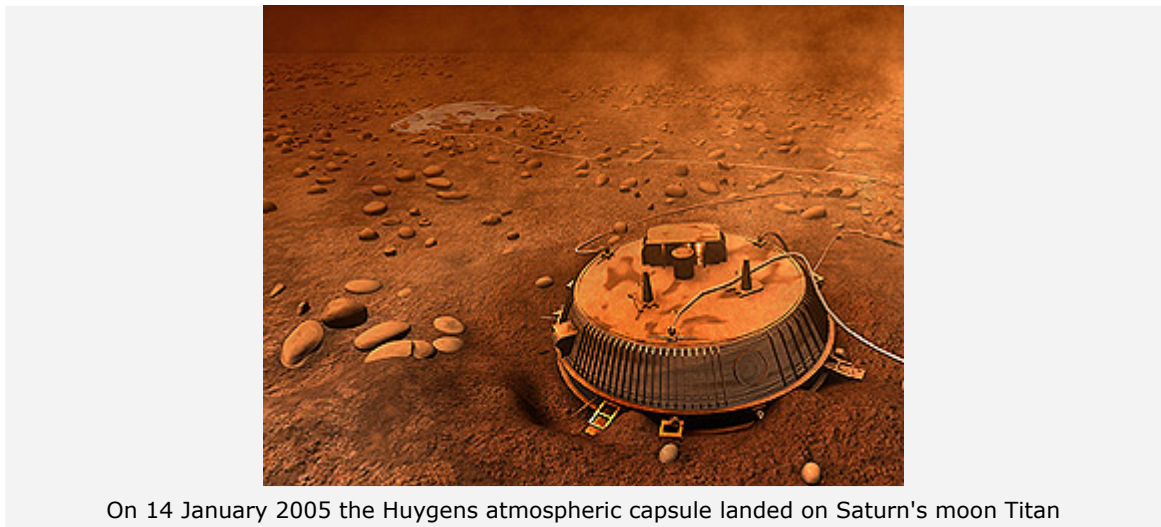


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Milestones in space: Five years ago the European Huygens space probe landed on Saturn's moon Titan

14 January 2010

Results of the current Cassini-Huygens mission are documented in two books – DLR scientists map the icy moons and describe their geology



