Preparing for a human mission to Mars

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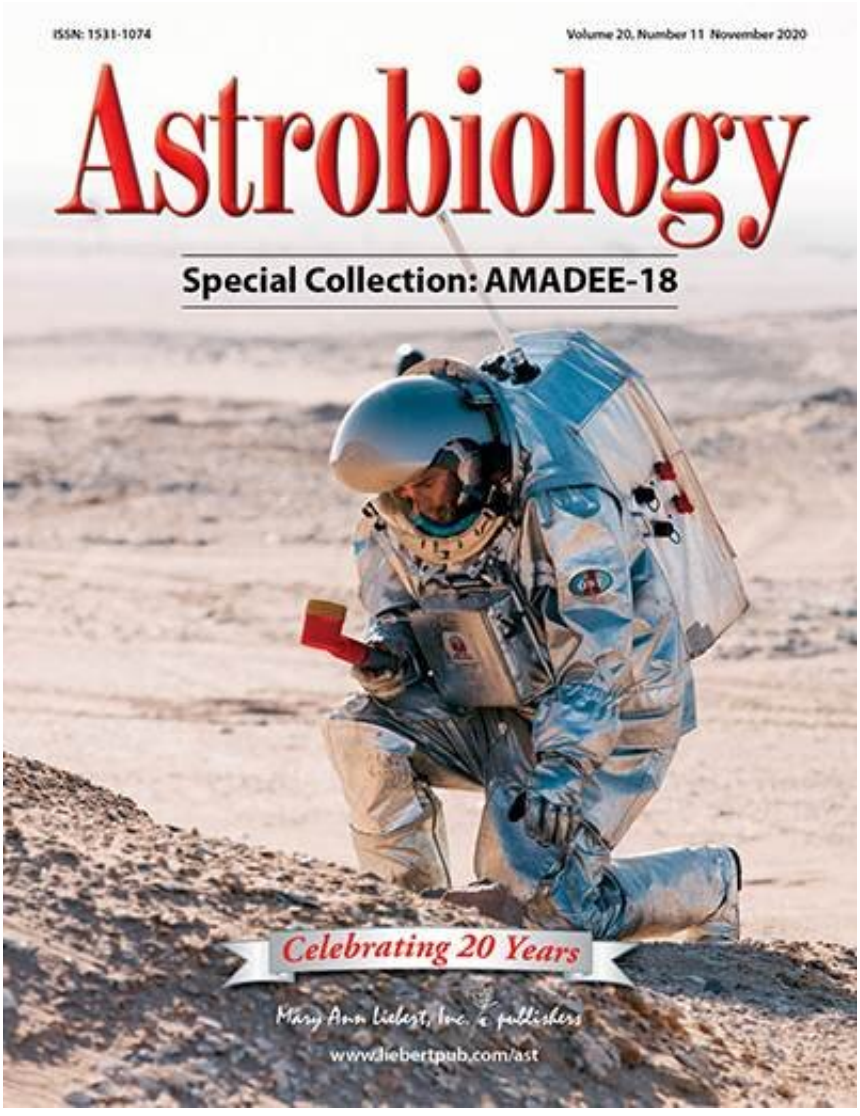

Credit: Mary Ann Liebert, Inc., Publishers

Future human missions to Mars depend on field research in an environment similar to that of Mars. It will enable the evaluation of operational concepts and optimization of strategies. The goals and results of the AMADEE-18 Mars analog mission are detailed in a special collection of articles in the peer-reviewed journal *Astrobiology*.

The AMADEE-18 expedition was designed in preparation for future human missions to the Mars surface. The mission took place in the Dhofar Desert in the Sultanate of Oman and was directed by a Mission Support Center in Austria. Brief descriptions of some of the papers in the collection follow.

A comprehensive overview of the mission, describing its technical and organizational infrastructure, is provided by Gernot Groemer, Austrian Space Forum, and coauthors. They describe the proposed workflow for coordinating the timing and location of the instruments and experiments. "In validation of this workflow, the decision-making interaction between the field and the Mission Support Center was studied," state the authors.

A performance metrics analysisis presented by Sophie Gruber, Austrian Space Forum, and coauthors. Their aim is to develop a benchmarking tool for mission planning and evaluation. "We propose a method to compare analog missions across agencies, disciplines, and complexities/fidelities to improve scientific output and mission safety and maximize effectiveness and efficiency," say the authors.

Methods to localize an unmanned aerial vehicle on Mars, such as an autonomous helicopter, were tested by Eren Allak, University of Klagenfurt, and coauthors. "In the absence of a global positioning system, a computationally efficient localization technology that can be applied on Mars is visual-inertial odometry (VIO). The AMADEE-18 mission provided an opportunity to test the feasibility of a state-of-the-art VIO algorithm and the camera in a Mars-like analog environment,"

state the authors.

More information: Gernot Groemer. Special Collection on the AMADEE-18 Mars Analog Simulation, *Astrobiology* (2020). DOI: 10.1089/ast.2020.2373