WS#43: Data Spaces for the Development of AI & Robotic Applications

"Data Spaces for the Mobility, Healthcare and Industrial Domain – The PLIADES Project Case"

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ERF 2025, Thursday 27th March

PLIADES

"AI-Enabled Data Lifecycles Optimization & Data Spaces Integration for Increased Efficiency & Interoperability"

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No. 101135988

PLIADES – Mission

Develop an Advanced AI-enabled Data Integration Framework

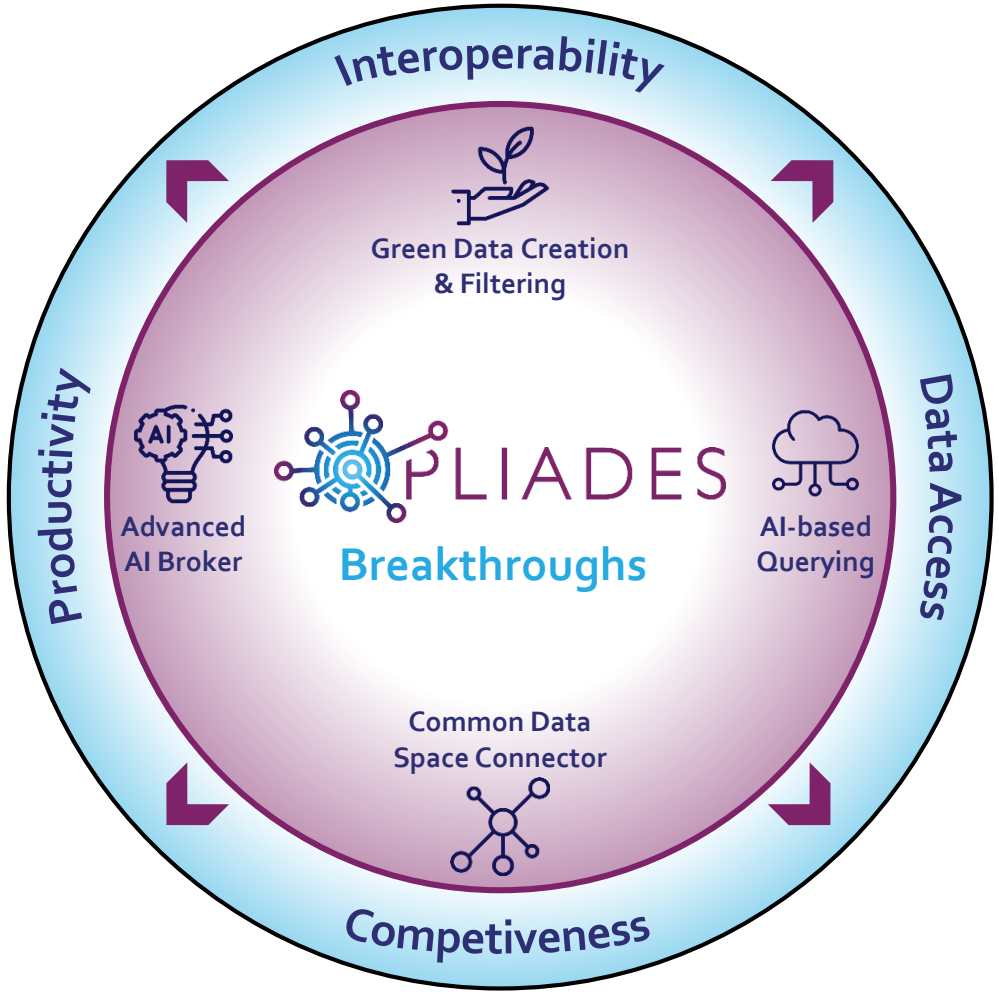
Enhancing Lifecycle Optimisation & Data Spaces Integration to:

Interconnect Diverse Data Spaces
→ Enhancing Efficiency & Interoperability

Expand Data Lifecycles
→ Supporting Green Data Creation, Ownership, Reuse & Disposal

