MAGICIAN

AUTONOMOUS DEFECTS DETECTION AND REPAIR IN MANUFACTURING

MAGICIAN-2nd Open Call WEBINAR

Daniele Fontanelli; Francesca Pasqualino, Lorena Sanz, Iason Oikonomidis; Luca Muratore; Nikolaos Tsagarakis

UNITN; ZAB; FORTH; IIT

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I. Introduction to the MAGICIAN Project

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Robotic solutions for high quality product aesthetics and a safer working environment in manufacturing

Daniele Fontanelli

UNITN | 28.01.2026

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Challenge

Consumers increasingly expect manufacturing products to be free of defects which sets high standards for the production process.

However, associated working processes are physically and cognitively demanding for workers and executed in a potentially hazardous environment.

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Objectives

MAGICIAN will develop robotic solutions to classify and rework defects from semi-finished products autonomously before the finalization of product aesthetics.

These solutions are designed to be *modular*, applicable to *various manufacturing fields*, *reducing physical strain* and *enhancing safety* for human operators.

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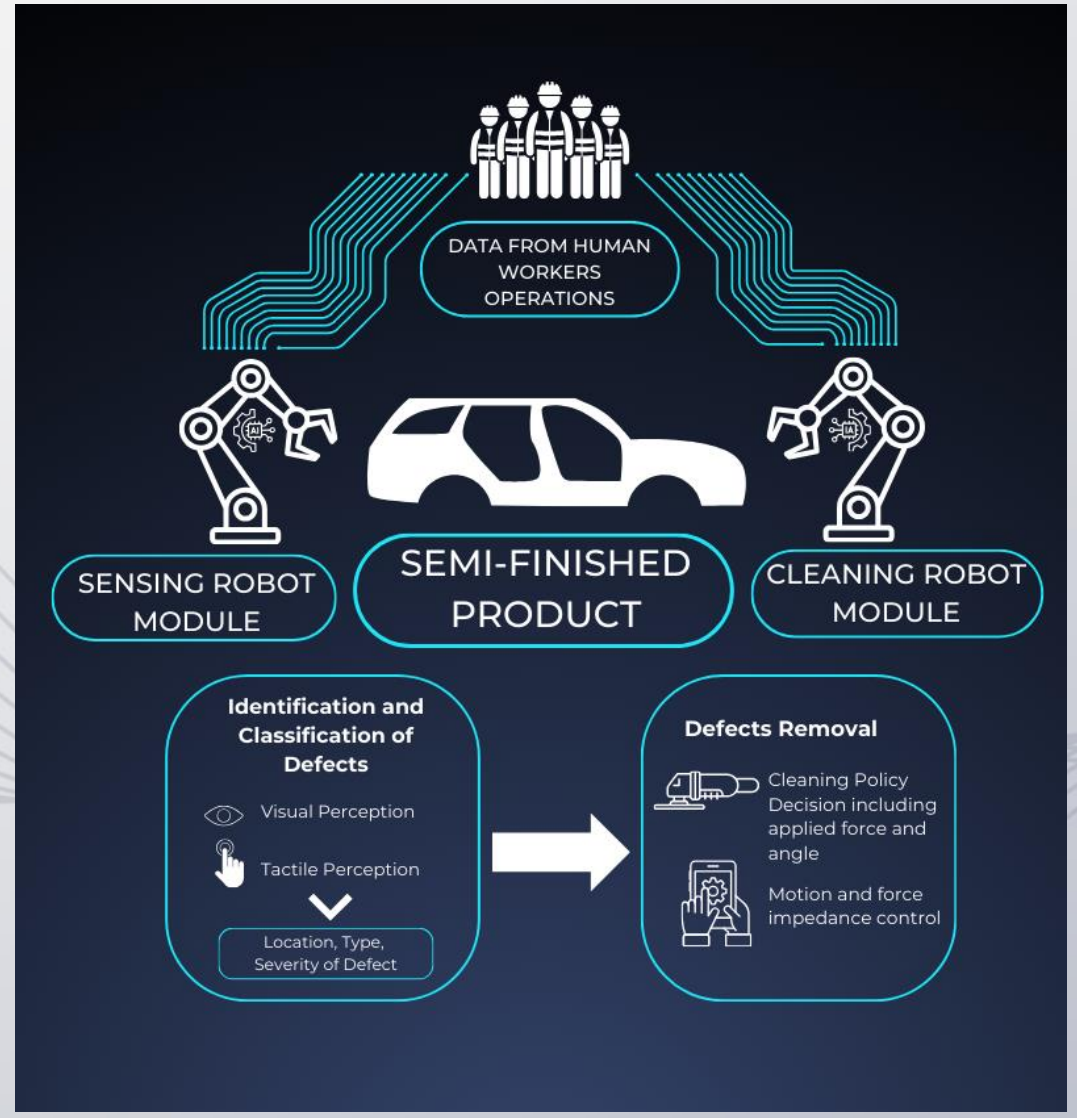
Robotic solutions



