



TRAINING SERVICES PORTFOLIO

Robotized NDT testing

This service integrates Non-Destructive Testing (NDT) tools with robotic systems, enabling autonomous and precise inspection of aircraft components. By leveraging robotic navigation, inspections can be performed in hazardous or hard-to-reach areas, improving both efficiency and accuracy while minimizing human exposure to risks.

Key capabilities include:

- Automated NDT inspection, allowing continuous, high-precision evaluation of structural integrity.
- Access to confined and hazardous areas, where human technicians would face significant challenges.
- Faster and more reliable defect detection, reducing maintenance downtime and enhancing aircraft safety.
- Digital Twin integration, storing detected crack locations and structural data for real-time monitoring and predictive maintenance.

This approach enhances inspection quality, operational safety, and maintenance efficiency, making it ideal for aerospace, automotive, and other high-precision industries.



Type
Application



Contact organization
LMS



Format
Hybrid



**Qualification title/
professional profile**

Industrial Companies
Technology Providers
System Integrators
Students/Engineers



**Technology used
for training**

Presentation
Collaborative robot with NDT capabilities
Human-robot interaction interfaces



**Co-funded by
the European Union**

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TRAINING SERVICES PORTFOLIO

Electrical Assembly: Challenges and state of the art

This webinar will present the state of the art in electrical assembly with robots. Available technologies, including grippers, sensors, vision systems, planning methods, teaching methods, and path planning methods will be reviewed. Companies which offer these solutions will also be presented. Common cabling and assembly problems which are solved will be presented, then research work which addresses the next open problems will be presented.

After the Webinar, Participants will be able to assess electrical assembly tasks in their company and determine which parts may be automated, and which companies / products / technologies could assist them in automating



Type
Application



Contact organization
Fraunhofer IPK



**Qualification title/
professional profile**
Engineers
Software Developers
Automation Engineers



**Technology used
for training**
Presentation



**Co-funded by
the European Union**

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TRAINING SERVICES PORTFOLIO

High Payload Collaborative Robots (hand-guiding applications)

This course provides an in-depth introduction to hand-guiding techniques for industrial robots and the fundamental principles of collaborative robotics. Participants will explore the capabilities and applications of collaborative robots (cobots), with a focus on safety and operational guidelines.

The course includes an overview of the ISO/TS15066:2016 standard, covering essential safety requirements and risk assessments for human-robot collaboration. Students will gain hands-on experience with hand-guiding methods and learn best practices for ensuring safe and efficient robot operation in collaborative environments.



Type
Application



Contact organization
AIMEN



**Qualification title/
professional profile**
Engineers
Technicians



**Technology used
for training**
Presentation
High-payload collaborative robot
Hand-guiding tool



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the European Union**

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TRAINING SERVICES PORTFOLIO

Robotized polishing for industrial parts with collaborative robots for non-experts

This webinar introduces the fundamentals of automated polishing using collaborative robots (cobots), making advanced robotic surface finishing accessible to non-experts. By leveraging intuitive programming and adaptive control, cobots can perform high-precision polishing tasks with minimal setup, improving consistency and efficiency in industrial manufacturing.

Participants will gain insights into:

- The basics of robotized automated polishing, including key principles and system components.
- How to integrate a robotized polishing solution in a mobile robot for more flexibility and surface polishing.
- How collaborative robots simplify automation, enabling safe and user-friendly integration.
- Real-world applications and benefits, such as enhanced surface quality, reduced manual labor, and increased productivity.



Type
Application



Contact organization
TECNALIA



**Qualification title/
professional profile**
Technicians
Engineers
Software developers



**Technology used
for training**
Presentation
Mobile robot with surface polishing grippers



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the European Union**

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TRAINING SERVICES PORTFOLIO

Robotic inspection in confined spaces

The Aircraft Fuel Tank Maintenance Pilot Line provides a dedicated environment for developing and testing inspection and maintenance tasks within aircraft fuel tanks—particularly those that are difficult to automate, such as working in confined spaces and performing damage detection and repairs. Its main value lies in two areas:

1. The basics of robotized automated polishing, including key principles and system components.
2. How to integrate a robotized polishing solution in a mobile robot for more flexibility and surface polishing.