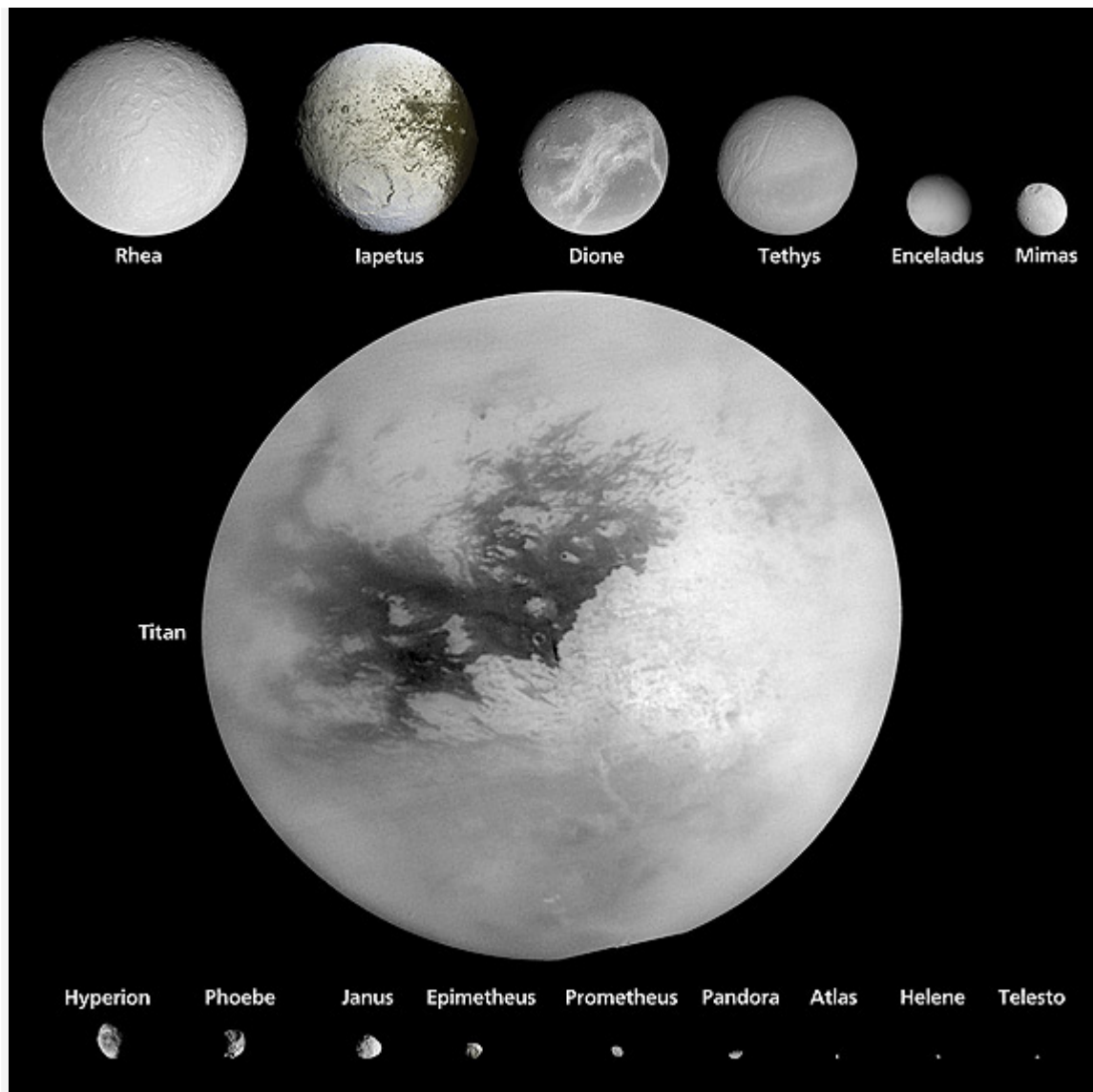
On 14 January 2005 the Huygens atmospheric capsule landed on Saturn's moon Titan

Five years ago, on 14 January 2005, the Huygens probe floated through the atmosphere of Saturn's moon Titan suspended on parachutes and, two-and-a-half hours later, landed gently on the surface, which is at a temperature of minus 180 degrees Celsius. From there, it transmitted several hours of measurement data to the Cassini mother probe. Two new books, in which scientists from the German Aerospace Center (Deutsches Zentrum für Luft- und Raumfahrt; DLR) have had significant involvement, bring together the results of the Huygens landing and the first four years of the Cassini spacecraft in orbit around Saturn.

The volumes 'Saturn from Cassini-Huygens', edited by Michele Dougherty, Larry Esposito and Stamatios M. Krimigis and published by Springer Dordrecht Verlag (Heidelberg, London, New York, 2009), and 'Titan from Cassini-Huygens', edited by Robert Brown, Jean-Pierre Lebreton and Hunter Waite and published by Springer Dordrecht Verlag (Heidelberg, London, New York, 2010), set the standard for Saturn research in the coming decade.

The bold manoeuvre of the Huygens probe was also the first landing of a space probe on a body in the outer Solar System. It took almost 90 minutes for radio signals to travel the 1.4 billion kilometres back to Earth. When the measurements from the experiments, the pictures of the probe's descent and, finally, of the surroundings of the landing site arrived in Darmstadt, there was no end to the celebrations. In amazement, the scientists and over a hundred media representatives looked at the branching system of valleys through which ice-cold liquid hydrocarbons must have flowed. Blocks of ice, rounded by a flowing medium, lay in front of the probe. "The Huygens landing represented an exceptional success for European space exploration, and, above all, planetary research," Prof. Ralf Jaumann, from the DLR Institute of Planetary Research in Berlin, recalls.

