



CASSINI SOST SEGMENT

Rev 162 Handoff Package

Segment Boundary 2012-068T20:01:00 – 2012-071T06:01:00

28 July 2011

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SMT report and SPASS

Science Highlights

Notes & Liens

Integration Checklist

SMT report

SOST rev 162

DATA VOLUME SUMMARY --- TRANSFER FRAME OVERHEAD INCLUDED (80 BITS PER 8800-BIT FRAME)

DOWNLINK PASS NAME	Start doy hh:mm	End doy hh:mm	OBSERVATION_PERIOD							DOWNLINK_PASS							
			P4					P5	RECORDED		PLAYBACK						
			START (Mb)	SCI (Mb)	HK+E (Mb)	TOTAL (Mb)	CPACTY (Mb)	MARGN (Mb)	OPNAV (Mb)	SCI (Mb)	ENGR (Mb)	TOTAL (Mb)	CPACTY (Mb)	MARGN (Mb)	NET_MARGN (Mb)	CAROVR (%)	
SP_162EA_C34HEFNON069_PRIME	069 18:16	069 21:16	0	1052	94	1146	3322	2176	0	185	18	1349	245	-1104	0	0%	1104
SP_162EA_M34BWGOTP069_PRIME	070 00:46	070 06:01	1104	301	15	1420	3322	1902	0	373	31	1824	315	-1510	0	0%	1509
SP_162EA_C70METNON070_PRIME	070 18:51	070 21:01	1509	1683	54	3246	3322	76	0	158	13	3417	677	-2741	0	0%	2740
SP_162EA_M70METOTB070_PRIME	070 21:01	071 06:01	2740	0	0	2740	3322	582	0	570	53	3363	3308	-56	0	0%	55

