Paper ID: 101382
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IAF HUMAN SPACEFLIGHT SYMPOSIUM (B3)
Advanced Systems, Technologies, and Innovations for Human Spaceflight (7)

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TOWARDS INCLUSIVE SPACE EXPLORATION: ADAPTED SPACESUITS FOR SPECIALLY-ABLED PARASTRONAUTS

Abstract

The selection of John McFall as the first specially-abled parastronaut by the European Space Agency (ESA) has demonstrated that the inclusion of astronauts with disabilities is no longer a theoretical discussion but a reality in the making. However, current spacesuit designs were developed with able-bodied astronauts in mind and are unlikely to meet the needs of parastronauts with varying physical conditions. As space agencies move towards greater inclusivity, the challenge of adapting spacesuits to accommodate different requirements must be addressed.

While discussions on accessibility in space have long been ongoing, practical steps towards implementation are still in their infancy. To bridge this gap, the Consortium of Spacesuit Research and Development (Cos-Rad) is leading a project to develop adapted (analog) spacesuits specifically designed for astronauts with disabilities, with CHASM and Mars Society UK (MSUK) as co-leads. By modifying existing suit designs, this initiative aims to enable specially-abled individuals to participate in analog space missions, making them as inclusive as possible and aligning with Sustainable Development Goal 10 (SDG 10) of the UN Agenda 2030. A key feature of the adapted spacesuit will be its modularity, allowing it to be customized to different needs while remaining open-source to encourage further development and refinement.

Following the development of an initial prototype, Cos-Rad, CHASM, and MSUK aim to collaborate with institutional partners operating analog mission habitats to test and evaluate the adapted spacesuit in realistic mission scenarios. Such collaborations will allow for a comprehensive assessment of the suit's functionality, mobility, and ergonomics in conditions that simulate extraterrestrial environments. The insights gained from these trials will help refine the design and ensure that it meets the specific requirements of parastronauts in both analog and, eventually, real space missions.

The adaptation of spacesuits for specially-abled astronauts is an essential step towards truly inclusive space exploration. By demonstrating the feasibility of tailored suit designs in analog environments, this project not only expands accessibility in simulated space missions but also lays the groundwork for future developments in real spaceflight. With a modular, open-source approach, the project ensures that ongoing improvements can be made, shaping a future where space is accessible to all.

Keywords: spacesuit adaptation, parastronauts, analog missions, accessibility