VIRTUAL REALITY AT INFN-LNL

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In Legnaro National Laboratories, the SPES facility under construction requires new prescriptions in terms of safety and operative procedures. In particular, the Cyclotron vault and all bunkers should be managed as high radiation environment. Due to this fact, several restrictions to area accessibility can occur during normal machine operations or cool down periods, producing delays in operations and planning related to local maintenance and environment supervision. In order to overcome these limitations, a new approach based on Virtual Technology has been studied and implemented. This new tool can be considered the first step for redesign the concepts of training and maintenance planning, let operators be formed in a safer, but realistic, environment.

Virtual Reality (VR) is an emerging technology which let developers reproduce environments and object with high level of detail.
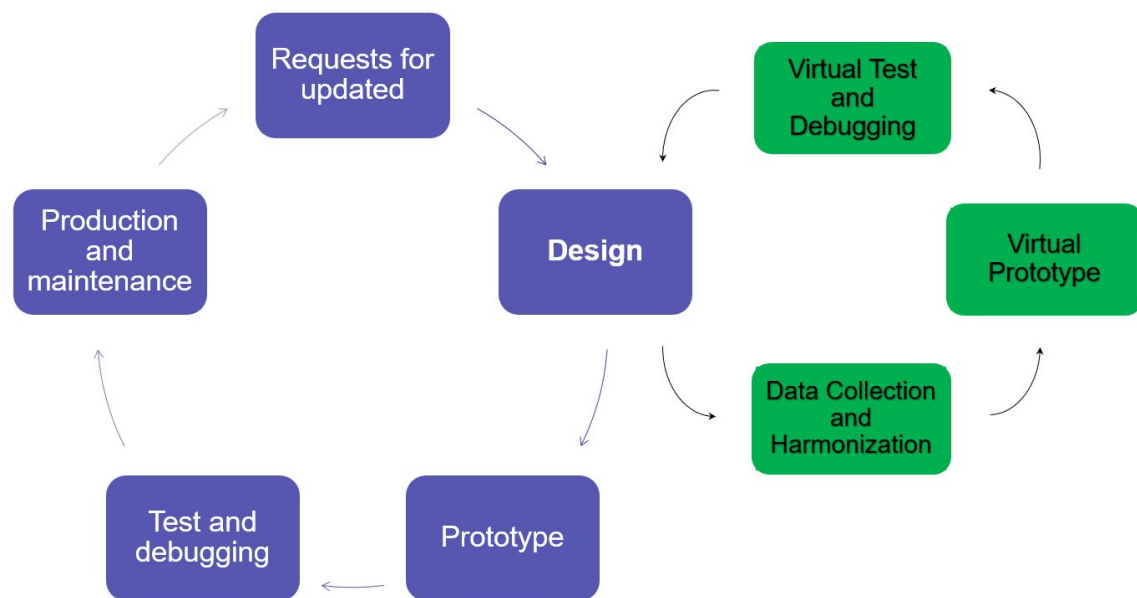
Main Characteristics

- **Photorealism**
- **Real Time**
- **Immersive**
- **Interactive**

WORKFLOW

This technology can be adopted as a tool to help users (managers, developers, operators) in different critical tasks, and it can be integrated in the common design process.

Characteristics of the new "*double wheel*" flowchart:
- Data collection and data harmonization among different groups and services
- The immersion provided by VR let designers rapidly understand pro and cons of the design, with high accuracy

A proof of concept has been developed to demonstrate the validity of this approach.
Particular aspects kept in mind have been:

- **Optimization of hardware performance/costs**
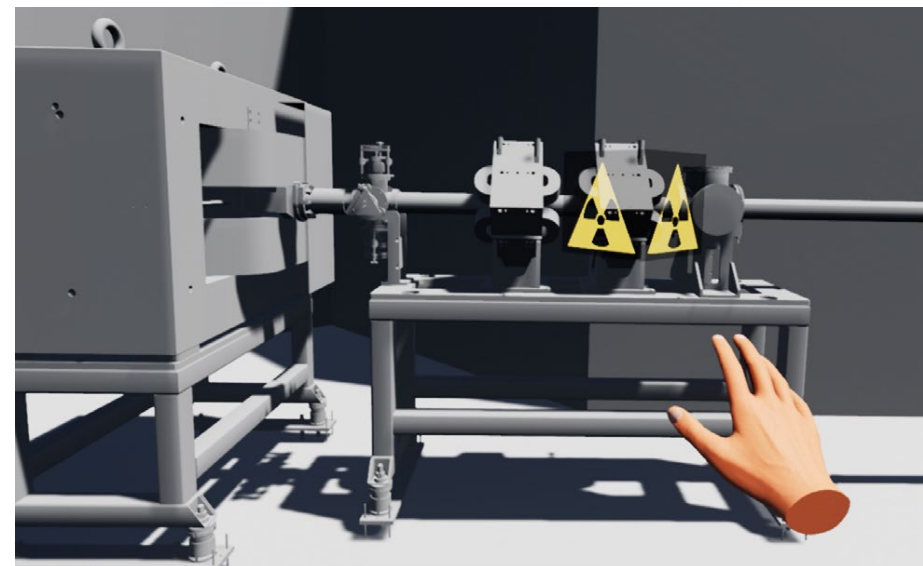- **Optimization of software and license costs**

AREA OF INTEREST

Training

Data Collection and Design

Training: Radioprotection PoC

Through the collection of data from several sources (mechanics, plant schemas, etc.) it is possible to replicate an immersive virtual environment. This is the first step for every other VR application and, at the same time, it provides the first important feedback in terms of dimensional verification.

