

The Cassini/Huygens Mission to Saturn and Titan

Robert T. Mitchell
Jet Propulsion Laboratory
California Institute of Technology
Pasadena, California
USA

Cassini/Huygens is a joint United States NASA , European Space Agency, and Italian Space Agency mission to Saturn to perform a detailed investigation of the Saturnian system, including Saturn's rings, magnetosphere, atmosphere, and internal structure, as well as to study Saturn's large moon Titan and the numerous smaller icy satellites. Huygens is the name of the ESA provided atmospheric probe that will enter the atmosphere of Titan, descend to the surface, and return scientific data to the Cassini orbiter passing overhead. The combined Cassini Orbiter and Huygens Probe spacecraft was launched on 15 October 1997, and is now well into its third year of flight on its nearly seven year trajectory to Saturn.

Because of the long transit time from launch to arrival at Saturn, a substantial development effort covering flight and ground software and the design of operational plans and processes is being implemented during the cruise phase. In addition, a fairly active plan of instrument and engineering subsystem maintenance, instrument checkout and calibration, and the return of science data where opportunities exist has made the cruise phase of the mission a very busy and productive one.

This paper summarizes the principal accomplishments of the Cassini/Huygens mission over the past year, which include a complete reload of the flight software on the spacecraft, including that of most of the orbiter science instruments, the final definition of the exact orbital tour to be flown at Saturn, and considerable progress in designing the sequence of science observations to be made in the tour. The activities leading to completing the science plan prior to arrival at Saturn in '04 are presented in detail. Another significant event, the flyby of Jupiter in December, 2000 for the final gravity assist needed on the way to Saturn, and the planned science observations during this encounter, are described.