

Visualization and Analysis of Data from Small-Body Missions with NASA' s Solar System Treks Portals

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This presentation provides an overview of portals within NASA' s Solar System Treks Project (SSTP) that specifically target small bodies within our Solar System.

These portals each allow for visualization of different data products in 2D maps with various projections. They also allow users to conduct interactive 3D flyovers. The VR tool allows users to generate their own virtual reality flyovers for any user-defined paths along the bodies' surfaces. Other tools let users measure distances, generate elevation plots, and create 3D print files for user-defined regions or the entire body.

JAXA' s Hayabusa 2 mission recently completed a campaign of reconnaissance, sample collection, and rover deployment at the near-Earth asteroid (162173) Ryugu. JAXA is providing mission data to SSTP, which is incorporating it into the new Ryugu Trek portal (<https://trek.nasa.gov/ryugu>). The internationalized user interface features controls in both English and Japanese. The portal' s bookmarks feature takes users to particular areas of interest for more detailed looks at specific landforms and sites. On Ryugu, we focus on the surface sample site, impactor and sub-surface sample site, as well as landing sites and traverse paths for the HIBOU, OWL, and MASCOT rovers.

While Hayabusa2 was exploring Ryugu, NASA' s OSIRIS-REx mission began conducting a detailed examination of the asteroid (101955) Bennu, another near-Earth object. At the request of NASA' s Planetary Science Division and the OSIRIS-REx mission, SSTP began implementation a new portal for the asteroid Bennu, featuring data that is being returned from OSIRIS-REx. The Bennu Trek portal (<https://trek.nasa.gov/bennu>) reveals Bennu' s top-like shape, a fascinating commonality with Ryugu. It also reveals details of Bennu' s intensely boulder covered terrain. Bookmarked features include Nightingale, Sandpiper, Osprey, and Kingfisher, the top four candidates for sample collection.

In its investigations of Vesta and Ceres, NASA' s Dawn mission has returned spectacular data of the surfaces of these two prominent small bodies within the asteroid belt. This presentation will showcase the use of the Ceres Trek (<https://trek.nasa.gov/ceres>) and Vesta Trek (<https://trek.nasa.gov/vesta>) portals and demonstrate how they can be used to visualize and analyze particularly interesting landforms such as the pitted terrain on Vesta and relic cryovolcanoes on Ceres.

Under development at this time is a new portal for Mars' larger Moon, Phobos. This portal will make extensive use of data from ESA' s Mars Express. It is being designed in collaboration with JAXA to support Japan' s upcoming Martian Moons eXploration (MMX) mission. This presentation will provide a preview of a prototype for Phobos Trek.

Other Near-Earth asteroids being considered as candidates for future portals include (433) Eros utilizing data gathered by the NEAR Shoemaker mission, and (25143) Itokawa using data from JAXA' s Hayabusa mission. Together, a growing collection of small body Trek portals would enhance capabilities for comparative planetology among this fascinating class of objects.

All of these products are efforts in the NASA Solar System Treks Project, available at <https://trek.nasa.gov>. NASA's Solar System Trek online portals provide web-based suites of interactive data 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 a growing number of planetary bodies. These portals are being used for site selection and analysis by NASA and its international partners, supporting upcoming missions. In addition to demonstrating the capabilities of selected portals in this presentation, we will solicit input from the community for ideas for future enhancements to the portals.

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