CassiniXM
EXTENDED MISSION

CASSINI SOST SEGMENT

Rev 136 Handoff Package

Segment Boundary 2010-225T07:49:00 – 2010-227T07:49:00

25 Jan. 2010

Integration: Amanda Hendrix

Package: Nora K. Alonge

SMT report and SPASS

Science Highlights

Notes & Liens

Integration Checklist

SMT report

https://cassini.jpl.nasa.gov/sp/icy/136EN/SOST_136EN_100122.rpt

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DATA VOLUME SUMMARY --- TRANSFER FRAME OVERHEAD INCLUDED (80 BITS PER 8800-BIT FRAME)
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| | Start | End | 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_136EA_C70METNON226_PRIME	226 03:05	226 05:30	0	3270	81	3351	3316	-34	0	70	14	3401	793	-2609	-42	0%	2608
SP_136EA_M70METNON226_PRIME	226 12:30	226 17:45	2608	722	30	3360	3316	-42	0	154	31	3502	1844	-1658	1023	20%	1658
SP_136EA_G34BWGNON226_PRIME	226 17:45	226 21:19	1658	0	0	1658	3316	1659	0	105	21	1783	222	-1562	1023	31%	1561
SP_136EA_C70METNON426_PRIME	226 22:49	227 07:49	1561	44	6	1612	3316	1705	0	349	53	2013	3037	1023	1023	34%	0

	CAPS (Mb)	CDA (Mb)	CIRS (Mb)	INMS (Mb)	ISS (Mb)	MAG (Mb)	MIMI (Mb)	RADAR (Mb)	RPWS (Mb)	UVIS (Mb)	VIMS (Mb)	PROBE (Mb)
TOTAL RECORDED (OPNAV data not included)	280.8	650.9	348.3	37.4	1211.0	115.3	158.8	0.0	710.2	559.7	599.0	0.0

SPASS

https://cassini.jpl.nasa.gov/sp/icy/136EN/SPASS_SOST_136_100125.pdf
https://cassini.jpl.nasa.gov/sp/icy/136EN/SPASS_SOST_136_100125.xls
https://cassini.jpl.nasa.gov/sp/icy/136EN/SPASS_SOST_136_100125.txt

