Lunar and Planetary Mapping and Modeling with NASA's Solar System Trek Portals

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NASA's Solar System Trek online portals for lunar and planetary mapping and modeling provide web-based suites of interactive visualization and analysis tools to enable mission planners, planetary scientists, students, and the general public to access mapped data products from past and current missions for the Moon, Mars, and Vesta. Portals for additional bodies are in development. As web-based toolsets, the portals do not require users to purchase or install any software beyond current web browsers. A standardized interface provides 3D visualization and navigation, with keyboard controls allowing the user to maneuver a first-person visualization of "flying" across planetary surfaces. User-specified bounding boxes can be used to generate STL and/or OBJ files to create physical models of surface features with 3D printers. These portals are being used for site selection and analysis by NASA and a number of its international partners, supporting upcoming missions. During the past year, significant changes have been made to this suite of data visualization and analysis tools.

NASA's long-standing Lunar Mapping and Modeling Portal (LMMP) has now been replaced with a new, improved portal, Moon Trek (https://moontrek.jpl.nasa.gov). Moon Trek provides a suite of interactive tools that incorporate observations from past and current lunar missions, creating a comprehensive lunar research Web portal. The online Web portal allows anyone with access to a computer to search through and view a vast number of lunar images and other digital products. The portal provides easy-to-use tools for browsing, data layering and feature search, including detailed information on the source of each assembled data product and links to NASA's Planetary Data System. Interactive maps, include the ability to overlay a growing range of data sets including topography, mineralogy, abundance of elements and geology. Its visualization and analysis tools allow users to measure the diameters, heights and depths of surface features, perform analyses such as lighting and local hazard assessments including slope, surface roughness and crater/boulder distribution.

Mars Trek (https://marstrek.jpl.nasa.gov), the project's Mars portal, has been assigned by NASA's Planetary Science Division to support site selection and analysis for the Mars Human Landing Exploration Zone Sites. This effort is concentrating on enhancing Mars Trek with data products and analysis tools specifically requested by the proposing teams for the various sites. Also being given very high priority by NASA Headquarters is Mars Trek's use as a means to directly involve the public in these upcoming missions, letting them explore the areas the agency is focusing upon, understand what makes these sites so fascinating, follow the selection process, and get caught up in the excitement of exploring Mars. In this presentation, we will show some of the new enhancements to Mars Trek supporting human landing site selection, and discuss plans for future additions.

Vesta Trek (https://vestatrek.jpl.nasa.gov) utilizes data from the Dawn mission and is the first application of Trek technology to a small, irregular world.

This year, we began work on a mapping and modeling portal for Mars' moon, Phobos. We are coordinating this effort with the International Phobos/Deimos Landing Site Working Group, with landing site selection and analysis for JAXA's MMX mission as a primary driver.

The presentation will provide an overview of the current status of the portals that have been released, provide a preview of portals currently under development, and solicit input for future products and enhancements.

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