" connects the steps in the design and manufacturing process where the as-built information is captured and used for continuous improvement. The physical demonstration is held at the SAMIXI gantry cell, supported by presentations of the digital thread and simulated activities.



### TARGET COMPONENT

The target component is a partial assembly of a lower fuselage section, comparable to the size of an Airbus A320 aircraft. Sample skin patches with and without artificial defects, with and without stringers represent the full-size fuselage skin panel in different stages of processing and included as well are cargo floor connection brackets and a cargo floor surround structure.



SCAN ME





**Penelope**  
CLOSED-LOOP DIGITAL PIPELINE



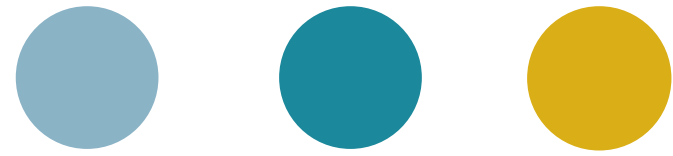
# PENELOPE

## EARLY ADOPTERS PROGRAMME



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# Penelope's Early Adopters Programme

Access **FREE services and training** to make the best out of your manufacturing production with PENELOPE's industry 4.0 solutions to further innovation in intelligent, efficient and flexible manufacturing for high-precision large parts.

14

Packages

6

Didactic  
Factories



Submission open:  
06.05.2024 at 10:00  
Brussels time

Submission deadline:  
21.06.2024 23:00,  
Brussels time





# EAP: THE BENEFITS

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# Early Adopters Programme: Benefits



## Hands-On Training

Equip your workforce with practical skills in robotics, collaborative manufacturing, and digitalization to drive operational excellence.

## Optimized Processes

Leverage advanced simulation tools and extended reality platforms to refine manufacturing processes, reducing errors and maximizing efficiency.

## Cost-Efficient Solutions

Implement cost-effective strategies through virtual reality simulations, reducing the need for physical prototypes and minimizing production expenses.

## Digital Transformation Support

Receive guidance on digital transformation initiatives, empowering your company to embrace Industry 4.0.

## Streamlined Operations

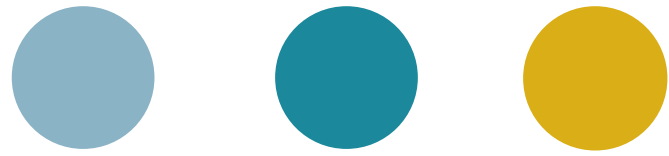
Integrate collaborative robotics and IIoT solutions into your production line



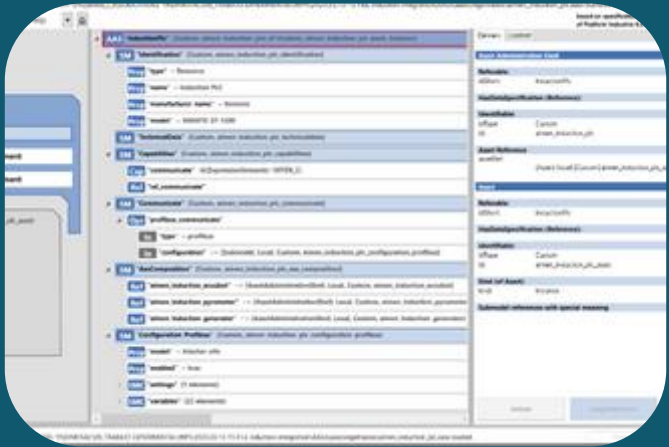


# EAP: THE OFFER

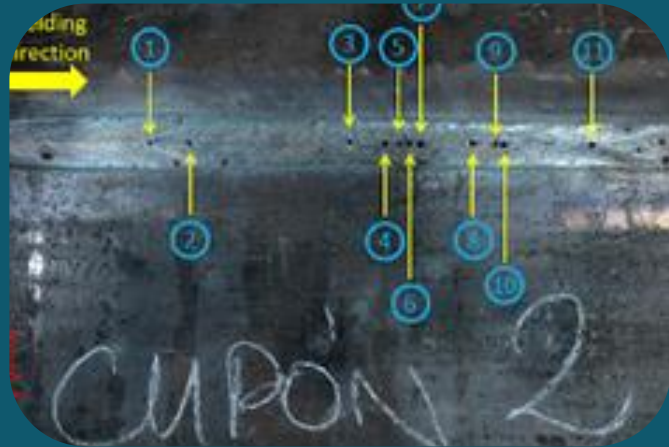
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# The Offer




Package 1  
AAS and Digital Twin



Package 2  
Training on welding defects and inspection



Package 3  
Collaborative Robots



Package 4  
Robot Operating System



Package 5  
Large workspace, high precision robotics



Package 6  
Hand-guiding robotics



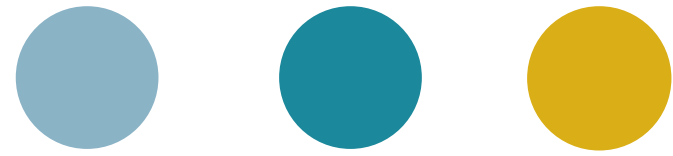
Package 7  
Cable Robotic



Package 8  
Augmented Reality








# The Offer



Package 9  
Virtual Reality




Package 10  
Collaborative robotics demonstrator



Package 11  
Opportunities and challenges of digitization + TELEGON



Package 12  
Robotic welding & collaborative robotics for "non-experts" + Cobots in production



