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iDROP, a Promising Virtual Reality Tool to Assist Operations in Nuclear Facilities

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Virtual Reality (VR) is increasingly being used in industry to optimize design processes and procedures. It is therefore very obvious for these technologies to be used as a support for nuclear operations, to solve scenario design, operational safety and operator training issues. For the past 10 years, the CEA has been developing a tool, called iDROP which includes VR technologies. This program is a unique tool that combines in a single piece of software coupled with immersive technologies, all the features required to simulate interventions (remote handling or with direct contact) in ionizing environments, and in particular, to account for teleoperation during remote interventions, and access for human interventions, while evaluating the doses associated with these operations. iDROP provides several modules: first, it offers a dose calculation module, based on MERCURE 6.4, which has been optimized for real-time calculations and calculates the dose received by a point in space using the linear attenuation method. Since the calculations are performed in real time, the dose rate and cumulated dose vary instantaneously depending on movements and changes in the environment. The second feature remains in physical simulations and kinematic chains. This module solves classical mechanics problems in real time, preventing interpenetration between 3D objects. This module also simulates the robots' kinematic chains and rapidly helps to check the work area's accessibility for these devices. iDROP comes with a module for simulating human movements and verifying the accessibility of worksites and workstation ergonomics for operations carried out by humans. Finally, the main value of this software is the fact that it can be used with VR devices (stereoscopic system, motion capture system and force feedback interfaces), offering a full-scale 3D user experience. This paper first describes the features of the iDROP platform and then lists the benefits of using this tool to prepare nuclear operations.

Which "Key Question" does your Abstract address?

TEC2.8

Which alternative "Key Question" does your Abstract address? (if any)

TEC2.7

Topics

TEC2

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