SPASS

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Request	Riders	Start (SCET)	Start (Epoch)	Duration	End (SCET)	Primary	Secondary	Comments
Sequence S72, length = 73 days		2012-024T22:55:00		072T12:52:00	2012-097T11:47:00			
SOST_162 Segment		2012-068T20:01:00		002T10:00:00	2012-071T06:01:00			
SP_162TI_WAYPTTURN068_PRIME		2012-068T20:01:00		000T00:40:00	2012-068T20:41:00	ISS_NAC to Titan	POS_X to 216.5/-83.7	
NEW WAYPOINT		2012-068T20:41:00		001T01:00:00	2012-069T21:41:00	ISS_NAC to Titan	POS_X to 216.5/-83.7	
ISS_162OT_JARROT033_PRIME	V	2012-068T20:41:00		000T09:35:00	2012-069T06:16:00	UVIS_FUV to Rocks	POS_X to 216.5/-83.7	No Preference to secondary pointing. No return to WP (team-internal hand-off)
ISS_162OT_MUNROT036_PRIME	V	2012-069T06:16:00		000T09:35:00	2012-069T15:51:00	UVIS_FUV to Rocks	POS_X to 216.5/-83.7	No Preference to secondary pointing. Pick-up at Jansaxa (team-internal hand-off)
ISS_162TI_M3OR1CLD068_PRIME	C, V	2012-069T15:51:00	E162_M3OR1CLD068+000T00:00:00	000T02:00:00	2012-069T17:51:00	ISS_NAC to Titan	POS_X to 216.5/-83.7	No Preference to secondary pointing
SP_162EA_DLTURN069_PRIME		2012-069T17:51:00		000T00:25:00	2012-069T18:16:00	XBAND to Earth	NEG_X to NEP	
SP_162EA_C34HEFN069_PRIME	N	2012-069T18:16:00		000T03:00:00	2012-069T21:16:00	XBAND to Earth	NEG_X to NEP	NEG_X to NEP or NSP (changed to RA/DEC equiv), CAPS
SP_162DR_WAYPTTURN069_PRIME	M, N	2012-069T21:16:00		000T00:25:00	2012-069T21:41:00	XBAND to Dust_RAM (0.0,0.0,-5.0 deg. offset)	POS_Y to NEP	
NEW WAYPOINT		2012-069T21:41:00		000T08:54:00	2012-070T06:35:00	XBAND to Dust_RAM (0.0,0.0,-5.0 deg. offset)	POS_Y to NEP	
MP_162DR_DUSTHAZRD001_PRIME	C, M, N	2012-069T22:14:00		000T02:11:00	2012-070T00:25:00	XBAND to Dust_RAM (0.0,0.0,-5.0 deg. offset)	POS_Y to NEP	
SP_162EA_DLTURN070_PRIME	C, N	2012-070T00:25:00		000T00:21:00	2012-070T00:46:00	XBAND to Earth	POS_X to NSP	
SP_162EA_M34BWGOTPO69_PRIME	C, N	2012-070T00:46:00		000T05:15:00	2012-070T06:01:00	XBAND to Earth	POS_X to NSP	
Periapse R = 3.245 Rs, lat ...		2012-070T02:13:19		000T00:00:01	2012-070T02:13:20			
SP_162EN_WAYPTTURN070_PRIME		2012-070T06:01:00		000T00:34:00	2012-070T06:35:00	ISS_NAC to Enceladus	NEG_Z to 123.6/-6.6	Collaborative Rider(s): CIRIS
NEW WAYPOINT		2012-070T06:35:00		000T03:50:00	2012-070T10:25:00	ISS_NAC to Enceladus	NEG_Z to 123.6/-6.6	
ISS_162EN_ENCEL001_PRIME	C, U, V	2012-070T06:35:00		000T01:40:00	2012-070T08:15:00	ISS_NAC to Enceladus	NEG_Z to 123.6/-6.6	Collaborative Rider(s): CIRIS, UVIS. No Preference to secondary pointing
ISS_162TI_M3OR2CLD070_PRIME	C, V	2012-070T08:15:00	E162_M3OR2CLD070+000T00:00:00	000T01:30:00	2012-070T09:45:00	ISS_NAC to Titan	NEG_Z to 123.6/-6.6	No Preference to secondary pointing
SP_162RH_WAYPTTURN070_PRIME		2012-070T09:45:00		000T00:40:00	2012-070T10:25:00	ISS_NAC to Rhea	POS_X to 230.5/-82.4	
NEW WAYPOINT		2012-070T10:25:00		000T19:36:00	2012-071T06:01:00	ISS_NAC to Rhea	POS_X to 230.5/-82.4	
CIRIS_162RH_RHEA001_PRIME	I, U, V	2012-070T10:25:00		000T04:35:00	2012-070T15:00:00	CIRIS_FP1 to Rhea	POS_X to 230.5/-82.4	
ISS_162RH_REGMAPO01_PIE	C, M, U, V	2012-070T15:00:00		000T01:30:00	2012-070T16:30:00	ISS_NAC to Rhea	POS_X to 230.5/-82.4	Collaborative Rider(s): UVIS. 2 min. dwell
ISS_162RH_RHEARINGS001_PRIME	C, M, U, V	2012-070T16:30:00		000T01:50:00	2012-070T18:20:00	ISS_NAC to Rhea	POS_X to 230.5/-82.4	
SP_162EA_DLTURN470_PRIME		2012-070T18:20:00		000T00:31:00	2012-070T18:51:00	XBAND to Earth	POS_X to NSP	Use 30 seconds turn margin, not 2 minutes (late secondary change after timeline integrated).
SP_162EA_C70METNON070_PRIME		2012-070T18:51:00		000T02:10:00	2012-070T21:01:00	XBAND to Earth	POS_X to NSP	
SP_162EA_M70METOTB070_PRIME	C, N	2012-070T21:01:00		000T09:00:00	2012-071T06:01:00	XBAND to Earth	Rolling	same as OTP pass, CAPS

Science Highlights

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SOST rev 162 is a nontargeted periapse with a 9176 km Enceladus flyby, and a 41,858 km pass by Rhea. There is also a MEA cover closure dust hazard nearly on top of a periapse OTM, fun fun.

