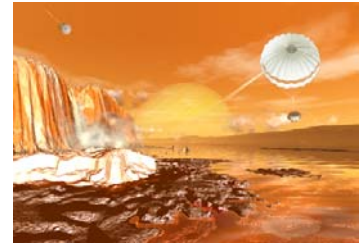


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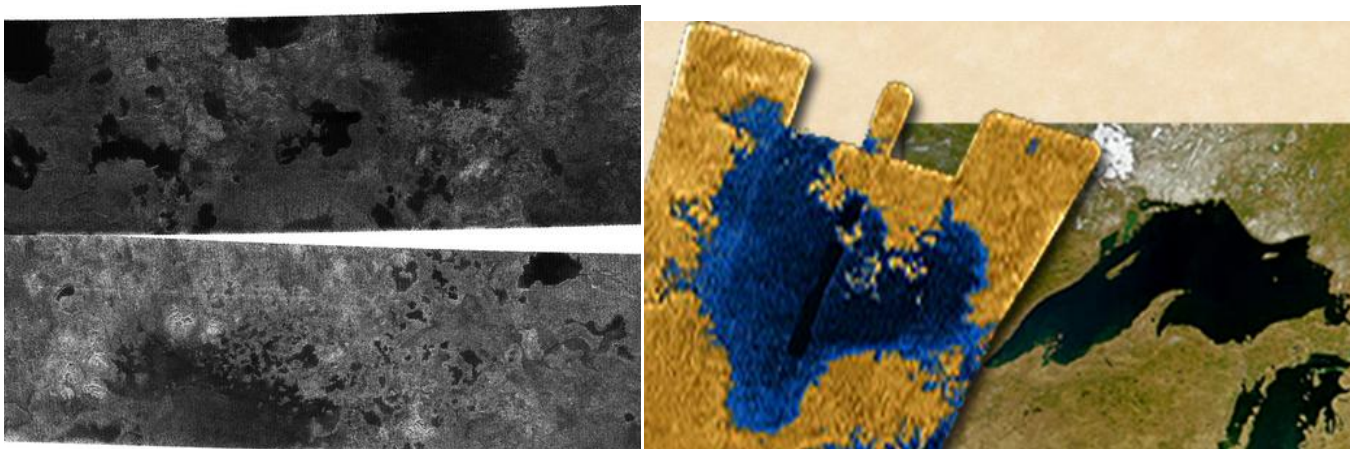
Exploring the Surface of Titan with *Cassini-Huygens*

Elizabeth P. Turtle
April 17, 2007

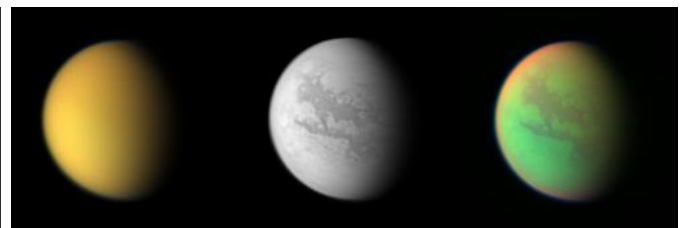
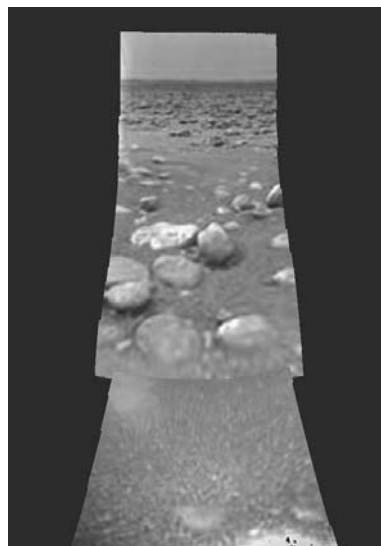


Titan (artist's conception)

Saturn's moon, Titan, is unusual amongst the other moons of the Solar System. It has been known to have an atmosphere denser than that of Earth for decades now, but we finally have a spacecraft in Saturn orbit that is gradually revealing details of this very strange place.



“Lakes” on Titan? The *Cassini* spacecraft carries a radar system used to “image” the surface of Titan. Smooth surfaces, such as lakes, reflect the radar signal away from the spacecraft, making the surface look dark. The image pair on the left shows a number of dark, smooth features that, when processed (right), prove to be comparable in size to large lakes on Earth (Lake Superior is shown on the right, at the same scale). Note that the shape of the shorelines on Titan resembles the shape of terrestrial shores, complete with flooded fjord-like tributaries. But what are the lakes made of? Titan is too cold for lakes of water! Some sort of hydrocarbon fluid may be the best candidate; imagine, lakes of ethane or methane!



Views of Titan

Left: Orbital radar view of Titan, showing linear features interpreted as *dunes* (Mars and Earth have dunes, too)

Middle: Surface view from the *Huygens* landing site.

“Rocks” in foreground are a few inches across.

Above: Titan's atmosphere and clouds are opaque to visible light, making Titan look pretty bland to the eye (left). The middle view shows Titan in the near-infrared, where the atmosphere is clear enough to reveal smooth areas. The same data are shown in “false-color” on the right.



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Who Were the Namesakes of the Cassini Spacecraft and the Huygens Probe?



Giovanni Cassini

Christiaan Huygens

Giovanni Domenico Cassini was an engineer, a hydraulics expert, and an astronomer. Among his discoveries were the accurate determination of the length of the martian day and the discovery in 1675 of a division, or gap, in Saturn's ring system that now bears his name. Cassini produced an outstanding map of the Moon, and discovered Saturn's moons Iapetus (1671), Rhea (1672), Tethys (1684), and Dione (1684).

Christiaan Huygens was a Dutch mathematician, a protégé of Rene Descartes. Huygen's specialties were parabolas, catenaries, and other exotic curves, but he also invented the first practical pendulum clock. He also ground lenses and built telescopes, one of which he used to discover Saturn's moon, Titan, in 1655.

What about "Titan?" In mythology, the Titans were a race of giants that pre-dated the deities of Olympus, the sons and daughters of Uranus (the Sky) and Gaia (the Earth). The Titans and their offspring are namesakes of a number of Solar System objects, including Saturn and its moons Tethys, Phoebe, Rhea, and Iapetus. At its discovery, Titan was thought to be the largest satellite in the Solar System, so its name was doubly appropriate, both by its association with Saturn and by its size. [The Titans also gave their name to the element titanium and to the word "titanic."]



Image: DASA, Germany

Diagram of the *Cassini* spacecraft (left) and a picture of the *Huygens Titan Probe* (above).

Images in this document from JPL *Cassini* website



Our Speaker

Elizabeth P. Turtle is a planetary scientist at the Johns Hopkins University Applied Physics Laboratory, and is a member of the *Cassini* Imaging Team.

References

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