



CASSINI SOST_163EN SEGMENT

Rev 163 E17 Handoff Package

Segment Boundary 2012-086T18:47:00 – 2012-089T18:32:00

28 July 2011

Sarah Milkovich / Nancy V

SMT report and SPASS

Science Highlights

Notes & Liens

Integration Checklist

SMT report

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

DOWNLINK PASS NAME	OBSERVATION_PERIOD		DOWNLINK_PASS														
	Start doy hh:mm	End doy hh:mm	P4							P5	RECORDED		PLAYBACK				
			START (Mb)	SCI (Mb)	HK+E (Mb)	TOTAL (Mb)	CPACTY (Mb)	MRGN (Mb)	OPNAV (Mb)	SCI (Mb)	ENGR (Mb)	TOTAL (Mb)	CPACTY (Mb)	MARGN (Mb)	NET_MARGN (Mb)	CAROVN (%)	CAROVN (Mb)
SP_163EA_G34HEFNON087_PRIME	087 03:07	087 09:07	0	397	35	433	3322	2889	0	159	35	627	642	14	15	0%	0
SP_163EA_C70METSEQ088_PRIME	088 10:32	088 19:32	0	3198	125	3321	3322	1	0	859	53	4234	3731	-503	606	8%	502
SP_163EA_M70METNON088_PRIME	088 19:32	088 20:32	502	0	0	502	3322	2820	0	180	6	689	214	-475	606	14%	474
SP_163EA_C70METSEQ089_PRIME	089 09:32	089 18:32	474	2186	56	2716	3322	606	0	232	53	2988	4129	1128	1128	28%	0

SMT warnings: 2 standard ones about Radar warmups and TLM modes, one for the dual playback changing the PPL

