CASSINI XXXTWT SEGMENT

Rev 139 Handoff Package

Segment Boundary 2010-288T04:02:00 – 2010-291T04:02:00

26 April 2010

Nancy V: WP, DL strategy
Amanda H: Science timeline
Nora A: Segment clean-up, DV, package

SMT report and SPASS

Science Highlights

Notes & Liens

Integration Checklist

SMT report

Report: https://cassini.jpl.nasa.gov/sp/icy/rev139/SOST_139_100415.rpt
Warnings: https://cassini.jpl.nasa.gov/sp/icy/rev139/SOST_139_100415.warning (none)

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

			OBSERVATION_PERIOD							DOWNLINK_PASS							
			P4						P5	RECORDED		PLAYBACK					
DOWNLINK PASS NAME	Start doy hh:mm	End doy hh:mm	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)	(%)	CAROVR (Mb)
SP_139EA_C34HEFOTB288_PRIME	288 18:20	289 03:20	0	492	60	552	3319	2767	0	219	53	824	642	-183	0	0%	182
SP_139EA_G34HEFNON290_PRIME	290 15:02	290 19:02	182	2653	151	2986	3319	332	0	91	24	3101	313	-2789	0	0%	2788
SP_139EA_C70METNON290_PRIME	290 19:02	291 04:02	2788	0	0	2788	3319	531	0	215	53	3056	3000	-57	0	0%	57

- Note: Following segment, XD_139_140, has agreed to accept the small carryover. (Although, SOST leads do not believe that this is actually a real impact, due to data compression and SOST data utilization history.)

SPASS

https://cassini.jpl.nasa.gov/sp/icy/rev139/SPASS_SOST_139_100421.pdf
https://cassini.jpl.nasa.gov/sp/icy/rev139/SPASS_SOST_139_100421.xls
https://cassini.jpl.nasa.gov/sp/icy/rev139/SPASS_SOST_139_100421.txt