Two modular robotic solutions:

- **a sensing robot for defect analysis (SR)**
- **a cleaning robot for reworking defects (CR)**

Both robots will use AI modules to perform associated operations.

Data needed for these AI modules will be gathered by learning from workers operating on semi-finished products.

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Approach

Human-centred approach

MAGICIAN applies a **human-centred design strategy** to shape the progress of automation and human-robot collaboration in manufacturing towards an emphasis on trust, empathy, and ethics.

Use Cases

MAGICIAN solutions will be tested in an **automotive manufacturing use case**. Both robots will be coupled with human operators during the testing to ensure trust-based human-robot collaboration.

Additional use cases will be engaged through **two Open Calls**.

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Impact Potential

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- Innovative robotic components for mechanical working operations allowing for human-robot collaboration
- Improved productivity in manufacturing and maintenance
- Improved health and safety conditions for human workers and focus on added value operations
- Tested applicability of solutions for various manufacturing application fields
- Strengthened trust in AI and robotic technologies

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Project Details

- **MAGICIAN – iMmersive leArninG for ImperfeCtion detectIon and repAir through human-robot interactioN**
- **4-year EU project: October 23-September 27**
- **11 project partners from 7 countries coordinated by Università di Trento**
- **1 Automotive Use Case and extension of Use Cases through 2 Open Calls**

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II. Administrative & Operational details of 2nd Open call

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- Scope & Definition Open Calls
- SMEs & Startups
- Single AUC & Twin AUC Configuration
- Fundings Formualtion
- Evaluation, Notification, Sub-grant signature, start-end project

Francesca Pasqualino; Lorena Sanz

ZAB Brussels | 28.01.2026

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Scope & Definition Open Calls

MAGICIAN project will launch **2 Open Calls** for proposal (FSTP) to select up to **10 SMEs/start-ups** for implementation of ad-hoc experimentation.

1st Open Call

- **General Scope:** Integration of new functionalities within MAGICIAN
- **Open period**: February 3rd- May 2nd 2025
- Distribute up to 1 Mln. EUR of total funding to winning proposals for project implementation ≤ 12 months
- Select up to 5 projects for 12 months implementation and 200k/EUR budget

2nd Open Call

- **General Scope**: Extending the applications of the intelligences embedded in the systems (AI) towards **new 5 use cases.**
- **Open period**: **December 2025-March 2026**
- Distribute up to 1 Mln. EUR of total funding to winning proposals for project implementation ≤ 12 months
- select up to 5 projects for 12 months implementation and 200k/EUR budget

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Scope & Definition Open Calls

MAGICIAN **Open Call 2** targets several sectors suitable as **use cases** to validate MAGICIAN framework. Each proposal must apply for 1 of the sector listed below:

Only the sectors explicitly mentioned are considered eligible Use Cases under this Open Call:

- ✓ Aerospace
- ✓ Electronics
- ✓ Heavy industry & Energy
- ✓ Interior design components
- ✓ Maritime & shipbuilding
- ✓ Public transports
- ✓ Intermediate components based on glass, plastic, textile
- ✓ White goods

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Scope & Definition Open Calls

Application Use Case proposals must adapt up to two of the following **MAGICIAN capabilities** to the chosen sector:

