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SIMSKILL-RU: IMPLEMENTATION AND RESULTS OF AN OREL-SPACECRAFT SIMULATOR IN THE SIRIUS-19 ANALOGUE MISSION.

Abstract

The SIMSKILL-RU Experiment in Moscow is a project implemented inside the NEK Analogue Facility in the Institute of Biomedical Problems in Moscow, as part of the 4-month research analogue mission "SIRIUS-19". The experiment's main goal is to understand how isolation and confinement affects the flight performance of the crew on long duration space missions, as it will be happening during the future Moon and Mars crewed programmes. Additionally, experiment also intends to propose which are the minimum training requirements to ensure the reliable control of the spacecraft throughout the whole mission. A spaceflight simulator based on the upcoming Russian Orel - former Federation – was developed in the University of Stuttgart and integrated inside the facility. The mission crew, composed by 6 members, including a real cosmonaut, performed a set of visual and instrumental approach and docking scenarios to the Lunar Gateway (LOP-G) each flight session. This article presents an overview on the design, implementation and integration of the simulator inside the facility. It additionally shows the experiment methodology and provides a detail on the obtained results. The gathered flight data is analysed by using statistical models and is enhanced by visual representations that should allow the reader to understand which are the critical parameters that define flight performance and which countermeasures could be applied.