



CASSINI SOST SEGMENT

Rev 221 Handoff Package

Segment Boundary 2015-251T09:50:00 – 2015-254T03:20:00

22 Jan 2015

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Science Highlights

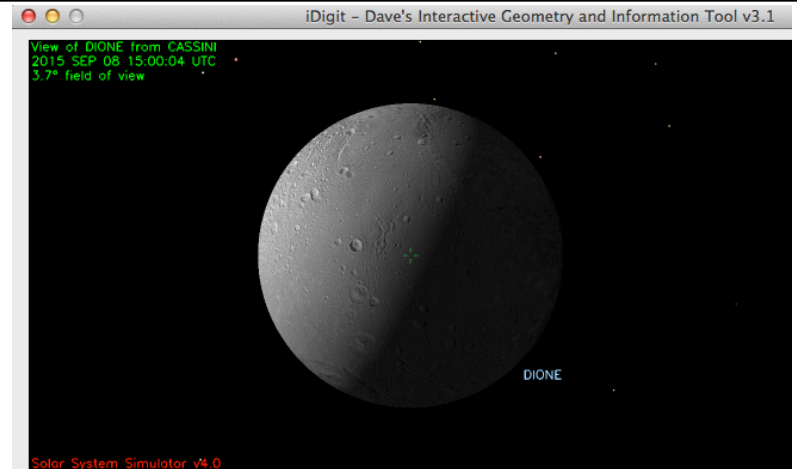
Notes & Liens

This document has been reviewed and determined not to contain export controlled technical data

Science Highlights DOY 251

SOST rev 221

ISS_221DI_REGMAP001_PIE is a 4 1/2 hrs long observation during Cassini's rev-221 equatorial approach to Dione. The range between spacecraft and moon varies between 120,000 km and 42,000 km (equivalent to a spatial resolution between 720 and 250 m/pxl in the NAC), and the phase angle increases from 26 deg to ~80 deg during the observation. Visible parts of the surface of Dione include parts of the anti-Saturn side and of the leading side. Geologic surface features of particular interest are Janiculum Dorsa, one of very few ridges on Dione, and the impact craters Murranus and Metiscus. These are located within Fidena Fossae close to Dione's apex-of-motion and show a highly degraded appearance similar to craters on Enceladus's northern hemisphere. This non-targeted Dione flyby will be the second-last relatively close passage on this moon in the Cassini mission, with the final one appearing only three weeks later in rev 222 at a similar altitude.



CIRS_221DI_DIONE001_PIE

Observations in both Rev 220 and Rev 221 will give CIRS a chance to better understand the spatial extent and magnitude of Tethys' and Dione's thermally anomalous regions.

Rev 220 has both daytime and nighttime mapping of thermally anomalous terrain on Dione. In rev 221, there is a 3 hour 35 minute observation (CIRS_221DI_DIONE001_PIE) during which our view of Dione remains unchanged (the phase and sub-spacecraft point only varies a little). We will make slow scans of Dione's nighttime leading (anomalous) hemisphere and daytime observations of the daylit trailing hemisphere between 12 and 32 km/pixel. These data will help to better characterize the spatial extent of Dione's thermal anomaly.

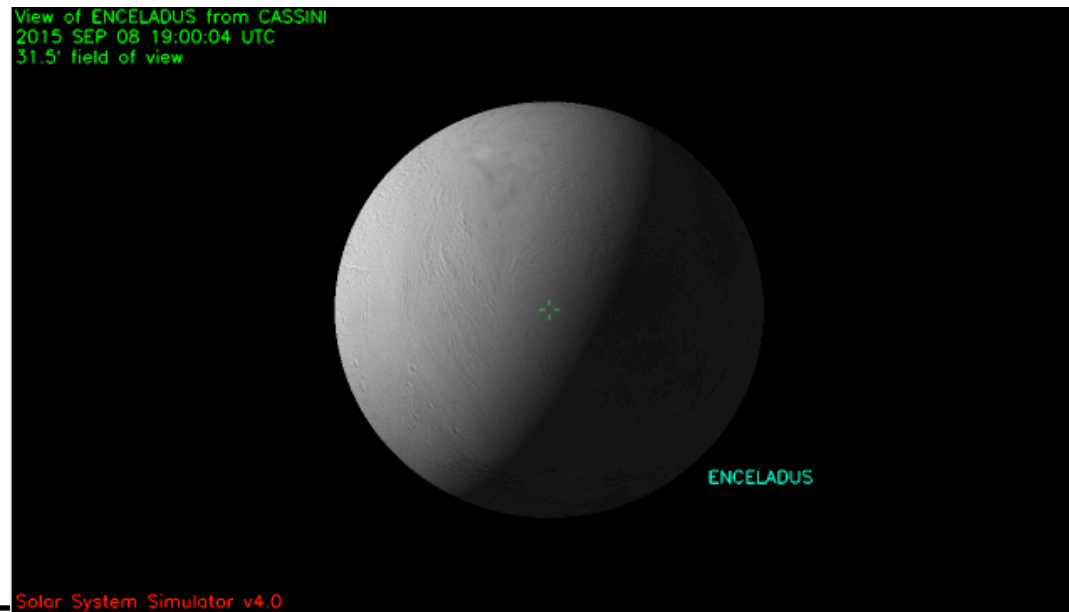
Science Highlights DOY 251 cont

SOST rev 221

ISS_221EN_PLMHPMR001_PIE, ISS_221EN_PLMHPMR002_PIE

The four plume observations in the SOST rev 221 segment consist of over 8 hours of total coverage spread out over 3 days, at a variety of ranges and phase angles. These observations are part of a campaign to monitor the brightness of the plume at different parts of Enceladus's orbit, which provides information on the processes which generate the plume and will help constrain models of Enceladus's interior.

