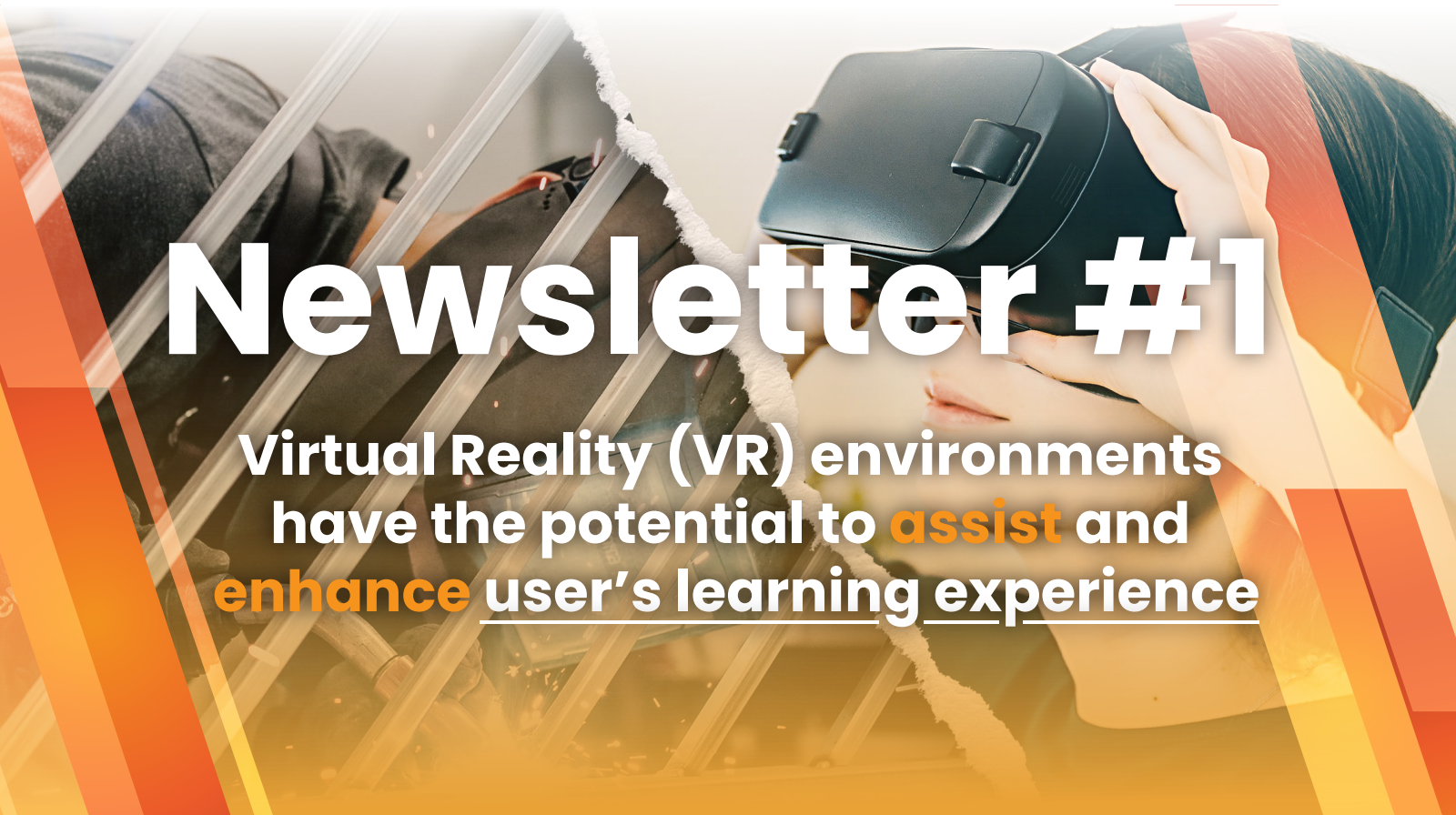
VR-VET

Non-Destructive Testing



Newsletter #1

Virtual Reality (VR) environments have the potential to assist and enhance user's learning experience

Welcome Message from the Coordinator

Dear readers, Welcome to first edition of our VR-VET e-newsletter!
We are thrilled to update you on our progress as we integrate virtual reality (VR) into liquid penetrant testing (PT) workflows, rethinking non-destructive testing (NDT) training.

In this newsletter, you will find a brief overview of the VR-VET project, a **presentation of our multidisciplinary partnership**, and **highlights of our initial milestones**. As the project coordinator, I encourage you to **follow our journey, share your feedback, and collaborate with us** as we innovate in NDT education.

