

V3S: Virtual Reality for Safe Seveso Subcontractors

The V3S project won a trophy at Laval Virtual in the category "Industrial Design and Simulation" at the 2011 edition

The V3S project was an exploratory research project. V3S has been funded by ANR/RNTL. The objective of the V3S project was to develop a generic tool for virtual reality simulation of work situations involving dangerous activities carried out by subcontractors on high risk sites. The field of security in high-risk industry lacks tools for decision support and risk management training. Virtual reality can offer powerful tools to fill this gap. The AZF accident in Toulouse brought public and media attention to outsourcing problems in high-risk industrial facilities, in particular to Seveso facilities. Our assumption is that the efficiency of virtual reality in training and decision support for risk management allows operators and managers to visualize the impact of their decisions on the technical, organizational and human system, they are responsible of. Moreover, the challenge addressed by the V3S technology is to allow the construction of tailor-made simulations (procedures, progressive deterioration of work situations...).

The originality of the project lies in the coupling of knowledge models and virtual environments in order to simulate work situations on high-risk sites.

The V3S tool consists of five scientific and technical sections:

1. Autonomous virtual agents: users collaborate with virtual characters that are based on cognitive models and frameworks. These agents show various human-like behaviours depending on the situation constraints (time pressure, risk behaviours, tiredness, expertise) (Heudiasyc and LATI);
2. Learner tracking: V3S assists the trainer in his monitoring task (traces and performance criteria), helps the learner to interpret his own activity (causality analysis) and dynamically adapts the virtual environment according to the training objectives and learner's level, actions and errors (Heudiasyc and LATI);
3. Physics: fluid simulation, virtual mannequins and flexible pipes are simulated using realistic physics engines (CEA LIST);
4. Risk management and human factors: risk analysis and activity models from the knowledge engineering domain allow to capitalize knowledge about situations and problems, and provide generic technical, organizational and human databases to be computed by other modules (INERIS, LATI, Heudiasyc);
5. High-quality rendering: for optimal immersion and increased efficiency, V3S banks on a high level of visual realism and real-time 3D sound (EMISSVE).

This project features two use cases: 1) loading of hazardous materials (EBTRANS, APTH) and 2) pipe maintenance operations (TICN, ICRC, SI-GROUP).

The V3S project is an applied research project coordinated by Heudiasyc. The V3S project consortium brings together research laboratories: Heudiasyc UMR6599 (UTC), CEA-LIST, LATI (University Paris Descartes), INERIS, end users: EBTrans, APTH, SI-GROUP, CICR, TICN and a software integrator: EMISSIVE.

Illustration



Video

<http://www.youtube.com/watch?v=yjQ- StpKEg>

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