CASSINI TOST SEGMENT

145TI_T74 Handoff Package

Segment Boundary 2011-048T20:31:00 – 2011-050T20:31:00

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SMT report and SPASS

Science Highlights

Notes & Liens

Integration Checklist

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_145EA_C70METNON050_PRIME	050 11:31	050 20:31	0	3140	165	3305	3318	13	0	355	53	3713	3995	281	282	7%	0

SSR PARTITION SIZE SUMMARY - SELECTED SSR CONFIGURATION: DOUBLE

	SSR A/B		
OBSERVATION PERIOD	P4 Size (Frames)	P5 Size (Frames)	P6 Size (Frames)
SP_145NA_C70OBSNON048_NA	188720	244	38863

DATA VOLUME REPORT --- TRANSFER FRAME OVERHEAD NOT INCLUDED

Event	Start doy hh:mm	End doy hh:mm	CAPS (Mb)	CDA (Mb)	CIRS (Mb)	INMS (Mb)	ISS (Mb)	MAG (Mb)	MIMI (Mb)	RADAR (Mb)	RPWS (Mb)	UVIS (Mb)	VIMS (Mb)	PROBE (Mb)	ENGR (Mb)	TOTAL (Mb)
OBSERVATION_NOR	048 20:31	050 11:31	745.2	73.6	535.0	24.1	600.0	83.6	150.7	0.0	819.5	0.0	80.0	0.0	163.0	3274.6
SP_145EA_C70METNON050_PRIME	050 11:31	050 20:31	32.4	127.9	86.4	3.2	0.0	16.0	38.9	0.0	42.1	4.9	0.0	0.0	0.0	351.9
DAILY TOTAL SCIENCE	048 20:31	050 20:31	777.6	201.5	621.4	27.3	600.0	99.6	189.6	0.0	861.6	4.9	80.0	0.0	163.0	

	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)	777.6	201.5	621.4	27.3	600.0	99.6	189.6	0.0	861.6	4.9	80.0	0.0

Request	Riders	Start (SCET)	Start (Epoch)	Duration	End (SCET)	Primary	Secondary	Comments
Sequence S66, length = 49 days		2011-017T08:42:00		049T04:20:00	2011-066T13:02:00			
Titan Flyby T74 Segment		2011-048T20:31:00		002T00:00:00	2011-050T20:31:00			
SP_145TI_WAYPTTURN048_PRIME		2011-048T20:31:00		000T00:40:00	2011-048T21:11:00	NEG_Y to Titan	NEG_X to NTP	
NEW WAYPOINT		**2011-048T21:11:00**		**001T14:20:00**	**2011-050T11:31:00**	**NEG_Y to Titan**	**NEG_X to NTP**	
SP_145TI_DEADTIME048_PRIME		**2011-048T21:11:00**		**000T00:15:00**	**2011-048T21:26:00**	**NEG_Y to Titan**	**NEG_X to NTP**	
CIRS_145TI_MIDIRTMAP001_PRIME	I, R, V	2011-048T21:26:11	GMB_E145_TITAN_T74-000T	000T06:38:00	2011-049T04:04:11	CIRS_FPB to Titan	NEG_X to 74.4/-6.2	
CAPS_145TI_T74PTG001_PRIME	C, M, R	2011-049T04:04:11	GMB_E145_TITAN_T74-000T	001T00:00:00	2011-050T04:04:11	XBAND to Earth (0.0,0.0,15.0 deg	NEG_X to NSP	HGA to Earth for RSS
145TI (t) T74 TITAN Inboun...		2011-049T16:04:11		000T00:00:01	2011-049T16:04:12			
CIRS_145TI_MIDIRTMAP002_PRIME	E, I, V	2011-050T04:04:11	GMB_E145_TITAN_T74+000T	000T06:31:00	2011-050T10:35:11	CIRS_FPB to Titan	NEG_Z to 215.4/-84.0	
SP_145TI_DEADTIME050_PRIME	**E**	**2011-050T10:36:00**	**GMB_E145_TITAN_T74+000**	**000T00:15:00**	**2011-050T10:51:00**	**NEG_Y to Titan**	**NEG_X to NTP**	
SP_145TI_DLTURN050_PRIME	E	2011-050T10:51:00		000T00:40:00	2011-050T11:31:00	XBAND to Earth	NEG_X to 40.6/83.5	ra/dec = nsp
NEW WAYPOINT		**2011-050T11:31:00**		**000T09:00:00**	**2011-050T20:31:00**	**XBAND to Earth**	**NEG_X to 40.6/83.5**	
SP_145EA_C70METNON050_PRIME	C, R	2011-050T11:31:00		000T09:00:00	2011-050T20:31:00	XBAND to Earth	Rolling	NEG_X to NEP or NSP, CAPS

