

## **Preliminary Investigation of Alternative Reality Environments for Accessibility Testing in Spacecraft Design**

### **Comparison of High-Fidelity Virtual Reality and Low-Fidelity Physical Reality**

**Technical Theme:** Added value of well-defined and designed UI/UX

#### **Authors:**

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#### **Description:**

The Artemis programme and other future aspirations to support and facilitate sustainable life in space, create the need for more accessible space architecture. This is not just due to the fact that the duration of future space missions will be greater than past missions and the risk of injuries increasing, but also due to the continuously diversifying astronaut profession, as shown by the selection of the first astronaut with a physical disability. As a contribution to the research field of accessibility in space, this thesis investigated the accessibility of Virtual Reality (VR) and Physical Reality (PR) as testing environments for spacecraft designs. The presentation will give an overview of the qualitative study that built upon a past research project with the Advanced Concepts Team at the European Space Research and Technology Centre (ESTEC) and was implemented in cooperation with the European Astronaut Centre (EAC). The result was a preliminary investigation of the International Space Station's Cupola and Display Control Panel in VR and PR, comparing the accessibility of the two testing environments and the tested design object with a simulated visual and gripping impairment. For that, an existing VR environment of the Cupola was used, and a PR mock-up was built as part of the thesis. In an experimental study, two groups of each six participants executed the same set of tasks in VR and PR. Recordings and questionnaires were used to collect the data. The results give an overview of the effectiveness, efficiency, satisfaction, and users' self-evaluation and needs in the two testing environments. Further, the presentation will give an introduction to the challenges in accessibility testing of space architecture and to first solutions for future research ambitions in the field.