The VR training represents a safe environment and a pre-defined experience where the user has to perform tasks and operations. It is possible to observe user's personal feedback and measure response times, very important during operations in hazardous environment.

AREA OF INTEREST

Machine operation and Maintenance

Data integration – VR, AR and MR solutions

Training: Radioprotection PoC
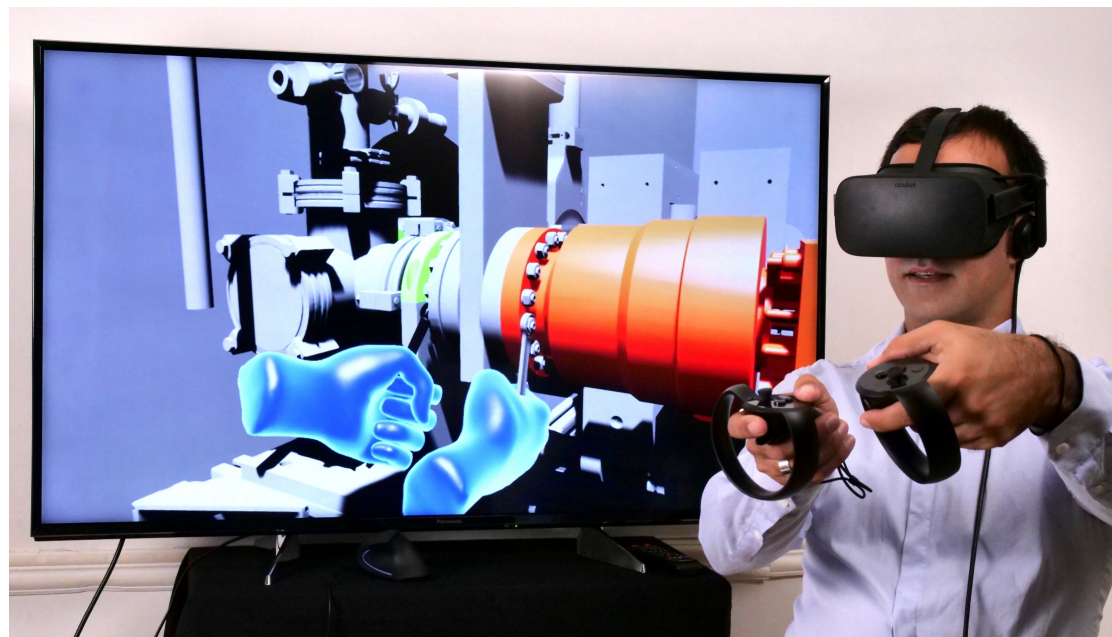
Having a complete and immersive environment based on CAD information give the opportunity to replicate objects and spaces with high precision. As consequence it is possible use VR technology to perform preliminary planning optimizing intervention times and procedures feasibility.
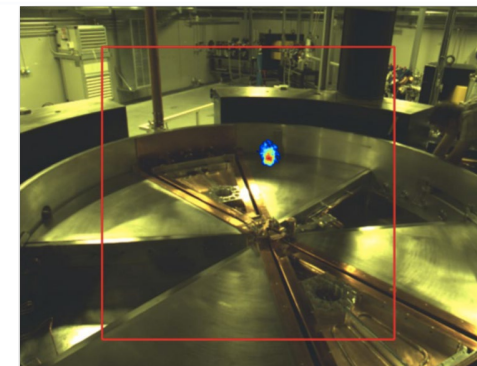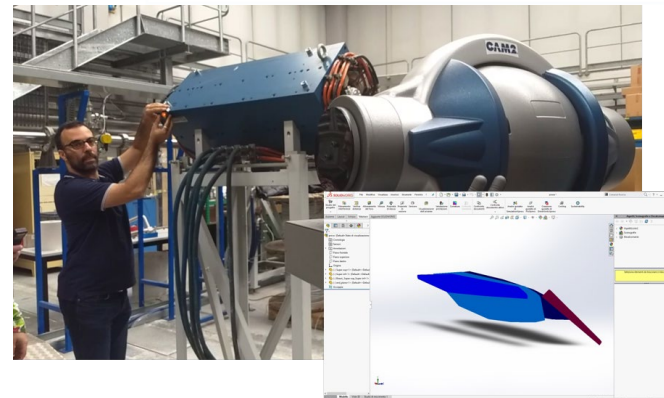
The information provided by the different services and groups constituting the Laboratory can be used to produce an additional level of details and immersion for the end user. For example, data produced by Radioprotection Service can be used in an AR and MR solution to perform a live radioactivity's map for the user that has to operate next to a particular apparatus.

VIRTUAL REALITY AND
AUGMENTED REALITY TECHNOLOGIES

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