Science Highlights

DOY 48 & 50:
CIRS - CIRS is performing hemisphere temperature mapping in the stratosphere to monitor seasonal change, especially of the north polar winter vortex

ISS - Determine seasonal changes in the methane-hydrocarbon hydrological cycle: of lakes, clouds, aerosols, and their seasonal transport; Determine seasonal changes in the high-latitude atmosphere, specifically the temperature structure and formation and breakup of the winter polar vortex; Determine the surface temperature distribution and cloud distribution; Determine surface and tropospheric winds

DOY 49:
CAPS: Observe Titan's plasma interaction as it goes from south to north of Saturn's solar-wind-warped magnetodisk from one solstice to the next

RSS: This is a collaborative observation with CAPS as the prime. We have two related goals: measure the fluid and dynamic Love number of Titan and determine Titan's geoid. The determination of the fluid Love number is the only way to find out with confidence whether Titan has a liquid ocean. The determination of the geoid is crucial to understanding the internal structure of Titan through correlative analysis of the gravity and RADAR planetary radii data.

Y bias and RSS

A **thruster keep out zone** is requested for the RSS gravity experiments in T74, between **2011-048T11:31 - 2011-050T20:31** (start of downlink in MAG_144_145 to end of T74).

- If a bias must be placed over DOY 50 downlink, RSS prefers that it be as late as possible, i.e., as close as possible to EOT

Notes and Liens

- Pointing:
  - Prime/rider coordination
    - CAPS_145TI_T74PTG001_PRIME with RSS
    - CIRS_145TI_MIDIRTMAP002_PRIME with ISS
  - Thruster keepout zone from **2011-048T11:31 - 2011-050T20:31** for RSS gravity
  - CDA agrees to no articulation from 2011-049T05:18 to 2011-050T05:18, for RSS
- Data Volume:
  - No data volume issues, record margin of 13 Mb on P4
- DSN:
  - No issues
- Opmodes:
  - Arranged with prev MAG segment to have RSS_K_RWAF opmode start during downlink prior to start of T74; RSS_K_RWAF used throughout T74
- Hydrazine:
  - None used
- Special Activities:
  - None

Sequence Liens:

- CDA no articulation: 2011-049T05:18 to 2011-050T05:18
- Request for no biases between: 2011-048T11:31 - 2011-050T20:31

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. No rocking downlinks. No AZSCANS (IGAPIMAGE). 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	No YBIAS included, for RSS
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)	X
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). MUST have a full length 9 hour station requested for NAV tracking data	n/a

Segment Checklist p2

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)	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."	n/a
24. Run the resource checker in CIMS and fix errors found. Remaining notes disposition here or on notes page	X
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.	X
26. Examine SMT warnings report, include dispositions here or on notes page of any items	X
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 or on notes page of any items (see next two items).	X
29. List any DSN stations requested during maintenance periods, AND JUSTIFICATION. **AVOID!!!!!**	X
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.	X
32. Apoapse segments only: List your percent 70M stations requested - avoid >35%.	n/a
33. Apoapse segments only: Follow Integration Guideline & Constaint #15c regarding “two out of three” types of science per RBOT segment. ME OTM’s split an RBOT segment.	n/a
34. Support images use _XXM or _XXM3 activity type	n/a
35. In CIMS check for “start before”, “end before”, “start after”, “end after” requests - fix if any problems found	X
36. 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
37. If sequence boundary at START of your segment, ensure IVPGAP info correct, NO “start before” MAPS requests	n/a
38. 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
39. 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
40. If conjunction is in your segment, see Conjunction page on SP Wiki	n/a
41. RAMAVOID: new waypoint, NOT in custom period	n/a
42. If on thrusters, confirm deadbands	n/a
43. Segment products linked to XXM deliveries page, & this package when you are done	X