The Virtual and Augmented Reality for Industry and Space (VARIaS)

Abstract for Final Presentation Days

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Virtual Reality is a promising medium for training within the space area. Recent advances in VR hardware have overcome several of the previous limitations that hindered VR adoption, simulator e.g. resolution for viewing small details and sickness with extended use. For adoption, particularly in the space industry, a major hurdle is that the creation of VR training elements is a costly, time-consuming process that requires a mixture of expert field knowledge and technical abilities in VR, as generally custom one-off applications must be built.

The Virtual and Augmented Reality for Industry and Space (VARIaS) project (contract AO/1-10382/20/NL/GLC/hh) developed a proof-of-concept no-code, fully pipeline system for creating VR training elements in the context of astronaut training. The VARIaS developed platform extends an existing Augmented Reality platform developed in part in the ESA VIPER project.

The resulting VARIaS platform has a pipeline for creation of training, for instance as tested with the ESA LSR. This pipeline contains 2 software components that are used, the VR Studio is a desktop application for specifying the virtual and digital twin as well as creating training processes and the VRIPR VR application. The pipeline enables a process of:

1. Import of CAD/model data and no-code creation of a digital twin representing the behavior of object
2. Immersive specification of a process for training by performance of the actions in the VRIPR
3. Semi-automated post-processing of the recorded performance in 2 to creation a VR training element
4. VR Training in VPIPR
5. Live Observer with 2 way communication in either VR or desktop
6. Post-action review of training or recordings in either VR or desktop

VARIaS pipeline was tested in the European Astronaut Center using the Life Support Rack as a test case. Two unique gloves were also tested in the VARIaS project to provide full hand tracking and feedback; currently these hardware solutions did not provide enough value add as the resolution and feedback capacities did not meet ESA expectations. The results of pipeline testing showed that the approach developed is promising for creating VR training in a new more efficient manner.