Industrial Paint/Coating VR Model with Twin Conversion Support

Summary

Profile type	Company's country	POD reference
Technology offer	**Türkiye**	**TOTR20260217009**
Profile status	Type of partnership	Targeted countries
PUBLISHED	**Research and development cooperation agreement**	**• World**
Contact Person	Term of validity	Last update
Enrico FRANZIN	**17 Feb 2026** **17 Feb 2027**	**17 Feb 2026**

General Information

Short summary

This project aims to develop an Industrial Paint and Coating Virtual Reality (VR) Model with Digital Twin conversion support to improve training, testing, and quality control processes in industrial painting applications. The solution integrates VR, AI-supported simulation, and digital twin technologies to replicate real-life spray painting processes under controlled virtual environments. The proposed system enables operators to receive real-time feedback on critical process parameters.

Full description

The VR model covers the complete industrial paint application workflow, including surface preparation, primer application, sanding, surface inspection, and topcoat painting. Critical process parameters such as spray gun distance, angle, pressure, fan shape, coating thickness, and layer homogeneity are continuously monitored and simulated in real time. The system provides instant visual, auditory, and haptic feedback to users, enabling effective learning and error correction during the training phase, followed by testing and quality control scenarios aligned with mass production conditions.

In addition, the project integrates Artificial Intelligence-supported Augmented Reality (AR) for quality control applications. Real-time camera-based image processing and AI models are used to detect coating defects, thickness deviations, and application inconsistencies, allowing virtual and physical process alignment through digital twin verification. This approach supports data-driven optimization of paint material usage, waste reduction, and defect prevention.

The developed VR and digital twin system will be validated through physical and functional testing, user performance analysis, and pilot implementation in an industrial production environment. By reducing raw material consumption, chemical exposure time, and training-related downtime, the project contributes to sustainable manufacturing, occupational health and safety (HSE), and workforce upskilling. The solution is scalable, interoperable, and transferable to different industrial sectors, directly supporting the objectives of the DIGITAL-2026-AI-09 Virtual Test Beds call.

Advantages and innovations

The project introduces a novel and integrated approach to industrial paint and coating processes by combining Virtual Reality (VR), Digital Twin technologies, and Artificial Intelligence (AI) within a large-scale virtual test bed environment. The key advantages and innovations include:

• Realistic VR-based training and testing environment:
Accurate simulation of real-world spray painting operations, allowing operators to practice and validate processes without interrupting production lines or consuming physical materials.

• Digital Twin conversion of paint processes:
Real-time synchronization between virtual models and physical paint processes enables continuous process optimization, validation, and predictive performance analysis.

• AI-supported defect detection and quality control:
Integration of AI-driven image processing and Augmented Reality (AR) allows early detection of coating defects, thickness deviations, and application errors, reducing rework and scrap rates.

• Material and cost efficiency:
Significant reduction in paint, raw material, and consumable usage through virtual testing and parameter optimization, directly contributing to waste minimization and cost savings.

• Improved occupational health and safety (HSE):
Reduced operator exposure to chemicals and hazardous environments by shifting training and testing activities into immersive virtual environments.

• Scalable and transferable solution:
The modular architecture of the VR and digital twin system enables easy adaptation to different production lines, industries, and use cases beyond paint and coating applications.

• Support for sustainable and digital manufacturing:
The project contributes to greener production processes, workforce upskilling, and the digital transformation of European manufacturing, in line with the objectives of the Digital Europe Programme.

Technical specification or expertise sought

Stage of development	**Sustainable Development goals**
Lab tested	• **Goal 7: Affordable and Clean Energy**
IPR Status	
No IPR applied	
IPR Notes	

Partner Sought

Expected role of the partner

The project is seeking VR technology partners and consortium members to jointly develop and deploy an Industrial Virtual Test Bed within the scope of the Digital Europe Programme. The expected roles of the partners include: • VR technology partner: Design and development of immersive VR training, testing, and quality control environments for industrial paint and coating processes, including interaction design, real-time feedback mechanisms, and user performance evaluation. • Consortium partner for Virtual Test Bed development: Active contribution to the formation of a multidisciplinary consortium, supporting large-scale test bed architecture, interoperability, and compliance with Digital Europe Programme requirements. • Digital Twin and simulation contribution: Collaboration on the integration and validation of digital twin models representing real-world paint processes, enabling synchronization between virtual environments and physical production systems. • AI and AR integration support (where applicable): Contribution to AI-supported quality control and AR-based inspection modules, including data-driven defect detection and process optimization. • Pilot implementation and validation support: Participation in pilot demonstrations, user testing, and validation activities in industrial environments to ensure scalability, robustness, and real-life applicability of the virtual test bed. • Dissemination and exploitation activities: Joint contribution to dissemination, standardisation, and exploitation of project results at European level, strengthening the visibility and impact of the consortium.

Type of partnership

Research and development cooperation agreement

Type and size of the partner

- **University**
- **SME <=10**
- **Big company**
- **R&D Institution**
- **SME 50 - 249**
- **SME 11-49**

Dissemination

Technology keywords

- **02002015 - Surface treatment (painting, galvano, polishing, CVD, ..)**

Market keywords

- **08002002 - Industrial measurement and sensing equipment**

Targeted countries

- **World**

Sector groups involved

- **Energy-Intensive Industries - Materials**