Cassini-Huygens – journey to the alien, icy place that is the outer Solar System

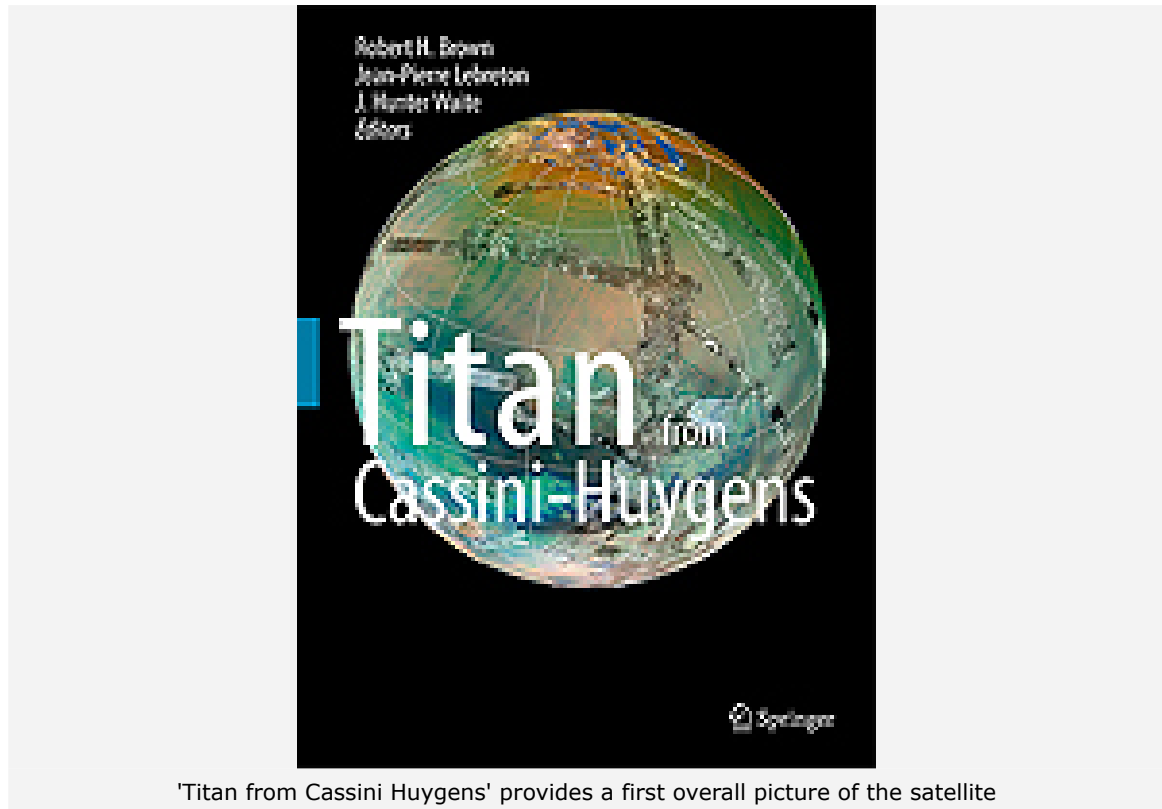


The 16 largest moons of Saturn shown to scale

"Since its arrival at Saturn in mid-2004, Cassini-Huygens has probably been the most exciting project in current planetary research – the mission, with its twelve experiments, keeps us in a constant state of excitement," Prof. Jaumann reports. "This mission has given us a much more precise picture of this alien region of giant gaseous planets in the outer Solar System – and their icy moons. Many things are new and unfamiliar, but the basic geological processes are similar to those on Earth - even if the ingredients are exotic," the planetary geologist and Cassini expert explains. Since 4 July 2004, Cassini has orbited Saturn more than 120 times. Another close Titan flyby, at a distance of 955 kilometres, occurred on 12 January 2010.

