The Cassini Tour Atlas

This is the output of the final run of the Tour Atlas script on the full mission trajectory reconstruction delivered on June 28, 2018, with the file name 180628RU_SCPSE_97288_17258.bsp.

The Tour Atlas examined a Cassini trajectory for a wide variety of scientific opportunities. The basic search engine was the EVENTS program, which was designed to search SPICE kernels for geometric events, with parameters provided in an input file. Contained in the master Tour Atlas Perl script were repeated executions of EVENTS. The results were conveyed to the Cassini science community via web pages available under the Tour Atlas section of the main SP web page.

The html pages, and all of the content have been provided to the PDS in this archived file set.

The main tour atlas page has links to the Tour Atlas trajectory analysis in five main categories:

- General Tour Information
- Titan
- Icy Satellites
- Occultations
- Rings

General Tour Information includes:

Times of apoapsis and periapsis.

The periapse of each orbit is further divided into time inside each of 20Rs, 18Rs, 15Rs, and 6Rs.

The Sun-Cassini-Saturn angle, which bears on ORS boresight protection, is provided for both 15 degrees and 12 degrees.

Geometry tables are generated for both 5 minute and 1-hour intervals.

Titan

The information is broken into flybys with closest approach under 100K km, distant flybys, Sun-Cassini-Titan angles of less than 12 degrees and less than 15 degrees (for flight rule validation) and Titan information over the whole tour at intervals of 5 minutes and 1 hour.

For each **close flyby**, ground tracks and tables of geometric data including the information listed below are provided:

Range (km) = Range in kilometers
Range (Rs) = Range in Saturn Radii
Alt (km) = Altitude
SSCLat = Sub-Spacecraft Latitude (deg)
SSCLon = Sub-Spacecraft Longitude (deg)
SSLat = Sub-solar Latitude (deg)
SSLon = Sub-solar longitude (deg)
Vrad = Radial Velocity (km/sec)
Vtan = Tangential Velocity (km/sec)
Phase = Phase Angle (deg)
SCET= Spacecraft Event Time (UTC)
SPT (deg) = Unknown
AD (rad) = Angular Diameter
RA = Spacecraft Right Ascension (deg)
RASun = Solar Right Ascension (deg)
OWLT (sec) = One Way Light Time
Dec = Spacecraft Declination (deg)
DEC Sun = Solar Declination (deg)
TAnom = Unknown

For the **more distant flybys** (100K km < r < 1M km), the flyby times and ground tracks are provided, but not the geometry details.

The **Icy Satellite** pages provides similar information but is divided into close and distant flybys only for the major satellites, i.e. Mimas, Enceladus, Tethys, Dione, Rhea, Hyperion, and Iapetus.

For the **"Rocks" or lesser satellites** the times of flybys less than 100,000 km are provided, as are those of less than 1 million km.

The Titan and Icy satellite flyby groundtracks and associated plots were produced by an IDL script called XMbodyinfo.

Occultations are identified for Saturn, Saturn rings, Titan, Enceladus, and other icy satellites.

Each of the first four types of occultations include solar, RSS, IR star and UV star instances.

For the icy satellites, only UV star occultations are identified.

For Saturn, a variant of solar that excludes those with ring conflicts is added.

Another variant identifies occultation by the rings with no occultation by the body of Saturn itself.

The **Rings** information is limited to zero phase events.