Enable AI-driven Brokers
→ Facilitating Data Discovery & Integration

Provide Data & Services
→ Improving *CCAM[1] & ADAS/AD[2] & HRI[3]*



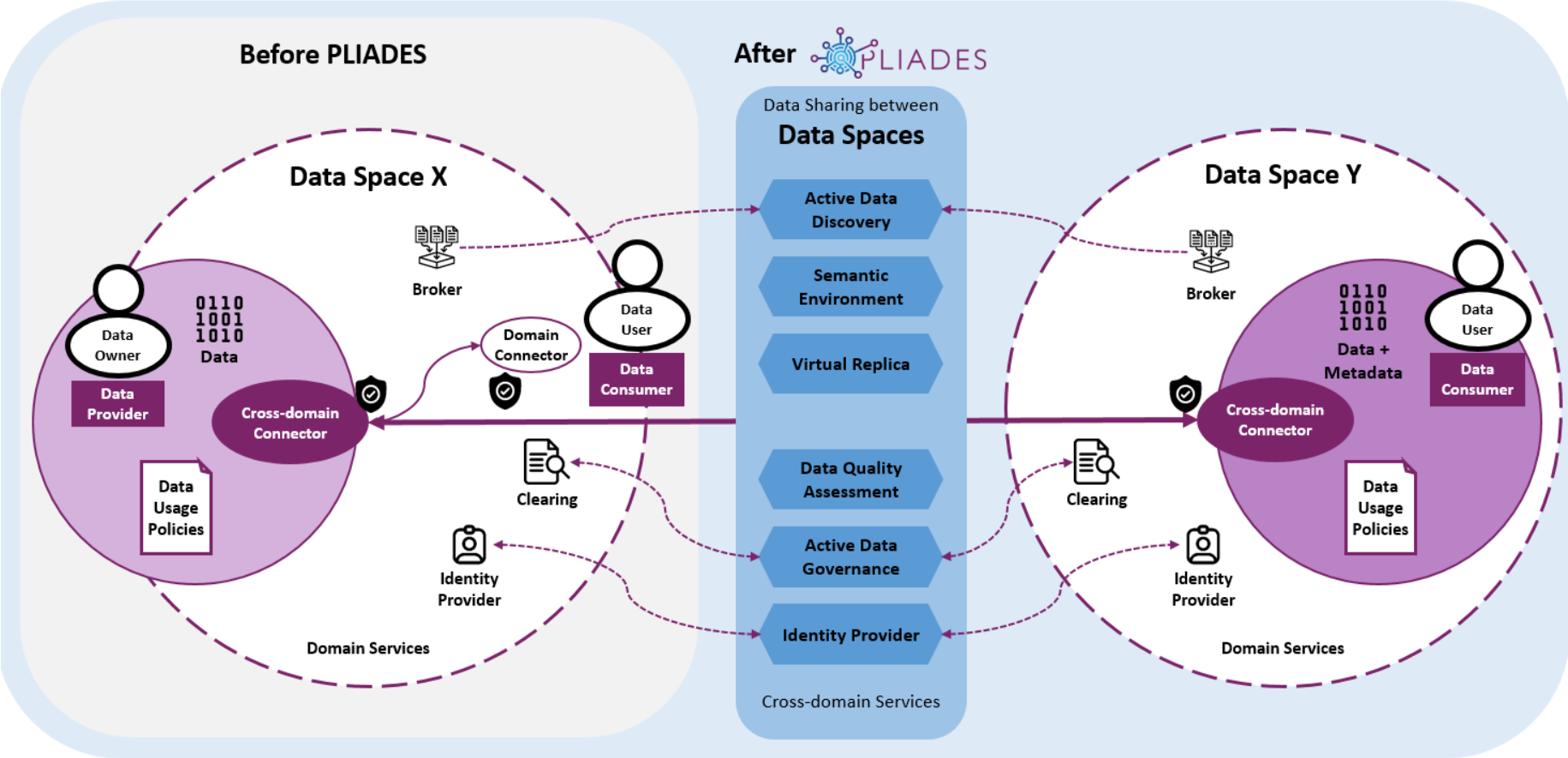
1. Cooperative, Connected & Automated Mobility, 2. Advanced Driver Assistance & Autonomous Driving, 3. Human-Robot Interaction

PLIADES – Approach

PLIADES establishes a secure & seamless **Data Exchange Ecosystem** by integrating **Diverse Data Spaces**

