3D.aero

Paint Automation

Smart solutions for high-performance coating processes

3D. PositionDetection
3D. EasyTeach
3D. PaintPilot

Introduction

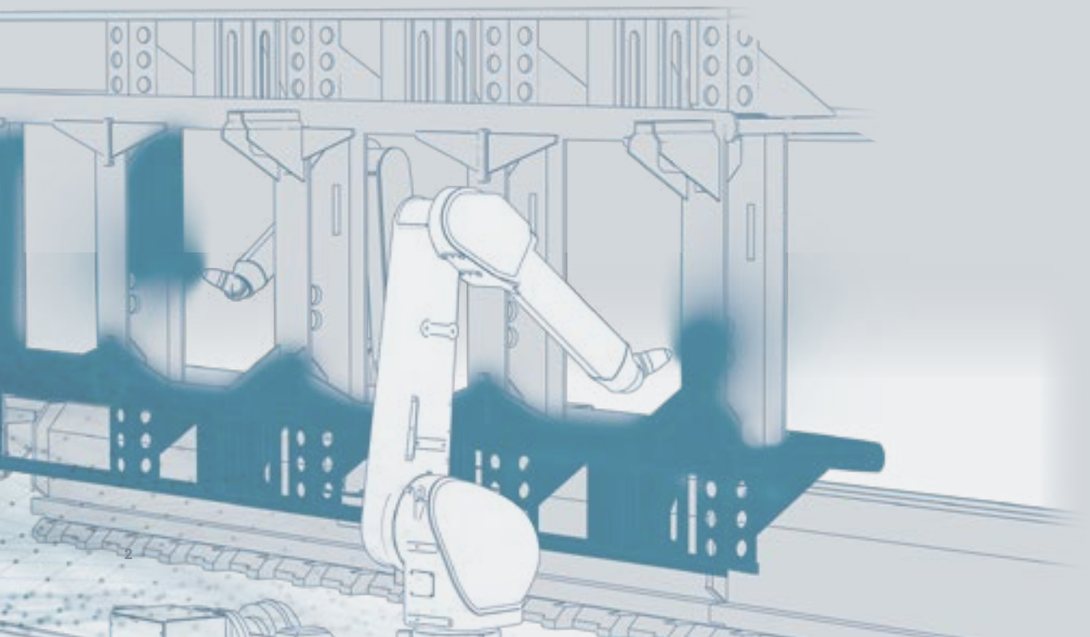
We automate your paint processes.

Today's coating applications demand higher precision, faster adaptation to part variation and more flexibility. Manual processes are reaching their limits while skilled labor becomes increasingly scarce, and traditional robot programming is time-consuming, expertdependent, and often uneconomical for small batches.

At **3D.**aero, we make automation accessible. With three intelligent modules tailored for paint applications, we support manufacturers, integrators, and coaters in taking the next step toward smarter production:

- **3D.PositionDetection for accurate part localization**
- **3D.EasyTeach for intuitive, no-code robot training**
- **3D.PaintPilot for fully automated paint path generation**

All systems are modular, easy to integrate, and powered by our proven **3D.**OS software platform. Whether you coat small components or large-scale structures, our solutions adapt to your needs – not the other way around.



coverphoto: © Daniel Reinhardt

System Overview

Three Solutions – One Vision: Smarter Paint Automation

SYSTEM	CORE FUNCTION	BEST FIT FOR
3D.PositionDetection	Detects part position and orientation	All part sizes, especially with variable layouts
3D.EasyTeach	No-code teaching	Manual paint processes
3D.PaintPilot	Generates robot programs auto-matically	Complex geometries, CAD-limited environments

With these easy-to-integrate solutions, we make automated painting accessible to user groups that were previously unable to automate their processes. Whether it's varying part positions, small lot sizes, or changing part geometries – 3D.aero's modular paint automation systems open up robotic painting for applications that were once out of reach or limited by scarce programming resources.

3D. PositionDetection

Automated part position recognition and offset correction for consistent paint results.

The **3D.PositionDetection** system identifies and communicates the exact position, orientation, and identity of each part entering the paint booth – whether stationary or moving on a conveyor. Using a combination of tailored sensors and our powerful **3D.**OS software, the system compares the actual position with the target position and calculates the offset. This data is sent directly to the robot, which then dynamically adjusts its pre-programmed path to match the real-world part position.

