

Laboratory for Manufacturing Systems and Automation

Department of Mechanical Engineering and Aeronautics

University of Patras, Greece



Παραδείγματα επιτυχημένων προτάσεων στο Cluster 4
Ενσωμάτωση ψηφιακών τεχνολογιών, XR, AI στον τομέα της Βιομηχανίας

Dr. Panos STAVROPOULOS

pstavr@lms.mech.upatras.gr

LMS: Introduction

The Laboratory for Manufacturing Systems & Automation (LMS) is oriented on research and development in cutting edge scientific and technological fields. LMS is involved in a number of research projects funded by the CEU and European industrial partners. Particular emphasis is given to the co-operation with the European industry as well as with a number of "hi-tech" firms. LMS employs approximately 100 researchers.

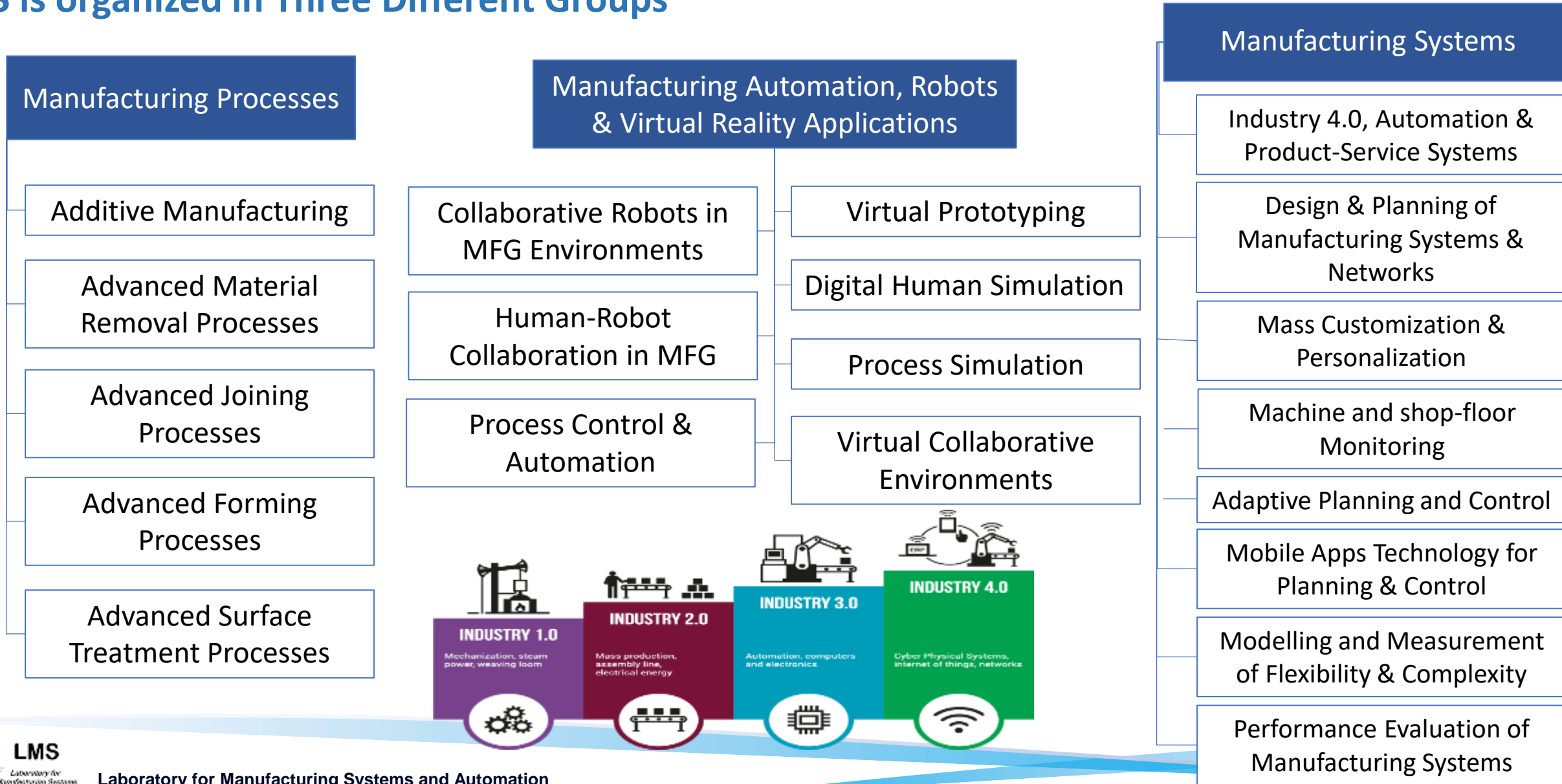
- Participation in more than **180 R&D Projects**
- Organization of more than **10 International conferences**
- Publication of more than **700 Scientific articles**



 lms.mech.upatras.gr

LMS: Areas of Expertise

LMS is organized in Three Different Groups



LMS: R&D projects



- Participation in more than 180 EU competitive R&D Projects
- Coordination of more than 50 EU competitive R&D projects
- Total funding of more than 100 M Euros