Key components

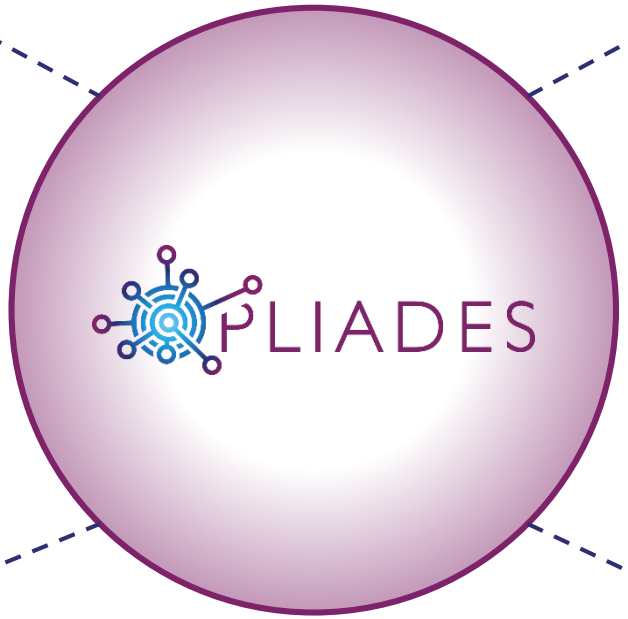
- Data Discovery & Governance
- Secure Data Exchange
- Cross-Domain Integration



PLIADES – Objectives

Novel **AI-enabled Tools** for **Sustainable** & **Human-factors-aware Data Creation** in **Diverse Dataspaces**

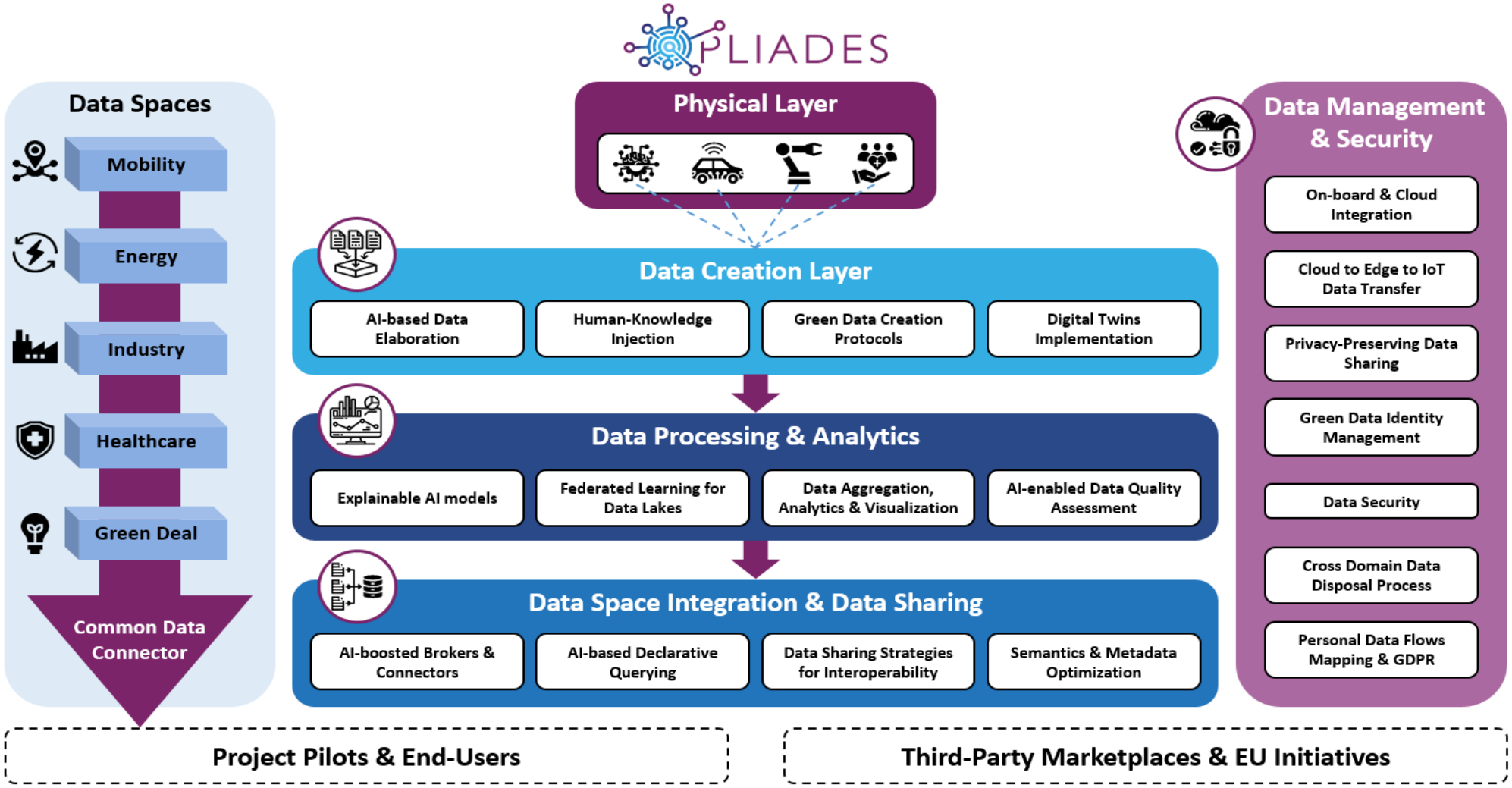
Advanced **Data Spaces Connectors** for Extended **Interoperability** across Different Data Spaces