KEY BENEFITS

- **Accurate localization** even for large and complex parts
- **Minimal sensor setup** with only a few sensors required
- **Immediate offset correction** to reduce paint errors and rework
- **Seamless integration** into new or existing painting systems via ROS interface
- **Quick setup & easy handling** during commissioning and production
- **Simple onboarding** via real-world scans and CAD data comparison

SMART TECHNOLOGY INSIDE

Combining the LC-X sensor with our in-house **3D.**OS platform and the absolute-measuring PXL+ sensor (featuring integrated color cameras), the system delivers reliable identification using 3D geometry and color contrast.

This eliminates complex recalibration and speeds up setup – even when replacing sensors or introducing new parts.

Specifications	LC-X	MC-X
Max. field of view	20 x 20 m	3 x 4 m
Max. range	30 m	6 m
Accuracy of position detection	+/- 10 mm	+/- 5 mm
Average process time for position recognition	20 s	8 s
Atex Certificate	Yes: II 3 G Ex pzc IIB T4 Gc	in progress
Laserclass	1	2/3R

BUILT FOR REAL PRODUCTION ENVIRONMENTS

Whether you're painting small brackets or full-size truck cabins: **3D.PositionDetection** ensures your robot always hits the mark automatically, and without interruption.

3D.EasyTeach

From manual to automated in under 10 minutes.

3D.EasyTeach enables operators to guide a robot manually – just like they would with a paint gun. Through infrared motion tracking and intuitive no-code software, the system captures every movement and translates it into a robot-ready paint path.

KEY BENEFITS

- **No programming required** – intuitive manual teaching process
- **Infrared motion tracking** for high-precision path recording
- **Teach once** – repeat endlessly with consistent quality
- **Empower skilled painters** to train robots without coding knowledge

HOW IT WORKS:

With the help of infrared cameras and motion capture markers, **3D.EasyTeach** records the exact path of the manually guided paint gun.

The system then transforms these movements into an optimized robot program – without a single line of code.

Adjustments can be made directly within the software, enabling fast iterations and refinements.

IDEAL FOR:

- **Manual painting processes that should be automated gradually**
- **Prototyping or high-mix low-volume production**
- **Quick onboarding of new parts or variants without lengthy programming**

Specifications	BASE	OPTIONAL PACKAGES
Max. field of view	3 m height, 2 x 2 m ground	4 m height, unlimited ground
Max. range	5 m	
Tracking accuracy	+/- 1 mm	+/- 0.5 mm
Max. speed in line tracking	10 m / min	
Atex Markings (certification ongoing, markings may be subjected to changes)	Tool: II 3G Ex c IIB T5 Gc II 3D Ex c IIIC T5 Dc	Tool: II 1G Ex c IIB T4 Ga II 1D Ex c IIIC T4 Da External cameras: II 2G Ex db IIB T4 Gb II 2D Ex tb IIIC T4 Db
Robot programming language	Fanuc, ABB, Kuka	*as per customers needs
Automatic reachability and singularity analysis and resolving	No	Yes

