

IAF HUMAN SPACEFLIGHT SYMPOSIUM (B3)  
Human Spaceflight Global Technical Session (9-GTS.2)

Author: Mr. Darpan Byahatti  
R V College of Engineering, Bengaluru, India, darpanrb.ac20@rvce.edu.in

A REVIEW ON ADVANCEMENTS IN SPACESUITS FOR ASTRONAUTS DURING MARS  
EXPLORATIONS**Abstract**

Keeping up with growing needs in space explorations, especially in planets such as Mars, there have been significant advancements in the design and development of spacesuits for humans. The Martian atmosphere challenges the human body and mind to encounter the shortage of resources and excessive thermal radiations. However, the spacesuits worn by astronauts are equipped to sustain extreme conditions of the Martian atmosphere and surface. This process requires years of research and the results obtained from simulating these conditions are applied to real-time fabrication and production of these spacesuits. This research paper examines the advancements made in spacesuits for human exploration during Mars missions. The paper begins by reviewing the requirements for Mars spacesuits, including mobility and life support systems. The paper then explores recent advancements in spacesuit technology, including advancements in materials and design. One key area of focus is the development of new materials and technologies that improve the durability and flexibility of spacesuits, while also enhancing radiation protection. This includes new lightweight materials such as aerogels, as well as the use of advanced electronics and sensors to monitor the spacesuit and provide real-time health data to the wearer. The paper also examines recent developments in spacesuit design, including new joint mechanisms and articulation systems that provide greater mobility and range of motion. Finally, the paper elaborates on the advancements in human-robot interaction, including the development of exoskeletons and robotic assistive technologies that can help astronauts perform tasks while wearing a bulky and restrictive spacesuit. Overall, the research paper provides an overview of the latest advancements in spacesuit technology and highlights the importance of continued innovation in this field to support the success of future human missions to Mars.