DOY 068/069 contains two small irregular moon observations, of Jansaxa and Mundilfari, to characterize their rotation. A Titan cloud monitor observation takes us to the first SOST downlink on doy 069. This downlink is only 3 hours long and then we turn to Dust_RAM for the E-ring dust hazard. We then turn back to earth and perform a prime OTM over a 5 hour 15 minute downlink (the OTM will be uplinked early).

After all that, the doy 070/071 observation period performs an Enceladus observation and another Titan cloud monitor before a series of Rhea observations, including regional mapping (PIE) and a ring search.

Notes and Liens

- Pointing:
 - SP_DLTURN470 has only 30 seconds of turn margin (will require hand edit to sp_turn sasf). This is due to late reintegration following late discovery that XMDLWG-suggested secondary for the OTP pass was NOT a safe attitude. Secondary changed for both OTP and OTB from NEG_X to POS_X; one prime observation shortened 5 minutes, and this lien on the DLTURN470 resulted. Alternately, the C70 pass on doy 70 could have been shortened 5 min, but we were already carrying over data.
 - Collaborative prime/rider coordination are marked in CIMS (there are 3)
 - RBOT friendly secondaries used for Enceladus and Rhea. Irregular moon secondaries match that of the Titan waypoint (via No_Preference) and are flexible
- Data Volume:
 - 56 Mb carryover to XD (OK with them), no negative SSR margin
- Special Activities:
 - Dust hazard/downlink/OTM-312: see next slide for details
- Resource checker errors:

000089 SP 2012-069T21:16:00 SP_162DR_WAYPTTURN069_PRIME Gap in Prime SPASS requests between SP_162DR_WAYPTTURN069_PRIME and MP_162DR_DUSTHAZRD001_PRIME. Gap of 000T00:33:00

Margin for dust hazard

000090 SP 2012-069T18:16:00 SP_162EA_C34HEFNON069_PRIME Secondary axis does not match between prime OTM (SP_162EA_C34HEFNON069_PRIME) and backup OTM (SP_162EA_DLTURN470_PRIME).

Artifact of dust hazard weirdness, the passes the actual burns are on have matching secondaries

000091 SP 2012-069T18:16:00 SP_162EA_C34HEFNON069_PRIME SP Downlink request name does not contain OTP Update request name so OTM associated downlink will have proper visibility

Artifact of dust hazard weirdness

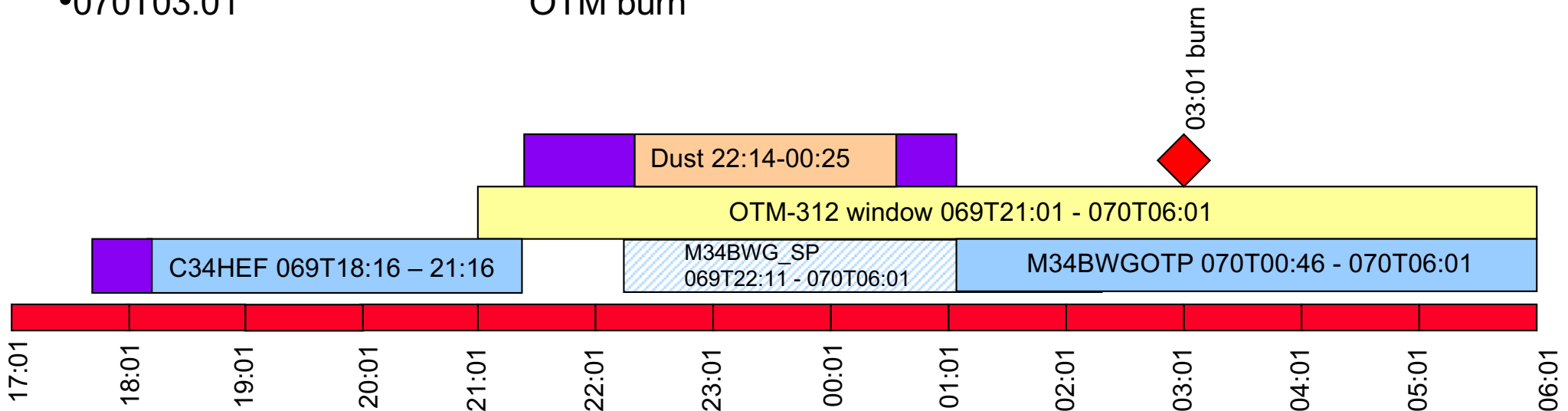
Sequence Liens: watch for PDT warnings on DLTURN470, and include dust hazard/OTM slide in kickoff package