ISS_221EN_ENCELADUS001_PIE is a two hour ORS observation of Enceladus that is coordinated between ISS, CIRS, and UVIS. It begins at 2015-251T20:30 from a range of 129,000 km at a phase angle of 93 degrees. The view of Enceladus is from above the equator where the illuminated scene shows the western side of the leading hemisphere. This region is dominated by extensively tectonized terrains. The observation geometry changes little over the two-hour period: Enceladus's diameter maintains ~65% the width of an ISS NAC frame and the phase angle increases only by 11 degrees by the end of the period. ISS will obtain broadband multispectral images from UV to Near-IR bandpasses to tiepoint with coordinated CIRS infrared and UVIS ultraviolet observations.



Science Highlights DOY 252

SOST rev 221

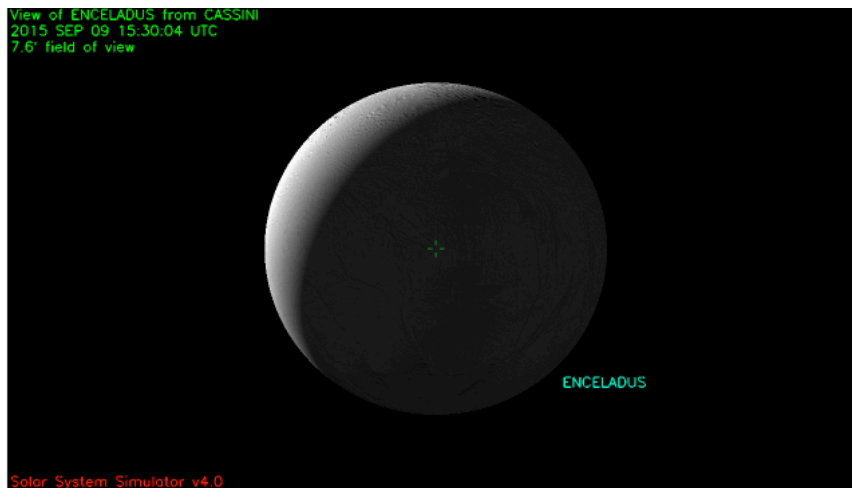
CIRS_221DI_COMPGLBL001_PRIME

Further nighttime mapping of the thermally anomalous terrain on Dione

ISS_221EN_PLMHPMR001_PRIME

Additional Enceladus Plume Observation, see DOY 251

ISS_221OT_GREROT027_PRIME is Cassini's only observation of the outer satellite Greip. From a distance of 12.2 million kilometers, Greip will appear as a point source of 15.4th magnitude in the data. By measuring the subtle variation of its brightness over a time span of ~19 hrs, a lightcurve can be derived with the goal to reveal Greip's rotation period. The diameter guess of this moon is 6 kilometers, its distance to Saturn varies between 12.7 and 24.3 million kilometers. Greip needs two-and-a-half years to orbit Saturn once on a retrograde path. It was discovered in January 2006