LMS: Indicative Cooperation Organisations



DAIMLER



AIRBUS GROUP

+GF+ AgieCharmilles



SIEMENS



FIDIA



bertrandt



VOLVO



EADS



BAE SYSTEMS



FESTO

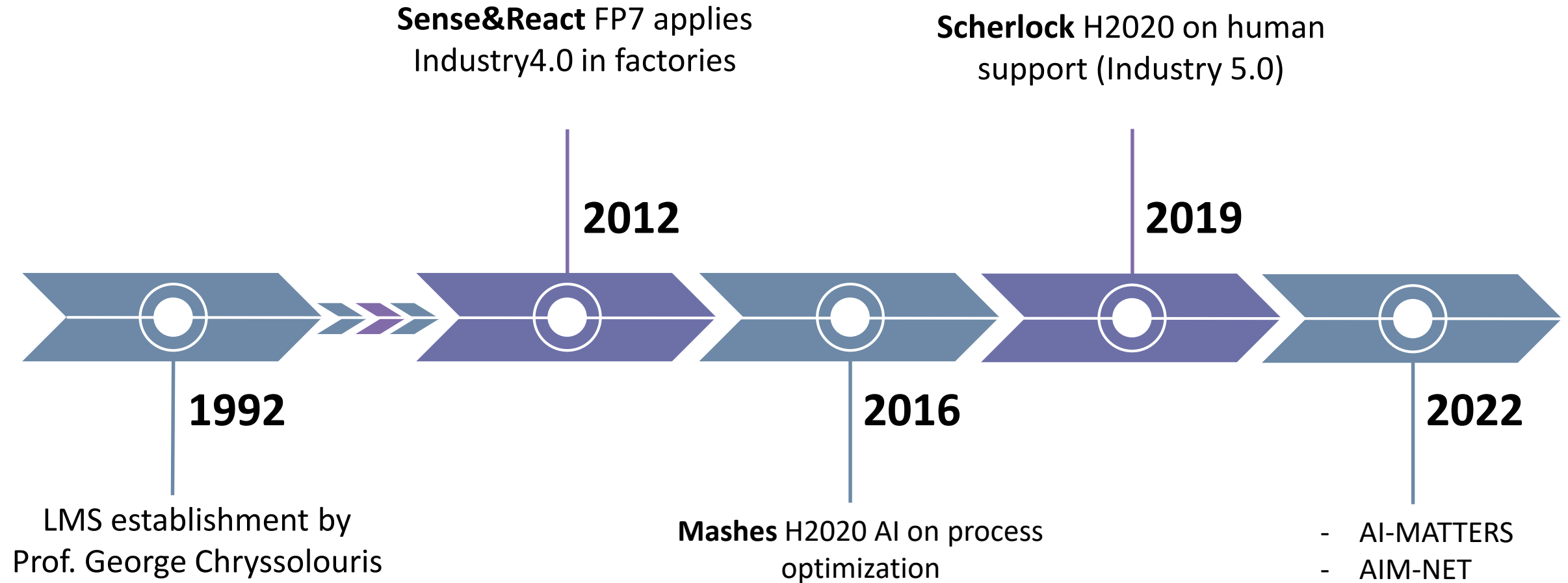


ALFA

pilz



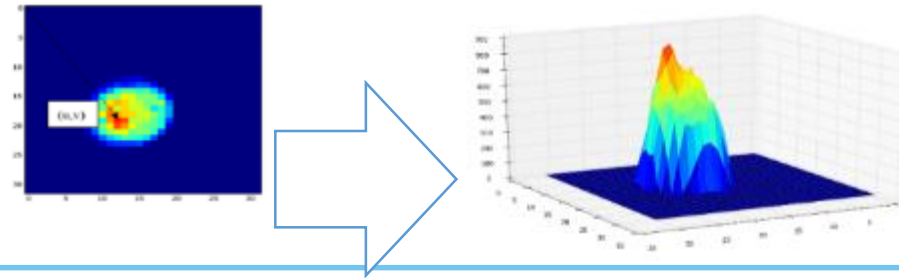
LMS: IND 4.0 journey highlights





Features extracted from thermal images:

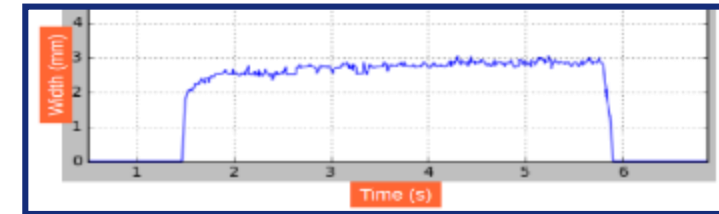
(1) Temperature distribution



(2) Geometrical characteristics

Melt-pool dimensions

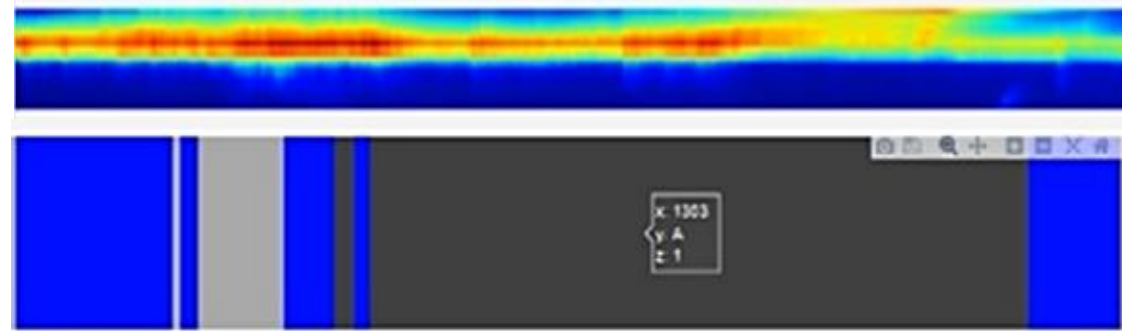
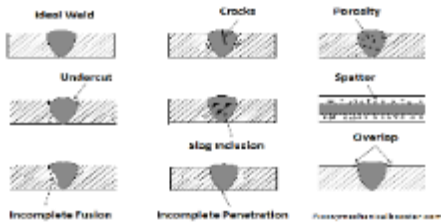
Moments (Statistical calc.
Correlated to size and position)



