



MYSTERIOUS TITAN

**Brought to you by TOST
(Titan Orbiter Science Team)**

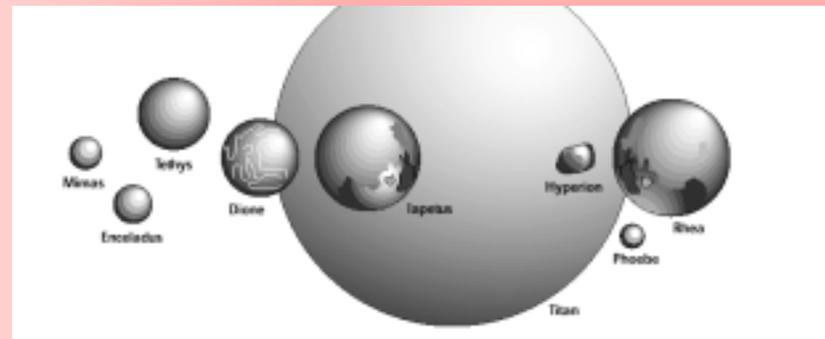


May 2004

INTRODUCTION

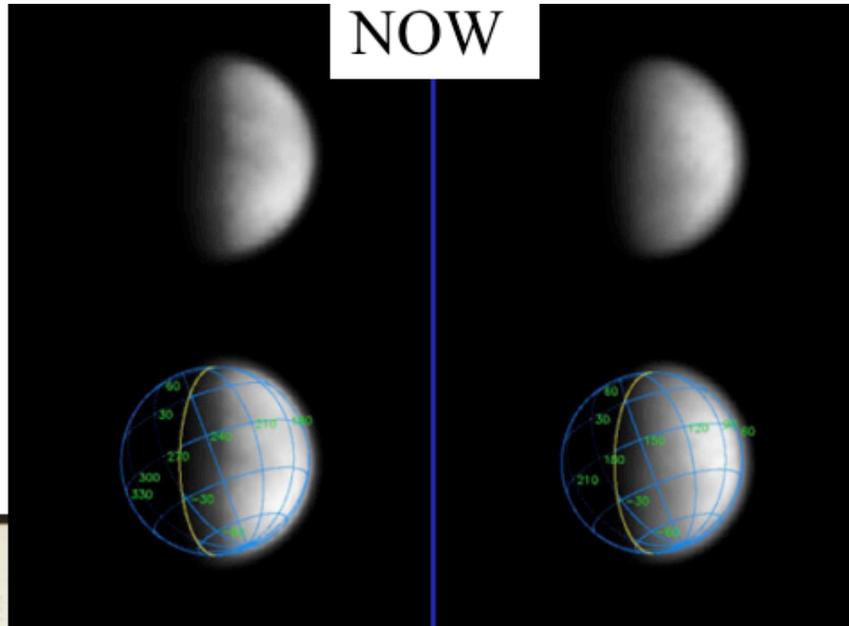
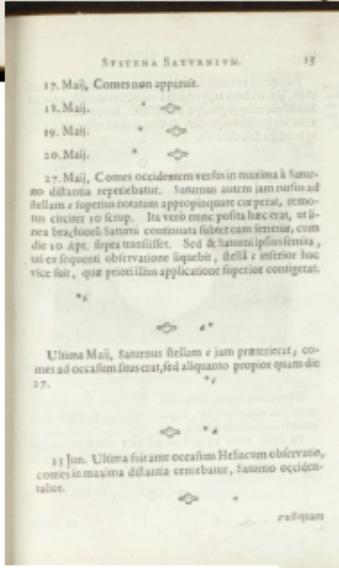
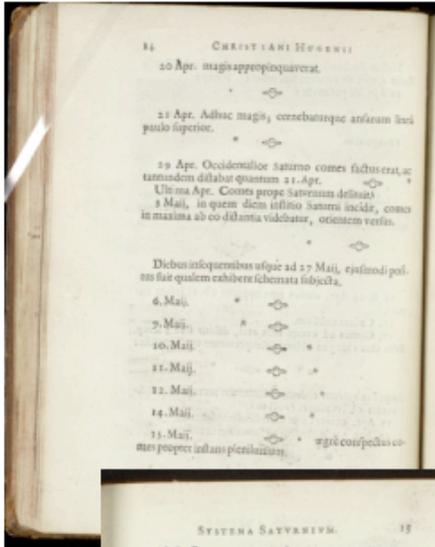


- Titan is the largest of Saturn's moons, and is the second largest moon in the solar system. Titan is a complex world more similar to a terrestrial planet than a typical outer planet moon.
 - Titan's orbit carries it in and out of Saturn's magnetosphere
 - Its surface is hidden by a thick nitrogen-rich atmosphere
 - Methane in the atmosphere participates in sunshine-driven chemistry which has produced a photochemical smog
 - Titan's hidden surface may have exotic features: mountains sculpted by hydrocarbon rain, rivers, lakes and "waterfalls" of flammable liquids
 - Water and ammonia magma may occasionally erupt, spreading across the surface, creating exotic landscapes

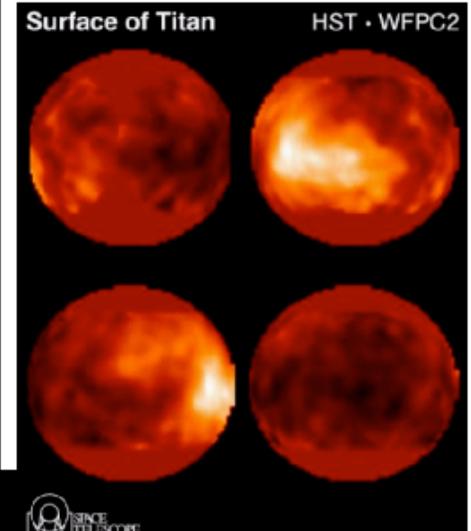




Titan Observations- through time



Recent...



Long ago...

Not so long ago...



TOST Summary



- 46 Titan flybys
 - Scattered throughout the tour but 2006 and 2007 are the heaviest
 - T0 July 1 2004 (350,000 km) flyby - hours after SOI
 - TA Oct of 2004 - first RADAR SAR image
 - TB Dec of 2004 - ORS flyby
 - Huygens mission Jan 2005
- Mainly ORS observations during the inbound and outbound time wings
 - Closest approach varies between RADAR observations of the surface, ORS observations of the surface, limb, or upper atmosphere, Radio Science occultations and bi-static observations, or INMS in-situ observations of the atmosphere.
- Pushing the spacecraft
 - Over half of the Titan flybys are on thrusters (hydrazine usage is an issue)
 - Power modes during Radio Science experiments usually unique
 - Attitude profile during a Titan flyby is ambitious
 - Always fill both SSRs!
- 4 broad science themes:
 - Interior Structure
 - Surface Characterization
 - Atmospheric Properties
 - Magnetospheric Interactions



SUMMARY



THE EXPLORATION OF TITAN IS AT THE VERY HEART OF THE CASSINI / HUYGENS PLANETARY MISSION.

TITAN IS THE SOLE FOCUS OF THE HUYGENS PROBE AND ONE OF THE MAIN TARGETS OF THE CASSINI ORBITER.

By combining the results from the Cassini mission with Earth-based astronomical observations, laboratory experiments and computer modeling, scientists hope to answer basic questions regarding the origin and evolution of Titan's atmosphere, the nature of the surface, and the structure of its interior.