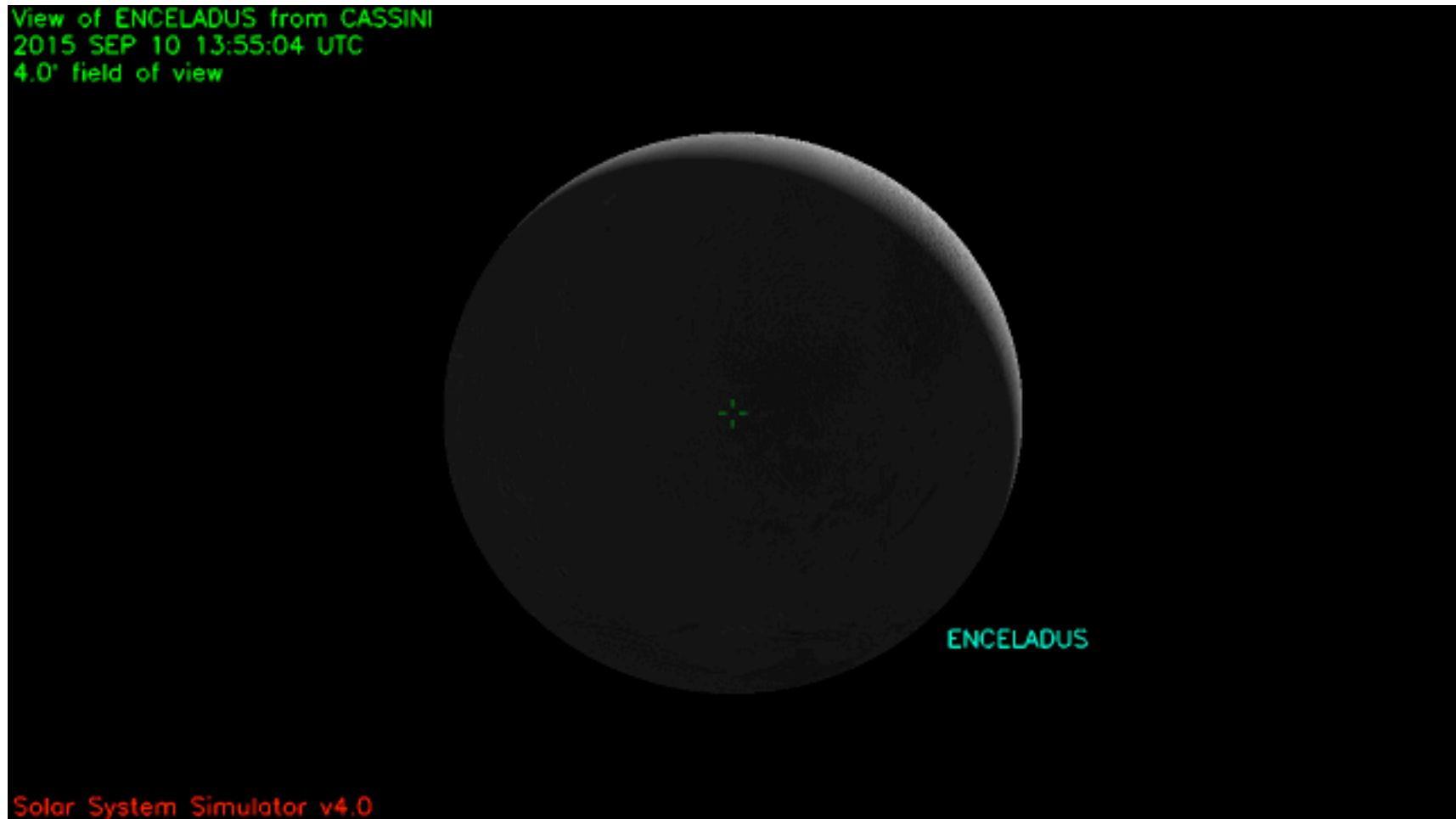


Science highlights DOY 253

SOST rev 221

ISS_221EN_PLMHPMR002_PRIME

Additional Enceladus Plume Observation, see DOY 251



Notes

SOST rev 221

- Pointing:
 - CIRS heating (>1.6°) during waypoints:
 - During the downlink roll on 2015-253, CIRS heats up by a max of 2.345 deg (per PDT)
 - RBOT secondaries are used when possible. Otherwise, plume friendly secondaries are used.
 - ISS_221DI_REGMAP001_PIE has target motion ~86deg over 4.5 hours. This has been added to the SPLAT, and Tillman and Tom Roatsch have been notified (email 7/28/14)
 - ISS_221OT_GREROT027_PRIME could not be checked for target motion, but is likely not an issue since it is very far away
 - CIRS_221EN_ENCELADUS001_ISS (starting at 2015-251T20:30) is the only collaborative rider and was recently designated as such.
- Data Volume:
 - No SMT warnings, No carryover
- DSN:
 - Made the G34 pass on 2015-253 a G34/G70 split pass for data volume. OK'd by RSS, Nav, Bill.
 - Note the the G70 is requested immediately after a maintenance period. C70 could be used here too but viewperiod does not start until 2015-253T23:05:00 which results in a lower overall capacity.
 - ap_downlink report check warnings:
 - SP_221EA_G34B26SEQ253_PRIME and SP_221EA_G70METSEQ253_PRIME are SEQ upload passes and should be at least 9 hours in duration
 - Goldstone only has viewperiods of 8:00-8:45. This was made a split pass for data volume and OK'd by Bill. If needed, we can use the OTB pass for SEQ uplink, as well as the NON pass on 2015-255.
 - 70m usage for sequence exceeds project commitment of <= 35%; is at 50%
 - Needs to be worked at sequence level
 - number of sequence upload passes is 2; should be 5 or more
 - Needs to be worked at sequence level
- Resource checker warnings:
 - Downlink Pass for sequence request has a duration of 4:20, 2:45.
 - See ap_downlink note above
 - Manually verify identical inertial pointing, the primary OTM may exist in the previous segment/sequence
 - My OTB pointing secondary = NEG_X to 274.0/72.0. Saturn Segment OTP secondary = NEG_X to 274.0/72.0
- Opmodes:
 - RSSKRWAF during last downlink for RSS MONCAL. The Opmode lasts for the whole viewperiod, but we will only be using Ka band during the 34meter portion of the pass. This opmode is not yet expired per Laura Burke, and does not require any instruments to sleep

Liens

SOST rev 221

Sequence Liens (should all be SPLAT items):

- ISS_221DI_REGMAP001_PIE has target motion ~86deg over 4.5 hours