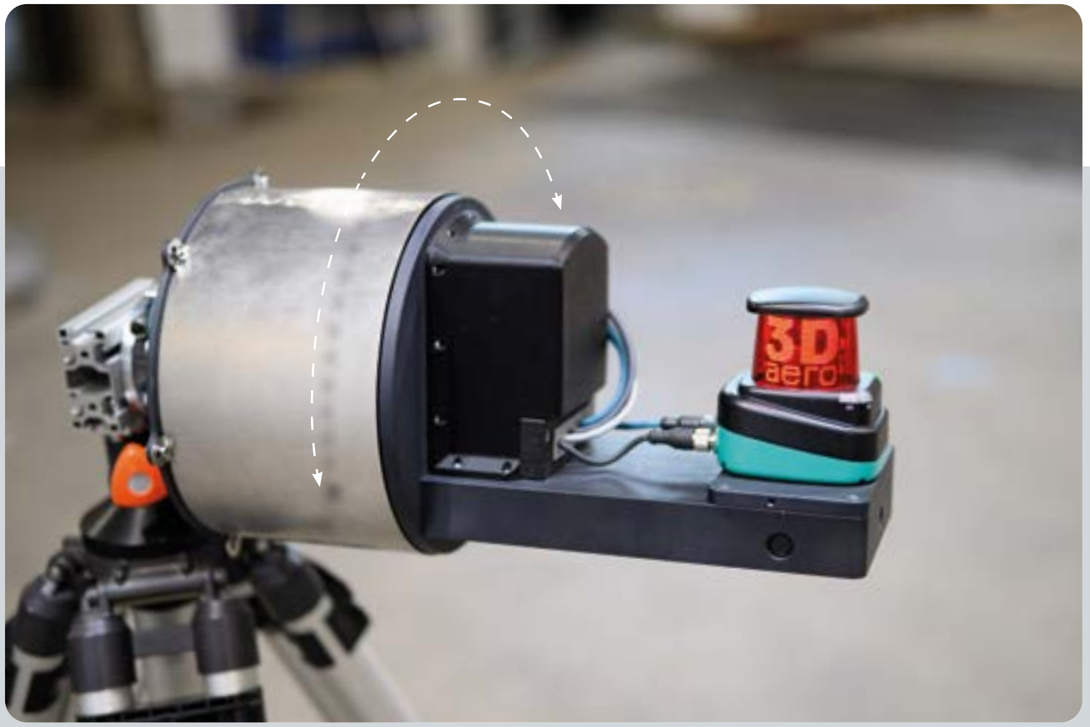
3D. PaintPilot

Automated paint path generation and efficient coating, no complicated software.

3D.PaintPilot is your solution for intelligent and efficient robot programming in paint applications. Designed for environments with high part variation and limited CAD availability, it automates the generation of coating paths – saving time, reducing dependency on experts, and unlocking the full potential of robotic painting.

KEY BENEFITS

- **Significantly reduced programming effort**
- **No CAD data required** – works with real scanned parts
- **Economical** even for small batches
- **Small to large quantities** and variety of parts
- **Automatic** coating path generation
- **Easy to use**, scalable, and modular

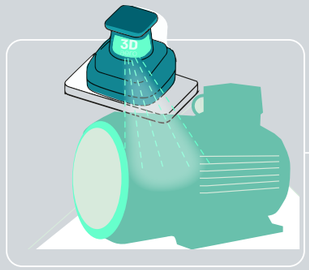


HOW IT WORKS:

The LC-X or MC-X sensor system digitally captures the workpiece. The **3D.PaintPilot** then applies the selected coating strategy and automatically generates the individual path.

Solutions

1



Scan part geometry with 3D.aero's sensor system (LC-X or MC-X)

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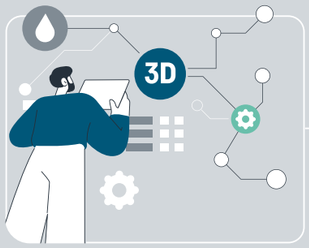

Select your individual coating strategy

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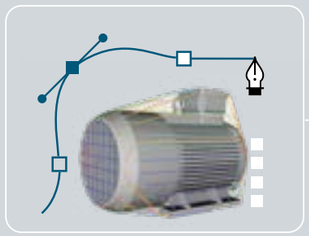

Generate the paint paths

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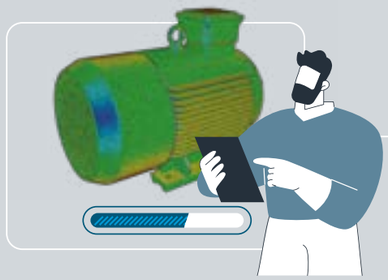
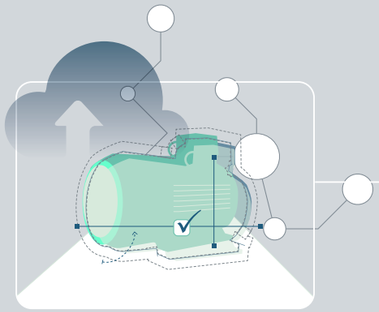


Reachability and collision check incl. visualization of the robot path for the user, optional manual fine-tuning

5



Transfer to robot controller for execution

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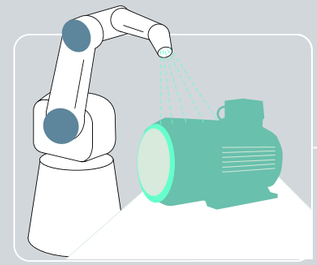

Coating of the component

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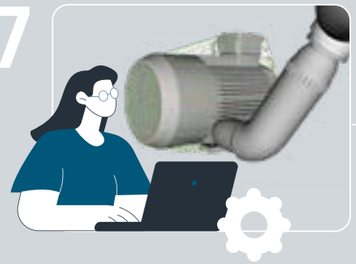


Possible manual optimization of the path

From first scan to finished program – the painting process is intuitive and repeatable, even with high product variability.

Powered by **3D.**OS

The system is built on **3D.**aero's **3D.**OS software platform, combining vision, soft PLC, and intuitive HMI design. Trusted in aerospace industry and construction machinery, **3D.**OS ensures smooth integration, remote support, and audit-ready data handling.