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			
Enceladus Flyby E17 Segment		2012-086T18:47:00		002T23:45:00	2012-089T18:32:00			
SP_163TI_WAYPTTURN086_PRIME		2012-086T18:47:00		000T00:40:00	2012-086T19:27:00	ISS_NAC to Titan	NEG_X to 38.7/83.8	
NEW WAYPOINT		2012-086T19:27:00		000T06:10:00	2012-087T01:37:00	ISS_NAC to Titan	NEG_X to 38.7/83.8	
ISS_163TI_M6OR2CLD086_PRIME	C, V	2012-086T19:27:00	E163_M6OR2CLD086+000T00:00:00	000T01:30:00	2012-086T20:57:00	ISS_NAC to Titan	NEG_X to 38.7/83.8	No Preference to secondary pointing
ISS_163OT_LSTITAN086_PRIME	V	2012-086T20:57:00		000T04:00:00	2012-087T00:57:00	ISS_NAC to Rocks	NEG_X to 38.7/83.8	No Preference to secondary pointing
SP_163EA_DLTURN087_PRIME		2012-087T00:57:00		000T00:40:00	2012-087T01:37:00	XBAND to Earth	NEG_X to NEP	
NEW WAYPOINT		2012-087T01:37:00		000T08:08:00	2012-087T09:45:00	XBAND to Earth	NEG_X to NEP	
SP_163EA_YBIAS087_PRIME	E	2012-087T01:37:00		000T01:30:00	2012-087T03:07:00	XBAND to Earth	NEG_X to NEP	
SP_163EA_G34HEFNON087_PRIME		2012-087T03:07:00		000T06:00:00	2012-087T09:07:00	XBAND to Earth	NEG_X to NEP	
SP_163EN_WAYPTTURN087_PRIME		2012-087T09:07:00		000T00:23:00	2012-087T09:30:00	NEG_Y to 40.0/-20.0	NEG_X to 73.5/75.5	pt 1 of 2
SP_163EN_WAYPTTURN487_PRIME		2012-087T09:30:00		000T00:15:00	2012-087T09:45:00	ISS_NAC to Enceladus	NEG_X to 73.5/75.5	pt 2 of 2
NEW WAYPOINT		2012-087T09:45:00		000T15:45:00	2012-088T01:30:00	ISS_NAC to Enceladus	NEG_X to 73.5/75.5	
ISS_163EN_PLMHPHRO01_PIE	C, U, V	2012-087T09:45:00		000T05:10:00	2012-087T14:55:00	ISS_NAC to Enceladus	NEG_X to NSP	SOST PIE
SP_163EN_DEADTIME087_PRIME		2012-087T14:55:00		000T00:10:00	2012-087T15:05:00	ISS_NAC to Enceladus	NEG_X to 73.5/75.5	
Begin Custom		2012-087T15:05:00	GMB_E163_ENCELADUS_E17-000T03:25:09	000T00:00:01	2012-087T15:05:01	ISS_NAC to Enceladus	NEG_X to 73.5/75.5	
CIRS_163EN_ENCELO01_PRIME	M, V	2012-087T15:05:00	GMB_E163_ENCELADUS_E17-000T03:25:09	000T02:25:00	2012-087T17:30:00	CIRS_FP1 to Enceladus	NEG_X to 73.5/75.5	Pick up at ISS_NAC to Enceladus, NEG_X to 73.5/75.5; Hand off at ISS_NAC to Enceladus, NEG_X to 73.5/75.5.
INMS_163EN_ENCEL17001_PIE	C, M	2012-087T17:30:00	GMB_E163_ENCELADUS_E17-000T01:00:09	000T02:00:00	2012-087T19:30:00	NEG_X to SC_RAM	NEG_Y to North_Pole_Dir	Pick up at ISS_NAC to Enceladus, NEG_X to 73.5/75.5; Hand off at ISS_NAC to Enceladus, NEG_X to 73.5/75.5.
Begin Dual Playback Science...		2012-087T18:15:09	GMB_E163_ENCELADUS_E17-000T00:15:00	000T00:00:01	2012-087T18:15:10			
163EN (t) E17 ENCELADUS In...		2012-087T18:30:09		000T00:00:01	2012-087T18:30:10			
End Dual Playback Science f...		2012-087T18:37:57	GMB_E163_ENCELADUS_E17+000T00:07:48	000T00:00:01	2012-087T18:37:58			
ISS_163EN_ENCELADUS001_PIE	C, M, U, V	2012-087T19:30:00	GMB_E163_ENCELADUS_E17+000T00:59:51	000T01:30:00	2012-087T21:00:00	ISS_NAC to Enceladus	NEG_X to 73.5/75.5	Collaborative Rider(s): UVIS. Pick up at ISS_NAC to Enceladus, NEG_X to 73.5/75.5; Hand off at ISS_NAC to Enceladus, NEG_X to 73.5/75.5. Collaborative Rider(s): UVIS