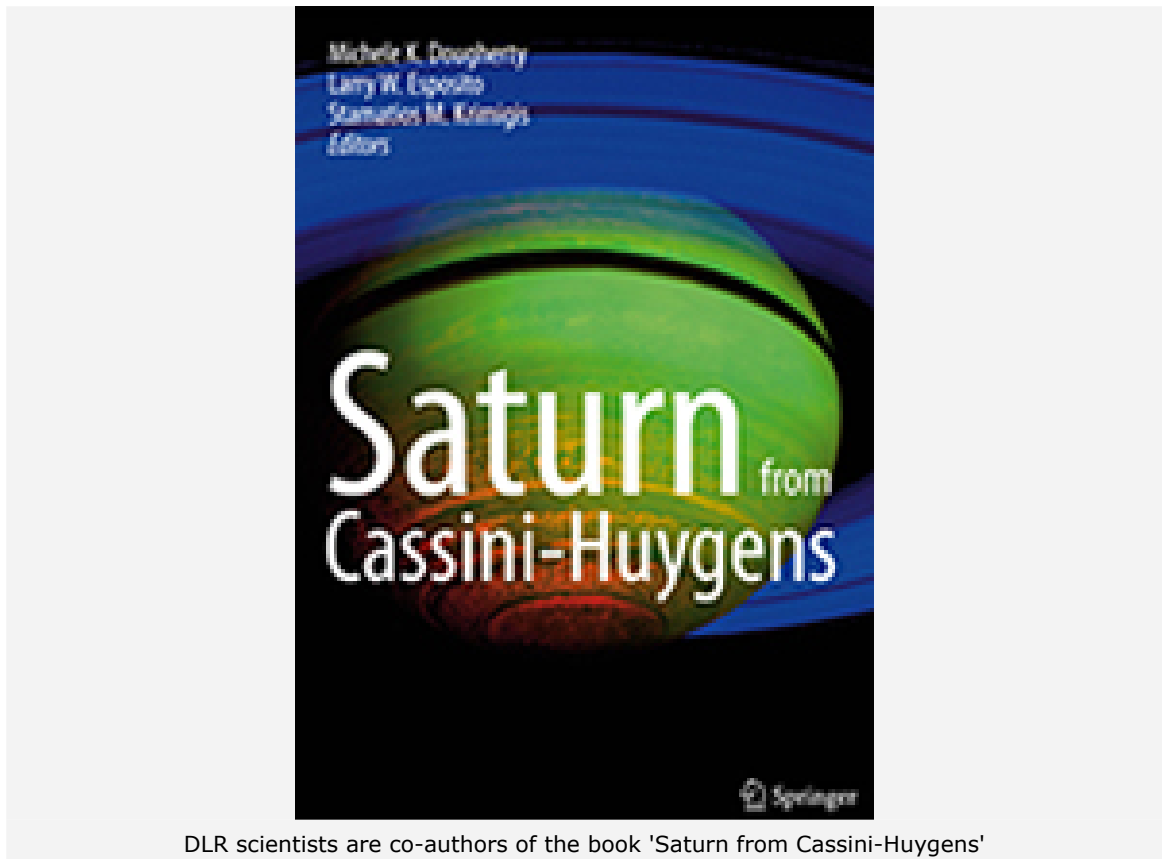
Other than Earth, Titan is the only body in the Solar System that has liquids on its surface. Its thick nitrogen atmosphere hides 'lakes' of liquid hydrocarbons such as methane and ethane. These hydrocarbons circulate like water on Earth in a cycle of evaporation, rain and drainage systems. DLR researchers recently demonstrated for the first time that a very large lake in Titan's north polar region is filled with liquid hydrocarbons.

Two books combine the collected knowledge into a new picture of the Saturn system



'Titan from Cassini Huygens' provides a first overall picture of the satellite

The Cassini probe and the landing of the Huygens atmospheric capsule on Titan are the basic elements of the joint American and European Cassini-Huygens mission. Both space probes have literally redrawn the picture of this mysterious moon. The book 'Titan from Cassini-Huygens' presents for the first time an overall picture of Titan using the knowledge acquired from the Huygens landing and the Cassini flybys.