(3) Weld characterization

Pores, Cracks, Penetration

Defects Characterization



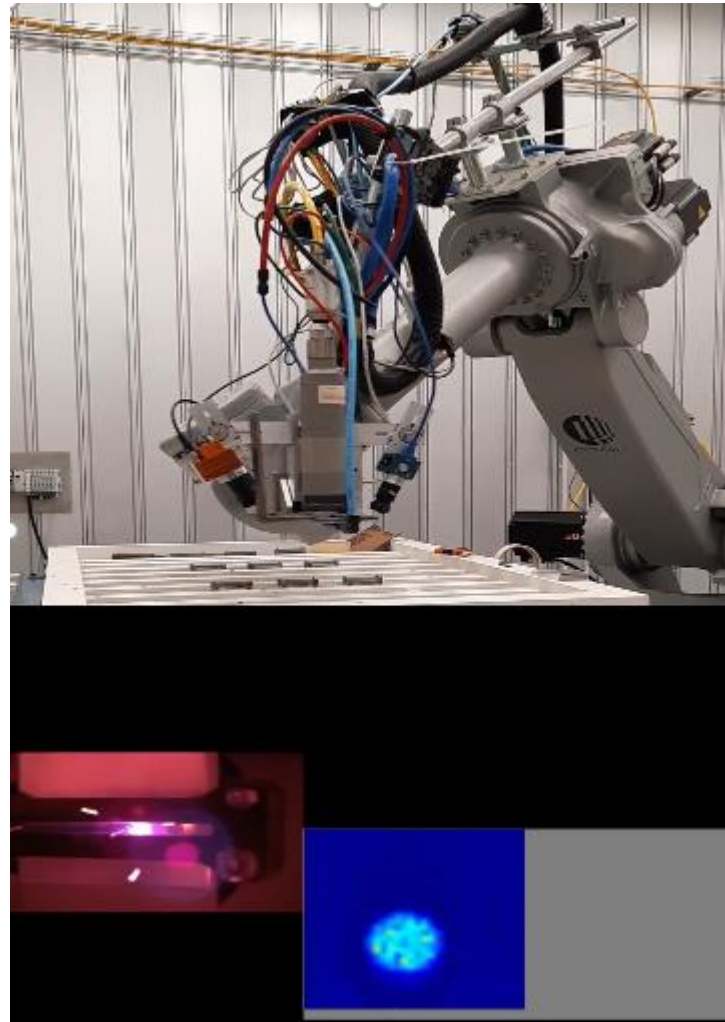
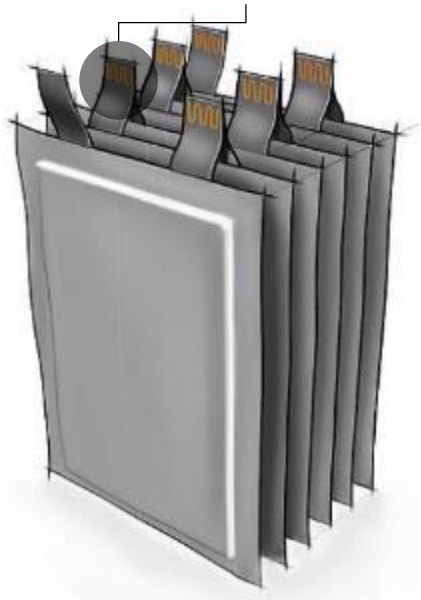
14.0 KETs

Networked sensors

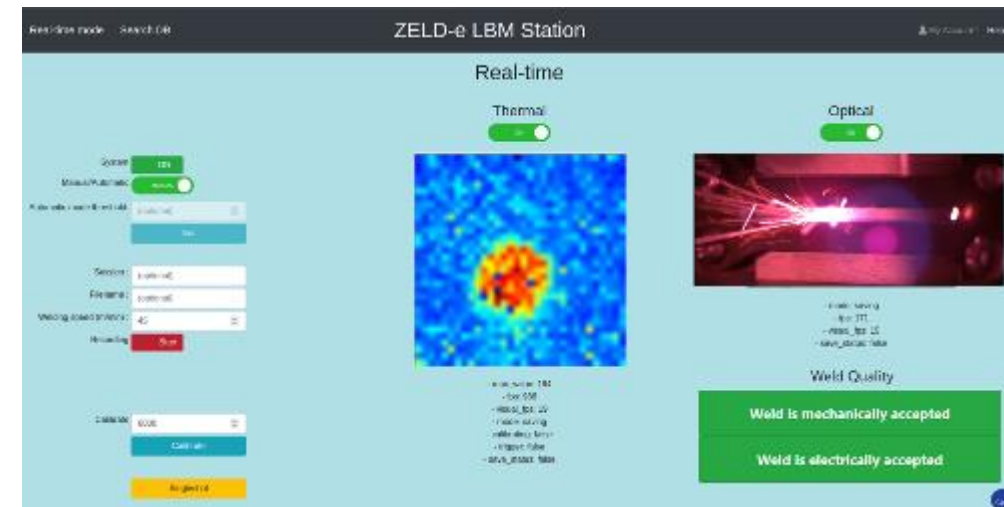
Robust manufacturing
Human in the loop

Zero Defect Manufacturing

e-Resistance, OK?
Mech. Strength, OK?