Novel **AI-boosted Data Brokers** Matching **Data Consumers** with **Data Providers** across **Different Sectors**

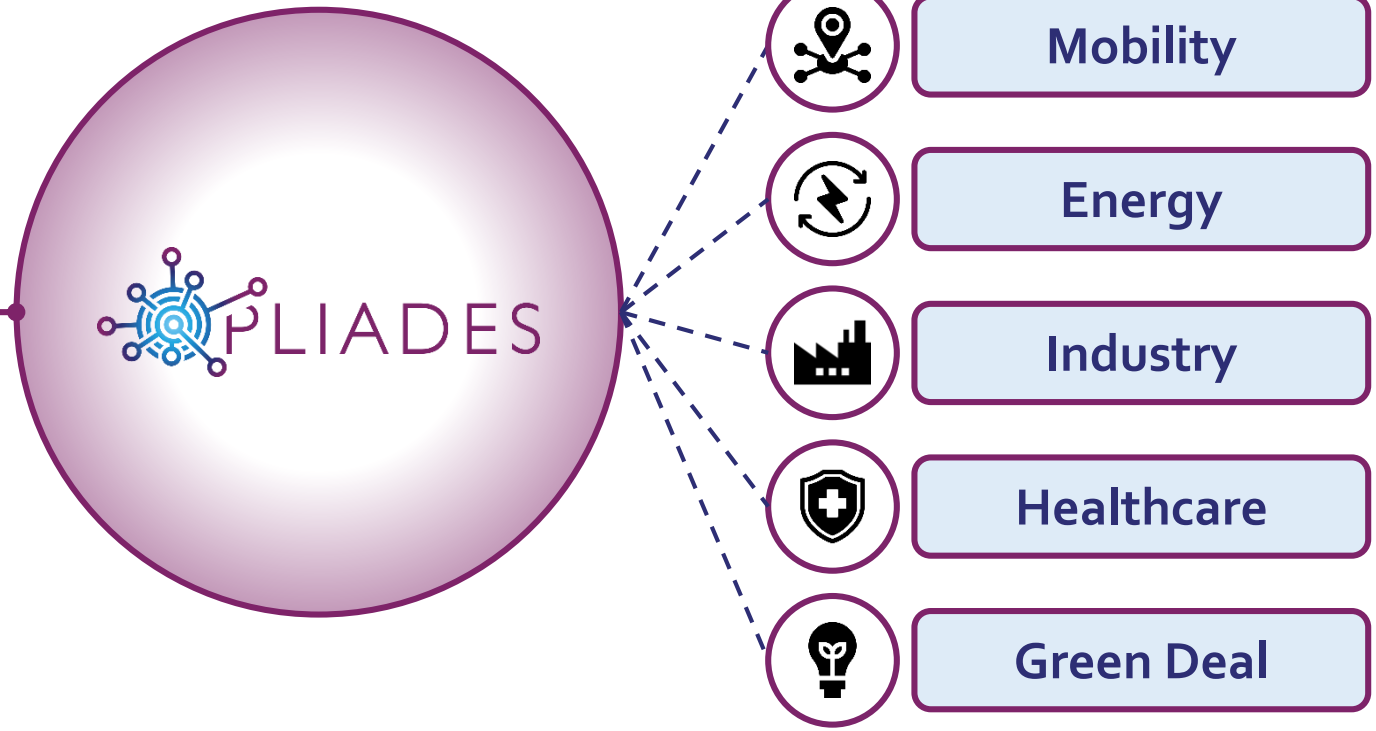
Novel **Data Processing & Analytics** Services, Ensuring **Data Privacy**, **Trustworthiness**, **Security**, **Re-use**, & **Disposal**