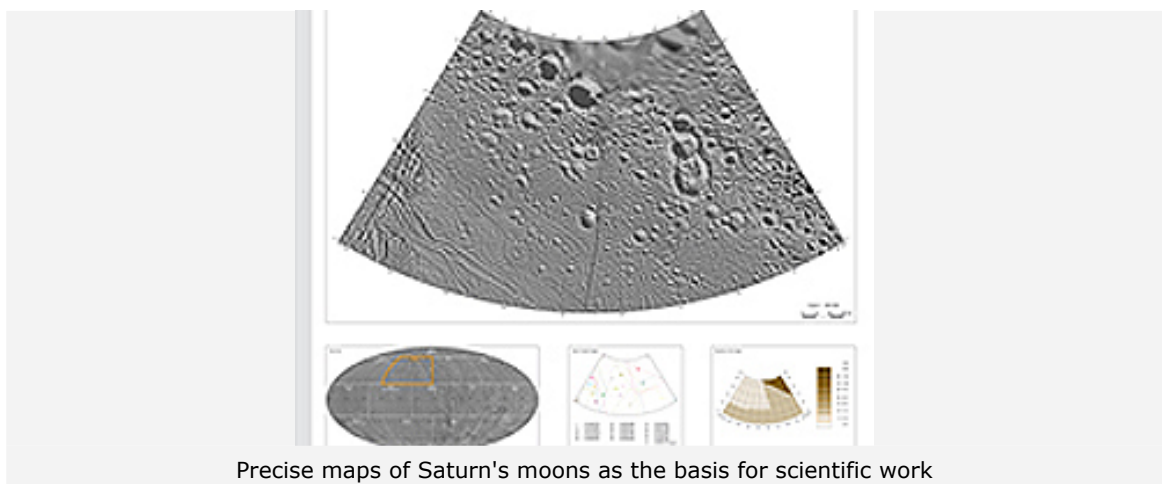


DLR scientists are co-authors of the book 'Saturn from Cassini-Huygens'

'Saturn from Cassini-Huygens' was published in parallel, drawing together on 805 pages the results of the Cassini orbiter's journey around Saturn, its rings and the other icy moons. More than 250 scientists from the USA, Europe and many other countries are directly involved with Cassini and Huygens. Now, these scientists have published for the first time all the results obtained since the arrival of the two probes.

DLR scientists were responsible for describing the geology of the icy moons – with the emphasis on Titan – as well as mapping the nine large icy moons. "Precise maps of all these bodies are one of the most important requirements for finding the answers to scientific questions," Prof. Jaumann explains. "Researchers can use them to investigate the scope of ice volcanism on mysterious Enceladus, how the strange light-dark division on the surface of Iapetus might be explained, why this moon has an up to 20-kilometre high mountain range along its equator, what causes the peculiar cracks on Tethys, Dione and Rhea, or how the 'lakes' on Titan are geographically distributed – to name but a few of the innumerable exciting topics."