COMAU stated that “A single out-of-spec joint can lead to scraping entire modules”






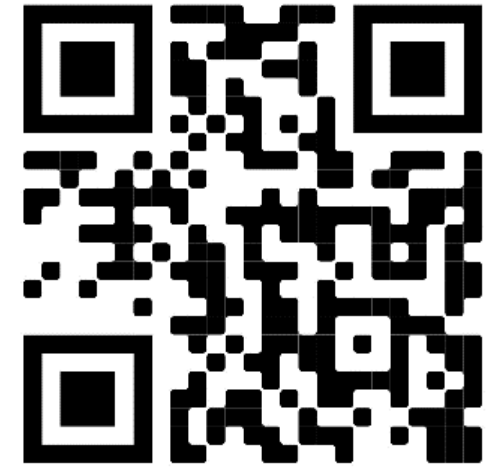
 sherlock-project.eu





 twitter.com/SherlockH2020

 linkedin.com/groups/13614049

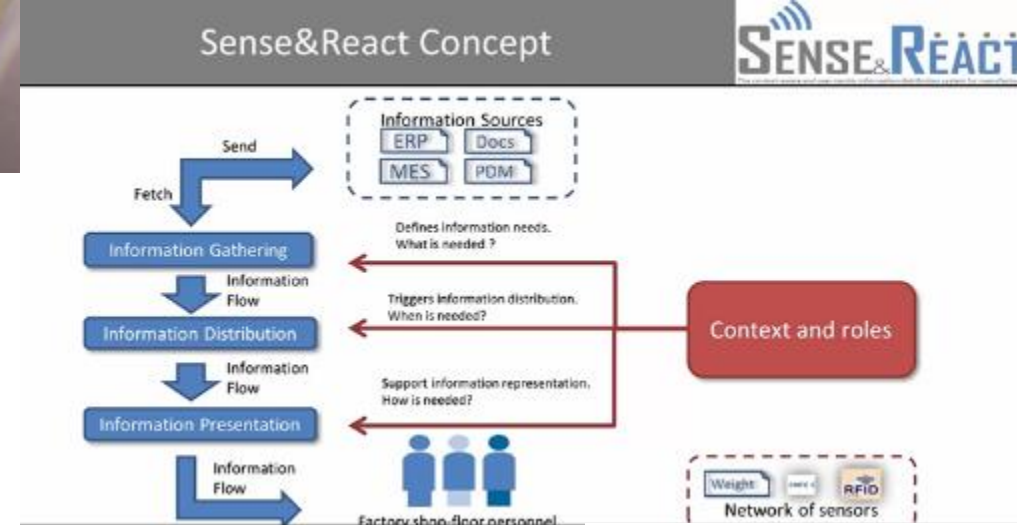
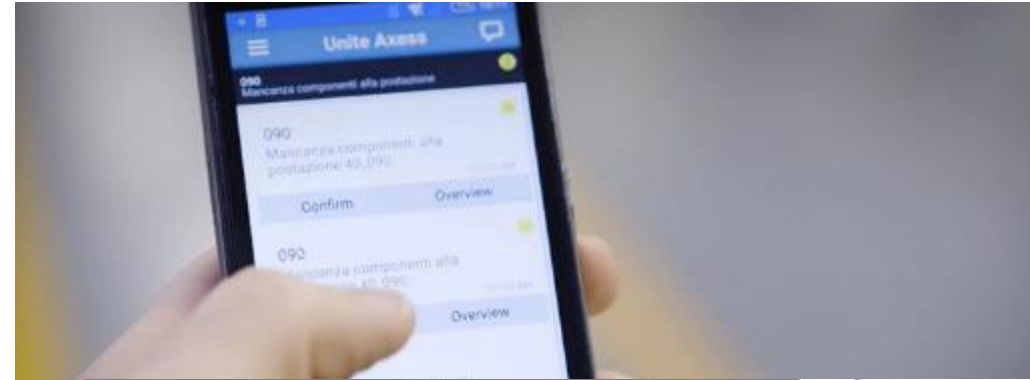
 facebook.com/sherlockh2020

XR and Robotics for Human-centric SME production



-  sherlock-project.eu
-  twitter.com/SherlockH2020
-  linkedin.com/groups/13614049
-  facebook.com/sherlockh2020

Sense&React – Industry4.0 tested



ARISE: Artificial Intelligence in Manufacturing for Sustainability in SMEs

[HORIZON-CL4-2022-TWIN-TRANSITION-01-06: ICT Innovation for Manufacturing Sustainability in SMEs]