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01. Project Overview, Partnership Presentation, Milestones

The VR-VET project aims to create immersive, learner-centered training modules for liquid penetrant testing (PT), blending state-of-the-art VR simulations with best practices in safety and environmental sustainability.

By combining theoretical knowledge with realistic, hands-on digital experiences, trainees gain **deeper insights into defect detection and compliance** with industry standards—ultimately **bridging theoretical concepts with real-world skills**. Co-funded by the European Union, VR-VET brings together **research institutions, academia and industry** to ensure a balanced knowledge triangle and robust policy advocacy.

Our **consortium** is built on the principle of including **research, academia, and industry / VET providers**, enhanced by policy influencers and an international federation. Each partner has formed a dedicated project team, composed of researchers, teachers, and specialists. Administrative staff contributes to procurement and financial operations, ensuring smooth implementation. Here are our key partners: ISIM Timisoara (**Coordinator**), BIBA, INTELIFORM, CESOL, IPUNTO, IIS, WT, EWF.

Our **associated partners** - **IIW (International Institute of Welding)** and **RAC SRL** - support wider dissemination, international integration, and sustainability of project outcomes.

Since our kickoff, the consortium has accomplished several key milestones, organized into **four main categories:**

01. Consortium Formation & Role Distribution:
- We assembled a balanced partnership across research, academia, and industry / VET providers, complemented by EWF's policy influence.
- Activities and responsibilities were allocated according to each partner's expertise, ensuring a well-structured, cohesive workflow.

02. Early Research & Design (WP2 & WP3):
- BIBA and IIS collaborated on VR platform design principles, focusing on user experience, scenario-based learning, and digital solutions that
- reflect green transitions.
  Discussions emphasized equipment calibration, temperature conditions, and best practices in advanced NDT procedures.

03. Initial Pilot Planning (WP4):
- CESOL introduced pilot course frameworks, shaping immersive VR content for the PT method and preparing guidelines for educational materials.

04. Dissemination & Knowledge Exchange (WP5):
- EWF coordinated early communications, linking the project's ambitions to policy stakeholders and aligning them with environmental and sustainable targets.
- Associated partners IIW and RAC SRL joined knowledge transfer events to increase the project's international reach.

02. Conception/design of VR application for NDT – PT examination and platform for Living lab network

Work Package 2 (WP2) focuses on conceiving, designing, and finalizing the technical and methodological foundations of the VR platform and Living Lab network for liquid penetrant testing (PT) NDT training. Led by IIS, in close collaboration with ISIM, BIBA, CESOL, and other partners, WP2 ensures that each stage of the VR platform's development aligns with industry standards and educational best practices.

With the following insights, WP2 has laid a strong foundation for the creation of a **highly effective, standards-based VR platform and Living Lab network** to facilitate and modernize liquid penetrant testing training.

OBJECTIVES

Establish Baseline Research:
- Investigate existing VR platforms and Living Lab models, ensuring an up-to-date understanding of technologies, standards, and user engagement strategies.

Define Technical and Methodological Specifications:
- Develop the conceptual framework for a transnational VR platform, focusing on practical use-cases, data management, and user interactivity.

Configure a Virtual/Real Living Lab Network:
- Outline how real and virtual lab spaces can interlink, supporting immersive training scenarios and collaborative research.

Finalize Requirements:
- Conclude with a comprehensive, consensus-driven document specifying all technical, infrastructural, and educational requirements for the VR platform and Living Labs.

ACTIVITIES

Research Activities on VR Platforms:
- Conducted a literature review to benchmark current VR solutions and living lab models.
- Gathered data on best practices in non-destructive testing, immersive learning, and relevant international standards (ISO, ASTM, etc.).

Evaluation & Design of Methodological and Technical Aspects (Platform for Virtual Living Labs):
- Formulated the platform's conceptual architecture: user navigation flows, data-entry structures, and VR device integration.
- Aligned design choices with environmental and safety guidelines, ensuring correct usage of NDT equipment and processes.

Evaluation & Design of the VR Application for PT NDT Method:
- Created preliminary simulations reflecting key steps—surface preparation, defect visualization, and safety checks.
- Incorporated feedback loops for dwell times, environment conditions, and consumables usage to mirror real-world operations.

Completion & Approval of Technical Requirements:
- Compiled all technical and methodological findings into a unified requirements document.
- Verified alignment with industry standards, stakeholder needs, and the overall WP2 objectives.

