

**MARS FIELD GEOLOGY, BIOLOGY, AND
PALEONTOLOGY WORKSHOP:
SUMMARY AND RECOMMENDATIONS**

November 18–19, 1998
Space Center Houston

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Lunar and Planetary Institute

Sponsored by
Lunar and Planetary Institute
National Aeronautics and Space Administration

Lunar and Planetary Institute 3600 Bay Area Boulevard Houston TX 77058-1113

LPI Contribution No. 968

Compiled in 1999 by
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This volume may be cited as

Budden N. A., ed. (1999) *Mars Field Geology, Biology, and Paleontology Workshop: Summary and Recommendations*. LPI Contribution No. 968, Lunar and Planetary Institute, Houston. 80 pp.

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Cover: Mars test suit subject and field geologist Dean Eppler overlooking Meteor Crater, Arizona, in Mark III Mars EVA suit.

PREFACE

In November 1998 the Lunar and Planetary Institute, under the sponsorship of the NASA/HEDS (Human Exploration and Development of Space) Enterprise, held a workshop to explore the objectives, desired capabilities, and operational requirements for the first human exploration of Mars. The goal of the workshop was to formulate recommendations that would ultimately contribute to NASA policy regarding the human exploration of Mars. Participants included world-class field geologists and geochemists, biologists, paleontologists, Apollo astronauts who explored the Moon, the scientists who trained them, shuttle and future space station astronauts, the NASA/JSC EVA office, and NASA mission planners. Together this group examined the realities of planning and executing an exploration campaign on the surface of Mars that would result in observations and sampling that would help define the present composition, morphology, and geologic evolution of Mars, and shed light on whether life ever existed on the planet. Current NASA planning envisions sending a crew of six people to Mars, as early as 2013, to conduct a long-term expedition. The crew will spend a year and a half on Mars and will have considerable mobility, along with sampling and analytical capability, in an area of high scientific interest. The workshop used these parameters to consider how the crew might spend 18 months conducting local and regional geologic reconnaissance and field work, and what they would require in terms of the equipment, capabilities, and skills to accomplish their goals.

The workshop participants formed four teams to address topics dealing with the surface mission, and each team presented their top-level recommendations for each. The four major themes addressed were:

1. Approaches to Mars Field Geology
2. Instrumentation: Analytical Capabilities on Mars
3. Crew Skills and Training
4. Communications Between Mars and Earth

This volume contains an introduction to the workshop and discussions and resulting recommendations from each of the four teams. A list of workshop participants and their relevant experience is also included. I would like to thank the following individuals for reviewing this document: Paul Spudis, Mike Duke, Carl Allen, Bob Garrison, Steve Hoffman, and Martin Brasier. I would also like to thank the team leaders William Muehlberger, Patricia Dickerson, Frances Westall, and Thomas Jones for leading their respective group discussions, writing the original topical reports, and reviewing early drafts of this paper. Logistics, administrative, and publications support for the workshop were provided by the Publications and Program Services Department of the Lunar and Planetary Institute. Special thanks go to Carol Howard and Angel Lopez, whose help was greatly needed and appreciated in preparing for and executing the workshop.

*Nancy Ann Budden
Houston, Texas
June 1999*

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