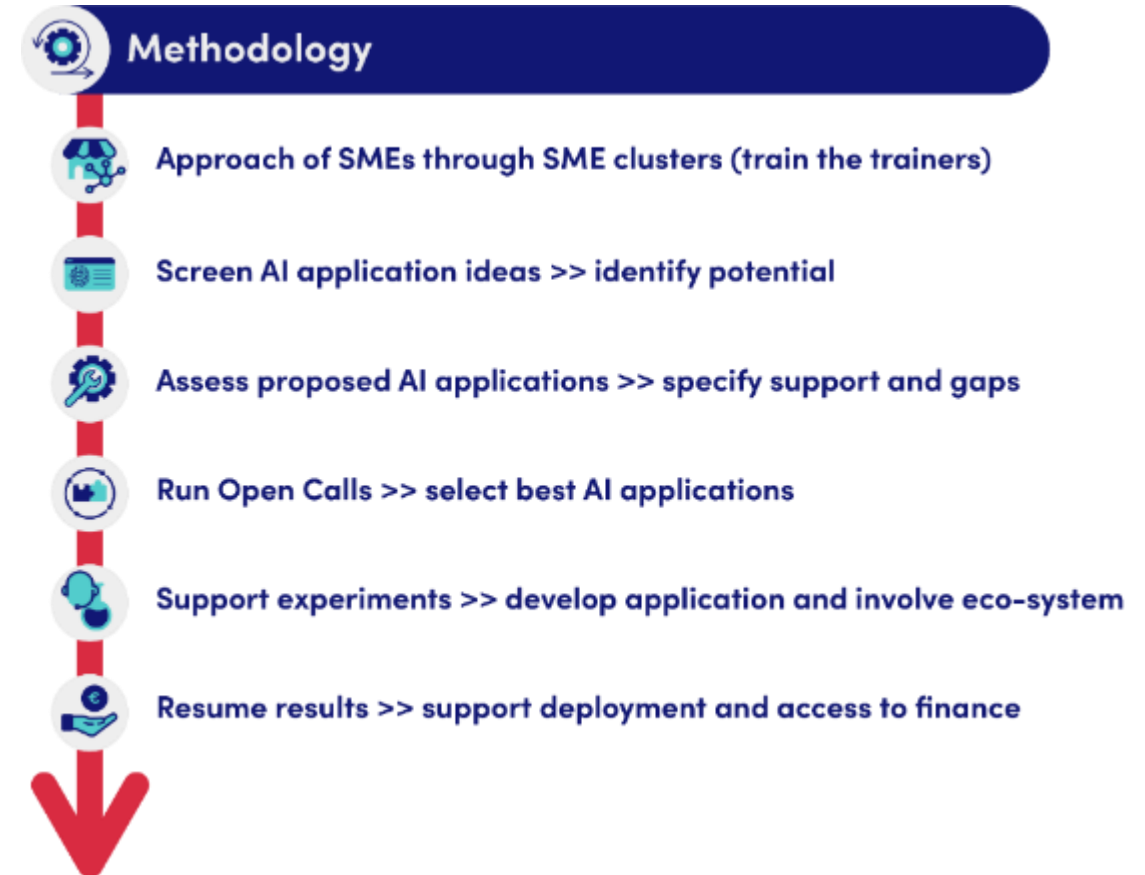
ARISE aims to create a framework to **support European SMEs** in the **uptake of Artificial Intelligence** applied to **manufacturing**

Specific focus of the use of **AI-enabled applications at the edge**, focusing on a **reduction of waste and carbon footprint** while ensuring **resiliency**.