SOST_139 - April 21, 2010

Request	Riders	Start (SCET)	Start (Epoch)	Duration	End (SCET)	Primary	Secondary	Comments
Sequence S64, length = 45 days		2010-284T04:17:00		044T15:18:00	2010-328T19:35:00			
SOST_139 Segment		2010-288T04:02:00		003T00:00:00	2010-291T04:02:00			
VIMS_139DI_DIONE001_PRIME	C, I, U	2010-288T04:02:00		000T14:18:00	2010-288T18:20:00	VIMS_IR to Dione	POS_X to 258.0/-74.5	
SP_139EA_C34HEFOTB288_PRIME	C, N	2010-288T18:20:00		000T09:00:00	2010-289T03:20:00	XBAND to Earth	Rolling	NEG X to NEP, CAPS
ISS_139EN_PLMHPMR001_PIE	C, U, V	2010-289T03:20:00		000T03:55:00	2010-289T07:15:00	ISS_NAC to Enceladus	NEG_X to NSP	SOST PIE
SP_139OT_WAYPTTURN289_PRIME		2010-289T08:21:00		000T00:25:00	2010-289T08:46:00	ISS_NAC to 35.0/-3.0	NEG_X to NSP	primary RA/Dec is Omi Cet
NEW WAYPOINT		**2010-289T08:46:00**		**000T13:10:00**	**2010-289T21:56:00**	**ISS_NAC to 35.0/-3.0**	**NEG_X to NSP**	
VIMS_139SA_OMICETOCC001_PIE	C	2010-289T08:46:00		000T02:30:00	2010-289T11:16:00	CIRS_FPB to 34.836/-2.978	PIC	
CIRS_139MI_MIMAS001_PRIME	I, M, U, V	2010-289T11:16:00		000T05:59:00	2010-289T17:15:00	ISS_NAC to Mimas	NEG_X to NSP	
ISS_139PL_PALENCLOS001_PIE	C, U, V	2010-289T17:15:00		000T01:30:00	2010-289T18:45:00	UVIS_FUV to Pallene	PIC	SOST PIE
Periapse R = 4.101 Rs, lat ...		2010-289T17:56:40		000T00:00:01	2010-289T17:56:41			
VIMS_139SA_ALPHYAOCC001_PIE	C	2010-289T18:45:00		000T02:30:00	2010-289T21:15:00	CIRS_FPB to 141.897/-8.659	PIC	
SP_139DI_WAYPTTURN289_PRIME		2010-289T21:15:00		000T00:18:00	2010-289T21:33:00	ISS_NAC to Dione	POS_X to 260.0/-25.0	part 1 of 2
SP_139DI_WAYPTTURN489_PRIME		2010-289T21:33:00		000T00:23:00	2010-289T21:56:00	ISS_NAC to Dione	POS_X to 111.0/-57.0	part 2 of 2
NEW WAYPOINT		**2010-289T21:56:00**		**000T15:36:00**	**2010-290T13:32:00**	**ISS_NAC to Dione**	**POS_X to 111.0/-57.0**	
CIRS_139DI_DIONE001_PRIME	I, U, V	2010-289T21:56:00		000T03:04:00	2010-290T01:00:00	ISS_NAC to Dione	POS_X to 111.0/-57.0	High spectral resolution scan/stare
ISS_139DI_REGMAP001_PIE	C, U, V	2010-290T01:00:00		000T03:15:00	2010-290T04:15:00	ISS_NAC to Dione	POS_X to 111.0/-57.0	SOST PIE
Begin Custom		**2010-290T04:15:00**		**000T00:00:01**	**2010-290T04:15:01**	**ISS_NAC to Dione**	**POS_X to 111.0/-57.0**	
CIRS_139RH_RHEA001_PRIME	I, U, V	2010-290T04:15:00		000T02:45:00	2010-290T07:00:00	ISS_NAC to Rhea	POS_X to 129.2/-66.3	Pick up at ISS_NAC to Dione, POS_X to 111.0/-57.0; Hand off at ISS_NAC to Rhea, POS_X to 129.2/-66.3.
ISS_139RH_REGMAP001_PIE	C, U, V	2010-290T07:00:00		000T02:00:00	2010-290T09:00:00	ISS_NAC to Rhea	POS_X to 129.2/-66.3	Pick up at ISS_NAC to Rhea, POS_X to 129.2/-66.3; Hand off at ISS_NAC to Rhea, POS_X to 129.2/-66.3. SOST PIE
ISS_139RH_RHEARINGS001_PRIME	V	2010-290T09:00:00		000T03:52:00	2010-290T12:52:00	ISS_NAC to Rhea	POS_X to 129.2/-66.3	Pick up at ISS_NAC to Rhea, POS_X to 129.2/-66.3; Hand off at ISS_NAC to Dione, POS_X to 111.0/-57.0.
End Custom		**2010-290T12:52:00**		**000T00:00:01**	**2010-290T12:52:01**	**ISS_NAC to Dione**	**POS_X to 111.0/-57.0**	
SP_139EA_DLTURN290_PRIME		2010-290T12:52:00		000T00:40:00	2010-290T13:32:00	XBAND to Earth	POS_X to NEP	
NEW WAYPOINT		**2010-290T13:32:00**		**000T14:30:00**	**2010-291T04:02:00**	**XBAND to Earth**	**POS_X to NEP**	
SP_139EA_YBIAS290_PRIME	E	2010-290T13:32:00		000T01:30:00	2010-290T15:02:00	XBAND to Earth	POS_X to NEP	
SP_139EA_G34HEFNON290_PRIME	C	2010-290T15:02:00		000T04:00:00	2010-290T19:02:00	XBAND to Earth	POS_X to NEP	
SP_139EA_C70METNON290_PRIME	C	2010-290T19:02:00		000T09:00:00	2010-291T04:02:00	XBAND to Earth	POS_X to NEP	

October 15 - 18, 2010 (DOY 288-291)

These ~3 days encompass the rev 139 SOST segment, which has no targeted flybys, but several nice icy satellite observing opportunities. (And this is the first XXM periapse.)

DOY 288:
VIMS has prime pointing control of the spacecraft on this day and observes Dione for over 14 hours while the other Optical Remote Sensing (ORS) instruments ride along also taking images and data. We then turn toward Canberra, Australia to downlink all the information.

DOY 289:
DOY 289 is a very busy day for Cassini. We first observe Enceladus' south polar plume with ISS (and others riding) before transitioning to VIMS pointing control to observe a Saturn atmospheric occultation using the star OmiCet. We then turn the CIRS boresights toward Mimas for 6 hours (does it still look like PacMan?), before the Imaging Science Subsystem (ISS) collects several images of the moon Pallene. After that, VIMS turns back to Saturn to observe the star alpHya for another atmospheric occultation. CIRS completes this day by observing Dione.

DOY 290:
ISS begins the day by imaging Dione before we enter a custom hand-off period between the instruments CIRS and ISS to observe and map Rhea. ISS will complete this period by also searching for possible Rhea rings by doing a sit-and-stare where one presumed ring ansa may be. We then turn our High Gain Antenna (HGA) back toward Earth to downlink all the data, using both Goldstone, CA and Canberra, Australia DSN stations.

DOY 291:
Cassini continues to downlink icy satellite data.