Dust Hazard

Plan reviewed with SCO. OTM will be uplinked in previous day. No Ybias included to 1st of 2 downlinks due to proximity of OTM.

- 2012-069T17:51 Turn to XBAND to Earth, -X to NEP
- 069T18:16 Downlink over DSS-45
- 069T21:16 Turn to HGA to RAM, +Y to NEP (0,0,-5)
- 070T00:25 Turn to XBAND to Earth, +X to NSP
- 070T00:46 Begin downlink over M34BWG
- 070T03:01 OTM burn

Note change in downlink secondary!



Segment Checklist p1

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Item	Disposition notes, or X if complete
1. Disposition all requests in CIMS - approve all pending requests, no outstanding revisions/new requests	x
2. No rocking downlinks. No AZSCANS (IGAPIIMAGE). No arrayed downlinks.	x
3. Examine SPASS, ensure 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 (also for DLTURN before Ybiases)	x
4. Waypoints and downlinks are violation free (per CTV). NOTE ON ISSUES PAGE if periods of no valid waypoint	x
5. SP turns have been checked and are violation free- use ctv_batch or PDT. Fix any issues found. First turn of segment has been checked using correct final attitude of previous segment. All turns use the slower XM slew rates and include 2 minutes turn margin. Allow extra turn time whenever possible to aid possible RBOT changes.	x
6. YBIAS windows have been included as required, guidelines met per https://cassini.jpl.nasa.gov/sp/xxmdev/ybias_mpforum.pdf	X, see picture
7. There are no more than 3 waypoint changes in a 24 hour period (DLTURN waypoints for YBIAS do not count)	x
8. The minimum prime instrument request duration outside ± 5 hours from a targeted satellite flyby is 30 minutes	x
9. Custom handoffs are limited to ± 3 hours around a targeted Titan flyby or an asymmetric 10 hour window for Icy Satellite flybys. Custom periods 1) designated properly with SPASS notes 2) requests have "pick up at" and "hand off at" information filled in correctly 3) turn times and handoff attitudes have been verified – early PDT work recommended!	n/a
10. PIEs are properly identified via _PIE naming convention. All agreed to PIEs have been integrated.	x
11. Prime/rider coordination: secondaries have all been reviewed and agreed to, collaborative observations are so designated, pre-designed in PDT, prime instrument agrees to work with riders for collaborate designs	x
12. Use rolling_sru if required. Follow rolling guidelines per SCO, see the ScoRules wiki page (linked to integration procedure)	n/a
13. The secondary axis for downlinks that contain prime and backup OTMs is the same, and inertially fixed	x
14. Downlinks that contain OTPs only roll for the first 4 hours of the downlink pass max. OTB: Full rolling OK, unless SRU issues, then 4_Hr_Rolling max (NO split rolls)	x
15. 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, put OTP/OTB in name of BOTH passes (for CDA). MUST have a full length 9 hour station requested for NAV tracking data	See picture, ok w/sco