(C1.1) Sensors for accurate defect detection and classification
(C1.2) polarized camera system
(C1.3) Increase defect removal and rework abilities
(C1.4) annotation Tools for Multi-Modal Data Public
(C1.5) Innovative approaches and architectures for improved defect detection and classification
(C2.1) Human Observation
(C2.2) Human Interface and Interaction

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III. Targeted companies & Application Configuration

Margherita Volpe; Francesca Pasqualino; Lorena Sanz

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Targeted Companies

MAGICIAN 2nd open Call targets SMEs and Start-ups, as defined by the European Commission
https://ec.europa.eu/growth/smes/business-friendly-environment/sme- definition/

Company category	Staff headcount	Turnover	Balance sheet total
Medium-sized	< 250	≤ € 50 m	≤ € 43 m
Small	< 50	≤ € 10m	≤ € 10m
Micro	< 10	≤ € 2m	≤ € 2m

→ Start-ups

How are SMEs / Startups defined for the Open Call?

The MAGICIAN Open Call follows the definition of SMEs by the European Commission.
With regard to startups, in the Guide for Applicants under the definition table, start-ups are categorized as "Micro-sized enterprises." startups should have a maximum of five years of existence and possess an official certificate confirming their establishment, issued, for example, by a chamber of commerce. This document must be uploaded together to the proposal file in the application process.

N.B. Natural entities (individuals) are NOT allowed to apply

Eligible countries:

EU Member States;

Horizon Europe Associated Countries;

list-3rd-country-participation_horizon-euratom_en.pdf

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Single AUC & Twin AUC Configuration

MAGICIAN supports SMEs and Start-ups applying according two types of configuration

SINGLE AUC

- One Third party (= the applying company)
- Cascade funding partner (ZAB)
- 200 k€ max of cascade funding for the applying company

TWIN AUC

- Two Third parties (= the applying company(ies)
- Cascade funding partner (ZAB)
- Each applying consortium receives a max of 200 k€ of cascade funding each
- One of the two legal entities will be designated as **coordinator** and will serve as the **sole** point of contact with the MAGICIAN counterparts
- One of the two legal entities **must be a representative of the Use Case** proposed

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IV. Evaluation, Selection & Implementation

Margherita Volpe; Francesca Pasqualino; Lorena Sanz

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AUC Evaluation

END 2ND OC → AUC EVALUATION PROCESS

The 2nd Open Call will close in **March 2026**

EVALUATION CRITERIA

- *Excellence*
- *Impact (Business case-oriented)*
- *Implementation quality*

EVALUATION STEPS

- External experts
- Business case evaluation
- MAGICAN evaluation committee

SCORES

- **1** to **5** for each criteria (equally ranked)
- Minimum total threshold **9** out of **15**
- In case of same score, the ranking depends on best value of **Excellence**

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AUC Selection

AUC SELECTION → NOTIFICATION TO APPLICANTS

- ***5 selected proposals*** *will be reported to MAGICIAN project officer for final granting decision*

The first call notifications are planned for **May 2026**
+In case of **Grant**, it will include outcomes and next steps infos
- In case of **NOT grant**, it will include evaluation report

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Funding Scheme

The maximum funding per Application Use Case is 200 k€, at a funding rate of **70%** of the budget for **SMEs**, reaching **up to 100%** of the budget in case of **Start-ups**

Pre-financing (50%)
Upon the successful competition KoM Meeting

Final payment (15%)
Following the conclusion of AUC and achievement of milestones & deliverables

Intermediate payment (35%)
Following submission and approval of a status report (WP + Risk Ass. + Financial report)

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AUC Implementation

SUB-GRANT SIGNATURE → PROJECT STARTING → PROJECT ENDING

All involved parts will sign **a sub-grant standard agreement** before AUC implementation starts (KoM)

AUC will start (KoM) in **June 2026**
AUC will last **12 month** until **June 2027**