Type

Application



Contact organization

LMS



Format

Hybrid



Qualification title/ professional profile

Industrial Companies
Technology Providers
System Integrators
Students/Engineers



Technology used for training

Presentation
Collaborative robot
Perception systems/cameras
Teleoperation interfaces



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the European Union

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PORTFOLIO TRAINING SERVICES

Robot teleoperation and indirect human-robot interaction

This service refers to remotely control and monitor robotic systems, facilitating precise task execution in hazardous or challenging environments. By leveraging advanced teleoperation technologies, all robot functionalities are managed from a safe distance, significantly reducing human exposure to risks.

This approach enhances safety and efficiency in maintenance operations and can be applied throughout critical procedures such as:

- Fine-tuning the robot's position for optimal maneuverability.
- Navigating into confined spaces, such as fuel tanks, without direct human intervention.
- Executing Foreign Object (FOD) detection and Non-Destructive Testing (NDT) to ensure structural integrity and compliance with safety standards.

This service supports industries requiring high-precision robotic control in environments where human presence is limited or unsafe, optimizing both operational efficiency and worker safety.



Type
Enabling technology



Contact organization
LMS



Format
Online



**Qualification title/
professional profile**
Engineers
Integrators



**Technology used
for training**
Presentations
AR equipment for human-robot
interaction



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the European Union**

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PORTFOLIO TRAINING SERVICES

Force control in collaborative robots for steady pressure application

This webinar explores the principles of force control in collaborative robots (cobots) and how precise force regulation enhances automation in manufacturing and assembly tasks.

Key takeaways include:

- Fundamentals of Force Control: Concepts like compliance, feedback loops, and adaptive response.
- Consistent Pressure Application: How cobots maintain steady force for tasks like polishing, deburring, and material handling.
- Real-World Use Cases: Insights into improved product quality, safety, and process efficiency.

Ideal for professionals working with force-sensitive robotic applications, this session offers practical guidance on optimizing cobot performance for high-precision tasks.



Type

Enabling technology



Contact organization

TECNALIA/Fraunhofer IPK/LMS



Format

Online



Qualification title/ professional profile

Technicians
Engineers
Software Developers



Technology used for training

Presentation
Collaborative robot
Force sensor



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the European Union

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TRAINING SERVICES PORTFOLIO

Basic concepts of robot safety in collaborative spaces

This course offers a comprehensive introduction to safety in collaborative robotics, with a focus on industrial applications.

Key highlights include:

- Overview of Traditional Safety Devices: Understanding classical methods used to protect workers and machines
- Introduction to Collaborative Robotics: Benefits and use cases in modern manufacturing.
- ISO/TS 15066:2016 Standard: In-depth coverage of safety requirements, including risk assessment, force/pressure limits, and safe human-robot interaction.
- Key Safety Mechanisms:
 - Speed and Separation Monitoring (SSM): Adaptive robot behavior based on human proximity.
 - Hand-Guiding: Intuitive programming for flexible and safe robot operation.

By the end of the course, participants will be equipped to safely implement and manage collaborative robots in line with industry standards and best practices.



Type

Enabling technology



Contact organization

AIMEN



Format

Online



Qualification title/ professional profile

Engineers
Technicians



Technology used for training

Presentation
High-payload robot
People detection system
Hand-guiding tool



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TRAINING SERVICES PORTFOLIO

Basic principles of environment reconstruction with vision sensors

This webinar introduces the fundamental concepts of environment reconstruction using vision sensors, focusing on how robots perceive and interpret their surroundings for precise navigation, object detection, and manipulation. By leveraging advanced imaging technologies, robots can create accurate 3D representations of their environment, enhancing automation and decision-making in various applications.

Participants will gain insights into:

- Core principles of vision-based environment reconstruction, including depth sensing, point clouds, and 3D mapping.
- How vision sensors enhance robotic perception, enabling object recognition, obstacle detection, and adaptive path planning.
- Real-world applications and benefits, such as quality inspection, autonomous navigation, and bin-picking automation.