Package 13  
Extended Reality Platform + Ergonomics



Package 14  
Extended Reality Platform + VR Tools



# APPLY NOW!

Open to all European Companies  
and H2020 Associated Countries



[www.penelope-project.eu](http://www.penelope-project.eu)





# DIDACTIC FACTORIES

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# XL PILOT FACTORY

- ❖ Training and upskilling capabilities enabling the workforce transition towards Industry 4.0
- ❖ A general-purpose testbed for assisting in the industry adoption of digital-centric solutions (INDUSTRY 5.0)



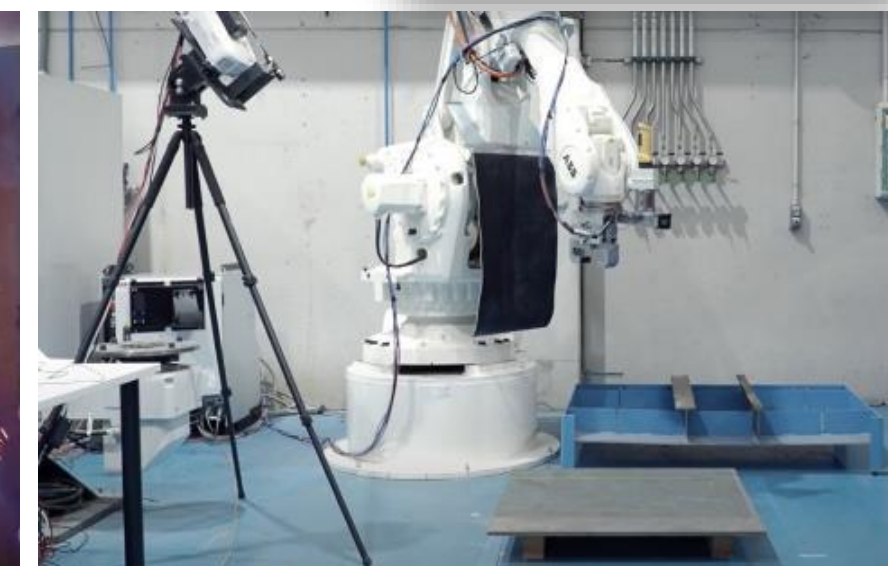
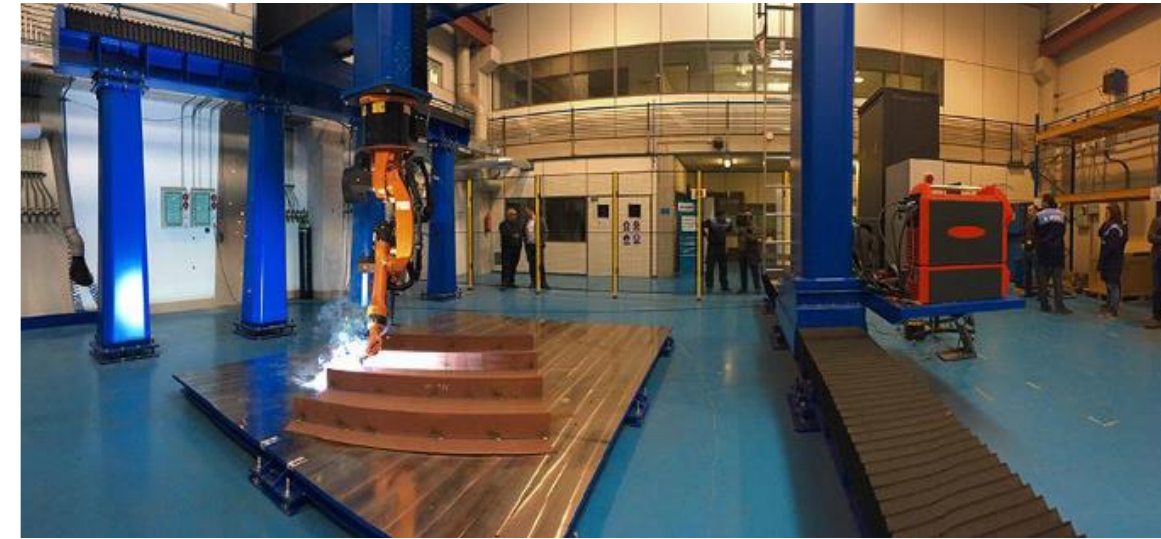
AR/VR TOOLS



ROBOTICS



EXOSKELETONS







# Find PeneloPe Online



WEBSITE

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[www.penelope-project.eu](http://www.penelope-project.eu)



TWITTER

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[@PenelopeEU1](https://twitter.com/PenelopeEU1)



LINKEDIN

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[/penelope-eu](https://www.linkedin.com/company/penelope-eu)





# Thank you for your attention!



**Félix Vidal**  
**PENELOPE Project Coordinator**  
**AIMEN Technology Centre**  
**May, 8th 2024**



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