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Operational Feasibility of Human-Robotic Analog Planetary Missions: An analysis from AMADEE-15

Sophie Gruber[2], Pradyumna Nanda Vyshnav[1], Gernot Groemer[2], Anna Losiak[3], Nina Sejkora, Michael Mueller[4], Joao Lousada, Carmen Koehler[6]

[1]Aalto University, Finland
[2]University of Innsbruck, Austria
[3]Planetary Geology Lab, Insitute of Geological Sciences, Polish Academy of Sciences, Poland
[4]Technical University of Graz, Austria
[5]INSYEN AG, Germany
[6]i-EM, Italy

The AMADEE-15 Mars Analog Simulation Mission was performed by the Austrian Space Forum (OeWF) in order to assess both the challenges and possibilities of studying a Martian rock glacier in an environment which is analogous to the Martian surface by human experimenters (analog astronauts), in cooperation with robotic vehicles. The mission took place at the Kaunertal glacier, Austria, from the 2nd to 4th of August 2015, where a field crew, located at the glacier and remotely supported by a Mission Support Center (MSC), conducted experiments preparing for future human Mars missions in the fields of engineering, planetary surface operations, human factors, robotics, astrobiology and geosciences. Our work explores the advantages and restrictions of performing human/robotic analog missions from the viewpoint of all the different teams working together under conditions which are analogous to real mission scenarios. An overview of the mission architecture as well as the conducted experiments during Extra Vehicular Activities (EVAs) is provided along with the documentation of the environmental challenges related to the test site operations. Furthermore, it offers suggestions for strategic improvements in mission planning and performance methodologies. In conclusion, we are aiming to pave the way for efficient and successful human missions to Mars.