Ali Baba: DLR cartographers use names from 'Arabian Nights' for new structures



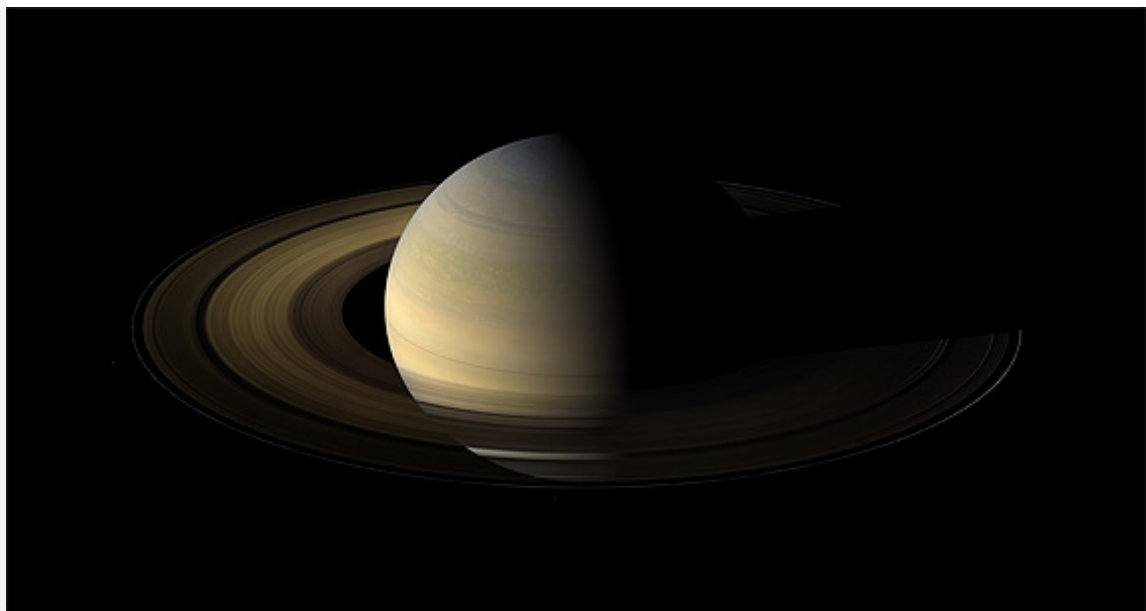
Precise maps of Saturn's moons as the basis for scientific work

The atlases for the large icy moons are being created under the direction of DLR physicist Dr Thomas Roatsch, using the images from the Cassini camera system. "We are constantly improving the maps of the moons," Dr Roatsch explains, "because the long duration of the mission means that there are repeated close flybys. These regularly give us new, detailed image data."

More precise pictures and maps reveal new surface phenomena. In planetary cartography, these are assigned names in accordance with specific rules made by the International Astronomical Union (IAU). "For Enceladus, characters and places from Arabian Nights were chosen for this purpose," Roatsch explains. So there is one map for the area of the northern polar region, for example, which is called Sindbad following DLR proposals and there are regions with the names Shahrazad (Scheherazade) and Ali Baba.

Cassini Saturn mission remains in 'equinox phase' until September - multi-year extension envisaged

Currently 61 moons of Saturn are known. Most of these moons are blocks of ice just a few kilometres across, but Titan, with a diameter of 5,150 kilometres, is the second largest satellite in the Solar System after Jupiter's moon Ganymede, and the only one with a dense atmosphere. It is, therefore, one of the most interesting objects in planetary research.



Equal length of day and night on Saturn: the start of spring in the northern hemisphere

Cassini-Huygens is a joint project of NASA, the European Space Agency (ESA) and the Italian space agency ASI. The Jet Propulsion Laboratory (JPL) in Pasadena (California) is carrying out the mission for the NASA Science Directorate. The Cassini orbiter was designed, developed and built at JPL.

In Germany, DLR, the Max Planck Society (Max-Planck-Gesellschaft; MPG), several universities and the German aerospace industry are scientifically involved in this mission. The main German contribution to the experiments on the Cassini orbiter consists of the provision of the cosmic dust analyser to investigate minute particles in space. The dust analyser investigates electrical charge, speed, course, mass and chemical composition. The mechanical components of the instrument were manufactured at DLR in Berlin under the direction of Dr Franz Lura.

Germany's financial contribution to the mission is about 120 million Euro. In this context, the DLR Space Agency has continuously supported the German contributions with funds from the federal government. The mission was extended for the first time in mid-2008 and christened 'Cassini Equinox Mission' because of the period on Saturn when day and night are equally long; it will officially end in September 2010. Further extensions of the mission are in prospect - until 2017 - and are being intensively prepared by NASA and the scientists involved.

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