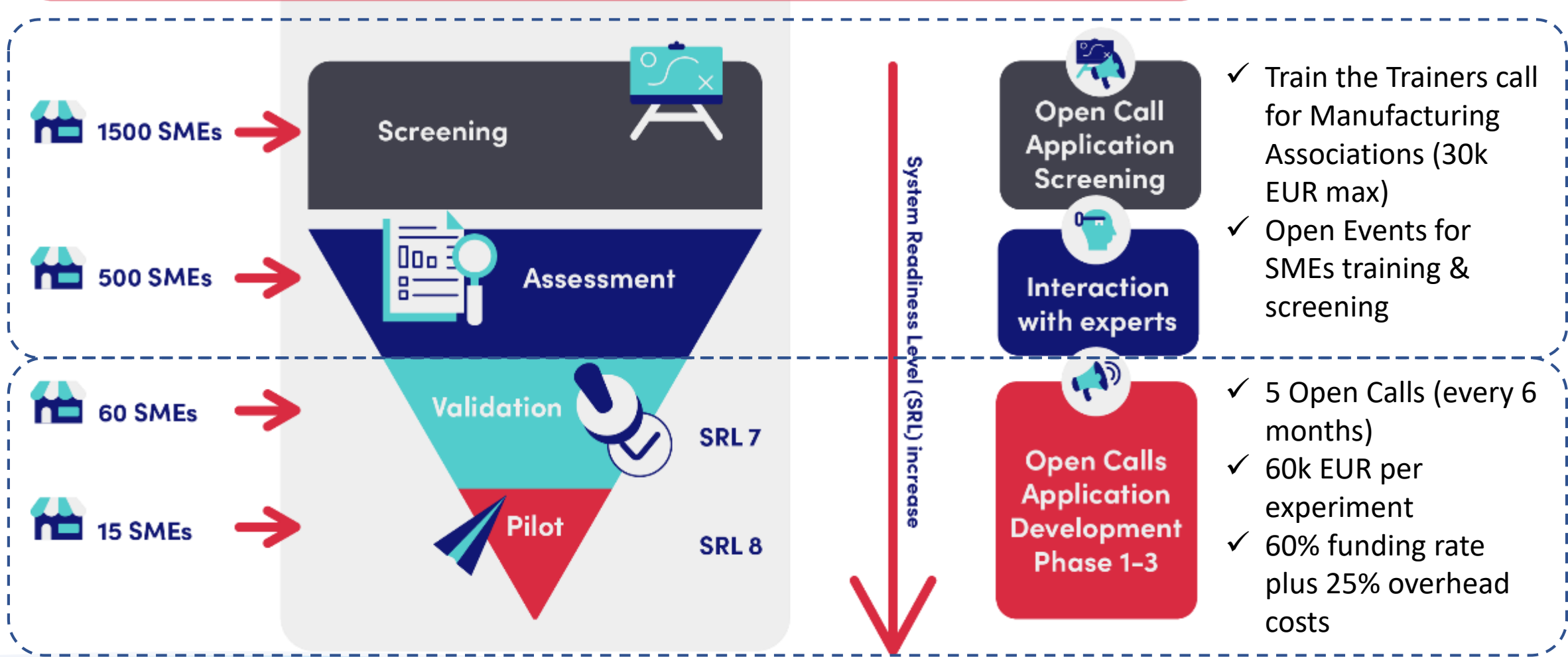
 airise.eu

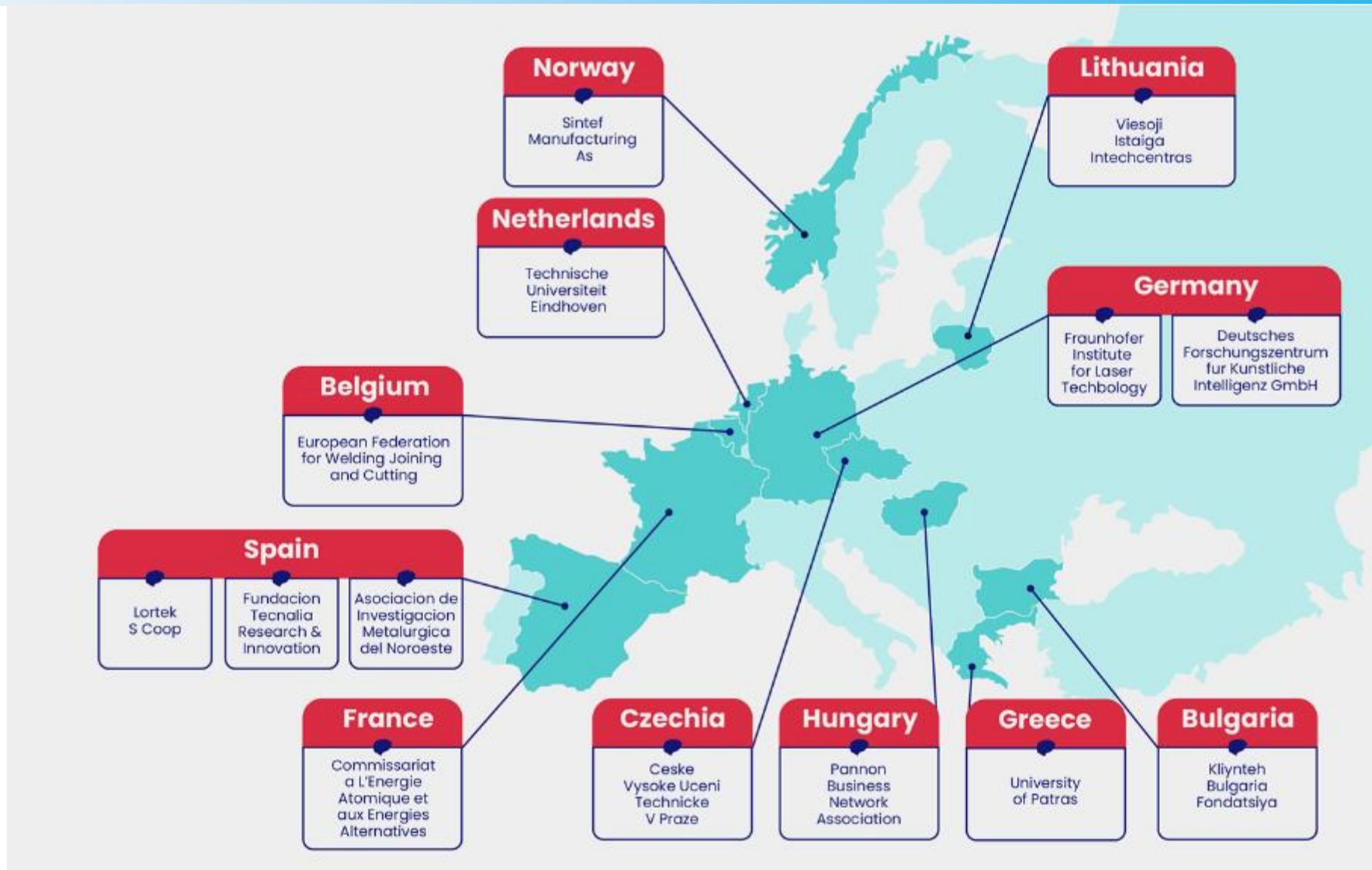
 facebook.com/airise.eu

 linkedin.com/company/airise



Manufacturing SMEs AI Application Support



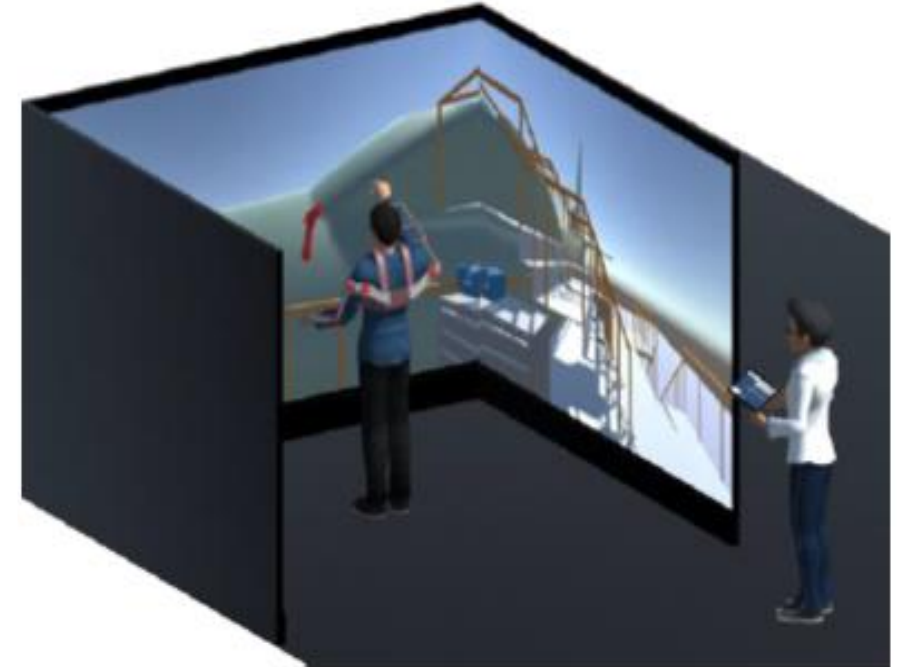


MASTER-XR: Mixed reality ecosystem for teaching robotics in manufacturing

[HORIZON-CL4-2022-TWIN-TRANSITION-01-06: ICT Innovation for Manufacturing Sustainability in SMEs]

MASTER-XR aims to:

- **Boost the XR ecosystem** for teaching and training of robotics in manufacturing
- Provide **Open XR platform - safe robotic environments, programming flexible robotic applications and advanced interaction mechanisms.**
- **Deliver rich training content** on robotics.
- **Integrate third party contributions** through two Open Calls



 master-xr.eu

 twitter.com/MasterXR_EU

 linkedin.com/company/master-xr

1st OC



Any kind of institution can apply to the Open Call and receive funding



Maximum funding: 200K



Large companies receive 50% funding



Duration: 9 months

2nd OC



Only institutions providing education or content creation services for the validation of the MASTER technologies



Maximum funding: 100K



Large companies receive 50% funding

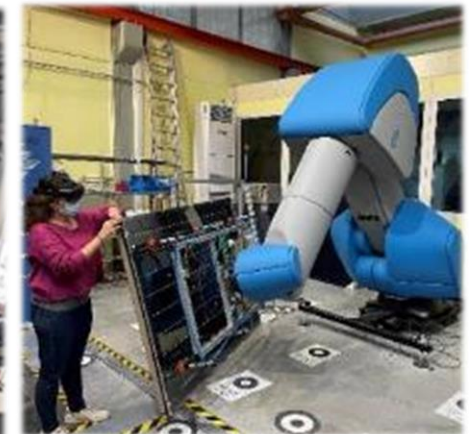


Duration: 9 months

AI-MATTERS: AI MAnufacturing Testing and experimenTation network For EuROpean industrieS

