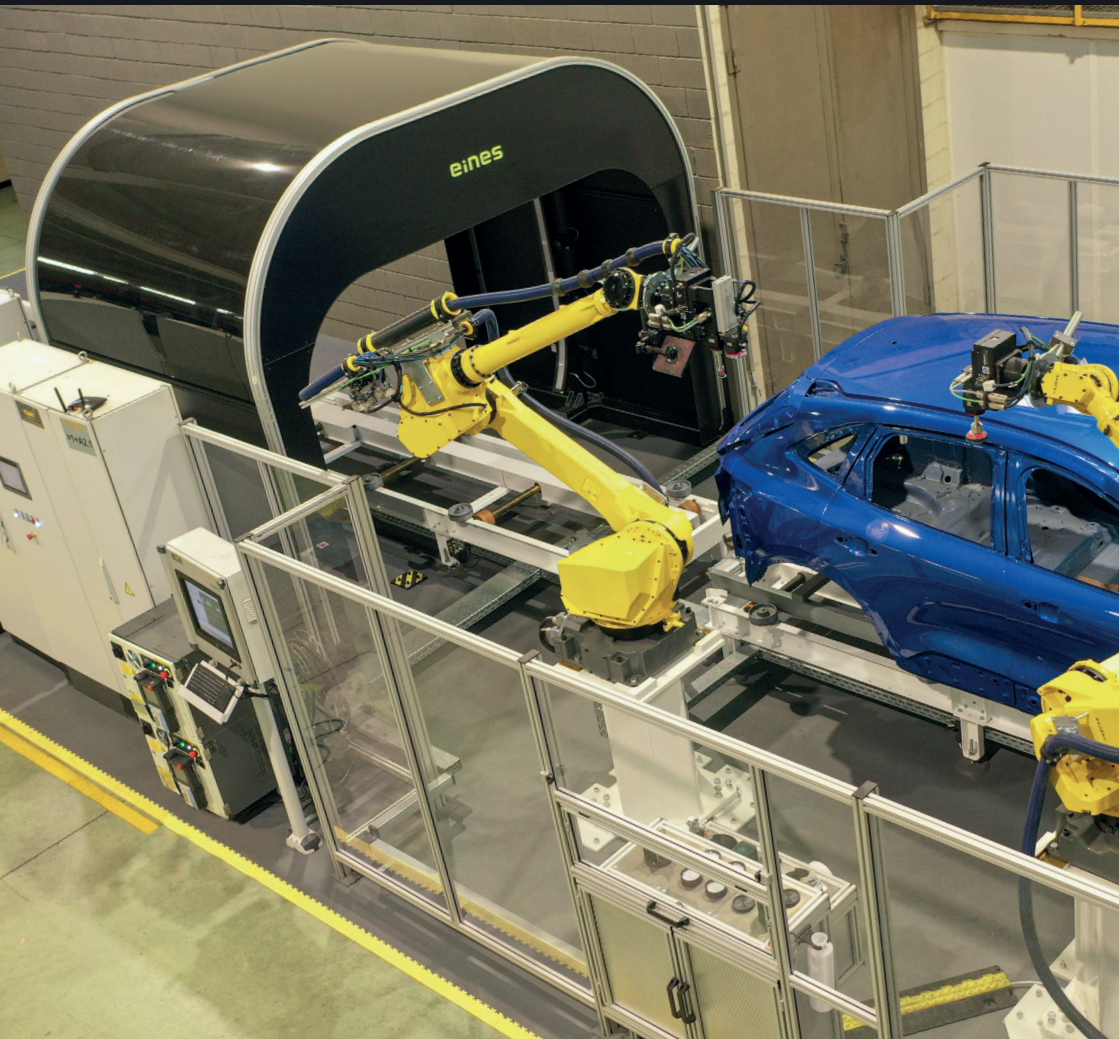


eines × TCEMT

Complete Turnkey Solution for Paint Defect-Free Car Bodies

Automatic Defect Detection, Positioning & Repair



| Essential Process

eines



VISION-BASED DEFECT LOCALIZATION

Introducing the 3rd generation of our ESFI tunnel, now with fully integrated Artificial Intelligence:

- Enhanced detection of small paint defects, all kind of them-including pinholes and dents
- Improved sensitivity and precision
- Accurate defect detection near edges and feature lines
- Color-independent detection
- Fully automated model configuration

eines



DEEP LEARNING DEFECT CLASSIFICATION

The ESFI tunnel captures over 40,000 images per car body.

These are processed using CNNs to generate a complete 3D map of defect locations, types, and characteristics—providing a comprehensive file for the repair system.



[ESFI] Paint Surface Quality Inspector System

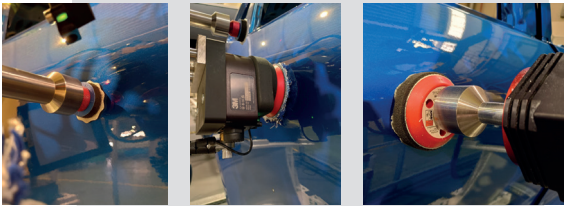


ICEM1



AUTOMATIC SANDING, CLEANING & POLISHING

The ASPS performs different actions for repair paint defects on car bodies with high precision. It ensures flawless finishes while reducing manual intervention and cycle time



ICEM1



DEFECT IN-DEPTH ANALYSIS POST REPAIR

The ASPS features onboard vision systems that perform post-sanding inspections. This allows decisions like reprocessing or final approval.