PLIADES – Concept Overview



PLIADES – Use Cases

PLIADES Outcomes will be Evaluated in **Six Use Cases**, **Focusing** on **Key AI & Robotics Technologies**, oriented around **Five Diverse Data Spaces**



Use Case 1 – Industrial Data Space

UC1. Integrating Data Life Cycles of Sustainability, Operations & Process Industry Manufacturing Operations

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Industry

Impact for AI & Robotics in Industrial Manufacturing:

- AI-powered Smart Manufacturing with Zero-Waste Production
- Predictive Maintenance & AI-based Process Optimization
- Human-in-the-Loop AI for Reliable & Efficient Industrial Automation
- Secure & Scalable AI-Driven Industrial Data Sharing

Use Case 2 – Healthcare Data Space

UC2. Integrating Data Life Cycles of Service Robot to Improve HRI with End Users

- HRI in Rehabilitation
- HRI in Patient Monitoring

Current Robots from CERTH Performing Human Action Recognition & Receptionist Tasks

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Healthcare

Impact for AI & Robotics in Healthcare:

- Human-Centric AI for Personalized Robotic Assistance
- Secure, Scalable Data Spaces for AI-Driven HRI Training
- Improved Robot Autonomy & Adaptability in Healthcare
- Privacy-Preserving AI Development for Ethical & Reliable Robotics

Use Case 3 – Healthcare Data Space

UC3. Integrating Data Life Cycles of Personalized Medicine Services to Improve Diagnostic & Prognostic Clinical Prediction Models

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Healthcare

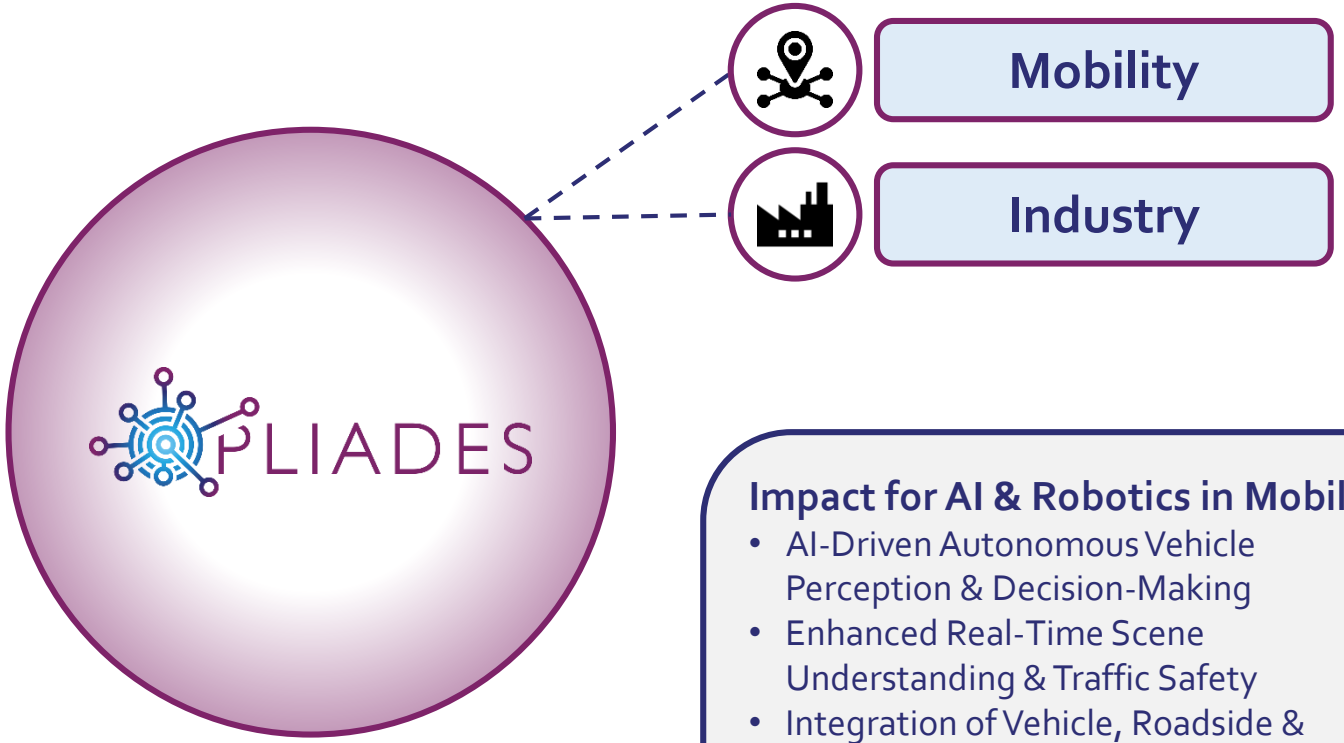
Impact for AI & Robotics in Healthcare:

- AI-powered Personalized Medicine & Precision Healthcare
- Predictive AI Models for Early Disease Detection & Risk Assessment
- Advanced Machine Learning for Personalized Treatment Recommendations

Use Case 4 – Mobility & Industrial Data Spaces

UC4. Integrating Data Life Cycles of Smart Vehicles for CCAM Operations & ADAS/AD Functions

- AI-based ADAS Development
- AI-based Traffic Management



Impact for AI & Robotics in Mobility:

- AI-Driven Autonomous Vehicle Perception & Decision-Making
- Enhanced Real-Time Scene Understanding & Traffic Safety
- Integration of Vehicle, Roadside & Floating Vehicle Data for AI Training
- Human-AI Collaboration for Data Labeling & Autonomous Driving Optimization

Use Case 5 – Energy, Green Deal & Industrial Data Spaces

UC5. Integrating Data Life Cycles of WEEE1/Batteries Management & Car Parts Manufacturing Operations

1 Waste Electrical &Electronic Equipment

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- Energy
- Green Deal
- Industry

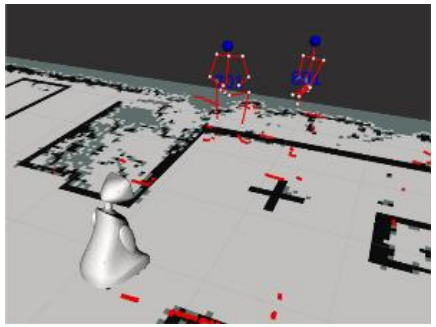
Impact for AI & Robotics in Sustainable Manufacturing & EV Lifecycle Management:

- AI-Driven Predictive Maintenance for EV Batteries & Powertrains
- Smart Data-Driven Decision Making for Sustainable Manufacturing & Recycling
- Trustworthy AI & Explainable ML for Green Deal-Compliant Industrial Processes

Use Case 6 – Healthcare & Industrial Data Spaces

UC6. Integrating Professional Service Robot Data Life Cycles to Improve HRI with Robot Operators

- HRI in telepresence robot operation
- HRI in rehabilitation robot operation
- HRI in manufacturing inspection robot operation



