

Martian Field Geologist: What to Wear when Looking for Life on a Desert Planet?

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Abstract

Why send humans to Mars? Why would NASA have sent Jack Schmitt to the Moon? The simple answer is to put our best exploration system on the surface of a celestial planet we know tantalizing little about but has the potential for hosting life developed in parallel with Earth. Now that we're returning to the Moon with Artemis III, what does the well-outfitted lunar field geologist need in the surface?

What would this human exploration system wear during outings on the Red Planet? The EVA (Extra-Vehicular Activity) Mobility Unit (EMU) used today is an extension of the design used for the Apollo A7L-6 suit used for the lunar surface. A new surface suit has been showcased by Axiom Space that is more flexible and less massive than the EMU. As Jack Schmitt will attest, a more flexible, lower volume suit would help for survey and sampling operations.

Future lunar and Mars EVA operations will be routine parts of the mission. Suit performance, and human performance, will need to be monitored and managed to maximize operations while minimizing risk and overhead. Digital systems for operations will potentially include external data links to extend the human presence in the form of AI/ML sense-making applications to over-the-horizon robotic exploration systems. Delivering this information to the human can be in the form of a Heads-Up Display (HUD) in the helmet which would allow a customizable data presentation by the individual. Applying ML to the actions of the crew will drive efficiencies in data access.