Research report: virtual reality at nuclear issues - a review study

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Recently, several applications using concepts related to virtual reality has been proposed to help on solving issues of great interest in Nuclear Engineering [1], [2], [3]. Among them are power plant's control rooms simulators [4]; measurement of the estimated radiation dose in a nuclear power plant [5]; use of game engines to create virtual environments to support evacuation planning of buildings and circulation in areas subjected to radiation [6] ; development of a man - machine interface based on speech recognition [7]; virtual control tables for simulation of nuclear power plants [8]; ergonomic evaluation of control rooms [9], and other ones. Many of these applications are developed at Instituto de Engenharia Nuclear (IEN), having their results published in form of articles in periodicals and conferences.

This review intends to present the state-of-the-art from 2007 to 2015 of using VR techniques at nuclear issues by researchers of Brazilian's facility IEN, showing the evolution in the use of these concepts, describing some of its results and showing prospects for future applications that can make use of virtual reality technology. From the examined literature, it is clear that the survey using VR techniques as of 2007 has given rise to several works at IEN. The different amount of publications denotes a major degree of development of some areas like safety training/ physical security, nuclear power plant operators training/ ergonomic studies and dose assessment which together correspond to more than 80% of that in comparison to the other two, development of virtual devices and nuclear waste treatment which does not mean that an area is more important than the others.

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