

# **Titan Trek and IcyMoons Trek: Two New Online NASA Visualization and Analysis Portals for Saturn's Moons**

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## **Abstract**

Saturn's moons are the focus of two new online visualization and analysis tools produced by NASA. The Solar System Treks family of online portals provides a suite of interactive visualization and analysis tools. These enable mission planners, lunar scientists, engineers, students, and the general public to access mapped data products from past and current missions for a growing number of planetary bodies. They integrate data from a variety of instruments aboard a number of missions. This presentation will introduce two new portals in the Solar System Trek suite. Titan Trek highlights Saturn's largest moon, and IcyMoons Trek features a number of Saturn's other moons as studied by the Cassini mission.

## **1. Introduction**

This presentation will provide an overview of the uses and capabilities of NASA's Titan Trek and IcyMoons Trek online mapping and modeling portals, new additions to a web-based suite of data visualization and analysis tools designed to support mission planning, scientific research, and education/outreach.

## **2. An Integrated Family of Online Web Portals**

Titan Trek and IcyMoons Trek are two of the newest portals produced and released by NASA's Solar System Treks Project. The project is managed by NASA's Solar System Exploration Research Virtual Institute and developed at NASA's Jet Propulsion Laboratory. These tools enable mission planners, planetary scientists, and engineers to access mapped data products from a wide range of instruments aboard a variety of past and current missions, for a growing number of planetary bodies. Other Solar System Trek portals have been implemented for

bodies including the Moon, Mars, Vesta, and Ceres. Additional portals are in development, including a portal for Mars' moon Phobos.

The Cassini mission conducted multi-instrument investigations of the Saturn system. It sent back a valuable collection of data about those worlds. The Cassini mission commissioned NASA's Solar System Treks Project to implement two new online portals enabling integration, access, and dissemination of data gathered through the mission's investigations of Saturn's moons.

As web-based toolsets, the Titan Trek and Icy Moons Trek portals do not require users to install any software beyond current web browsers. They provide analysis tools that facilitate measurement and study of terrain including distance, height, and depth of surface features. They allow users to easily find and access the geospatial products that are available. Data include imagery from the VIMS and ISS cameras, as well as the RADAR synthetic aperture images, topography, derived physical parameters and community-sourced geological and hydrological mapping products.

Users have the ability to drill down to find the PDS data used to produce the geospatial products. Data products can be viewed in 2D and 3D, and can be stacked and blended together rendering optimal visualization that reveals details that no single data set can show. Data sets can be plotted and compared against each other. In addition to keyboard and mouse control, standard gaming and 3D mouse controllers allow users to maneuver first-person visualizations of flying across the moons' surfaces. The portals also provide users the ability to specify any area of terrain for generation of STL/OBJ files that can be sent to 3D printers to make 3D models. 3D prints and the data visualization capabilities of these portals are particularly valuable in engaging students, educators and general public to personally

explore the moons. In addition to the web portals, standard Application Programmable Interfaces (API) are available to facilitate access and dissemination of the data products to external applications and use.

### **3. Summary and Conclusions**

Investigators of Saturn's moons have powerful new visualization and analysis tools available to them with the release of the new Titan Trek and IcyMoons Trek portals. Individually, these portals enable detailed study of Saturn's moons by researchers, mission planners, educators, students, and the general public. As components of the Solar System Treks Project, with its growing number of planetary bodies represented, these new portals also facilitate comparative planetology studies between and among Saturn's moons, and between these moons and other bodies.

### **Acknowledgements**

The authors would like to thank the Cassini Mission, the Planetary Science Division of NASA's Science Mission Directorate, NASA's SMD Science Engagement and Partnerships, and the Advanced Explorations Systems Program of NASA's Human Exploration Operations Directorate for their support and guidance in the development of Titan Trek and IcyMoons Trek.