Mars Weekend: A Panel and Games at the Museum of Science Boston

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Introduction

This ongoing outreach project uniquely combines the data, systems, and resources of four existing NASA-funded research projects on Mars robotic navigation (MER Participating Scientist project and ExoMars PanCam project), intelligent Mars data processing (AISR Crater Detection project), and Lunar mapping (LRO Participating Scientist project). The project aims to stimulate the public excitement about Mars and Lunar science and exploration and to enrich the public with expertise developed at The Ohio State University (OSU), the University of Massachusetts Boston (UMB), and the Lunar and Planetary Institute (LPI) through our outreach partner, the Museum of Science, Boston. This project has so far achieved the following:

- Establish an interactive web-based Mars Crater Seeker system (Figure 2) for K-12 students, teachers, and the public by integration of the expertise and results of Mars research including orbital and rover imagery and software systems developed at the participating institutions.
- Effectively take advantage of the public science and technology component of the Museum of Science, Boston, which hosts more than 1.5 million visitors yearly, by designing and implementing Mars and Lunar scientific education activities in its daily programs, specifically in the newly proposed Mars Weekend program.

Figure 1: Top: Game Tables, Bottom: Sam Kounaves Speaking about the Phoenix Lander Mission

Approach

The first Mars Weekend took place June 4-5, 2011, at the Museum of Science, Boston. The programming for both days consisted of invited talks, a panel discussion, and an array of hands-on activities for museum visitors. The invited speakers included three PIs of various NASA-funded projects: Wei Ding from the University of Massachusetts Boston, Ron Li from The Ohio State University, and Sam Kounaves from Tufts University.

The centerpiece of each day in this weekend event was the panel discussion, which covered Mars rover navigation/localization efforts, Mars and Lunar mapping, automatic crater detection, habitability of Mars, and Mars chemistry research activities for NASA missions and research programs. Designed as a day-long panel of discussions and presentations to the museum audience at the Gordon Current Science & Technology Stage, Mars Weekend panelists and speakers included three PIs of various NASA funded projects along with Education Associates of the Museum of Science. The panel discussed Mars rover navigation/localization efforts, Mars and Lunar mapping, automatic crater detection, habitability of Mars, and Mars chemistry research activities for NASA missions and research programs. The presentations introduced science and engineering principles that are applicable to Mars exploration, rover traverse design, crater detection and planetary exploration in general.

The Crater Seeker game system was used as a fun and engaging platform in which scientific products from NASAs Mars Exploration Rover 2003 (MER) mission and the AISR crater detection project could be utilized

in the appropriate context. Crater Seeker allows users to explore a planets surface using the original images, maps, and scientific results produced during mission operations. Through this exploration users have a first-hand experience with a variety of scientific research tools used for Mars exploration such as satellite imagery, rover navigation cameras, false color slope maps, depth elevation models, and rover position gauges. The simulated rover also experiences slippage based on the slope of the ground directly below the rover. The rover will slip more forward and backwards then it will side to side to simulate the orientation of the wheels. The platform uses the KML file format that is standardized by the OpenGIS Consortium to allow other outreach teams to reuse this application. The application is written in JavaScript and requires no server side processing so it is able to be hosted on any basic HTTP server.

Activities

- *How Much Would You Weigh on Mars?* Visitors could weigh themselves on a specially labeled scale, and could test a set of labeled backpacks that simulate weights on Mars, the Moon, and other planets.
- *Stomp Rockets* Guided by a facilitator, visitors used construction paper and tape to build and test their own pneumatic rockets.
- *Impact Crater Lab* In this facilitated activity, visitors dropped spheres of various sizes and masses into tubs of sand topped with iron filings. The color contrast between the pale sand and dark filings clearly showed ejecta patterns from the impacts.
- *Life on Mars: What Might We Find?* Chris Hallman shared his research about theoretical life on Mars using microscopes and models. As a playful ancillary activity, visitors designed their own Martian life forms with craft supplies.
- *Moon and Mars Terrain* Visitors examined large image mosaics of the Moon's surface created by Frank Centinello, as well as globes of the Moon and Mars showing topography. Hand lenses and descriptions of points of interest were provided.
- *Large 3D Panorama* 3D glasses were provided for visitors to view a 20-foot-long poster of a stereoscopic panorama taken by a MER.

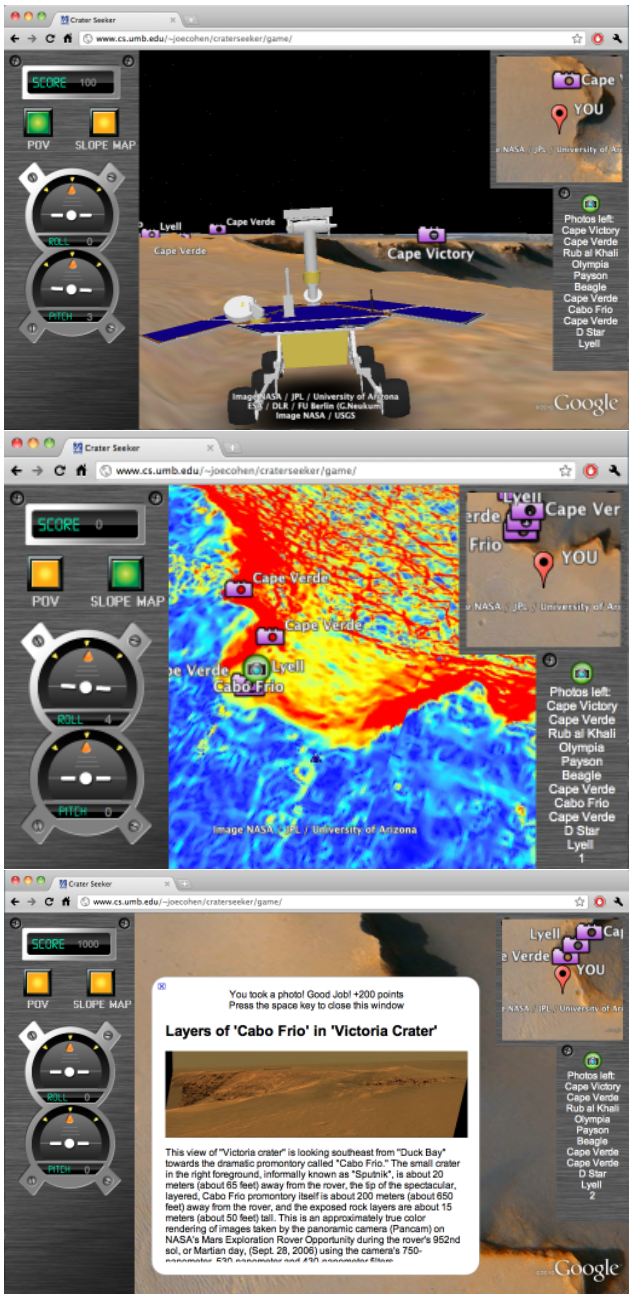

Figure 2: Top: CraterSeeker in Point of View mode, Middle: CraterSeeker with the Victoria Crater slope map turned on, Bottom: A photo has been found and the description is shown