Notes and Liens

- Pointing:
  - NO periods without a valid WP
  - 2-part WP turn on DOY 289
  - Using Earth WP at beginning of segment, so no WP turn needed. (ok in CRC)
  - SPASS gap (on purpose): 1 hr 6 min between ISS plume at 289, 03:20 and WP. (ok in CRC)
  - Collaborative prime/rider coordination designs:
    - ISS_139PL_PALENCLOS001_PIE at 289, 17:15:00
    - ISS_13DI_REGMAP001_PIE at 290, 01:00:00
    - all custom period requests
  - Teams have validated custom handoffs and turn times
  - RBOT friendliness of delivery: We used rbot_my_spass and all teams are using an RBOT-friendly secondary except the 2 ISS plumes at 289, 03:20 and 17:15 and ISS Pallene at 289, 17:15 (no friendlies identified), CIRS Mimas at 289, 11:16, and potentially the 2 out-of-discipline Saturn PIEs at 289, 08:46 and 18:45 (who kept PIC even after being informed of their RBOT-friendly options).
- Data Volume:
  - No dual PB. 57 Mb carryover to following XD segment, which has been approved. (see p. 2 here)
- DSN:
  - No issues
- Opmodes:
  - No issues
- Hydrazine:
  - N/A
- Special Activities:
  - Working around hi-phase near end of ISS plume at 289, 03:20, but should not need CMT management if turn back to WP in time.

Sequence Liens:

- None

Segment Checklist p1

Item	Disposition notes, or X if complete
1. Disposition all requests in CIMS - approve all pending requests, no outstanding revisions/new requests	x
2. Version the SPASS in CIMS, use label INTEG_FIN, in description put date and your name	x
3. Examine SPASS, ensure SP turns correctly designated PRIME or NEW WAYPOINT. Review Ybias presentation. Prime RSS observations require the Xband to Earth attitude be a waypoint, use DLTURN with spass type New Waypoint	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. All turns use the slower XM slew rates and include 2 minutes turn margin. First turn of segment has been checked using correct final attitude of previous segment	x
6. YBIAS windows have been included as required, guidelines for integration met per latest Ybias package	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 or Icy Satellite flyby. 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!	2 team custom period around non-targeted RH
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	x
12. Use rolling_sru if required per CTV checks	x
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)	x
16. Downlinks (attitude/rolling) match XMDLWG plan. Negotiated changes should be reported back to the WG	x

Segment Checklist p2

Item	Disposition notes, or X if complete
17. Multi-revolution turns about the X-axis have an offset greater than or equal to 30 degrees about Z	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)	N/A
19. 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
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	X (Saturn PIEs- assume Saturn TWT did what they needed to do)
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	N/A
23. 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	N/A
24. Run the resource checker in CIMS and fix errors found. Remaining notes disposition here	2 items - both OK, see bullet 3 & 4 of p, 5 here. (observation period name errors also, but that will affect all segments)
25. Run SMT, if SSR not empty at end of segment include in notes. Aim for empty SSR every 4 days minimum.	(see notes page 5)
26. Examine SMT warnings report, include dispositions here of any items	X - No warnings.
27. RSS boresight: one _SP pass, two _PRIME downlink passes, one hour observation block in SNER_3	N/A

Segment Checklist p3

Item	Disposition notes, or X if complete
28. Examine “ap_downlink report check” output, include dispositions here of any items (see next two items).	All ok - I think these are from the observation period name change in work.
29. List any DSN stations requested during maintenance periods, AND JUSTIFICATION. **AVOID!!!!!**	None
30. Avoid requesting two overlapping stations (except for RSS science) whenever possible – use RSS station for downlink too – or have RSS move ORT	x
31. Compare RSS requests to DSN requests, make sure they jive (ORT, occ, etc), ORTs are integrated.	N/A
32. List your percent 70M stations requested - avoid >35%	1/3
33. Examine “ap_downlink report nav” output, MP should ensure NAV OK with gaps in 2way	x
34. In CIMS check for “start before”, “end before”, “start after”, “end after” requests - fix if any problems found	x
35. 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
36. If sequence boundary at START of your segment, ensure IVPGAP info correct, NO “start before” MAPS requests	N/A
37. If sequence boundary at END of your segment (ie in the next segment), ensure 6 “SEQ” upload DSN passes - will probably ripple into preceding segment(s), make sure to notify them. Last pass has Ybias window in front, no bonus science. NO “end after” MAPS requests	N/A
38. 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/XXMOpModes	N/A
39. If conjunction is in your segment, see Conjunction page on SP Wiki	N/A
40. RAMAVOID: new waypoint, NOT in custom period	N/A
41. If on thrusters, confirm deadbands	N/A
42. Segment products & this package linked to XXM deliveries page	Will do!