Robots from CERTH performing Human Action Recognition & Inspection Tasks

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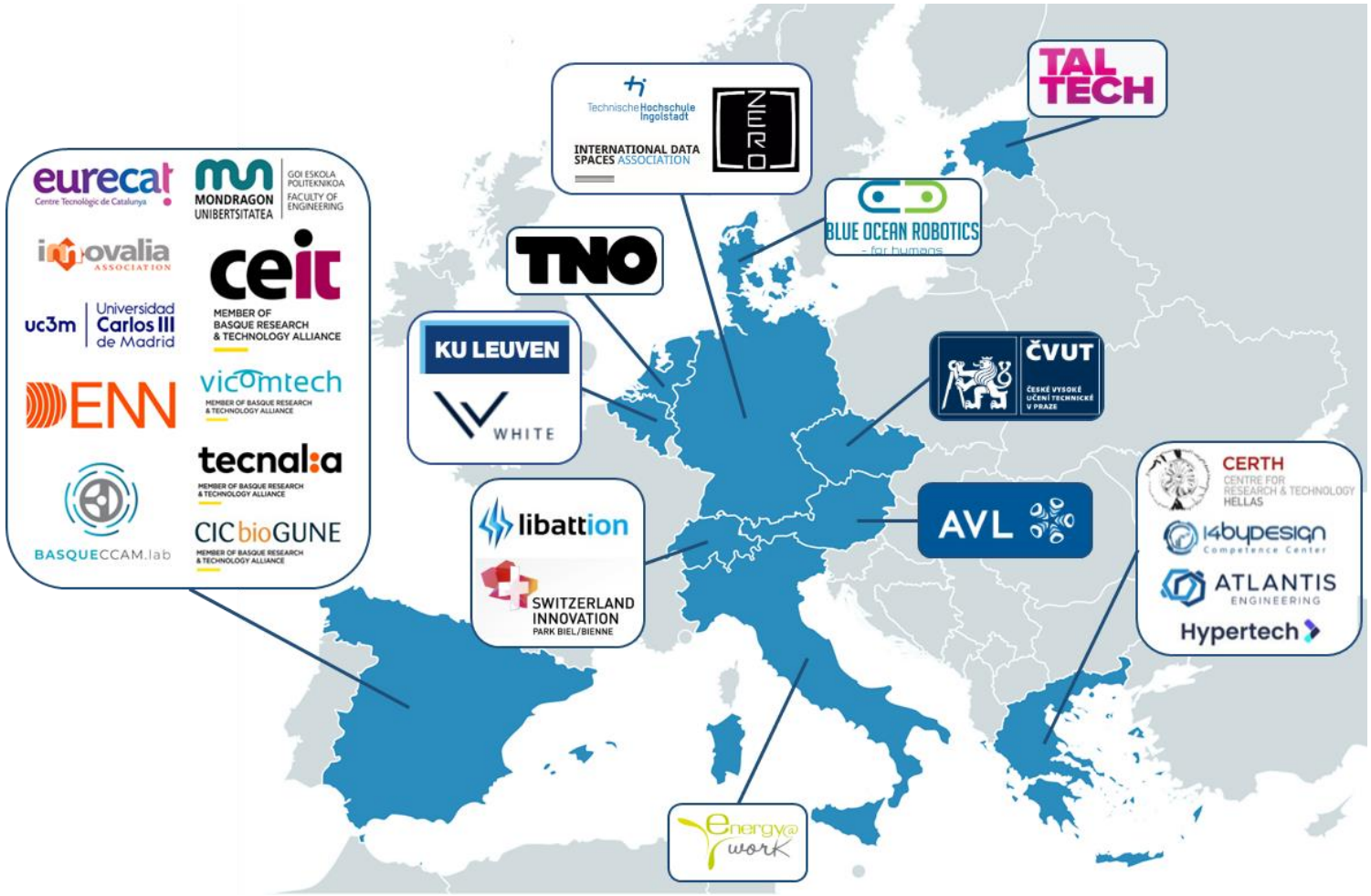
Healthcare

Impact for AI & Robotics in Healthcare:

- AI-powered HRI Enhancement through Multimodal Data Fusion (Speech, Gestures, and Commands)
- Adaptive Robotic Systems for Healthcare Environments with Personalized Interaction.
- Secure and Scalable AI-driven Data Spaces for Continuous Robot Learning and Human-robot Collaboration.

Consortium



PLIADES Consortium

- 28 Partners
- 10 EU Member States & Switzerland

Consortium Breakdown

- 13 RTOs
- 10 SMEs
- 5 NPOs

Thank you for your attention!

Any Questions?

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