



CASSINI T99 SEGMENT

Rev 202 Handoff Package

Segment Boundary 2014-064T21:56:00 – 2014-066T21:41:00

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J. Pitesky

SMT report and SPASS

Science Highlights

Notes & Liens

This document has been reviewed and determined not to contain export controlled technical data

SMT report

TOST rev 202

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

DOWNLINK PASS NAME	Start doy hh:mm	End doy hh:mm	OBSERVATION_PERIOD							DOWNLINK_PASS							
			P4				P5	RECORDED		PLAYBACK							
			START (Mb)	SCI (Mb)	HK+E (Mb)	TOTAL CPACTY (Mb)	MRGN (Mb)	OPNAV (Mb)	SCI (Mb)	ENGR (Mb)	TOTAL (Mb)	CPACTY (Mb)	MARGN (Mb)	NET_MARGN (Mb)	CAROVR (%)	CAROVR (Mb)	
SP_202EA_M34BWGNON065_PRIME	065 04:26	065 07:41	0	419	28	447	3322	2875	0	45	19	511	119	-392	280	6%	391
SP_202EA_G34BWGNON065_PRIME	065 07:41	065 15:26	391	0	0	391	3322	2931	0	1224	46	1661	293	-1369	280	6%	1368
SP_202EA_C34BWGNON065_PRIME	065 15:26	065 23:26	1368	0	0	1368	3322	1954	0	1693	47	3108	302	-2806	280	7%	2806
SP_202EA_M34BWGNON465_PRIME	065 23:26	066 04:26	2806	0	0	2806	3322	516	0	60	30	2895	189	-2706	280	7%	2706
SP_202EA_C70METNON066_PRIME	066 12:41	066 21:41	2706	301	35	3042	3322	280	0	199	53	3294	3792	497	498	13%	0

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	064 21:56	065 04:26	0.0	12.3	45.5	2.3	250.0	11.6	32.8	0.0	30.7	0.0	30.0	0.0	27.2	442.5
SP_202EA_M34BWGNON065_PRIME	065 04:26	065 07:41	0.0	6.1	0.0	1.2	0.0	5.8	16.3	0.0	15.3	0.0	0.0	0.0	0.0	44.6
SP_202EA_G34BWGNON065_PRIME	065 07:41	065 15:26	0.0	14.6	0.0	2.8	0.0	29.7	35.4	0.0	1130.4	0.0	0.0	0.0	0.0	1212.9
SP_202EA_C34BWGNON065_PRIME	065 15:26	065 23:26	0.0	15.1	0.0	12.9	0.0	41.0	32.6	0.0	1575.5	0.0	0.0	0.0	0.0	1677.1
SP_202EA_M34BWGNON465_PRIME	065 23:26	066 04:26	0.0	9.5	0.0	1.8	0.0	8.9	15.3	0.0	23.6	0.0	0.0	0.0	0.0	59.2
DAILY TOTAL SCIENCE	064 21:56	066 04:26	0.0	57.6	45.5	21.1	250.0	96.9	132.4	0.0	2775.6	0.0	30.0	0.0	27.2	
OBSERVATION_NOR	066 04:26	066 12:41	0.0	15.5	94.9	3.0	75.0	14.6	25.2	0.0	38.8	1.1	30.0	0.0	34.4	332.6
SP_202EA_C70METNON066_PRIME	066 12:41	066 21:41	0.0	17.0	86.4	3.2	0.0	16.0	27.5	0.0	42.4	4.9	0.0	0.0	0.0	197.5
DAILY TOTAL SCIENCE	066 04:26	066 21:41	0.0	32.5	181.3	6.2	75.0	30.7	52.7	0.0	81.3	6.0	30.0	0.0	34.4	

	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)	0.0	90.1	226.8	27.3	325.0	127.6	185.2	0.0	2856.8	6.0	60.0	0.0

