CASSINI SOST SEGMENT

Rev 120 Handoff Package

Segment Boundary 2009-305T12:35:00 – 2009-307T12:35:00

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Links to files

Science Highlights

Notes & Liens

Integration Checklist

Links to files

TOL (xls, txt):
https://cassini.jpl.nasa.gov/sp/icy/120EN/SOST_120EN_TOL_090408.xls
https://cassini.jpl.nasa.gov/sp/icy/120EN/SOST_120EN_TOL_090408.txt

SPASS (txt, pdf, xls):
https://cassini.jpl.nasa.gov/sp/icy/120EN/SPASS_SOST_120EN_090408.txt
https://cassini.jpl.nasa.gov/sp/icy/120EN/SPASS_SOST_120EN_090408.pdf
https://cassini.jpl.nasa.gov/sp/icy/120EN/SPASS_SOST_120EN_090408.xls

SMT report:
https://cassini.jpl.nasa.gov/sp/icy/120EN/SOST_120EN_090406.rpt
https://cassini.jpl.nasa.gov/sp/icy/120EN/SOST_120EN_090406.warning

DSN (text, nav, seg):
https://cassini.jpl.nasa.gov/sp/icy/120EN/SOST_120EN_090406_text.txt
https://cassini.jpl.nasa.gov/sp/icy/120EN/SOST_120EN_090406_nav.txt
https://cassini.jpl.nasa.gov/sp/icy/120EN/SOST_120EN_090406_seg.txt
https://cassini.jpl.nasa.gov/sp/icy/120EN/SOST_120EN_090406_faster.txt

Nov. 1 - Nov. 3, 2009 (DOY 305-307)

These 48 hours encompass the E7 (rev 120) Enceladus flyby at a closest-approach altitude of 99 km. Although MAPS is prime at C/A, this is a very busy flyby as we also have RADAR and ORS prime observations of Enceladus before and after C/A, respectively. Early in the segment, UVIS will target Rhea at high-phase, RSS will perform both ingress and egress Saturn occultation observations, and ORS will study Enceladus' plume at high-phase.

DOY 305: UVIS starts out the segment with a high-phase Rhea observation to measure satellite albedo in ultraviolet light for a good sampling of longitude and phase space. They will determine the phase function to investigate surface microstructure and frost properties, as a function of location. CIRS and VIMS will ride along.

Approaching Enceladus, ISS will image Enceladus' plume twice at very high phase while Cassini is in eclipse. These are critical observations for ISS. CIRS will also map Enceladus while RSS takes time for both ingress and egress occultations of Saturn's ionosphere and atmosphere. This will measure vertical profiles of electron density in the ionosphere, and of density, pressure, and temperature in the neutral atmosphere.

DOY 306: RADAR will target Cassini's Z-axis at Enceladus to execute a raster scan to obtain simultaneous scatterometry and radiometry. INMS will then have prime control during closest-approach with CDA and ORS riders. This high-value data will be protected by dual playback to the DSN. After closest-approach VIMS and UVIS will image Enceladus at infrared, visible, and ultraviolet wavelengths.

DOY 307: UVIS closes out the segment by investigating volatiles near the moon Dione with a long ultraviolet stare searching for a tenuous atmosphere. Then Cassini's optical navigation team will take three pictures before turning the spacecraft's high-gain antenna toward Madrid, Spain on Earth to downlink the data.

Notes and Liens

Notes:

- Pointing:
  - See “Special Activities” below. For RSS LUB, SP is doing turn to/from Earth to prevent having an invalid waypoint during that time in the unlikely event the LUB cannot be uplinked.
- Data Volume:
  - All good: no carryover, no negative margin
- DSN:
  - 1 maintenance conflict - see #27 in checklist
- Opmodes:
  - All good: accommodating ORS, MAPS, RSS, and RADAR (and relevant warm-ups)
  - RSS using X, S-band (2 freq.) for occs. Prefer CDA does NOT articulate.
- Special Activities:
  - Enceladus and the sun are in the same direction from Cassini for the beginning of this segment, so pointing ORS to Enceladus is tricky. But, we are occulted by Saturn (2009-305, 14:34:44 - 19:06:20) so CTV and PDT violations during that time can be ignored. CMT management will likely be necessary.

Sequence Liens:

- CRC items that are ok: OPNAV is data class “normal” to go to P4; RADAR WU starts outside GMB absolute timed and ends inside GMB epoch-relative (at RADAR prime start time); Telem change during ISS_120EN_PLMHRHP002_PRIME to accommodate RADAR warm-up for 15 min.
- RSS prefers CDA does not articulate during their observations:

  2009-305T15:37:00 RSS_120SA_OCCIN001_PRIME
  2009-305T18:44:00 RSS_120SA_OCCOUT001_PRIME

Segment Checklist p1

Item	Disposition notes, or X if complete
1. Disposition all requests in CIMS - approve all pending requests	X
2. Version the SPASS in CIMS, use label INTEG_FIN, in description put date and your name	X
3. Examine SPASS, ensure opnav & SP turns correctly designated PRIME or NEW WAYPOINT. Prime RSS observations require the Xband to Earth attitude be a waypoint, use DLTURN with spass type New Waypoint	X
4. Waypoints and downlinks have been checked and are violation free (per CTV). NOTE ON ISSUES PAGE if periods of no valid waypoint	X - Note we are in Saturn occultation 2009-305, 14:34:44 - 19:06:20 so any ORS to Sun violations then are fine. Also custom period 2009-306T01:13:58 - 11:41:59.
5. SP turns have been checked, have adequate time, and are violation free. All large turns >60 degrees use the slower slew rates as specified by AACS in FR07D145 and include turn margin as specified in the Extended Mission slew margin policy. Exceptions to this rule are specified in FR07D145	Turns to and from LUB were given SOST Leads approval for normal turn rates (not slower) due to criticality of occ observations. (2009-305, 15:17:00 - 15:37:00 and 20:46:00 - 21:25:00)
8. There are no more than 3 waypoint changes in a 24 hour period	Was 2 on DOY 305, but needed to add turn to/from Earth for RSS LUB
6. The minimum prime instrument request duration outside ±5 hours from a targeted satellite flyby is 30 minutes	1 ISS plume request using the WP attitude (observe at WP 20 min. w/ no turns).
7. Custom handoffs are limited to the following periods: 1) ±3 hours around a targeted Titan flybys, 2) ±3 hours around a targeted Icy Satellite flyby, and 3) for OPNAVs that precede or follow a Downlink (special case)	C/A - 6 hr to + 4 hr due to close flyby; pseudo custom HO during LUB (uses ORS WP att.)
8. Custom periods designated properly with SPASS notes (n/a for opnavs)	X
9. Custom period requests have “pick up at” and “hand off at” information filled in correctly (n/a for opnavs)	X
10. Use rolling_sru if required (not using rolling_bias as a default anymore as of 12/08)	X
11. The secondary axis for downlinks that contain prime and backup OTMs is the same, and inertially fixed	N/A
12. Downlinks that contain OTPs only roll for the first 4 hours of the downlink pass max. OTB: 6_hr rolling OK, unless SRU issues, then 4_Hr_Rolling max	N/A
13. There is one downlink pass block per OTM prime or backup window (one wedding cake for a split pass). Exception - if first split downlink pass is ≤4 hours can use 2 cakes, put playback_gap in 2nd pass	N/A
14. Downlinks (attitude/rolling) match XMDLWG plan. Negotiated changes should be reported back to the WG	X
15. (guideline) The downlink attitude secondary vectors (and offsets) are mostly the same between RWA biases	N/A

Segment Checklist p2

Item	Disposition notes, or X if complete
16. Multi-revolution turns about the X-axis have an offset greater than or equal to 30 degrees about X	N/A
17. Live moveable blocks (LMBs) include the appropriate time margin specified as a DEADTIME request in CIMS at the beginning and end of the moveable block. TLM modes in separate OBSMOV request	N/A
18. Live moveable blocks use an LMB epoch and use the appropriate epoch naming conventions. Live Update Blocks use a LUB epoch (RSS only)	X
19. All stellar occultation observations include an additional +/-20 minutes of time (40 minutes total) when they occur within -1 day to +2 days of Saturn periapse	N/A
20. All Ground and Live Moveable blocks associated with non-targeted geometric events (e.g., solar and earth occultations) include an additional +/-20 minutes of time margin (40 minutes total) to account for reference trajectory changes.	N/A
21. Check your GMB, LMB, LUB, Occ times against current reference trajectory	X
22. Dual playback of high value science data is performed via multiple playbacks within this segment. CIMS entries are correct. Dual playback does not affect downstream segments	X
23. Run the resource checker in CIMS and fix errors found. Paste remaining notes here with disposition	X - all ok. See p. 4 “Sequence Liens” section for CRC dispositions.
24. Run SMT, if SSR not empty at end of segment include in notes, and instances of <-90 SSR margin	X (no carryover, no neg. margin)
25. Examine SMT warnings report, include dispositions here of any items (negative SSR margin already covered)	OK: - CDA exceeding pick up rate during RADAR WU of 15 min. (expected) - RADAR losing 5.4 Mb of DV during blind part of warmup in S_N_ER_3

Segment Checklist p3

Item	Disposition notes, or X if complete
26. Examine “ap_downlink report check” output, include dispositions here of any items (see next two items).	See #27, #28
27. List any DSN stations requested during maintenance periods, AND JUSTIFICATION	SP_120NA_C70METNON306_SP overlaps start of DSS-43 weekly maintenance by 4.7 hours Main 9 hr DL after E7 flyby. Need to push back on DSN. Can’t downgrade easily.
28. List your percent 70M stations requested - avoid >35% (ha ha)	1 main DL, and 1 3-hr DL for dual PB
29. Examine “ap_downlink report nav” output, MP should ensure NAV OK with gaps in 2way	X
30. In CIMS check for “start before”, “end before”, “start after”, “end after” requests - fix if any problems found	X
31. Verify OPNAVs are in SNER5, sanity check rest of tlm modes	X
32. If sequence boundary at START of your segment, ensure IVPGAP info correct, NO “start before” MAPS requests	N/A
33. If sequence boundary at END of your segment (ie in the next segment), ensure 5 “SEQ” upload DSN passes - will probably ripple into preceding segment(s), make sure to notify them. NO “end after” MAPS requests	N/A
34. Verify opmodes correct (RSS and RADAR especially), teams going to sleep have agreed? Use table at https://cassini.jpl.nasa.gov/wiki/bin/view/Cassini/XMOpModes	X
35. Compare RSS requests to DSN requests, make sure they jive (ORT, occ, etc), ORTs are integrated.	X
36. If conjunction is in your segment, see Conjunction page on SP Wiki	N/A
37. Be aware of any AZSCANSs in your segment (only 2 planned in 2009)	N/A
38. RAMAVOID: new waypoint, NOT in custom period	N/A
39. If on thrusters, confirm deadbands	X - (2, 2, 20)
40. Segment products & this package linked to XM deliveries page	X