Cassini Prepares to Swoop by Saturn's Geyser-Spewing Moon

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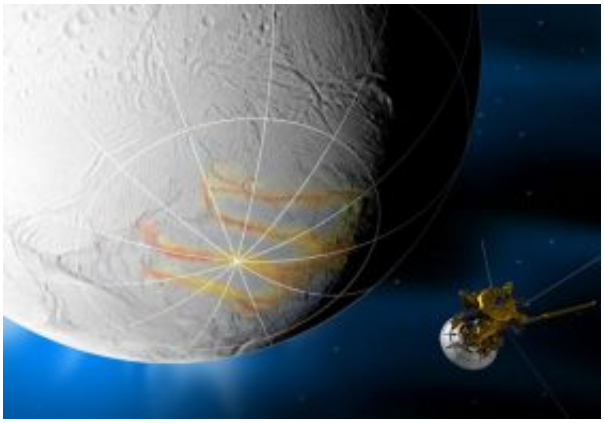

Artist concept of Cassini flying by Enceladus. Image credit: NASA/JPL

(PhysOrg.com) -- Fractures, or "tiger stripes," where icy jets erupt on Saturn's moon Enceladus will be the target of a close flyby by the Cassini spacecraft on Monday, Aug. 11.

Cassini will zoom past the tiny moon a mere 50 kilometers (30 miles) from the surface. Just after closest approach, all of the spacecraft's cameras -- covering infrared wavelengths, where temperatures are mapped, as well as visible light and ultraviolet -- will focus on the fissures running along the moon's south pole. That is where the jets of icy water vapor emanate and erupt hundreds of miles into space. Those jets have fascinated scientists since their discovery in 2005.

"Our main goal is to get the most detailed images and remote sensing data ever of the geologically active features on Enceladus," said Paul Helfenstein, a Cassini imaging team associate at Cornell University in Ithaca, NY. "From this data we may learn more about how eruptions, tectonics, and seismic activity alter the moon's surface. We will get an unprecedented high-resolution view of the active area immediately following the closest approach."

Seeing inside one of the fissures in high resolution may provide more information on the terrain and depth of the fissures, as well as the size and composition of the ice grains inside. Refined temperature data could help scientists determine if water, in vapor or liquid form, lies close to the surface and better refine their theories on what powers the jets.

Imaging sequences will capture stereo views of the north polar terrain, and high resolution images of the south polar region will begin shortly after closest approach to Enceladus. The image resolution will be as fine as 7 meters per pixel (23 feet) and will cover known active spots on three of the prominent "tiger stripe" fractures.

In addition to mapping the moon's surface in visible light as well as infrared and ultraviolet light, Cassini will help determine the size of the ice grains and distinguish other elements mixed in with the ice, such as oxygen, hydrogen, or organics.

"Knowing the sizes of the particles, their rates and what else is mixed in these jets can tell us a lot about what's happening inside the little moon," said Amanda Hendrix, Cassini ultraviolet imaging spectrograph team member at NASA's Jet Propulsion Laboratory, Pasadena, Calif.

Other instruments will measure the temperatures along the fractures, which happen to be some of the hottest spots on the moon's surface.

"We'd like to refine our numbers and see which fracture or stripe is hotter than the rest because these results can offer evidence, one way or the other, for the existence of liquid water as the engine that powers the plumes," said Bonnie Buratti of JPL, team member on Cassini's visual and infrared mapping spectrometer.

Cassini discovered evidence for the geyser-like jets on Enceladus in 2005, finding that the continuous eruptions of ice water create a gigantic halo of ice and gas around Enceladus, which helps supply material to Saturn's E-ring. This marks Cassini's second flyby of Enceladus this year. During Cassini's last flyby of Enceladus in March, the spacecraft snatched up precious samples and tasted comet-like organics inside the little moon. Two more Enceladus flybys are coming up in October, and they may bring the spacecraft even closer to the moon. The Oct. 9 encounter is complimentary to the March one, which was optimized for sampling the plume. The Oct. 31 flyby is similar to this August one, and is again optimized for the optical remote sensing instruments.

Provided by NASA