SPASS

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Request	Riders	Start (SCET)	Start (Epoch)	Duration	End (SCET)	Primary	Secondary	Comments
Sequence S82, length = 76 days		2013-362T01:47:00		075T19:25:00	2014-072T21:12:00			
Titan Flyby T99 Segment		2014-064T21:56:00		001T23:45:00	2014-066T21:41:00			
SP_202TI_WAYPTTURN064_PRIME	M	2014-064T21:56:00		000T00:40:00	2014-064T22:36:00	XBAND to Earth	NEG_X to 39.483/83.428	
NEW WAYPOINT		2014-064T22:36:00		001T14:05:00	2014-066T12:41:00	XBAND to Earth	NEG_X to 39.483/83.428	
SP_202TI_DEADTIME064_PRIME	M	2014-064T22:36:00		000T00:15:00	2014-064T22:51:00	XBAND to Earth	NEG_X to 39.483/83.428	
ISS_202TI_MONITORNA001_PRIME	C, M, R, V	2014-064T22:51:00	GMB_E202_TITAN_T99-000T17:35:47	000T03:30:48	2014-065T02:21:48	ISS_NAC to Titan	NEG_X to 39.483/83.428	No Preference to secondary pointing
SP_202EA_M34BWGNON065_PRIME	M, R	2014-065T04:26:47	GMB_E202_TITAN_T99-000T12:00:00	000T03:14:13	2014-065T07:41:00	XBAND to Earth	NEG_X to 39.483/83.428	
SP_202EA_G34BWGNON065_PRIME	M, R	2014-065T07:41:00	GMB_E202_TITAN_T99-000T08:45:47	000T07:45:00	2014-065T15:26:00	XBAND to Earth	NEG_X to 39.483/83.428	
SP_202EA_C34BWGNON065_PRIME	M, R	2014-065T15:26:00	GMB_E202_TITAN_T99-000T01:00:47	000T08:00:00	2014-065T23:26:00	XBAND to Earth	NEG_X to 39.483/83.428	
202TI (t) T99 TITAN Inboun...		2014-065T16:26:47		000T00:00:01	2014-065T16:26:48			
SP_202EA_M34BWGNON465_PRIME	R	2014-065T23:26:00	GMB_E202_TITAN_T99+000T06:59:13	000T05:00:47	2014-066T04:26:47	XBAND to Earth	NEG_X to 39.483/83.428	
CIRS_202TI_MIDIRTMAP002_PRIME	I, R, V	2014-066T04:26:47	GMB_E202_TITAN_T99+000T12:00:00	000T07:19:13	2014-066T11:46:00	CIRS_FP to Titan	PIC	Collaborative Rider(s): ISS. Template M3?
SP_202TI_DEADTIME066_PRIME	R	2014-066T11:46:00	GMB_E202_TITAN_T99+000T19:19:13	000T00:15:00	2014-066T12:01:00	XBAND to Titan	NEG_X to 39.483/83.428	
SP_202EA_DLTURN066_PRIME	R	2014-066T12:01:00		000T00:40:00	2014-066T12:41:00	XBAND to Earth	NEG_Y to 295.99/55.69	
NEW WAYPOINT		2014-066T12:41:00		000T09:00:00	2014-066T21:41:00	XBAND to Earth	NEG_Y to 295.99/55.69	
SP_202EA_C70METNON066_PRIME	C, E, R	2014-066T12:41:00		000T09:00:00	2014-066T21:41:00	XBAND to Earth	NEG_Y to 295.99/55.69	MIMI. NEG_Y to Saturn (0,0,-9.5). CIRS heating RA/Dec equiv of MIMI's desired

Science Highlights

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DOY 064: Inbound, ISS will acquire a mosaic of and monitor Titan's high northern latitudes, where it will be important to track clouds and the evolution thereof as summer approaches. VIMS will have distant observations of Titan that will be used to monitor cloud formations and the evolution of the South Polar vortex.

DOY 065: RSS starts their Titan Gravity science observation. During the Solstice Mission, the main science objectives of gravity measurements at Titan are: 1) assess the presence of a global subsurface ocean by measuring the short-period changes of the gravity field induced by Saturn's tidal field (eccentricity tides); 2) determine the geoid of the satellite and the presence of large scale gravity anomalies; and 3) determine the rheology of the icy crust by correlative analysis with altimetric data. T99 is another high inclination flyby in the noon sector of Saturn's magnetosphere, very similar to T98 but at an altitude of 1500 km. With closest approach in the dayside, Cassini will be able to study the draping and the diffusion of the external magnetic field within the upper ionosphere and over the flank facing away from Saturn. A comparison with flybys at similar local times (T83-T98) will be very useful. Outbound, CIRS continues to monitor stratospheric temperatures.

Y bias windows & data volume

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An engineering Y bias window overlaps the last 90 minutes of the DOY 066 Canberra 70M downlink. Due to RSS science (see next slide) TOST is requesting that AACS try to avoid placing a bias in this segment. ***SCO has agreed to perform an on-Earth bias if a bias must be placed AND if data volume is tight.*** Consequently, we are not specifying a plan to cut data volume overflow in the event that this Y bias results in the shortening of the downlink.

Y bias and RSS

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No Biases during (overlapping) the RSS science observations: Occultation experiments (rings, Saturn atmospheric, Titan, Satellite), Bistatic observations and prime gravity observations.

For gravity observations, the requirement is no biases (thruster firing) in arcs devoted to gravity observations. A gravity arc is defined as the time between the start of the first tracking pass and the end of the last pass, so if there's a gap in between the tracking passes, there should be no biases there as well. Any firing in this arc would destroy the coherence of the trajectory and would lead to an unpredictable result.

Gravity Science Enhancements. Placing the YGAP window during the first 90 minutes of the downlink is OK for inbound GSEs. Impact to outbound GSEs should be looked at on a case-by-case basis (contact Aseel), and the ones following a prime gravity observation would likely be more impacted by a Y-Bias than the ones following an occultation.

RSS requests no thruster firing from the beginning of the inbound GSE 064/12:56:00 (in XD segment) until the end of the outbound GSE 066/12:41:00, with the critical period being from 065/04:27:00 to 066/04:27:00. If biases are needed during the GSEs, try to place them as early as possible during the inbound GSE or as late as possible during the outbound GSE.

Notes

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- Pointing:
 - No YGAPs added to this segment due to RSS science
- Data Volume:
 - SCO will use on-Earth bias if data volume is tight
 - Constant low downlink rate used during RSS activities to simplify implementation in the event of DSN changes
- DSN:
 - Level 3 requests for all passes on DOY 065 (DSS-55 (2x), -25, and -34)
- Resource checker:
 - Gap in SPASS from 2014-065T02:21:48 – 04:26:47 for RSS warmup
- Opmodes:
 - No issues
- Hydrazine:
 - Flyby on RWA
- Special Activities:
 - RSS Gravity flyby (SPLAT item)

Liens

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Sequence Liens (should all be SPLAT items):

- Request for no biases during RSS gravity experiments (SPLAT item)