BEFORE SANDING

TYPE: **CRATER**
SIZE: 0.35 mm

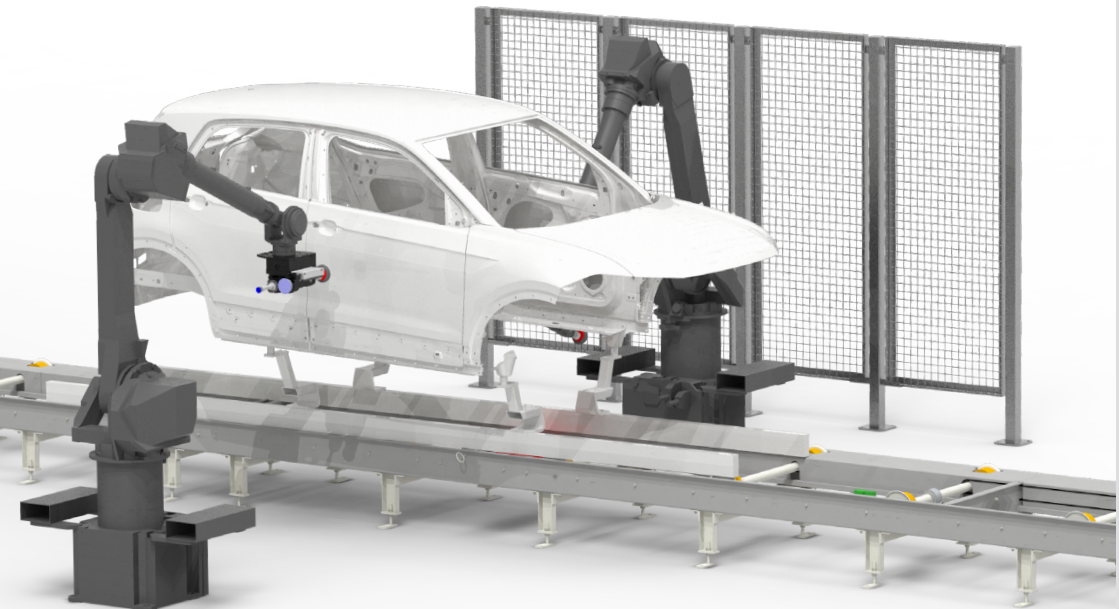


AFTER SANDING

RESULT: **OK**



[ASPS] Automatic Sanding and Polishing System



| Simulation & Digital Twins

Simulation is critical. We use a digital twin of the tunnel to simulate scan performance, light reflection, camera setup, and implementation time. Synthetic defect simulations further expand our defect image database, helping reduce commissioning time and improving classification accuracy. Both simulations are supported by Konica Minolta's advanced data analytics tools.



We perform a full simulation to analyse accessibility, style lines, edge defects, and potential interferences—ensuring optimal robot performance in real production conditions

| What stands out in this solution?

ADAPTABILITY

of the process to the customer's specific plant layout, production flow, and quality standards

MODULARITY

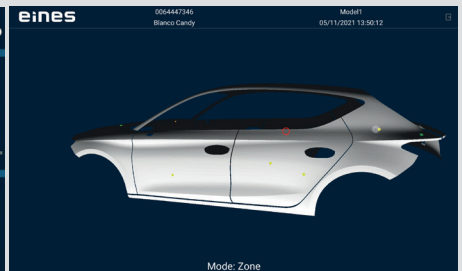
enabling easy maintenance and scalable system upgrades without production downtime

FLEXIBILITY

of handling various defect types, vehicle models, and production phases with minimal reconfiguration

| Digitalization

Both systems are fully integrated into a digital ecosystem that enables real-time data analysis, traceability, and reporting. Every inspection and repair process is automatically recorded, allowing users to access detailed reports with defect maps, repair history, and system performance metrics. This digitalization not only ensures full transparency and quality control but also supports predictive maintenance and continuous process optimization through data-driven insights



| Know more about Eines Vision Systems

We are a leading provider of advanced machine vision solutions, specializing in the development and implementation of cutting-edge technologies for automated quality inspection and manufacturing processes.

With a strong focus on innovation, precision, and reliability, we offer a comprehensive range of products and services designed to enhance productivity, ensure product quality, and reduce operational costs across various industries.

By leveraging state-of-the-art imaging techniques and artificial intelligence, we are at the forefront of transforming industrial automation, delivering customized solutions that meet the unique needs of each client.

SURFACE QUALITY

METROLOGY

PART ID & MEP

ROBOT GUIDANCE

OUR SOLUTIONS

| Know more about ICEMI Advanced Automation

We are a specialized engineering company focused on designing and integrating industrial automation solutions to improve efficiency, traceability, and quality in manufacturing environments.

With over 30 years of experience and a commitment to technological excellence, we provide tailored systems that combine robotics, control engineering, and industrial IT to optimize production processes and support digital transformation in multiple sectors.

Our expertise spans from concept design to turnkey project delivery, ensuring seamless integration, scalability, and long-term support for each solution.

Conveyors & Automated Transport Systems

Mechanical & Electrical Design

Industrial Software & Data Integration

Robotic & Automation Cells

OUR SOLUTIONS



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