Type
Enabling technology



Contact organization
TECNALIA



Format
Online



**Qualification title/
professional profile**
Technicians
Engineers
Software Developers



**Technology used
for training**
Presentation
Collaborative robot
3D reconstruction sensor



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the European Union**

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PORTFOLIO TRAINING SERVICES

AI perception systems in collaborative robotic cells

This course provides an in-depth understanding of AI-powered detection systems in robotic cells, focusing on how artificial intelligence enhances safety, efficiency, and human-robot interaction in industrial automation. Participants will explore key AI technologies used to detect people and objects, recognize gestures, monitor safe distances, and control robots through intelligent systems.

The course includes hands-on demonstrations to illustrate these concepts in real-world applications.

- People and Object Detection
- Gesture Recognition
- Speed & Separation Monitoring (SSM)
- Robot Control
- Demonstration



Type

Enabling technology



Contact organization

LMS/AIMEN



Format

Online



Qualification title/ professional profile

Technicians
Engineers



Technology used for training

Presentation
Edge-tracking sensors
Hand-recognition sensors

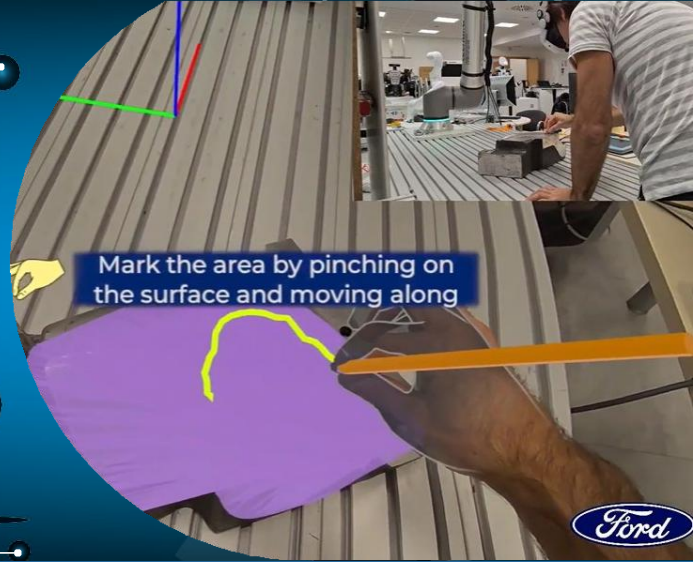


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CONVERGING



TRAINING SERVICES PORTFOLIO

Teaching robots from demonstration

This webinar will present how robots can be instructed through demonstrations to address complex vision-based tasks. State of the art methods for single-task and multi-task teaching by demonstration will be presented, along with the types of teaching interfaces, speed and reliability, and data efficiency.

After the Webinar, Participants will be able to identify tasks that can be taught by demonstration, estimate the complexity of this teaching process, and know which products can be available to help them realize this solution.



Type

Enabling technology



Contact organization

Fraunhofer IPK



Format

Hybrid



Qualification title/ professional profile

Engineers
Software Developers
Automation Engineers



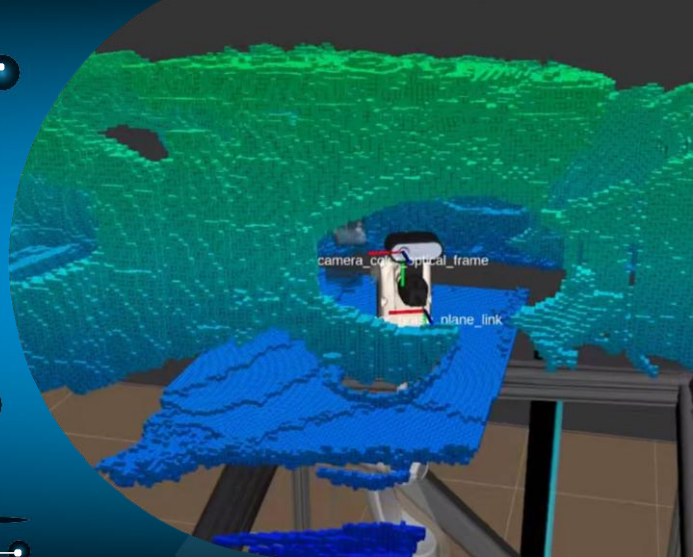
Technology used for training

Presentation
Collaborative robot
Perception system



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the European Union

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TRAINING SERVICES PORTFOLIO

Digital twin in real-time process execution

This service leverages real-time digital twin technology to create a continuously updated virtual representation of a system, reflecting the current status of all assets. By integrating real-time data, the digital twin enables predictive insights, process optimization, and enhanced decision-making.