SP_163EN_DEADTIME487_PRIME		2012-087T21:00:00	GMB_E163_ENCELADUS_E17+000T02:29:51	000T00:10:00	2012-087T21:10:00	NEG_Y to Enceladus	NEG_X to 73.5/75.5	Pick up at ISS_NAC to Enceladus, NEG_X to 73.5/75.5; Hand off at ISS_NAC to Enceladus, NEG_X to 73.5/75.5.
ISS_163JA_JANUS001_PIE	C, V	2012-087T21:10:00		000T03:40:00	2012-088T00:50:00	ISS_NAC to Janus	NEG_X to 33.4/86.3	Pick up at ISS_NAC to Enceladus, NEG_X to 73.5/75.5; Hand off at ISS_NAC to Enceladus, NEG_X to 73.5/75.5.
Periapse R = 3.253 Rs, lat ...		2012-087T21:31:38		000T00:00:01	2012-087T21:31:39			
End Custom		2012-088T00:50:00		000T00:00:01	2012-088T00:50:01	ISS_NAC to Enceladus	NEG_X to 73.5/75.5	
SP_163DI_WAYPTTURN088_PRIME		2012-088T00:50:00		000T00:40:00	2012-088T01:30:00	NEG_Y to Dione	POS_X to 238.8/-77.4	
NEW WAYPOINT		2012-088T01:30:00		000T07:32:00	2012-088T09:02:00	NEG_Y to Dione	POS_X to 238.8/-77.4	
RADAR_163DI_SCATTRAD001_PRIME		2012-088T01:30:00		000T03:00:00	2012-088T04:30:00	NEG_Z to Dione	POS_X to 238.8/-77.4	
ISS_163DI_REGMAP001_PIE	C, U, V	2012-088T04:30:00		000T03:44:00	2012-088T08:14:00	ISS_NAC to Dione	POS_X to 238.8/-77.4	Collaborative Rider(s): UVIS
SP_163EA_DLTURN088_PRIME	C	2012-088T08:14:00		000T00:26:00	2012-088T08:40:00	XBAND to Earth	POS_X to 238.8/-77.4	
SP_163EA_DLTURN488_PRIME		2012-088T08:40:00		000T00:22:00	2012-088T09:02:00	XBAND to Earth	POS_X to NEP	
NEW WAYPOINT		2012-088T09:02:00		000T12:10:00	2012-088T21:12:00	XBAND to Earth	POS_X to NEP	
SP_163EA_YBIAS088_PRIME	E	2012-088T09:02:00		000T01:30:00	2012-088T10:32:00	XBAND to Earth	POS_X to NEP	
SP_163EA_C70METSEQ088_PRIME	C, E, M	2012-088T10:32:00		000T09:00:00	2012-088T19:32:00	XBAND to Earth	Rolling	POS_X to NEP or NSP, CAPS
Pointer Reset in preparatio...		2012-088T19:32:00		000T00:00:01	2012-088T19:32:01			
SP_163EA_M70METN088_PRIME	C	2012-088T19:32:00		000T01:00:00	2012-088T20:32:00	XBAND to Earth	Rolling	POS_X to NEP or NSP, CAPS
SP_163RH_WAYPTTURN088_PRIME		2012-088T20:32:00		000T00:40:00	2012-088T21:12:00	NEG_Y to Rhea	POS_Z to 221.8/-83.5	
NEW WAYPOINT		2012-088T21:12:00		000T10:50:00	2012-089T08:02:00	NEG_Y to Rhea	POS_Z to 221.8/-83.5	
ISS_163TI_M6OR2CLD088_PRIME	C, V	2012-088T21:12:00	E163_M6OR2CLD088+000T00:00:00	000T01:30:00	2012-088T22:42:00	ISS_NAC to Titan	POS_Z to 221.8/-83.5	No Preference to secondary pointing
ISS_163OT_LSRHEA088_PRIME	V	2012-088T22:42:00		000T03:33:00	2012-089T02:15:00	ISS_NAC to Rocks	POS_Z to 221.8/-83.5	
CIRS_163RH_RHEA001_PRIME	I, U, V	2012-089T02:15:00		000T00:45:00	2012-089T03:00:00	NEG_Y to Rhea	POS_Z to 221.8/-83.5	Collaborative Rider(s): UVIS
ISS_163RH_SATCAL001_PRIME	C, U, V	2012-089T03:00:00		000T01:00:00	2012-089T04:00:00	ISS_NAC to Rhea	NEG_Z to North_Pole_Dir	Collaborative Rider(s): UVIS
RADAR_163SA_ENGTST107_PRIME		2012-089T04:00:00		000T03:22:00	2012-089T07:22:00	NEG_Z to Saturn	NEG_Y to 221.8/-83.5	
SP_163EA_DLTURN089_PRIME		2012-089T07:22:00		000T00:40:00	2012-089T08:02:00	XBAND to Earth	POS_X to NEP	
NEW WAYPOINT		2012-089T08:02:00		000T10:30:00	2012-089T18:32:00	XBAND to Earth	POS_X to NEP	
SP_163EA_YBIAS089_PRIME	E	2012-089T08:02:00		000T01:30:00	2012-089T09:32:00	XBAND to Earth	POS_X to NEP	
SP_163EA_C70METSEQ089_PRIME	C	2012-089T09:32:00		000T09:00:00	2012-089T18:32:00	XBAND to Earth	Rolling	POS_X to NEP or NSP, CAPS

