CASSINI SOST SEGMENT

Rev 183 (R4) Handoff Package

Segment Boundary 2013-067T14:29:00 to 2013-069T14:29:00

July 18 2012

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SMT report and SPASS

Science Highlights

Notes & Liens

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_183EA_G34BWGNON068_PRIME	068 07:10	068 10:10	0	547	70	618	3322	2704	0	42	18	678	243	-435	0 0%	434
SP_183EA_M34BWGNON068_PRIME	068 23:17	069 02:17	434	2387	55	2877	3322	445	0	104	18	2999	229	-2770	0 0%	2770
SP_183EA_G70METNON069_PRIME	069 05:29	069 14:29	2770	375	13	3158	3322	164	0	323	53	3534	3422	-113	0 0%	113

SPASS

Request	Riders	Start (SCET)	Start (Epoch)	Duration	End (SCET)	Primary	Secondary	Comments
Sequence S77, length = 72 days		2013-013T17:51:00		071T19:24:00	2013-085T13:15:00			
SOST_183_R4 Segment		2013-067T14:29:00		002T00:00:00	2013-069T14:29:00			
ISS_183OT_OUTERSAT001_PRIME	R, U	2013-067T14:29:00		000T16:37:00	2013-068T07:06:00	UVIS_FUV to Rocks	POS_X to 163.5/0.9	Observe one of these: Tarvos, Albiorix, Hyrrokkin, or Greip.
SP_183EA_DEADTIME068_PRIME	R	2013-068T07:06:00		000T00:04:00	2013-068T07:10:00	XBAND to Earth	NEG_Y to 297.0/44.0	
SP_183EA_G34BWGNON068_PRIME	R	2013-068T07:10:00	GMB_E183_RHEA_R4-000T11:07:27	000T03:00:00	2013-068T10:10:00	XBAND to Earth	NEG_Y to 297.0/44.0	RSS_183RH_GRAVITY001_PIE
Begin Custom		2013-068T10:10:00	GMB_E183_RHEA_R4-000T08:07:27	000T00:00:01	2013-068T10:10:01			
ISS_183OT_OUTERSAT002_PRIME	U, V	2013-068T10:10:00	GMB_E183_RHEA_R4-000T08:07:27	000T04:35:00	2013-068T14:45:00	UVIS_FUV to Rocks	POS_X to 163.5/-9.5	Pick up at XBAND to Earth, NEG_Y to 297.0/44.0; Hand off at CIRS_FP1 to Rhea, POS_X to 163.5/-9.5. Same target as OUTERSAT001.
CIRS_183RH_SOUTHPOLE001_PRIME	I, U, V	2013-068T14:45:00	GMB_E183_RHEA_R4-000T03:32:27	000T02:02:27	2013-068T16:47:27	CIRS_FP1 to Rhea	POS_X to 163.5/-9.5	Pick up at CIRS_FP1 to Rhea, POS_X to 163.5/-9.5; Hand off at XBAND to Earth, NEG_Y to 0.0/-69.8.
RSS_183RH_GRAVITY002_PIE	C, I, M, U, V	2013-068T16:47:27	GMB_E183_RHEA_R4-000T01:30:00	000T03:00:00	2013-068T19:47:27	XBAND to Earth	NEG_Y to 0.0/-69.8	Collaborative Rider(s): CIRS, UVIS. Pick up at XBAND to Earth, NEG_Y to 0.0/-69.8; Hand off at XBAND to Earth, NEG_Y to 0.0/-69.8
183RH (t) R4 RHEA Inbound...		2013-068T18:17:27		000T00:00:01	2013-068T18:17:28			
ISS_183RH_REGMAP001_PRIME	C, U, V	2013-068T19:47:27	GMB_E183_RHEA_R4+000T01:30:00	000T03:30:00	2013-068T23:17:27	ISS_NAC to Rhea	POS_X to 163.5/-9.5	Collaborative Rider(s): CIRS, UVIS. Pick up at XBAND to Earth, NEG_Y to 0.0/-69.8; Hand off at XBAND to Earth, NEG_Y to 297.0/44.0. 2 min. dwell; 4 min. dwell for footprints near terminator
End Custom		2013-068T23:17:27	GMB_E183_RHEA_R4+000T05:00:00	000T00:00:01	2013-068T23:17:28			
SP_183EA_M34BWGNON068_PRIME	R	2013-068T23:17:27	GMB_E183_RHEA_R4+000T05:00:00	000T03:00:00	2013-069T02:17:27	XBAND to Earth	NEG_Y to 297.0/44.0	RSS_183RH_GRAVITY003_PIE
ISS_183RH_GLOCOL001_PRIME	C, U, V	2013-069T02:17:27	GMB_E183_RHEA_R4+000T08:00:00	000T02:50:33	2013-069T05:08:00	ISS_NAC to Rhea	POS_X to 163.5/-9.5	Collaborative Rider(s): CIRS
Periapse R = 8.032 Rs, lat ...		2013-069T03:40:05		000T00:00:01	2013-069T03:40:06			
SP_183EA_DEADTIME069_PRIME		2013-069T05:08:00		000T00:01:00	2013-069T05:09:00	XBAND to Earth	NEG_X to 297.0/44.0	
SP_183EA_DLTURN069_PRIME		2013-069T05:09:00		000T00:20:00	2013-069T05:29:00	XBAND to Earth	POS_X to NEP	
SP_183EA_G70METNON069_PRIME	C, R	2013-069T05:29:00		000T09:00:00	2013-069T14:29:00	XBAND to Earth	Rolling/SRU	CAPS. POS_X to NEP or NSP. SID suspend