[DIGITAL-2022-CLOUD-AI-02-TEF-MANUF: Testing and Experimentation Facility for Manufacturing]

AI-MATTERS aims to **strengthen the EU manufacturing industry uptake of Artificial Intelligence (AI) technology** through **world-class testing and experimentation facilities** where the **EU innovation ecosystem** can **adapt and validate trustworthy AI solutions** that increase competitiveness and improve social and environmental impact



AI-MATTERS CONSORTIUM

AI MATTERS Network
25 beneficiaries

7 Nodes 1 Satellite



Fraunhofer IPA

PTB Physikalisch-Technische Bundesanstalt National Metrology Institute

University of Stuttgart Institute of Electrical Energy Conversion

ARENA2036

cea list **cea2 tech**

Network coordinator

tecnal:a MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

AFM CLUSTER **INVEMA** **aimen** TECHNOLOGY CENTRE

Norway

ALEXANDRA INSTITUTE **ODENSE TOBOTICS** **FORCE TECHNOLOGY**

Brainport Industries **TNO** innovation for life **TU/e** Eindhoven University of Technology

CZECH INSTITUTE OF INFORMATICS ROBOTICS AND CYBERNETICS CTU IN PRAGUE **VSB TECHNICAL UNIVERSITY OF OSTRAVA**

CEITEC **BRNO UNIVERSITY OF TECHNOLOGY**

MADE Competence Center 14.0 **ENGINEERING** THE DIGITAL TRANSFORMATION COMPANY **F3K** FONDAZIONE BRUNO KESSLER FUTURE BUILT ON KNOWLEDGE