Through this technology:

- Potential issues can be identified and prevented by simulating scenarios based on live operational data.
- Maintenance procedures are optimized, ensuring proactive rather than reactive interventions.
- Resource efficiency is improved, minimizing waste and downtime while maximizing system performance.

This service is ideal for industries requiring high-precision monitoring and operational efficiency, such as manufacturing, logistics, and industrial automation. It ensures seamless integration between physical and digital operations, paving the way for smarter, data-driven workflows.



Type

Enabling technology



Contact organization

LMS



Format

Online



Qualification title/ professional profile

Technicians
Engineers
Integrators



Technology used for training

Presentation



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the European Union

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Okay, I'll update the tools for the robot.

Resource	Tool
Human Worker	Manual Handling
COMAU Robot	Vacuum Gripper

Now that we have identified the subparts, assembly steps, resources, and tools, we can move on to defining the final positions and rotations of all parts in their final assembled positions. Could you please provide the precise coordinates (X, Y, Z) and rotations (Roll, Pitch, Yaw) for each part (TC002, EY003, EY004, PC005) relative to the BP001 (Base Part) in its final position? This information is crucial for accurate task planning and robot programming. If providing exact coordinates and rotations is not feasible, please provide as much detail as possible regarding the relative positions and orientations of the parts. For example, you could describe the offset distances and angles between the parts.

For the eye1 the coordinates are x: 0.1 y: 0 z: 0, for the eye 2 x:0.2 y:0 z:0 and with direction all vertical



Thinking...

Summary

Export Plan

reply...

TRAINING SERVICES PORTFOLIO

Task planning and robot programming

This service applies AI-driven task planning and robot programming to deliver adaptive, intelligent, and efficient robotic control for industrial operations.

Key features include:

- Automated Task Planning: Robots autonomously generate and optimise task sequences for maximum efficiency.
- Adaptive Control: Real-time adjustments based on environmental and operational changes.
- AI-Assisted Decision-Making: Data-driven insights support complex task execution.
- Perception-Based Damage Detection: Robots detect and analyse damage type, location, and severity.
- Experience-Based Learning: Continuous improvement through analysis of past operations.

Ideal for sectors like manufacturing, logistics, and industrial automation, this service reduces human workload, enhances precision, and supports predictive maintenance.



Type

Enabling technology



Contact organization

LMS



Format

Online



Qualification title/ professional profile

Engineers

Integrators



Technology used for training

Presentation



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TRAINING SERVICES PORTFOLIO

Extended reality operator training

This service leverages Extended Reality (XR) technologies—including Virtual Reality (VR), Augmented Reality (AR), and Mixed Reality (MR)—to provide immersive, hands-on training for operators in complex and high-risk environments. By simulating real-world scenarios in a controlled virtual space, trainees can develop critical skills and decision-making abilities without the risks associated with live operations.

This approach enhances learning retention and operational readiness across various industries by enabling:

- Realistic, interactive simulations that replicate real-world tasks and challenges.
- Risk-free training environments, allowing operators to practice emergency procedures and high-stakes operations safely.
- Data-driven performance analysis, offering real-time feedback to improve efficiency and precision.



Type

Enabling technology



Contact organization

LMS/TECNALIA



Format

Physical



Qualification title/ professional profile

Technicians
Engineers
Software Developers



Technology used for training

Presentation
VR goggles



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TRAINING SERVICES PORTFOLIO

Basic principles of automatic trajectory generation

This webinar introduces the fundamental concepts of automatic trajectory generation, focusing on how robots plan and execute smooth, efficient movements for various industrial applications. By leveraging advanced algorithms and motion planning techniques, robots can optimize their paths for precision, speed, and safety.

