CASSINI TOST_275 SEGMENT

Rev 275 Handoff Package

Segment Boundary 2017-143T12:14:00 – 2017-145T08:57:00

26 Oct 2016

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SMT Report, Timeline, SPASS

Science Highlights

Notes & Liens

SMT Report

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_275EA_M70METSEQ144_PRIME	144 20:44	145 04:29	0	2618	137	2755	3322	567	0	185	46	2986	2315	-671	998	24%	671
SP_275EA_G70METNON145_PRIME	145 04:29	145 08:57	671	0	0	671	3322	2652	0	102	26	799	1797	998	998	56%	0

SSR PARTITION SIZE SUMMARY - SELECTED SSR CONFIGURATION: DOUBLE

	SSR A/B		
OBSERVATION PERIOD	P4 Size (Frames)	P5 Size (Frames)	P6 Size (Frames)
SP_275NA_OBSERV143_NA	188954	10	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	143 12:14	144 20:44	0.0	122.6	392.9	11.7	630.0	57.8	99.4	720.4	153.3	201.3	204.5	0.0	135.8	2729.7
SP_275EA_M70METSEQ144_PRIME	144 20:44	145 04:29	0.0	29.2	72.9	2.8	0.0	13.8	23.7	0.0	36.5	4.3	0.0	0.0	0.0	183.2
SP_275EA_G70METNON145_PRIME	145 04:29	145 08:57	0.0	16.9	37.4	1.6	0.0	7.9	13.7	0.0	21.1	2.5	0.0	0.0	0.0	101.0
DAILY TOTAL SCIENCE	143 12:14	145 08:57	0.0	168.7	503.2	16.1	630.0	79.5	136.8	720.4	210.9	208.0	204.5	0.0	135.8	

	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	168.7	503.2	16.1	630.0	79.5	136.8	720.4	210.9	208.0	204.5	0.0

TOST_275 Master Timeline

275TI	117954

Start Time	End Time	Prime Activity	Obs. Detail	Op Mode	TLM Mode	Comments
2017-143T12:14:00	**2017-143T12:54:00**	SP Turn to WP	NEG_Y to Titan / NEG_X to Sun	DFPW Normal	S_N_ER_3	Secondary is preferred by MIMI
2017-143T12:54:00	2017-143T14:44:00	ISS Long Range Monitoring	TC1a, TC1b, TN1a, TN2c, TN2d	DFPW Normal	S_N_ER_3	
2017-144T14:44:00	**2017-144T16:44:00**	**VIMS DIONE PIE**	IC1a Out of Discipline: Dione High Phase	DFPW Normal	S_N_ER_3	ISS Collaborative
2017-143T16:44:00	**2017-143T23:18:00**	**CIRS MIR LMBINT**	TN1c	RADWU	S_N_ER_5A for 15min @16:44, S_N_ER_3 after	ISS WAC riders (in middle if possible) to break up long period without ISS observations. CIRS: 2.5 hours on nadir, 4 hours on limb (at closest point)
2017-143T23:18:00	**2017-144T01:18:00**	**RADAR ALTIMETRY PIE**	TC1a, TN1a	RADRWA	S_N_ER_8	RADRWA: VIMS, ISS SLEEP
2017-144T00:18:12		**CLOSEST APPROACH**				TOST priority 1: Highest priority CIRS/RADAR
2017-144T01:18:00	**2017-143T05:33:00**	**CIRS FIR NADMAP**	TN2c	DFPW Normal	S_N_ER_3	DFPW_Normal: VIMS, ISS out of SLEEP
2017-144T05:33:00	2017-144T06:33:00	ISS Long Range Monitoring	TC1a, TC1b, TN1a, TN2c, TN2d	DFPW Normal	S_N_ER_3	
2017-144T06:33:00	2017-144T10:33:00	CIRS MIR LMBMAP	TC1b	DFPW Normal	S_N_ER_3	
2017-144T10:33:00	2017-144T11:33:00	ISS Long Range Monitoring	TC1a, TC1b, TN1a, TN2c, TN2d	DFPW Normal	S_N_ER_3	
2017-144T11:33:00	2017-144T15:33:00	CIRS MIR TMAP	TC1b	DFPW Normal	S_N_ER_3	
2017-144T15:33:00	2017-144T20:04:00	ISS Long Range Monitoring	TC1a, TC1b, TN1a, TN2c, TN2d	DFPW Normal	S_N_ER_3	CIRS sit and stare after initial ISS mosaic
2017-144T20:04:00	**2017-144T20:44:00**	SP Turn to Earth for downlink	XBAND to Earth / NEG_Y to 141.0/-53.0	DFPW Normal	S_N_ER_3	End of Sequence - no Ybias gap needed MIMI Attitude with RA/DEC secondary
2017-144T20:44:00	**2017-145T04:29:00**	Madrid 70M	Note: Rolling	RSSKRWAF	RTE_N_SPB	Shadow DSS-55 for RSS OCC ORT
2017-145T04:29:00	**2017-145T08:57:00**	Goldstone 70M	Note: Rolling	DFPW Normal	RTE_N_SPB	

