Success! Cassini flies by Titan, collects intel on mysterious lakes

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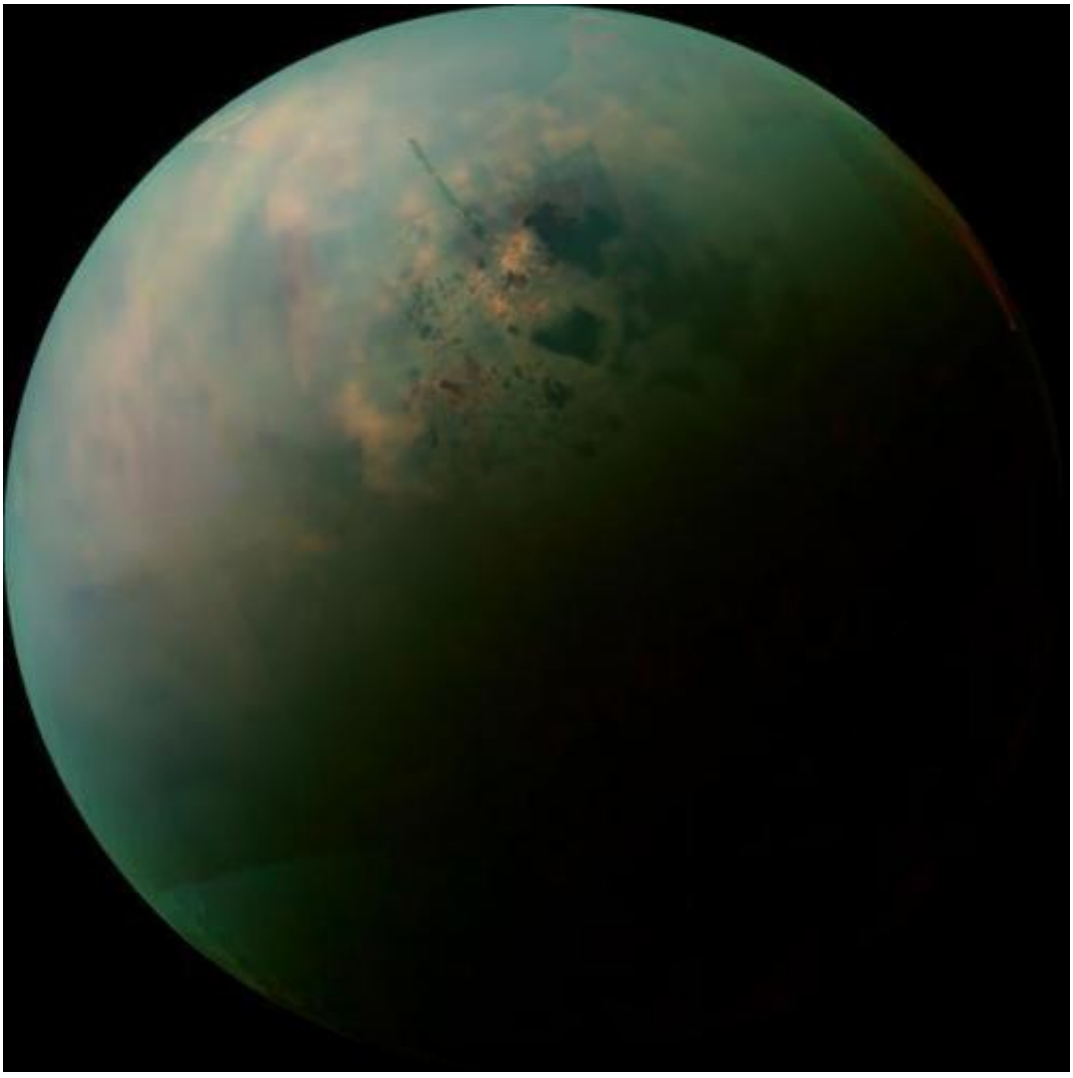

Credit: NASA/JPL-Caltech/University of Arizona/University of Idaho

NASA's Cassini mission flew past Titan early Wednesday morning, successfully completing a complex maneuver that will help scientists better understand one of the solar system's most intriguing moons.

Beginning around midnight, a team of scientists and engineers guided the spacecraft into an orbit that allowed them to bounce a radio signal off the surface of Titan toward Earth, where it was received by a land-based telescope array 1 billion miles away.

"We are essentially using Titan as a mirror," said Essam Marouf of San Jose State University, who's a member of the Cassini radio science team. "And the nature of the echo can tell us about the nature of Titan's surface, whether it is liquid or solid, and the physical properties of the material."

Saturn's moon Titan is the second-largest moon in the solar system after Jupiter's moon Ganymede, and in some ways it's one of the most Earth-like bodies we have encountered. Like Earth, it has a thick atmosphere, and it is the only other world we know of that has a system of liquid lakes and seas on its surface.

However, unlike Earth, its surface is far too cold to sustain liquid water.

Scientists have hypothesized that Titan's famous lakes and seas are made of liquid methane or ethane, but Marouf explains that those inferences are mostly based on the fact that methane and ethane would take on a liquid state in the conditions on Titan, rather than direct observation.

"There is no really direct measurement that tells us what they are exactly," he said. "If the data from this morning is good enough, it will tell us what these liquids really are."

From 11:30 Tuesday evening to 11 Wednesday morning, Marouf

gathered with other members of Cassini's radio science team in a control room at the Jet Propulsion Laboratory in La Canada Flintridge near downtown Los Angeles, watching as the new data were received by a radio telescope array in Australia.

He said they could not analyze the data in real time, but they were able to tell that the signal was clear enough to give them something to work with.

Cassini performed a similar experiment on Saturn's surface on May 17 that was also a success. That time, the researchers were able to collect information from two of the largest bodies of liquid on Titan: Ligea Mare and Kraken Mare.

This time, Cassini bounced its radio signal off an area between the two seas where radar images had found smaller liquid regions similar to rivers, lakes and channels on Earth.

"This kind of experiment takes a meticulous kind of preparation to first know where to look, and then design the maneuvers," Marouf said. "There are many pieces that have to work flawlessly to end up with the data."

He said the team hopes to look over the data this week and share its early results at a Cassini science team meeting next week in the Netherlands.