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First Ever Topographic Map of Titan Produced

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Titan, the largest of Saturn’s natural satellites and the only moon in the solar system with a dense atmosphere, is a fascinating little place. Peering through its thick orange clouds may not be the easiest of tasks, but a team of planetary scientists using NASA’s Cassini spacecraft have created the first full topographical map of its surface — created using radar measurements. Knowing more about the surface of this smoggy moon is invaluable in understanding how it works, and what processes are occurring on its surface. Our knowledge of Mars was revolutionized by measurements made with the Mars Global Surveyor (MGS), and now it’s Titan’s turn.

[**Top 10 Places To Find Alien Life**](http://news.discovery.com/space/alien-life-exoplanets/top-10-places-to-find-alien-life-130130.htm) Titan is one of the most active and interesting places in the solar system. Just like Earth, it has both geological and hydrological processes, as well as complex weather systems. Also just like Earth, all of these processes can be affected by the topography of Titan’s surface. One interesting thing about Titan is that it’s surprisingly flat. The topographic range (i.e. the range from the highest point to the lowest point) of Titan’s surface is just 2.5 kilometers (1.5 miles). The highest point on the surface of the entire moon is only about half a kilometer above the average. Just to put that into perspective, [**mountains on other planets**](http://en.wikipedia.org/wiki/List_of_tallest_mountains_in_the_Solar_System) are dramatically larger than this. Maxwell Montes on Venus is 6.4 km (4 mi) high, Mount Everest here on Earth is 8.5 km (5.3 mi) high, and Olympus Mons on Mars is a staggering 21.9 km (13.6 mi) high!

[**BIG PIC: Titan’s ‘Nile River’ Discovered**](http://news.discovery.com/space/titans-nile-river-discovered-121212.htm) The reason for Titan’s flat surface isn’t entirely clear. It could be that the icy crust on Titan isn’t strong enough to support tall mountains. Or possibly, the weather systems in the dense atmosphere erode away any taller peaks. It’s hard to say for certain. Titan’s crust and geography are all composed of water ice instead of rock and the rain on Titan is composed of liquid hydrocarbons — we still know relatively little about how a system like this works. Another interesting thing about Titan is that it appears to be bulging in the middle. The highest points on the moon’s surface are at its equator, quite near the points where the moon faces directly towards, and directly away from Saturn — Titan is tidally locked, so one side is constantly facing towards its gassy-ringed parent planet. This bulge in the middle explains why most of the rivers on Titan flow towards the world’s poles. The new map also shows a dry basin in Titan’s southern hemisphere. There’s a good chance this was once a sea, thousands of years ago when humans were still in the process of migrating out of Africa. The climate on Titan changes gradually over time so, while most of the hydrocarbon lakes and seas are currently in the northern hemisphere, the south used to be much wetter.

[**NEWS: The ‘Tropical’ Lakes of Saturn’s Moon Titan**](http://news.discovery.com/space/astronomy/tropical-lakes-found-on-saturns-moon-titan-120614.htm) Interestingly, as well as seas, Titan also has deserts. Sand seas are seen all across this hazy moon. Some of these are trapped in basins, while others are spread across wide open plains, where they’re shaped by Titan’s winds as well as the contours of its landscape. Unfortunately, this new map of Titan is only a topographic map, and not a complete map. A similar map of Earth would show mountain ranges and land masses, giving a good impression of our planet’s surface, but with no details. With a topographic map of Earth, we wouldn’t be able to pick out any fine details, and smaller landmasses like Japan, Madagascar, or New Zealand would be missed entirely. Unfortunately, as exciting as it is to finally have a cohesive topographic picture of Titan’s surface, we’re still lacking the vital details we have of the surfaces of nearer worlds like Mars and Venus. For that, we may have to wait until the next craft is sent to orbit Saturn’s giant moon. *Whenever that may be.*