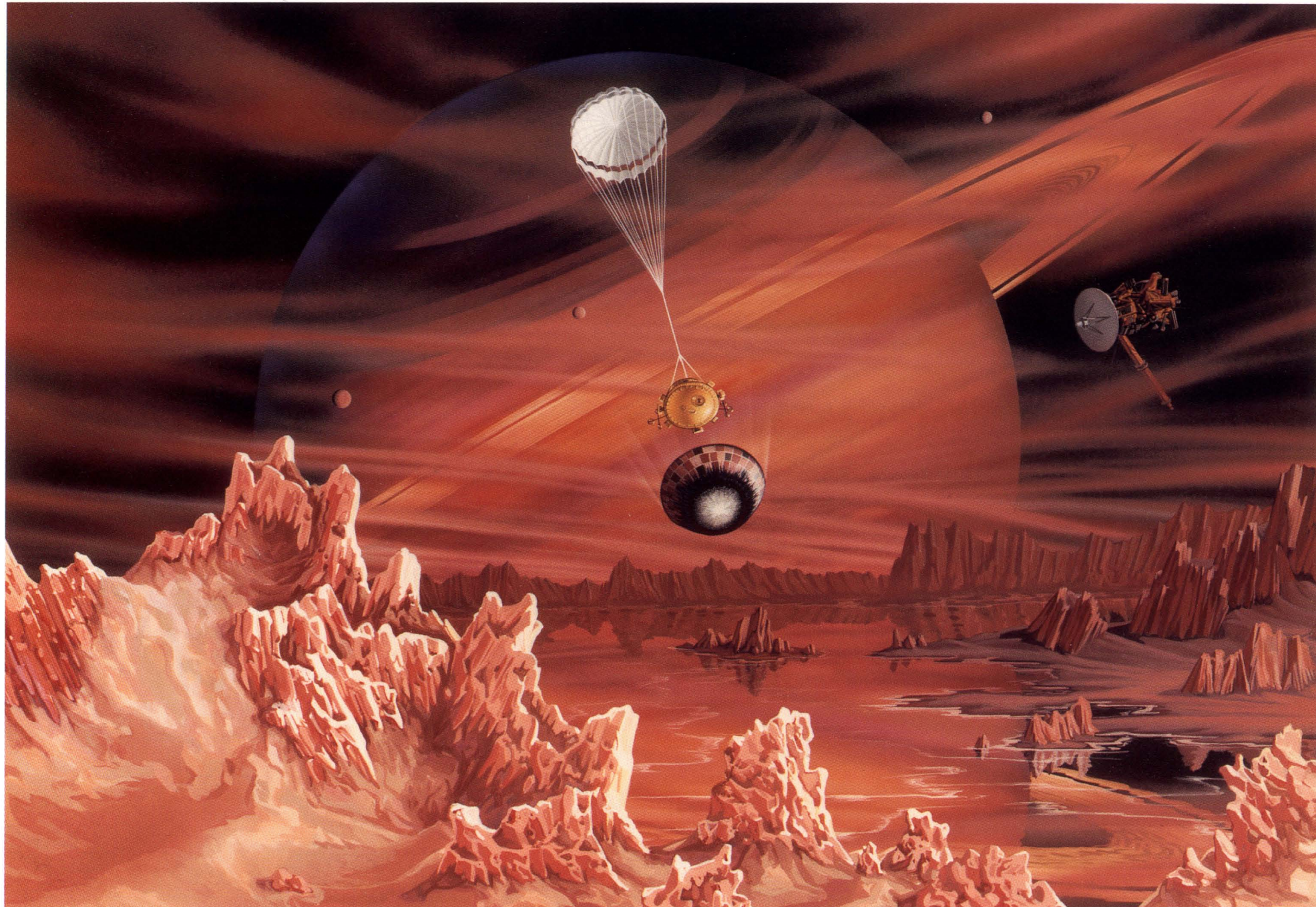




National Aeronautics and
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Jet Propulsion Laboratory
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Pasadena, California

The Cassini Mission to Saturn and its Moon Titan





In this artist's rendering, the European-provided Huygens probe parachutes through the atmosphere of Saturn's moon Titan after being released by the Cassini orbiter. The orbiter will receive the probe's data, transmit the findings back to Earth, and then explore Saturn's vast realm for nearly four years.

Exploring the Complex Saturnian System

In October 1997, a robotic spacecraft will begin a seven-year journey to reach Saturn, some 1.4 billion kilometers from Earth. Once at Saturn, the spacecraft will explore the planet's atmosphere and interior, and its system of dramatic rings, magnetosphere, numerous icy satellites, and the intriguing Titan.

The Cassini mission is an international venture involving the National Aeronautics and Space Administration (NASA), the European Space Agency (ESA), and the Italian space agency (Agenzia Spaziale Italiana, or ASI) — as well as several European academic and industrial partners. Managed for NASA by the Jet Propulsion Laboratory of the California Institute of Technology, Cassini is developing a spacecraft with a complement of sensors to conduct 27 different scientific investigations. The two-story-tall spacecraft consists of a Saturn orbiter

and the ESA-built Huygens Titan probe. At launch, the orbiter will have a mass of nearly 5300 kilograms, over half of which will be propellant for trajectory control. The mass of the Titan probe, which has a diameter of 2.7 meters, is roughly 350 kilograms.

The mission is named in honor of the 17th-century French-Italian astronomer Jean Dominique Cassini, who discovered the prominent gap in Saturn's main rings, as well as the icy moons Iapetus, Rhea, Dione, and Tethys. The Titan probe is named in honor of the Dutch scientist Christiaan Huygens, who discovered Titan in 1655, then announced four years later that the strange Saturn "moons" seen by the Italian astronomer Galileo Galilei in 1610 were actually a system of rings surrounding the planet. Huygens was also famous for his invention of the pendulum clock — the first accurate timekeeping device.

Titan, which is slightly larger than the planet Mercury, has an atmosphere denser than Earth's. This brownish-orange, hazy atmosphere consists of nitrogen, methane, and a complex array of carbon-based molecules. Hidden below Titan's atmosphere is a frigid surface that may contain lakes of liquid ethane over a thin layer of frozen methane and ammonia, below which is probably a mantle of frozen water ice. In the atmosphere, nitrogen and

methane molecules are bombarded by high-energy particles and ultraviolet light, creating organic molecules that clump together and rain down on Titan's surface. In many ways, the chemical processes occurring on Titan today may resemble the organic chemistry of early Earth — although the extremely cold conditions on the moon make the development of life there unlikely.

The Cassini mission is part of NASA's program to systematically explore the solar system. Cassini's exploration of the Saturnian system from 2004 to 2008 is expected to shed light on issues ranging from the origin of the solar system to the beginning of life on Earth — inspiring young and old alike to learn more about science. Besides the promise of these scientific returns, Cassini offers an opportunity for international cooperation, as well as a focus for new technology developments like innovative computer microcircuits, solid-state recorders and power switches, and gyroscopes without moving parts.