



An Integrated European Training Ecosystem for Advanced Inspection and Welding Skills: XR Scenarios, Digital Platforms and Specialisation Pathways



vr-vet.eu



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Introduction

Industrial inspection and welding are facing growing skills gaps as technologies evolve, particularly in hydrogen (H₂) infrastructure and Additive Manufacturing (AM). Traditional training is often constrained by safety requirements, limited access to industrial settings and scalability challenges, including safety management, rapid technological evolution, infrastructure access and geographical barriers.

This work presents an integrated European training ecosystem developed through complementary initiatives: VRVET, INSPIRE, AILEEN, CoVE-WENDT and DILAPRO. By combining immersive learning, digital delivery and specialisation pathways, the ecosystem modernises training for inspection and welding professionals and strengthens Europe's industrial competitiveness.

The Integrated European Training Ecosystem



An integrated European ecosystem combining complementary initiatives to deliver scalable, practice-oriented training in inspection, welding and advanced manufacturing.

Digital Platform & Living Labs:

- Digital-based platform with structured resources and trainer guidance.
- Living Labs in Italy, Spain, Romania and Germany for blended digital and hands-on training.

Methodological Approach

The ecosystem combines immersive XR technologies, blended learning and Living Lab environments to support practice-oriented, scalable and safe training.

- VR and AR scenarios simulate real inspection and welding procedures in safe, controlled environments.
- Blended delivery through a digital platform integrates theory, guidance and assessment.
- Living Labs enable hands-on implementation of XR tools in real training settings.
- Focus on competency development, error-based learning and procedural reinforcement.
- Aligned with European work procedures and industrial requirements.
- Supports the Green Deal and sustainability by reducing material use and industrial waste.

Key Components & Specialisation Pathways

VRVET

- VR scenario for Liquid Penetrant inspection.
- Step-by-step immersive procedural training.
- Supports trainers and learners with digital tools.

INSPIRE

- AR scenarios for H₂ pipeline inspection.
- Practice-oriented welding inspection training.
- Contextual and application-driven approach.

INSPIRE

- Modular training catalogue for AM inspection.
- Progressive specialisation pathways.
- Aligned with industrial needs.

CoVE-WENDT

- Specialised VET network.
- Connects VET providers, industry & tech centres.
- Knowledge exchange & replication mechanisms.

AILEEN

- Modular training catalogue for AM inspection.
- Progressive specialisation pathways.
- Aligned with industrial needs.

DILAPRO

- Development of laser process planning via digital twins and for automated digital certification.
- Supports manufacturing environments.

Expected Impact

- Scalable European training ecosystem.
- Improved accessibility & safety in training.
- Industry-aligned competence development.
- Support to upskilling in NDT Inspection in Welding and Additive Manufacturing.

Implementation & Pilot Phase

Pilots of the XR-based solutions are scheduled for April–September 2026. The phase enables validation of pedagogical integration, usability and industrial relevance across multiple countries and training centres.



APR-SEP 2026
Pilot deployment in: Italy, Spain, Romania and Germany.



PILOT ACTIVITIES
XR-based training sessions and Living Labs with learners and trainers.



VALIDATION
Assessment of: Pedagogy, Usability, Effectiveness and Industrial relevance.



INTEGRATION
Refinement of tools, International delivery model and Improvements based on pilot results

Project Results



1 Curriculum, 1 guideline and innovative educational material.



1 Transnational VR platform / network of Living Labs.



4 Pilot training events.



8 Workshops / international conferences.