



Title of Investigation:

Handheld Mars Exploration (HAMEX)

Principal Investigator:

David Matusow (Code 588)

Other In-House Members of the Team:

Joe Sparmo (Code 585)

Initiation Year:

FY 2000

Aggregate Amount of Funding Authorized in FY 2003 and Earlier Years:

\$15,000

FY 2004 Authorized Funding:

\$4,500

Actual or Expected Expenditure of FY 2004 Funding: In-house:

\$4,500

Status of Investigation at End of FY 2004:

To be continued in FY 2005 with no additional funding

Expected Completion Date:

June 2005

Purpose of the Investigation:

The goal of this investigation is to build upon previous Handheld Mars Exploration (HAMEX) efforts to infuse Personal Digital Assistant (PDA) technology into educational activities for students. The result will be an exhibit at the Goddard Space Flight Center Visitor's Center, where students will be able to operate simulated Martian rovers that operate in a realistic Martian environment as part of a competition to study the Martian surface.

Accomplishments to Date:

In the last year, the HAMEX team has forged an important partnership with the Carnegie Mellon University to get access to the university's Personal Exploration Rovers (PERs). (The PER is a one-fifth-scale replica of the actual twin rovers currently operating on Mars.) The robots will become the cornerstone of a new HAMEX-developed exhibit, which will allow Washington, D.C. area students to operate the PERs in a simulated Martian exploration as part of a competition. The software to control the robots is being ported to PDA devices so that the students can be

in different areas of the Goddard Visitor's Center and still participate in the competition. The HAMEX team discussed this in a presentation earlier this year at the 2004 Maryland Instructional Computer Coordinators Association (MICCA) conference in Baltimore, Maryland.

Figure 1. A PER located on the simulated Martian environment at the Goddard Space Flight Center visitor's center



Planned Future Work:

This project is almost complete. An exhibit at the Goddard Visitor's Center is being created and will allow students from all over the area to come and compete in a Mars robotic competition. Using the PERs on loan from Carnegie Mellon University, students will explore a simulated Martian landscape and work together as teams to determine which rocks might have relevant scientific data. Each group's score will be recorded and compared with previous visitors' scores. The software to control the competition (using a touch screen monitor) is under development, as is the software to control the robot's actions. This work should be wrapped up by mid-2005.

Summary:

This project is unique because it uses state-of-the-art technology (PDAs) to help teach science using real-time space data. Furthermore, it takes advantage of the excitement of space exploration as a way to motivate and educate students and encourage them to pursue technical careers. Goddard benefits from the publicity that the exhibit generates and gives us insights into the use of PDAs for science-data missions. This activity was highly successful during the first competition held at the Odyssey School in Baltimore. Post-activity analysis by the school indicated that students enjoyed the activity and absorbed a great deal of new material in the areas of science, math, and engineering. Many more students in the metro region will be able to enjoy the same activity now that this activity has moved to the Goddard Visitor's Center, which increases its educational benefit. The primary risk associated with this project was taking the PER and converting it so that it would work in the HAMEX environment. This included porting code written for a personal computer to work on a PDA.