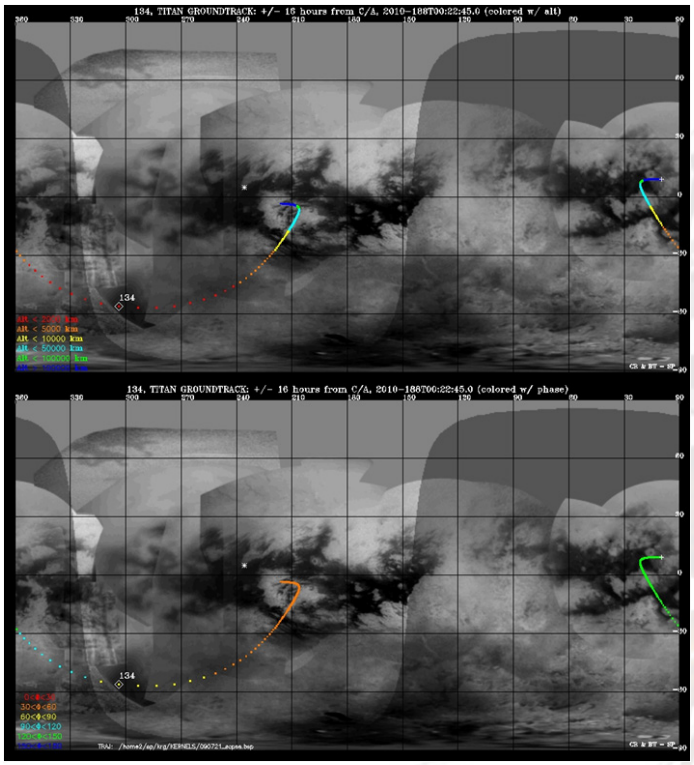
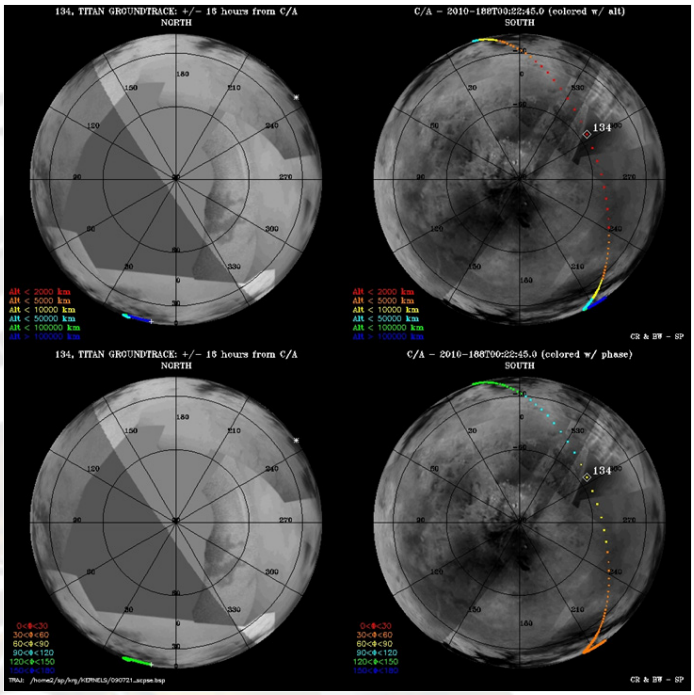
Cassini Equinox Mission Quick-Look Flyby Facts

Titan T71 Encounter (Orbit 119)

Cassini Groundtrack: Global Plot



Cassini Groundtrack: Polar Plot



Quick Facts

Closest Approach at 2010-188T00:22:45
July 7, 2010
Altitude: 1,010 km (~630 miles)
Speed: 5.9 km/sec (~13,000 mph)
Closest Approach latitude: 56.1° S

Flyby Setup Maneuver Schedule:
Apoapsis maneuver on Tuesday, June 29 UTC 181T01:40
Titan approach maneuver on Saturday, July 3 UTC 184T19:09:00

Closest Approch occurs ~ 2 days after Periapse
First Titan encounter in the Solstice Mission

Science Highlights

Closest Approach/Unique Observations

INMS: T71 passes on the 'nose' side of magnetospheric interaction region, making it unique and one of the best opportunities for INMS in the Solstice Mission for studying the effects of solar activity on Titan's atmosphere and Saturn's magnetosphere

RADAR: RADAR has a southwestern quadrant ridealong SAR of a poorly covered region in the prime and extended mission, valuable for determining Titan's global shape via SAR topographic measurements.

Significance of This Flyby

Inbound/Outbound Wings

ISS: will ride along with VIMS outbound from closest-approach to observe Titan's anti-Saturnian hemisphere and track any clouds that may be present. ISS will ride along with CIRS on the day following closest approach to continue to monitor clouds and the evolution thereof.

VIMS: global mapping of Titan will allow the VIMS to detect the presence of clouds and monitor the changes in the cloud formation after the equinox.

CAPS:The day after closest approach is a caboose period, with a MAPS campaign with CAPS as prime instrument.

CIRS: On T71 CIRS will obtain a vertical profile for trace species in the stratosphere via mid-IR limb sounding, and continue a long-term campaign of global mapping in the far-IR

UVIS: UVIS will obtain an image cube of Titan's atmosphere at extreme ultraviolet (EUV) and far ultraviolet (FUV) wavelengths by sweeping its slit across the disk. These cubes provide spectral and spatial information on nitrogen emissions, H emission and absorbtion, absorption by simple hydrocarbons, and the scattering properties of haze aerosols. This is one of many such cubes gathered over the course of the mission to provide latitude and seasonal coverage of Titan's middle atmosphere and stratosphere.

RWPS: Measure thermal plasmas in titan's ionosphere and surrounding environment; search for lightning in Titan's atmosphere; investigate the interaction of Titan with Saturn's magnetosphere.

MAG: T71 is a low altitude, pre-dusk flyby over the south pole. Its geometry is similar to T70. This will allow a comparison of the field line geometry in the induced magnetosphere. We assign grade one priority.

Sequence of Events

- Dark approach, with CIRS atmospheric observations followed by RADAR radiometry observations.
- INMS is prime at closest approach as the spacecraft passes on the 'nose' side of magnetospheric interaction region.
  - This makes for a unique flyby geometry, and one of the best opportunities for INMS in the Solstice Mission for studying the effects of solar activity on Titan's atmosphere and Saturn's magnetosphere. RADAR has a southwestern quadrant ridealong SAR of a region that was poorly covered in the prime and extended mission. These observations will be valuable for determining Titan's global shape via SAR topography.
- Lit outbound
  - Following the closest approach, VIMS is prime for regional and global mapping, with ISS and CIRS riding along.
  - The day after closest approach (a so-called "caboose" interval) will be used for MAPS campaign observations (designed by CAPS) and Titan monitoring observations (CIRS, with ISS and VIMS riding along)