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VIRTUAL REALITY FOR MULTI-USER EXPERIENCE IN SPACE MISSIONS

Abstract

In anticipation of manned missions to Moon and Mars, proper attention is being given to simulations in augmented (AR) and virtual reality environments. The goal of such simulation programs is both for training and study of human behaviour of astronauts in space simulated environments. The virtual multi-user experience consists in the virtual simulation of the experience made by a more users during the interaction between each other and also with the surrounding environment. In specific, in the Space sector the virtual multi-user experience can be applied to simulate concurrent activities of astronauts interacting with the simulated space environment already at the start of the project, with low budget and effort. Possible examples of application are in the simulation and training of exploration, maintenance and inspection, communication with ground/Space station, tasks execution for command and control of robotics systems, and most important also into safety analysis and risk preventions. Moreover, in order to offer a wide range of simulation capabilities, multi-user experience in VR can be also combined with experiences with AR devices.

Considering the key importance of multi-user experience in VR and AR, this paper intends to offer a short review of the activities of Mars Planet research group in this field focused on:

Reconstruction with an high level of likelihood of entire regions of Mars/Moon to be used in the VR environment.

Combination with the development of the two VR treadmills, called MOTIVITY and MOTIGRAVITY, which are used both for scope of scientific simulation and as well to activate educational programs.

Development of an easy spin-off of the developed technology to other sectors such as the healthcare sector.

High realism and immersion in VR appear to be useful in the treatment of neuropsychiatric diseases and behavioral troubles. The patient is in a virtual environment like in an habitat and evolves as he would in his daily life. The objective is to help him face his fears or behavioral problems in order to improve his real life.

Further development of this study could refer also to social and cultural research including community life and ethnographic analysis dimensions including a scenario for a possible first future simulation of a city on Mars and on the Moon as well as to apply it in other spin-off commercial and research sectors.