Science Highlights

ISS will observe irregular outer moon Hyrrokkin for over 20 hours to determine rotation periods

RSS performs a 3-part gravity measurement of Rhea. The inbound and outbound portions have been placed over downlinks, the closest approach is a prime observation with ORS-chosen pointing to drag the boresights over the north pole of Rhea.

The main goal of CDA for R4 is the identification and improved quantification of the impact generated dust cloud around Rhea. Since Rhea works as a "magnifier" for the impactor flux, the measurement is a great tool to constrain the flux of exogenous dust into the Saturnian system (which is a major Cassini science question).

ISS will map the north polar regions of Rhea

CIRS will map temperatures at the south pole of Rhea, which is now in winter darkness, to help understand whether volatiles can freeze out there during the long winter. CIRS will also make very high resolution measurements of temperatures at the north pole, which is warming up in the spring sunshine and may be releasing any volatiles that collected there during the previous winter.

Y bias windows, or lack thereof

RSS has a Rhea gravity experiment in 3 pieces (inbound-closest approach-outbound), as well as two GSE's: one inbound (in XD_182_183 segment 2013-067T05:29-14:29) and one outbound (in SOST_183_R4 2013-069T05:29-14:29)

Thruster firing/bias keep-out zone: 2013-067T05:29-069T14:29
From beginning of inbound GSE until the end of the outbound GSE, with the most critical period being the prime gravity observation (beginning of 1st segment until the end of the third segment).
If bias is required during Inbound GSE, place it as early as possible.
If bias is required during Outbound GSE, place it as late as possible.

Our single downlink has no Y-bias window due to the RSS gravity arc.

SCO is ok w/ Earth-pointed bias over track.

RSS ok with as late as possible during pass.

NAV: It would be great if the bias were to end about 0.5 - 1 hour before the track ended. This would allow us to better model the delta-V prior to design of OTM334. If you can't get coherent Doppler between the end of the bias and the end of the track, this would be as if the track ended early for us - we won't be able to to use the portion where the bias is occurring and we won't be able to build a better model of the delta-V prior to design of OTM334. Still, provided we get at least four hours of clean (i.e., no thrusting) coherent Doppler data, we should be in decent shape.

Notes

- Pointing:
  - ORS DRAG: The R4 closest approach secondary was debated between MAPS vs. ORS, no solution could be found that completely satisfied both, so the ORS attitude was chosen. This RA/DEC targets the north pole of Rhea.
  - Waypoint remains Xband to Earth, NEG_Y to 297/44 throughout; a custom period is used to minimize unnecessary turns and turn to & from the ORS drag secondary
  - The second outer satellite observation is during a solar occultation; CMT management should not be required
  - Rhea RBOT secondary used for ORS Rhea obs as well as the outersat obs; not possible to use "no_preference" due to –Y waypoint secondary
  - RSS original inbound PIE time was changed due to an Earth occultation
- Data Volume:
  - carryover of 113 Mb to XD is OK with them
- DSN:
  - Rev 183 Rhea R4 Gravity Observation: Level 3 request from 2013-068/0515 to 2013-069/0400
    - Stations: DSS-54, DSS-25, DSS-34, DSS-54 (DSS-55 preferred over 54 but in maintenance)
- Resource checker:
  - Three items that will not appear at the sequence level (we have no waypoint set in this segment, we use the one from the previous segment)
- Opmodes:
  - Required **Opmode is RSSK** (also during GSEs). RSSK-RWAF is valid until May, 2014 and does not impact other instruments
- Hydrazine: n/a
- Special Activities: none

Sequence Liens (SPLAT items):

- CDA no articulation is baseline +/- 30 min for Rhea, refined by RSS after port 1 Ckernel available