E17 is a 74 km inbound targeted flyby occurring on March 27

The segment begins with a preceding observation period on day 086/087, in which a Titan cloud monitor and satellite search around Titan L5 Lagrange point were integrated.

The flyby period takes place on day 087, beginning with a long Enceladus plume observation that combines two PIEs. Next CIRS leads ORS viewing of Enceladus followed by INMS being prime at closest approach (one of a set of 3 flybys of high priority for CAPS and CDA as well as INMS). ISS takes images outbound. All of these are PIEs.

Following that (early on day 088), ISS leads on a Janus PIE observation (nontargeted 43,863 km flyby), and then we turn to Dione (nontargeted 43,996 km flyby) for RADAR scatterometry/radiometry and an ISS-led regional map PIE with UVIS, CIRS, and VIMS all riding along.

After the dual-playback downlinks we have a caboose observation period on day 088/089, filled with a Titan cloud monitor, a search for rocks in the Rhea L5 points, more Rhea imaging (including a Rhea/Mimas/Janus mutual event), an ISS photometric calibration, and finally a RADAR engineering test of diagnostic modes.

Dual playbacks

- A Dual Playback for High Value Science has been planned
- Based on DSN requests, SMT results indicate it will fit within this segment
- A SPLAT item has been opened until the DSN negotiations for this time period are complete

Flyby	Driving Instrument	BEGHIVAL	ENDHIVAL	P4 Dual Playback	SSR-A empty after first playback?	Anything nonstandard?
E17	INMS	E17-15Min	E17+15 Min	124.4 Mb	Yes	Playback SSR-A first for 1 st pass

Notes and Liens

- Pointing:
 - Collaborative prime/rider coordination designs: 4, see the spass
 - Enceladus waypoint attitude has 3.7° modeled CIR heating, but part of that time will not be at that attitude
 - I am not sure why the Enceladus time period is a custom period as it seems everyone is picking up and handing off at the waypoint, but this may make later RBOT changes easier to implement in CIMS
 - >3 hr observations: ISS_163DI_REGMAP001_PIE 2012-088T04:30:00 000T03:44:00 2012-088T08:14:00 has 84 degrees target motion. SPLAT item added
 - All Ybias windows are before the downlinks
 - RBOT-friendly secondaries used where possible
- DSN: DSS 43 to 63 on doy 088 can't be a handover, viewperiod overlap timing doesn't work, so second pass uses 5 min playback delay
- Data Volume:
 - Dual playback meets guidelines, first downlink does not empty full SSR so must do A4 first (implemented in CIMS)
 - In exchange for upgrading our final pass to a 70M, we left margin on the pass (couldn't squeeze in to a HEF, didn't need the full 70M pass...hope this helps with DSN negotiations...)
- Resource Checker items:

Time	Request	Lien or Action	Reason to ignore
2012-088T10:32:00	SP_163EA_C7OMETSEQ088_PRIME	First_Part value of SSRAP4 does not match default of SSRBP4	Required for dual playback
2012-089T03:00:00	VIMS_163RH_RHEA001_ISS	Rider request VIMS_163RH_RHEA001_ISS start/end 2012-089T03:00:00/2012-089T04:00:00 <> Prime request start/end 2012-089T02:15:00/2012-089T03:00:00	VIMS rider name does not match prime's name. I don't care
2012-086T18:47:00	INMS_163SA_SURVEYSEG002_INMS	Request referencing GMB_E163_ENCELADUS_E17 occurs outside of corresponding Movable Block	rider, does not matter for GMB
2012-087T06:30:09	INMS_163EN_E17INBND001_INMS	Request referencing GMB_E163_ENCELADUS_E17 occurs outside of corresponding Movable Block	rider, does not matter for GMB
2012-087T20:30:09	INMS_163EN_E17OUTBND001_INMS	Request referencing GMB_E163_ENCELADUS_E17 occurs outside of corresponding Movable Block	rider, does not matter for GMB
2012-088T06:30:09	INMS_163SA_SURVEY002_INMS	Request referencing GMB_E163_ENCELADUS_E17 occurs outside of corresponding Movable Block	rider, does not matter for GMB
2012-087T15:00:09	RPWS_163RI_RPXING001_PRIME	Request referencing GMB_E163_ENCELADUS_E17 occurs outside of corresponding Movable Block	rider, does not matter for GMB
2012-087T21:10:00	ISS_163JA_JANUS001_PIE	Telemetry Mode change during an ISS observation	Telemetry mode change occurs during turn, OK

Sequence Liens:

- ISS_163DI_REGMAP001 lien to add inertial period(s)
- Dual playback lien regarding DSN negotiations
 - INMS @ 2012-087T17:30 (c/a) is using fast turn rates and will write the waiver to FR07D145

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
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!	x
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)	n/a
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	n/a

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.	n/a
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]	n/a
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)	X
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."	See notes
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.	n/a
26. Examine SMT warnings report, include dispositions here or on notes page of any items – 2 standard radar warmup/TLM mode warnings and one for the dual playback with A4 first PPL	3 to ignore
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).	See notes about non-handover pass
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)	Lien added
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)	x
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	