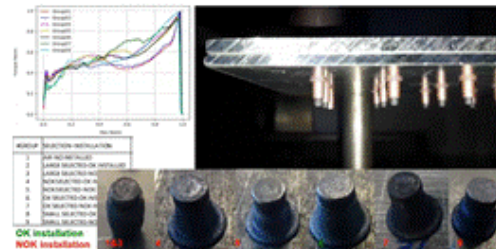
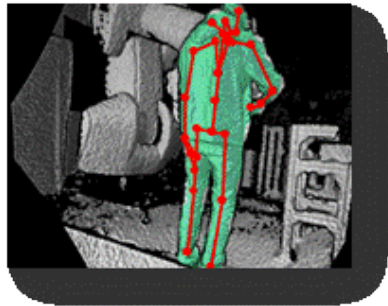
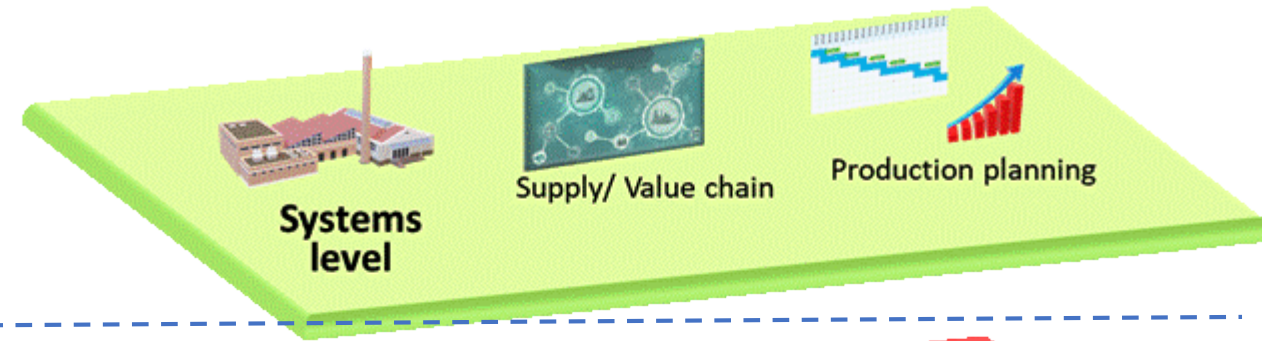
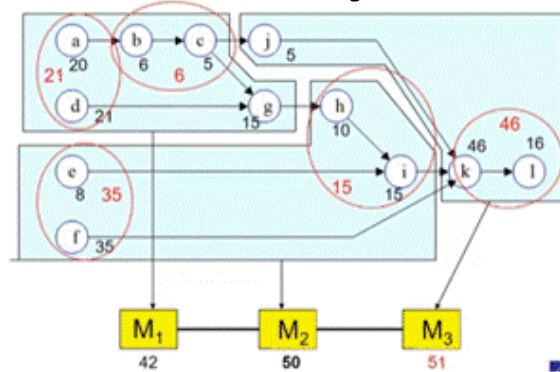
LMS Laboratory for Manufacturing Systems & Automation **Teaching Factory**

AIM-NET Artificial Intelligence in Manufacturing Networks

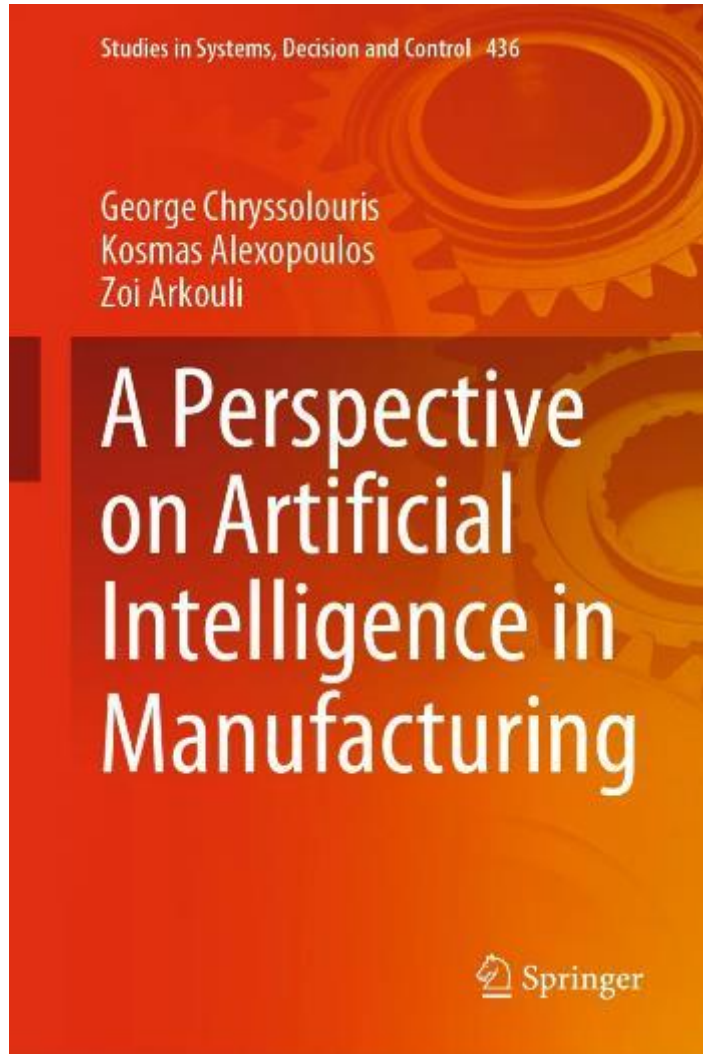


AIM-NET Artificial Intelligence in Manufacturing Networks

AI across the factory



A Perspective on Artificial Intelligence in Manufacturing - 2023



[A Perspective on Artificial Intelligence in Manufacturing | SpringerLink](#)

Bibliographic Information

Book Title	Authors
A Perspective on Artificial Intelligence in Manufacturing	George Chryssolouris, Kosmas Alexopoulos, Zoi Arkouli
DOI	Publisher
https://doi.org/10.1007/978-3-031-21828-6	Springer Cham
Copyright Information	Hardcover ISBN
The Editor(s) (if applicable) and The Author(s), under exclusive license to Springer Nature Switzerland AG 2023	978-3-031-21827-9 Published: 02 January 2023
eBook ISBN	Series ISSN
978-3-031-21828-6 Published: 01 January 2023	2198-4182
Edition Number	Number of Pages
1	IX, 135

Thank
you



LMS

*Laboratory for
Manufacturing Systems
& Automation*

**Laboratory for Manufacturing Systems &
Automation (LMS)**

Dept. of Mechanical Engineering & Aeronautics

University of Patras, Greece

www.lms.mech.upatras.gr