Segment Checklist p2

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Item	Disposition notes, or X if complete
16. Moving any downlink pass to a different view period requires coordination with Navigation. Changes to the DSN strawman plan require SPST manager approval.	x
17. Multi-revolution turns about the X-axis have an offset greater than or equal to 30 degrees	n/a
18. 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 for RSS). Waypoint same entering as leaving, and is valid throughout. Avoid skeet shoots in LMBs. If CMT management required, contain within LMB. Live moveable blocks use an LMB epoch and use the appropriate epoch naming conventions. Live Update Blocks use a LUB epoch (RSS only).	n/a
19. Pointing is not altered for science during any SCO/MP activity that has pointing requirements (e.g., dust hazards). [Note that science turns are allowed for all but the first minute of an inbound thruster transition during a Titan or icy satellite flyby. No science turns are allowed during any portion of the outbound transition]	x
20. 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
21. 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
22. Check your GMB, LMB, LUB, Occ times against current reference trajectory (Tour Atlas)	n/a
23. Dual playback of high value data is performed within this segment and does not affect downstream segments. CIMS entries are correct and SPASS type Note. SSR-A is emptied after the first downlink. Open a SPLAT item (tied to the ENGR request that resets the pointers, ie the DUALPB_CDS request) which says, "During DSN negotiations ensure that SSR-A is emptied before the pointers are reset. This item cannot be closed until the DSN negotiations are complete for both downlink passes, or the dual playback is deleted."	n/a
24. Run the resource checker in CIMS and fix errors found. Remaining notes disposition here or on notes page	See notes
25. SMT: note if SSR not empty at end of segment, have approval from following segment. No carryover across sequence boundaries. Aim for empty SSR every 4 days. No negative SSR margin during integration. List discrepancies on notes page.	56 mb to XD, OK
26. Examine SMT warnings report, include dispositions here or on notes page of any items	No warnings
27. RSS boresight: one _SP pass, two _PRIME downlink passes, one hour observation block in SNER_3	n/a

Segment Checklist p3

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Item	Disposition notes, or X if complete
28. Examine "ap_downlink report check" output, include dispositions here or on notes page of any items (see next two items).	Complaint about OTP not 9 hours long, due to dust hazard
29. List any DSN stations requested during maintenance periods, AND JUSTIFICATION. AVOID!!!!!!	n/a
30. Avoid requesting two overlapping stations (except for RSS science) whenever possible – use RSS station for downlink too	n/a
31. Compare RSS requests to DSN requests, make sure they jive (ORT, occ, etc), ORTs are integrated.	x
32. Apoapse segments only: List your percent 70M stations requested - avoid >35%.	n/a
33. Apoapse segments only: Follow Integration Guideline & Constraint #15c regarding "two out of three" types of science per RBOT segment. ME OTM's split an RBOT segment.	n/a
34. Periapse segments: >3 hr observations with >60 degree target motion are broken up by a 20 min inertial period (lien if not explicit in SPASS)	none
35. Support images use _XXM or _XXM3 activity type	n/a
36. In CIMS check for "start before", "end before", "start after", "end after" requests - fix if any problems found	x
37. Verify OPNAVs are in SNER5 and are support_image class, sanity check rest of tlm modes (RADAR 15 min in 5A/activity in 5A or 8, etc)	n/a
38. If sequence boundary at START of segment, ensure IVPGAP info correct, NO "start before" MAPS requests, OpNav is not first thing in segment	n/a
39. If sequence boundary at END of segment (ie in the next segment), ensure 6 "SEQ" upload DSN passes - will probably ripple into preceding segment(s), notify them. Last pass has Ybias window in front, no bonus science. NO "end after" MAPS requests	n/a
40. Verify opmodes correct (RSS and RADAR especially), teams going to sleep have agreed? MIMI: not in sleep during RPX? Use table at https://cassini.jpl.nasa.gov/wiki/bin/view/Cassini/XXMOpModes	x
41. If conjunction is in your segment, see Conjunction page on SP Wiki	n/a
42. RAMAVOID: new waypoint, NOT in custom period	n/a
43. If on thrusters, confirm deadbands	n/a
44. Segment products linked to XXM deliveries page, & this package when you are done	