KEY FINDINGS

High Potential of VR + Living Labs:
- Research confirms that combining realistic VR modules with a collaborative living lab structure can greatly enhance learning outcomes, especially for hands-on processes like PT NDT.

Importance of Industry-Standard Compliance:
- Ensuring alignment with ISO/IEC and ASTM references is essential for both authenticity of the training and acceptance of the final platform by industrial partners.

Data and Scenario Management:
- Flexible data-handling frameworks and diversified scenario options are critical, allowing multiple lab environments (real or virtual) and advanced features (e.g., random defect simulation).

Structured Feedback Loops:
- Immediate, context-aware feedback during VR simulations fosters higher knowledge retention and practical skill adaptation.

Collaboration Among Partners:
- Balanced contributions from research institutes, academia, industry, and EWF have expedited the technical review process and supported robust, standards-driven.

03. Implementation of VR application for NDT examination with penetrating liquids and platform for Living Lab laboratory network

Work Package 3 (WP3) focuses on turning the conceptual designs from WP2 into a fully operational Virtual Reality (VR) platform tailored for liquid penetrant testing (PT) training, as well as establishing a network of Living Lab laboratories that can be used collaboratively by project partners. Led by BIBA, WP3 integrates practical equipment needs, scenario development, platform implementation, and final testing, all designed to ensure an immersive, hands-on learning experience for NDT professionals.

With the following insights, WP2 has laid a strong foundation for the creation of a **highly effective, standards-based VR platform and Living Lab network** to facilitate and modernize liquid penetrant testing training.

(Further tasks - platform implementation, scenario deployment, Living Labs network creation, and final testing - are ongoing or scheduled for upcoming months).

OBJECTIVES

Ensure Logistics and Equipment Readiness:
- Search and prepare the specialized VR headsets and devices required for testing and piloting the VR platform.

Create Realistic PT Scenarios:
- Develop and implement practical simulations reflective of real-world PT processes, materials, and defect variations.

Develop a Transnational VR Platform and Living Labs:
- Set up a unified virtual reality environment and interconnected living laboratories to support hands-on learning and collaborative research.

Test, Validate, and Refine:
- Evaluate the VR platform's performance and usability, updating documentation and user guides based on partner and learner feedback.

ACTIVITIES

Logistic Preparedness:
- Specialized VR equipment (headsets, accessories) was purchased by each partner between Months 6 and 12.
- This ensures availability for pilot courses and platform testing, so that every participant has the minimum necessary devices to engage effectively in VR-based PT training.

Designing Scenarios for the PT NDT Course:
- Partners collaborated (Months 7–15) to propose real-case application scenarios featuring multiple welded configurations and varying materials/defects.
- Industrial partners contributed test cases reflecting authentic on-the-job challenges, ensuring that the VR simulations mirror real-world demands and complexity.objectives.

KEY FINDINGS

Active Industry Input:
- Involving industrial partners early helped create realistic and engaging scenario designs that resonate with actual PT workflows.

Equipment Readiness:
- Prompt procurement and careful selection of VR devices ensure that technical bottlenecks are minimized, enabling timely pilot courses and platform debugging.

Scenario Diversity:
- Incorporating multiple material types and defect variations fosters robust training modules adaptable to diverse industrial contexts.

Collaborative Framework:
- The WP3 activities reaffirm the importance of close collaboration among research, academia, and industry, ensuring the VR environment and Living Labs effectively support both advanced training and future innovation.

VR-VET IN ACTION:

HANDS-ON INNOVATION IN MADRID

In January this year, our partners gathered in Madrid for a dynamic transnational meeting hosted by CESOL. This session went beyond strategic planning — participants engaged in real Non-Destructive Testing (NDT) exercises led by Ipunto.

READ POST

DESIGNING THE VR-VET IMPLEMENTATION GUIDE

April '25 brought another milestone as partners met to brainstorm the structure and content of a practical guide aimed at helping VET organisations implement VR-VET tools and results. This guide is set to become a valuable resource, ensuring our outcomes.

READ POST

VR-VET ON THE INTERNATIONAL STAGE

Our work was also spotlighted at the prestigious TIMA Conference on Innovative Technologies for Joining Advanced Materials. Presenting VR-VET's advancements in immersive learning, we connected with leaders in the field.

READ POST

WHAT'S NEXT IN THE VR-VET PROJECT

June '25 marks another milestone as VR-VET steps onto the international stage, with presentations at IIW 2025 in Italy and the TIMA Conference in Romania—bringing our VR training innovations to the forefront of welding and advanced materials education.

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