

Cassini Update – February 25, 2005

Source: <http://sci.tech–archive.net/Archive/sci.astro/2005–02/3189.html>

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Date: 02/25/05

Date: 25 Feb 2005 13:37:26 -0800

Cassini Significant Events
for 02/11/05 – 02/23/05

The most recent spacecraft telemetry was acquired today from the Goldstone tracking station. The Cassini spacecraft is in an excellent state of health and is operating normally. Information on the present position and speed of the Cassini spacecraft may be found on the "Present Position" web page located at <http://saturn.jpl.nasa.gov/operations/present–position.cfm> .

Activities this week:

During the fifth week of S08, OTM–14 was successfully executed, Cassini flew past Enceladus for a non–targeted flyby, and passed through Saturn periapsis.

Thursday, February 17:

This was a VERY busy day. The time–line looked something like this:
(In Pacific time)

4:00 AM – The science folks bid a fond farewell to Enceladus as we completed closest approach and began the outbound leg of this flyby. Our next opportunity for Enceladus science is a scant three weeks away! This time, however, it will be a targeted encounter.

6:00 AM – The Spacecraft Operations Office (SCO) takes center stage as they begin the final Maneuver Automation System run and publish the resulting Orbit Trim Maneuver (OTM) #14 files.

7:00 AM – Uplink Operations merges the files with a copy of the background sequence currently running on board the spacecraft. They then send those files out for Flight Software Development System testing.

8:00 AM – The OTM and background sequence files are published and available for the teams to run their checklists.

1:00 PM – Everything is due, checklists, presentations, etc.

3:00 PM – The Maneuver Approval Meeting is held followed by the Command Approval Meeting (CAM). The difference is, at the Maneuver Approval meeting the Project says yes, this is the right maneuver to perform to keep us on the tour. At the CAM, the specific file names and uplink windows are documented on uplink forms, and concurring signatures obtained. Once it is all signed off, the forms are delivered to the ACE in preparation for radiation to the spacecraft.

5:00 PM – Is the beginning of track for the pass that will be used for uplink. The files are sent, and confirmation received that they have been successfully registered on board.

11:09 PM – The burn executes. The purpose of OTM–14 is to clean up any residual effects from the flybys and keep the spacecraft on its tour trajectory. It is part of the Titan 3 through Enceladus, 8–maneuver optimization chain.

This main engine burn was performed in the "blow–down" mode, where the fuel and oxidizer tanks were not directly connected to the helium pressurant source. The burn began at 11:09 and ran for 4.583 seconds, giving a delta–V of 0.71 m/s.

The OTM–14 Maneuver Wrap–Up Meeting will be held tomorrow.

This is the process that occurs every time we have a maneuver. Only the times of day, on any day, vary. Hats off to the teams involved – SCO, Navigation, Uplink Operations, and the Mission Support and Services Office. We are keeping them VERY busy.

Now let's talk about Enceladus! I'll give you some specifics about the observations that were performed. For more information there is a

really
good write-up on the Cassini Web page that is less cut and dried, and
goes
into the interpretation of the data that was obtained. It's a news
release
called "Saturn's Moons Titan and Enceladus Seen by Cassini".

Roughly three hours before Enceladus closest approach, the Cosmic Dust Analyzer (CDA) took measurements inside the E-Ring with an altitude to the Saturn ring plane between 190 km and 1140 km.

The Composite and Infrared Spectrometer (CIRS) had its first good opportunity to search for possible endogenic activity that may be associated with the production of the E-ring material. In addition, the CIRS team obtained their first good map of the dark side of Enceladus. This will allow them to look for passive thermal anomalies associated with surface structural differences, e.g., with friable vs. highly consolidated materials.

Optical Remote Sensing (ORS) observations and RADAR scatterometry and radiometry measurements were performed to probe the geologic history and composition of the surface of Enceladus, measure surface temperatures, look for current thermal activity and investigate whether a tenuous atmosphere exists.

The Cassini Plasma Spectrometer (CAPS) observed electrons and energetic ions near the satellite.

Finally, during both the inbound and outbound legs of the flyby, Radio Science (RSS) measurements were taken to constrain the mass of Enceladus, and to better understand the internal structure of this moon.

Two deliveries were made today as part of the Science Operations Plan Update process, official port #2 for tour sequence S11 and preliminary port #1 for S12. S11 was merged and delivered to ACS for end-to-end pointing validation, and the merge report for S12 was published for the teams to review and identify corrections.

Friday, February 18:

Earlier this month, SCO performed the first Inertial Reference Unit (IRU)–A calibration since the Probe was released from the Cassini Spacecraft last December. Three tests were performed where commands were sent to slew the spacecraft about the X–axis, Y–axis, and Z–axis.

This week a status report was issued on the tests. All were successfully executed with nominal results. In particular, the calibrated values of the scale factor errors, and the biases of IRU–A's gyroscopes meet the established requirements. What all this means is, ACS has concluded that the impulse induced as a result of Probe separation did not adversely impact this set of important ACS sensors.

Outreach staff members attended a week–long conference sponsored by NASA and the Native American Academy. Titled "One Earth, One Universe" this workshop focused on the differences and similarities between western and Native American science. This conference was the beginning of a dialogue with the objective of building a community that encompasses both of these communities.

Monday, February 21:

Holiday.

Tuesday, February 22:

Today Uplink Operations hosted a Sequence Approval meeting where the S09 background sequence and all 15 associated Instrument Expanded Block (IEB) files were approved for transmission to the spacecraft.

A Cassini–Huygens Analysis and Results from the Mission (CHARM) telecon was held where recent findings associated with Titan were discussed. Sixty–nine members of the community called into the talk.

Wednesday, February 23:

Uplink Operations has begun the radiation of the IEB files for S09. Seven

Ion and Neutral Mass Spectrometer files were sent along with the Ultraviolet Imaging Spectrograph IEB before the command window closed. More files will be sent tomorrow night.

The Magnetospheric Imaging Instrument successfully submitted an ASP command request and radiated it to the spacecraft. ASP or Automated Sequence Process allows instrument teams to directly command their instruments without having to go through the "nominal" real-time command process. The set of commands each instrument is allowed to send is limited and has been reviewed to ensure they do not adversely interact with the system or with the other instruments. This capability will simplify operations for the instrument teams.

ISS and the Ultraviolet Imaging Spectrograph (UVIS) jointly observed Dione, Enceladus, Mimas, Rhea and Tethys. The Visible and Infrared Mapping Spectrometer (VIMS) observed the G-Ring, and CIRS collected Mid-IR Maps showing the temperature of Saturn's troposphere and tropopause.

In addition to the ORS observations, the suite of Magnetospheric and Plasma Science (MAPS) instruments simultaneously performed low-rate magnetospheric surveys.

Wrap up:

That's it for this week.

Due to the rain, the February 18 and 19 Pasadena and Monrovia telescope viewing events reported in last week's report were postponed until this weekend. Same time and place, on February 25 and 26, same weather permitting caveat.

Feb 25 Pasadena: Colorado Blvd near DeLacey 6 – 10 p.m.

Feb 26 Monrovia: Library Square, corner of Myrtle and Lime 6 – 10 p.m.

The Cassini-Huygens mission is a cooperative project of NASA, the European Space Agency and the Italian Space Agency. The Jet Propulsion Laboratory, a division of the California Institute of Technology in Pasadena, manages the

Cassini–Huygens mission for NASA's Science Mission Directorate,
Washington,
D.C. JPL designed, developed and assembled the Cassini orbiter.