Participants will gain insights into:

- Core principles of trajectory generation, including interpolation methods, path planning, and motion constraints.
- How robots autonomously generate and optimize movements, ensuring smooth and collision-free operation.
- Real-world applications and benefits, such as automated assembly, welding, pick-and-place, and material handling.



Type
Enabling technology



Contact organization
TECNALIA,
Fraunhofer IPK



Format
Online



**Qualification title/
professional profile**
Technicians
Engineers
Software Developers



**Technology used
for training**



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the European Union**

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TRAINING SERVICES PORTFOLIO

Basic Principles of Asset Administration Shell Modelling

This service offers a complete solution for building Digital Twins using the Asset Administration Shell (AAS) framework, designed specifically for Industry 4.0 applications.

Key components of the service include:

- Implementation of AAS: Creating standardized digital representations of physical assets to ensure interoperability and seamless data exchange across industrial systems.
- AAS Structure & Submodels: Defining the structure and submodels of AAS to capture detailed asset information—such as features, properties, and functions—following the standards of the Industrial Digital Twin Association (IDTA).
- Use of IDTA Resources: Aligning with IDTA's official specifications and templates to ensure compatibility and industry-standard compliance.
- Practical Tools & Examples: Employing tools like Package Explorer to develop and test AAS models, along with hands-on exercises and examples to support implementation and understanding.
- Standards & Compliance: Providing guidance on AAS-related standards to help ensure all Digital Twin applications are aligned with best practices and regulatory requirements.



Type

Enabling technology



Contact organization

AIMEN



Format

Online



Qualification title/ professional profile

Technicians
Engineers
Software Developers



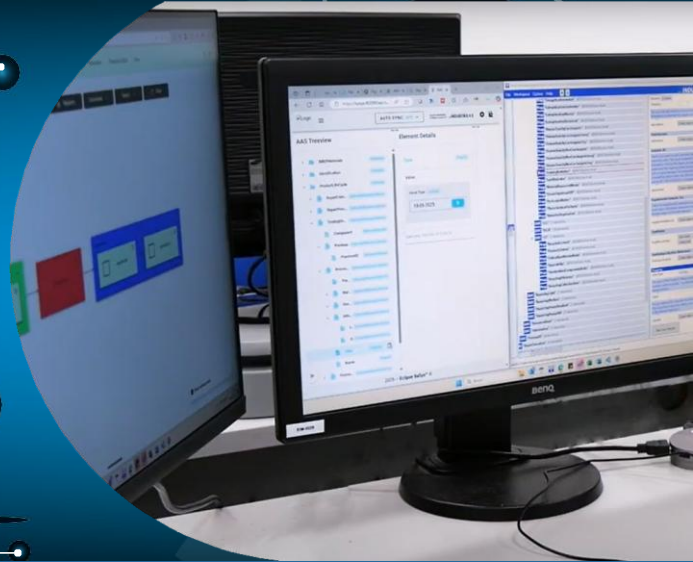
Technology used for training

Presentation
PC with Windows for the use of
Package Explorer



Co-funded by
the European Union

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TRAINING SERVICES PORTFOLIO

Use of AAS for assets digitalization

This consulting service supports organisations in evaluating the digitalisation of assets using the Asset Administration Shell (AAS) framework, with a strong focus on assessing specific use cases or scenarios to determine the feasibility, value, and alignment with business goals.

Key aspects of the service include:

- Open-Source Implementation: Cost-effective digital twin development using standard, flexible tools.
- AAS-Based Modelling: Creation of digital representations to enable seamless data integration and interoperability.
- PoC Development: Demonstrates feasibility and value of AAS for your assets.
- Tailored Assessment: Customised evaluations that address your organisation's unique challenges and strategic priorities.
- Feasibility Analysis: Assessment of the practicality and potential ROI of implementing AAS within your operations.
- Customised & Scalable: Tailored to your needs, with potential to scale across more assets.
- Prerequisites: Asset monitoring must be in place; remote IT access may be required.



Type
Enabling technology



Contact organization
AIMEN



Format
Online



**Qualification title/
professional profile**
Engineers



**Technology used
for training**
Presentation
AIMEN



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