IDEAL FOR:

- **Contract coating and in-house paint shops**
- **Small to large batch sizes**
- **Components with no or partial CAD availability**

INDUSTRIES:

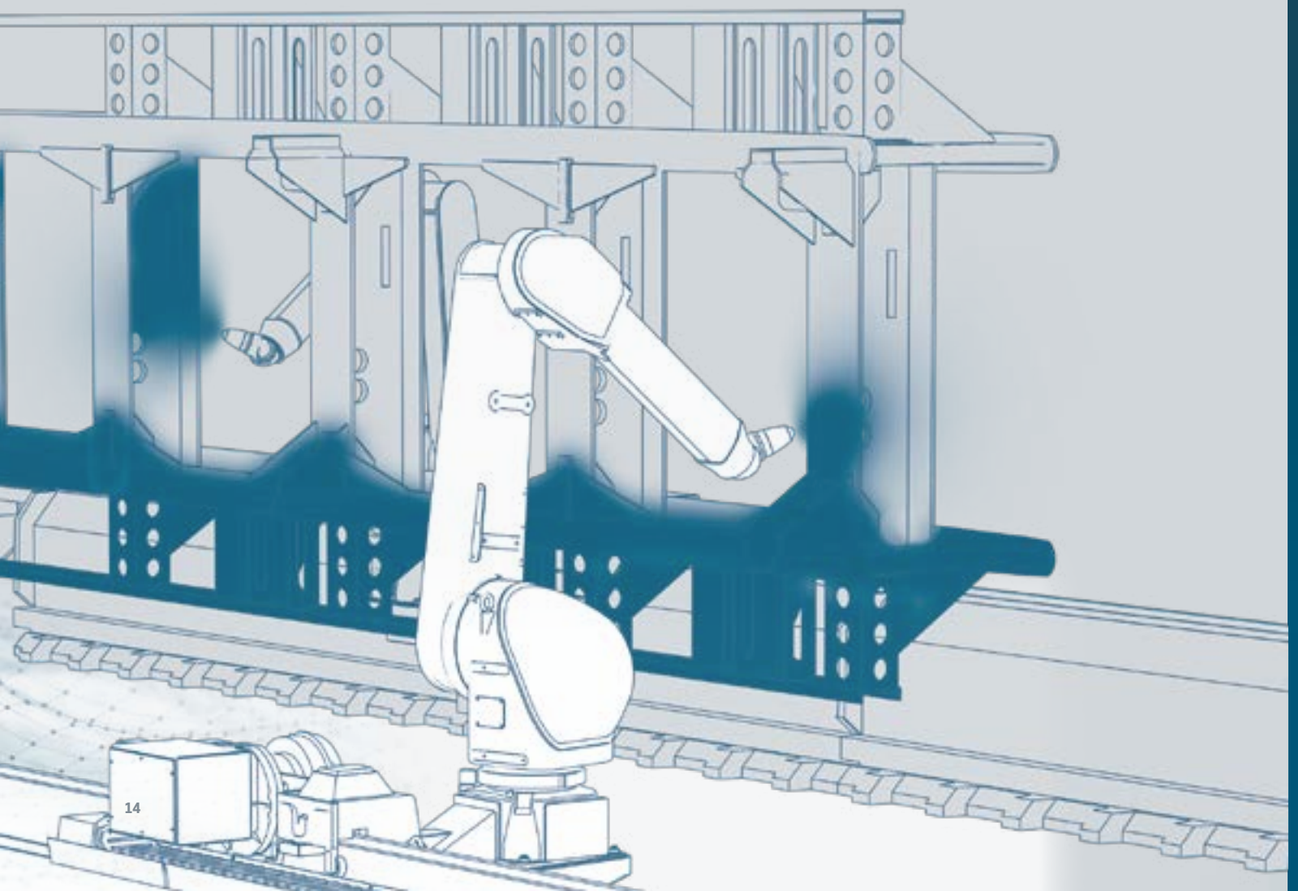
- **Agricultural & construction machinery**
- **Aerospace industry**
- **General industry**

COMPONENT APPLICATION AREAS:

- **Profiled components | Extrusion components**
- **Two-dimensional components | Aircraft side shell**
- **Large Components | Industrial compressors**
- **Small parts | Tool Housing**

Specifications

PROCESS TIME	**~20s**
APLICATION TECHNOLOGY	**Indifferent**
COMPATIBLE SENSOR	**LC-X / MC-X**
MAX. PART SIZE	**Biggest possible part for robot**
COMPATIBLE ROBOT	**All standard industrial robots**



Let's talk about your paint automation goals.

Whether you're facing complex geometries, high variant production, or simply want to make your paint processes more efficient – we're here to help.

Get in touch to explore how **3D.**aero's automation modules can boost your productivity and quality.

Photo: © Daniel Reinhardt

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