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Author: Dr. Eleonore Poli
Centre Suisse d'Electronique et de Microtechnique SA (CSEM), Switzerland

Mr. Tomas Ducai
University of Vienna, Austria
Mr. Axel Tricaud
France

ACCESSIBILITY STUDY IN ANALOGUE SPACE MISSIONS: ICARES-2 MISSIONS AND CONTROL GROUP FOR PARASTRONAUTS

Abstract

Mars missions are expected to take place within the next decade and will likely differ widely from ISS and Moon missions. This is supported by the lack of direct communication with mission control centre on Earth, the length of the voyage as well as a different purpose, residing in the wish to colonize Mars. While the first human settlements on Mars will most likely consist of astronauts conservatively selected by space agencies, the object of such settlements is for humans to strives on those bodies on the long run and become multiplanetary species. The creation of a society of its own meets the representation of all humans, including humans with handicaps. These provide sufficient reasons to train and prepare parastronauts – astronauts with handicaps, as well as develop and adapt space missions for the eventuality of a crew member becoming handicapped as a result of an accident in travel or on Mars. An interesting platform for the development and testing of missions is an analogue space mission. An analogue space mission replicates a space mission at lower costs and risks, and provide a test bed for crew members, experiments, habitats and life support systems. Such analogue space missions for parastronauts exist at LunAres Research Station, in Poland, where the first parastronaut mission took place in 2017. In 2023, ICAres 2 missions took place with further parastronauts. The topic of this research was to monitor a control group of 6 able-bodied crew members during a mission similar to that of ICAres-2, and then monitor 3 ICAres 2 missions with a parastronaut in each crew; with the aim to understand accessibility of analogue space missions. The parastronauts so far had a lower limb and upper limb deficiency respectively. The accessibility in the station did not seem to differ from the control group to the parastronaut crews, however all missions showed that the general differences in height, frame, health were sufficient to require modification in the mission, even for able-bodied crews. Shelves, narrow doors and exercise programs are typical aspect that must be modified. It is expected that for a deaf or blind parastronauts, communication protocols would also have to be altered. This research will provide insight into further modifications needed for space accessibility and the development of protocols in case of accidents which will lead to a disability and how a previously able-bodied astronaut can learn how to perform in the mission.