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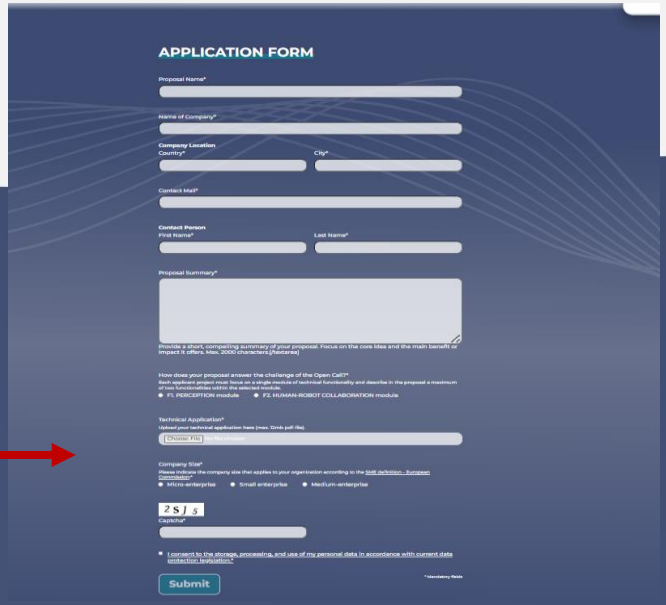
Administrative & Operational details for applying

INFOS: Open calls | MAGICIAN
EU Funding & Tenders Portal

Apply now

Get all information here

Join MAGICIAN helpdesk - every Tuesday, 17-18:00 (CET)



2nd Open Call

2nd OC Guide for Applicants

2nd OC Flyer

2nd Open Call Template

2nd OC Short Info

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III. Presentation of key capabilities Perception module

Iason Oikonomidis, Nikolaos Tsagarakis, Luca Muratore; Daniele Fontanelli

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PERCEPTION CAPABILITIES

C1.1 Sensors for accurate defect detection and classification

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Current Technical Specification

- Rapid scan of large surfaces, up to 2 sqm/min
- Detection of submillimeter defects
- Tactile sensing for low-contrast defects

Which sector is best positioned for adaptation

- White Goods
- Interior design Components
- Maritime & shipbuilding

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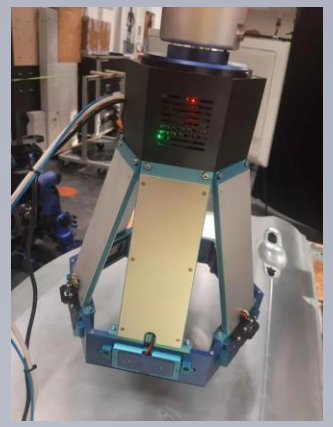
PERCEPTION CAPABILITIES

C1.2 Polarised Camera system

Technical Specifications current functionality



- Polarised lights and sensor for contrast
- Submilimeter size of pixel at focus distance
- Strong lighting system allows sharp images

Which sector is best positioned for adaptation

- Intermediate components (glass, plastic, textile)
- Electronics
- Aerospace

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PERCEPTION CAPABILITIES

C1.3 Increase defect removal and rework abilities

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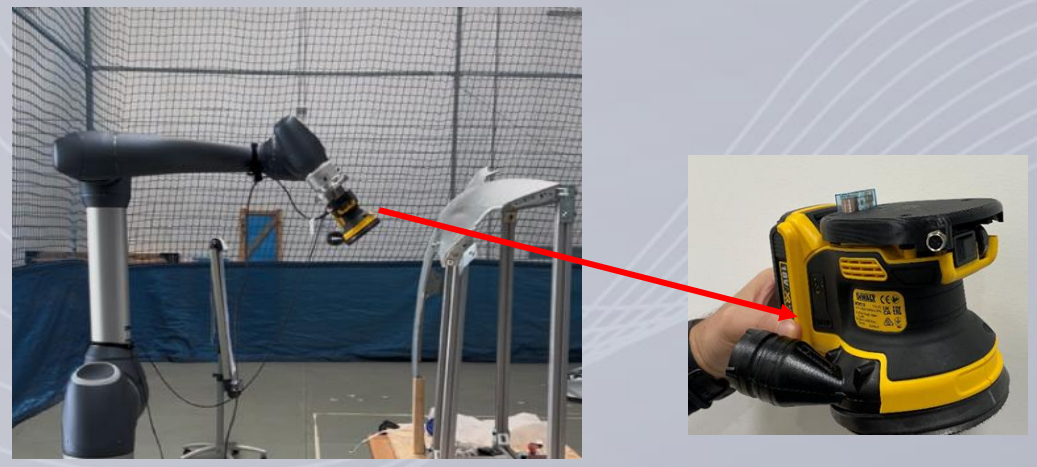
Current Technical Spefications