SOST 136EN - Jan. 25, 2010

Request	Riders	Start (SCET)	Start (Epoch)	Duration	End (SCET)	Primary	Secondary	Comments
Sequence S62, length = 37 days		2010-211T18:51:00		037T11:42:00	2010-249T06:33:00			
E11 Flyby Segment		2010-225T07:49:00		002T00:00:00	2010-227T07:49:00			
SP_136EA_WAYPTTURN225_PRIME	M	2010-225T07:49:00		000T00:40:00	2010-225T08:29:00	XBAND to Earth	NEG_X to NSP	
NEW WAYPOINT		2010-225T08:29:00		001T23:20:00	2010-227T07:49:00	XBAND to Earth	NEG_X to NSP	
ISS_136TI_M30R1CLD225_PRIME	C, M	2010-225T08:29:00	E136_M30R1CLD225+000T00:00:00	000T02:00:00	2010-225T10:29:00	CIRS_FPB to Titan	NEG_X to NSP	
ISS_136DI_PLUMESEAR001_PRIME	C, M, U, V	2010-225T10:29:00		000T02:21:00	2010-225T12:50:00	ISS_NAC to Dione	NEG_X to NSP	Stay at Dione; do not return to WP at request end (ISS internal handoff to Enceladus plume)
ISS_136EN_PLMLRHP001_PRIME	C, M, U, V	2010-225T12:50:00		000T02:10:00	2010-225T15:00:00	ISS_NAC to Enceladus	NEG_X to NSP	Pickup at Dione
ISS_136EN_PLMSCECL001_PRIME	C, M, U, V	2010-225T15:00:00		000T01:00:00	2010-225T16:00:00	ISS_NAC to Enceladus	NEG_X to NSP	handoff at WP
CIRS_136DI_FP3SECLN001_PRIME	C, I, M, U, V	2010-225T16:00:00		000T02:55:00	2010-225T18:55:00	CIRS_FP1 to Dione	NEG_X to NSP	PIE (SOST)
CIRS_136EN_DRKPLUME001_PRIME	I, M, U, V	2010-225T18:55:00		000T00:35:00	2010-225T19:30:00	CIRS_FP3 to Enceladus	NEG_X to NSP	PIE (SOST)
SP_136NA_DEADTIME225_PRIME	M	2010-225T19:30:00		000T00:04:59	2010-225T19:34:59	XBAND to Earth	NEG_X to NSP	
Begin Custom		2010-225T19:34:59	GMB_E136_Enceladus-000T02:56:00	000T00:00:01	2010-225T19:35:00	XBAND to Earth	NEG_X to NSP	
ISS_136EN_PLMHRHP002_PRIME	C, M, U, V	2010-225T19:34:59	GMB_E136_Enceladus-000T02:56:00	000T01:55:00	2010-225T21:29:59	ISS_NAC to Enceladus	POS_Z to NSP	Pick up at XBAND to Earth, NEG_X to NSP; Hand off at CIRS_FP3 to Enceladus, POS_X to NSP
CIRS_136EN_HIRES001_PRIME	I, M, U, V	2010-225T21:29:59	GMB_E136_Enceladus-000T01:01:00	000T03:00:00	2010-226T00:29:59	CIRS_FP3 to Enceladus	POS_X to NSP	Pick up at CIRS_FP3 to Enceladus, POS_X to NSP; Hand off at CIRS_FP3 to Enceladus, NEG_X to NSP. PIE (SOST). Pickup at Enceladus south pole, not Enceladus center. Handoff will need to be tweaked.
136EN (t) E11 ENCELADUS In...		2010-225T22:30:59		000T00:00:01	2010-225T22:31:00			
UVIS_136ST_URBETORI001_PRIME	M, U, V	2010-226T00:29:59	GMB_E136_Enceladus+000T01:59:00	000T01:45:00	2010-226T02:14:59	UVIS_HSP to 78.634/-8.202	NEG_X to NSP	Pick up at CIRS_FP3 to Enceladus, NEG_X to NSP; Hand off at ISS_NAC to Enceladus, NEG_X to NSP.
Periapse R = 3.457 Rs, lat ...		2010-226T01:04:02		000T00:00:01	2010-226T01:04:03			
VIMS_136EN_ENCEL001_PRIME	C, I, M, U	2010-226T02:14:59	GMB_E136_Enceladus+000T03:44:00	000T00:45:00	2010-226T02:59:59	ISS_NAC to Enceladus	NEG_X to NSP	Pick up at ISS_NAC to Enceladus, NEG_X to NSP; Hand off at XBAND to Earth, NEG_X to NSP.
End Custom		2010-226T02:59:59	GMB_E136_Enceladus+000T04:29:00	000T00:00:01	2010-226T03:00:00	XBAND to Earth	NEG_X to NSP	
SP_136NA_DEADTIME226_PRIME	M	2010-226T02:59:59	GMB_E136_Enceladus+000T04:29:00	000T00:05:01	2010-226T03:05:00	XBAND to Earth	NEG_X to NSP	
SP_136EA_C70METNON226_PRIME	M	2010-226T03:05:00		000T02:25:00	2010-226T05:30:00	XBAND to Earth	NEG_X to NSP	
ISS_136TE_TETHYS001_PRIME	C, M, U, V	2010-226T05:30:00		000T07:00:00	2010-226T12:30:00	ISS_NAC to Tethys	NEG_X to 89.949/51.62	ISS NAC to Tethys, NEG_X to 89.949/51.620
SP_136EA_M70METNON226_PRIME	M	2010-226T12:30:00		000T05:15:00	2010-226T17:45:00	XBAND to Earth	NEG_X to NSP	
SP_136EA_G34BWGNON226_PRIME	M	2010-226T17:45:00		000T03:34:00	2010-226T21:19:00	XBAND to Earth	NEG_X to NSP	
SP_136EA_YBIAS226_PRIME	E, M	2010-226T21:19:00		000T01:30:00	2010-226T22:49:00	XBAND to Earth	NEG_X to NSP	
SP_136EA_C70METNON426_PRIME	C, M	2010-226T22:49:00		000T09:00:00	2010-227T07:49:00	XBAND to Earth	NEG_X to NSP	

Science Highlights

August 13 - 15, 2010 (DOY 225-227)

These ~ 48 hours encompass the targeted E11 (rev 136) Enceladus flyby at a closest-approach altitude of 2554 km.

DOY 225:
Titan cloud monitoring starts of this day, followed by ISS imaging of Dione including a search for a Dione plume. CIRS will then observe Dione before moving on to stare at Enceladus and observe its plume. ISS then takes back prime control of the spacecraft to further image Enceladus' plume.

DOY 226:
Flyby day! CIRS will have prime pointing during closest-approach. The observations will continue to map the thermal radiation from the tiger stripes, taking advantage of the excellent viewing geometry of this flyby. In particular, they will focus on warm transverse fractures that connect Alexandria and Cairo Sulci, and on following up on earlier suggestions that substantial heat is escaping from the interior from the regions between the tiger stripes.

After closest-approach, UVIS will do a "PIE" (pre-integrated) ring observation, which is a stellar occultation by the rings of the star Beta Orionis. UVIS will observe the flickering of Beta Orionis with a sampling rate of 1000 measurements per second to get detailed measurements of the ring structure. Because the line of sight to the star is nearly parallel to the ring plane, this occultation is particularly sensitive to tenuous material in gaps and also to untangling the vertical structure of the rings.

