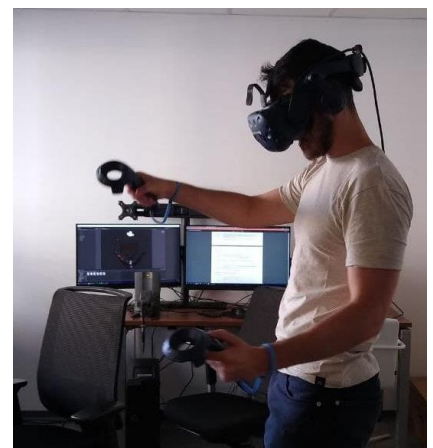


## VR SIMULATION KNOW-HOW FOR INDUSTRIAL PROCESSES

ValeriaLab is a research laboratory at the University of Granada (Spain) with more than 5 years of expertise creating virtual reality environments for many different use cases. These environments represent a powerful tool at different stages of design and operation of an industrial plant or a scientific facility. During the design stage, VR reconstructions allow fast validation of maintenance/logistics processes, early detection of collision risks and immersive experiences to facilitate the design of any operation. At the operation stage, these environments enable optimization of the maintenance processes and cost- and time-effective training of the task operators. The solution has been used for fusion and is available for new applications.

### Description of the technology

- Virtual Reality simulations of industrial processes represent valuable tools in order to increase knowledge of processes even at an early design stage.
- Starting from the early CAD designs and the description of the maintenance procedures, the ValeriaLab members create realistic and interactive reconstructions of the actions to be performed, transforming definition of tasks and operations into visualizations that facilitate validation and inspection.
- The simulations allow the optimization of the plant design and the procedures to be performed, making them safer, more productive and better defined.
- During the operation stage, the virtual environments enable immersive training of the operator in charge of performing the maintenance procedures. They could also receive information while doing the maintenance tasks.
- ValeriaLab at the University of Granada has been developing simulation tools for maintenance and logistic procedures in IFMIF-DONES and EUROfusion since 2019.



VR environments can be visualized with Head-Mounted Displays for achieving immersive experiences.

VR applications include multiple features for task simulations such as addition of multiple virtual cameras, multiple monitor visualization in a video-wall manner, task reproduction control and collision detections.



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### ■ Innovation and advantages of the offer

- The workflow allows all the information of the industrial processes to be represented in a single and interactive simulation. It includes CAD models as well as natural language description of the procedures and hardware movement parameters.
- The resulting simulations can be easily explored/visualized by the designers in order to detect future issues even at an early stage of definition, resulting in faster and safer design protocols.
- The same virtual environments can also be embedded as part of the control system to detect potential failures in the plant.
- Control devices can be connected to the virtual simulation to control the equipment.

### ■ Non-fusion Applications

- Design of assembly lanes in automation, chemical industries, and other manufacture facilities.
- Remotely-controlled robotic devices.
- Training of astronauts for extravehicular activities.
- Training of machinery operators in construction or logistics.

### ■ EUROfusion Heritage

This technology has been developed in the framework of the EUROfusion project, and more specifically the WPENS-DONES. The design of facilities involving irradiated materials, such as particle accelerators or fusion reactors, requires using remotely-controlled maintenance processes. VR simulation allows the adaptation of the plant based on the simulation of the maintenance processes at an early stage of design. Later, the VR environments facilitate the control of the procedures by the operator.