- A robotized grinding tool
  - A 2.6mm orbit and variable speed control
  - Integrated with 6DOF Force/torque sensor
  - ON/OFF control interfaced with robot controller
- Currently used for defects removal on car bodies
- Can be explored in other applications requiring surface preparation and finishing operations



Which sector is best positioned for adaptation

- **General Manufacturing/Fabrication industry**
  - **Deburring / edge finishing of machined metal parts** Robotic grinding to remove burrs and sharp edges after milling/drilling, improving safety and facilitating assembly consistency.
  - **Post-processing surface finishing of metal 3D printed parts**
  - 3D printed parts require surfafe finishing post processing to smothen their surface after fabrication.
- **Construction sector**
  - **Drywall joint sanding**

    Automated sanding to flatten surfaces
  - **Paint / coating removal for refurbishment**

    Remove old paint layers locally (or across large areas) to create a clean substrate for repainting.
- **Ship building / maintaiance industry**
  - **Hull surface preparation (rust removal before recoating)**
  - A force-controlled robotic grinding/sanding head can remove corrosion and old coating to achieve the required surface profile for new anti-corrosion/anti-fouling paint

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PERCEPTION CAPABILTIES

C1.4 Annotation Tools for Multi-Modal Data

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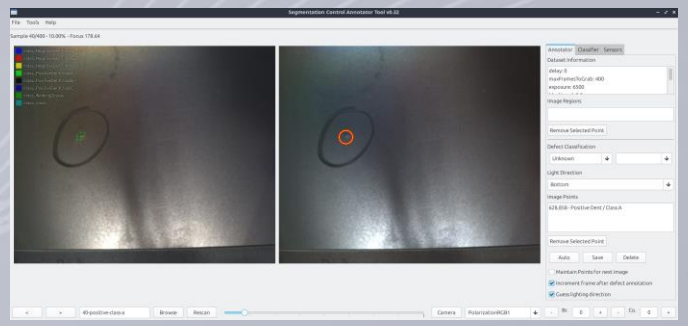
Current Technical Spefications

- Support for semi-automated annotation of defects
- Image and tactile loose support



Which sector is best positioned for adaptation

- White Goods
- Interior design Components
- Maritime & shipbuilding
- Intermediate components (glass, plastic, textile)
- Electronics
- Aerospace

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PERCEPTION CAPABILTIES

C1.5 Innovative approaches and architectures for improved defect detection and classification

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Current technical Spefications

- Small convolutional neural network
- Support for batching to accelerate computation

Which sector is best positioned for adaptation

- Any

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III. Presentation of key capabilities human-robot collaboration percpetion

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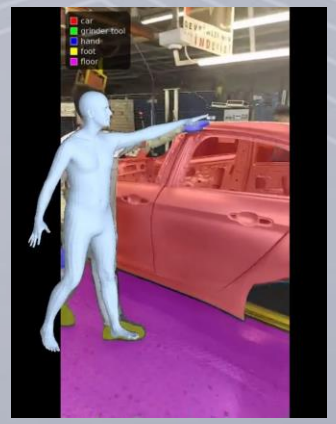
HUMAN-ROBOT COLLABORATION CAPABILITIES

C2.1 Human Observation

Current Technical Specifications

- Single-camera human pose and shape estimation
- Full-body 3D pose and shape with state-of-the-art accuracy
- Robust under occlusions and clutter
- Real-time execution



Which sector is best positioned for adaptation

- Sectors with production lines that rely on humans

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HUMAN-ROBOT COLLABORATION CAPABILITIES

C2.2 Human Interface and Interaction

Current Technical Specifications

- Interface through a GUI for defect visualization
- Human-motion detection and prediction through learning-based and model-based models
- Reactive and human-aware motion planning for robot control and collision avoidance

Which sector is best positioned for adaptation

- Any sector involving the presence of humans and robots in the same production area

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Q&A

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