To close out this flyby, VIMS will stare at Enceladus to collect data, and then handover to ISS to take some images of another satellite, Tethys.

DOY 227: Cassini continues to downlink the Enceladus flyby data, using Canberra, Madrid, and Goldstone DSN stations.

Y bias data volume

SOST rev 136

No Y-bias window overlapping DLs. We have an unusual DL strategy here, but have left a 90-min. Y-bias window between two DLs at the end of the segment.

We have SSR and DSN capacity margin on our last DL. This could allow potential DSN flexibility, if needed.

ARH / NKA

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25 Jan 10

Y bias and RSS

No RSS activities in this segment.

Notes and Liens

- Pointing:
    - Pointing agreements are listed in the "Comments" of the SPASS
    - Earth-pointed WP is good the whole time even though we have a custom period around C/A
    - Prime/rider coordination and designs were reviewed during SOST meetings (We can only trust the teams now, as they've said all is good.) Pretty much all requests can be called out as "collaborative".
    - Custom handoffs and turn times were validated during SOST meetings (See comment in previous bullet.) No hand-off mismatches in CIMS.
    - No known 2-part turns or 180 turns
    - No known Y-bias window issues
    - RBOT friendliness: all requests use WP secondary where possible

- Data Volume:

    - No segment carryover. No margin less than - 90 Mb. Extra SSR margin and DL capacity on last DL.

- DSN:

    - No maintenance overlaps, no OTMs, no Level 3 requests. (No RSS acitivities.)

- Opmodes:

    - No RSS or RADAR. DFPW_Normal is good the whole time.

- Special Activities:

    - No known special activities.

Sequence Liens:

- No liens to be worked in Implementation

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. All large turns >60 degrees use the slower XM slew rates and include turn margin as specified in the Extended Mission slew margin policy. Exceptions to this rule are specified in FR07D145	X
6. YBIAS windows have been included as required, guidelines for integration met per MP forum 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	C/A - 2:56 to +4:29
10. 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
11. Prime/rider coordination: secondaries have all been reviewed and agreed to, co-designed observations are so designated, pre-designed in PDT	X
12. Use rolling_sru if required per CTV checks	N/A
13. The secondary axis for downlinks that contain prime and backup OTMs is the same, and inertially fixed	N/A
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)	N/A
16. Downlinks (attitude/rolling) match XMDLWG plan. Negotiated changes should be reported back to the WG	Could not turn to DLWG attitude safely. Adjusted 2ry. Unsure if Amanda got CAPS input for new 2ry.

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)	GMB - appropriate margin/deadtime
19. Live moveable blocks use an LMB epoch and use the appropriate epoch naming conventions. Live Update Blocks use a LUB epoch (RSS only)	GMB - uses epoch naming conventions
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
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	X
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. Paste remaining notes here with disposition - SP_136NA_ENDCUSTOM226_PRIME: Request referencing GMB_E136_Enceladus occurs outside of corresponding Movable Block …..OK (false)- end custom is in GMB (at end with deadtime request)	X
25. Run SMT, if SSR not empty at end of segment include in notes, and instances of <-90 SSR margin	(see notes page)
26. Examine SMT warnings report, include dispositions here of any items (negative SSR margin should already be on notes page) - Only -34 Mb and -42 Mb SSR overages. No waivers needed.	X

Segment Checklist p3

Item	Disposition notes, or X if complete
27. Examine "ap_downlink report check" output, include dispositions here of any items (see next two items).	X
28. List any DSN stations requested during maintenance periods, AND JUSTIFICATION. **AVOID!!!!!**	None
29. List your percent 70M stations requested - avoid >35%	1 short 70m, 1 34m-70m handoff, 1 normal 70m. Needed capacity to playback flyby data. Some margin still available for DSN negotiations.
30. Examine "ap_downlink report nav" output, MP should ensure NAV OK with gaps in 2way	X
31. In CIMS check for "start before", "end before", "start after", "end after" requests - fix if any problems found	X
32. Verify OPNAVs are in SNER5 and are support_image class, sanity check rest of tlm modes (Tilmann often wants SNER5, RADAR 15 min in 5A/activity in 5A or 8, etc)	N/A
33. If sequence boundary at START of your segment, ensure IVPGAP info correct, NO "start before" MAPS requests	N/A
34. 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
35. 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 - All DFPW - no RSS, RADAR, no special opmodes or agreements
36. Compare RSS requests to DSN requests, make sure they jive (ORT, occ, etc), ORTs are integrated.	N/A
37. If conjunction is in your segment, see Conjunction page on SP Wiki	N/A
38. RAMAVOID: new waypoint, NOT in custom period	N/A
39. If on thrusters, confirm deadbands	N/A
40. Segment products & this package linked to XM deliveries page	X