

PREFACE

The HEDS-UP (Human Exploration and Development of Space–University Partners) program was instituted to build new relationships between university, faculty, students, and NASA in support of the Human Exploration and Development of Space. The program has provided a mechanism for university students to explore problems of interest to NASA through student engineering-design projects, led by a university professor or mentor, and aided by the HEDS-UP staff. HEDS-UP program management advised teams on the selection of projects that were aligned with the goals of the HEDS strategic enterprise, and provided contacts with NASA and industry professionals who served as mentors. Students became acquainted with objectives, strategies, development issues, and technologic characteristics of space exploration programs. In doing so, they prepared themselves for future engineering challenges, often discovering that the program was on their critical path to professional advancement. Many of the ideas were innovative and of interest to NASA. Industry benefitted from HEDS-UP as a mechanism to converge with talented students about to enter the work force. In addition, universities became more involved in the teaching of space exploration, and students were encouraged and mentored as they included education outreach as an element in their work. This in turn highlighted their performance to others and universities in their communities.

The culmination of the HEDS-UP program each year has been the HEDS-UP Forum, held at the Lunar and Planetary Institute (LPI) in Houston, Texas. During the Forum, teams presented their design projects to the university and industry participants and NASA personnel via written reports, oral presentations, models, prototypes, and experiment demonstrations. NASA, industry, and academic professionals presented discussion of current issues and topics of interest in space exploration. Included at the Forum was an informal poster session, where all attendees further discussed the teams' research findings.

The Fourth Annual HEDS-UP Forum was held May 3–5, 2001. This year's Forum included representation of 13 university teams, three of which were graduate student teams. Each team contributed a 15–20-page written report; these reports are reproduced in this volume. The agenda for the Forum shows the order of presentation talks by the university teams, NASA presenters, and LPI presenters. Invited speakers included Mr. John Connolly of the NASA Johnson Space Center, Dr. Alex Ignatiev of the University of Houston, Dr. Michael Duke and Dr. Paul Spudis of the LPI, and Dr. Larry Kuznetz of the University of California, Berkeley.

The Forum was organized by Dr. Kathleen Johnson, Education Manager at the LPI. Other staff members at the LPI provided logistical, photography, and publications support. A special thanks and acknowledgment goes to Dr. Michael Duke for pioneering this stellar event.

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