TOST_275 SPASS

Request	Riders	Start (SCET)	Start (Epoch)	Duration	End	Primary	Secondary	Comments
Sequence S99, length = 41 days		2017-104T14:55:00		040T18:02:00	2017-145T08:57:00			
TOST_275 Segment		2017-143T12:14:00		001T20:43:00	2017-145T08:57:00			
SP_275TI_WAYPTTURN143_PRIME		2017-143T12:14:00		000T00:40:00	2017-143T12:54:00	NEG_Y to Titan	NEG_X to Sun	
NEW WAYPOINT		2017-143T12:54:00		001T07:50:00	2017-144T20:44:00	NEG_Y to Titan	NEG_X to Sun	
ISS_275TI_LRMONITOR001_PRIME	C, V	2017-143T12:54:00		000T01:50:00	2017-143T14:44:00	ISS_NAC to Titan	NEG_X to Sun	
VIMS_275DI_HIPHASE001_PIE	C, I, U	2017-143T14:44:00		000T02:00:00	2017-143T16:44:00	ISS_NAC to Dione	NEG_X to Sun	Collaborative Rider(s): ISS. any rbot friendly secondary
CIRS_275TI_MIRLMBINT001_PRIME	I, U, V	2017-143T16:44:00		000T06:34:00	2017-143T23:18:00	CIRS_FPB to Titan	PIC	
RADAR_275TI_ALTIMETRY001_PIE		2017-143T23:18:00		000T02:00:00	2017-144T01:18:00	NEG_Z to Titan	NEG_X to NTP	
275TI (nt) TITAN Outbound, 117953.7 km		2017-144T00:18:12		000T00:00:01	2017-144T00:18:13			
CIRS_275TI_FIRNADMAP002_PRIME	U, V	2017-144T01:18:00		000T04:15:00	2017-144T05:33:00	CIRS_FP1 to Titan	NEG_X to Sun	
ISS_275TI_LRMONITOR002_PRIME	C, V	2017-144T05:33:00		000T01:00:00	2017-144T06:33:00	ISS_NAC to Titan	NEG_X to Sun	
CIRS_275TI_MIRLMBMAP002_PRIME	V	2017-144T06:33:00		000T04:00:00	2017-144T10:33:00	CIRS_FPB to Titan	PIC	
ISS_275TI_LRMONITOR003_PRIME	C, V	2017-144T10:33:00		000T01:00:00	2017-144T11:33:00	ISS_NAC to Titan	NEG_X to Sun	
CIRS_275TI_MIDIRTMAP002_PRIME	I, V	2017-144T11:33:00		000T04:00:00	2017-144T15:33:00	CIRS_FPB to Titan	NEG_X to Sun	Template A2: CIRS-ISS
ISS_275TI_LRMONITOR004_PRIME	C, V	2017-144T15:33:00		000T04:31:00	2017-144T20:04:00	ISS_NAC to Titan	NEG_X to Sun	
SP_275EA_DLTURN144_PRIME		2017-144T20:04:00		000T00:40:00	2017-144T20:44:00	XBAND to Earth	NEG_Y to 141.0/-53.0	MIMI Attitude (converted to RA/DEC secondary).
NEW WAYPOINT		2017-144T20:44:00		000T12:13:00	2017-145T08:57:00	XBAND to Earth	NEG_Y to 141.0/-53.0	
SP_275EA_M70METSEQ144_PRIME	C, R	2017-144T20:44:00		000T07:45:00	2017-145T04:29:00	XBAND to Earth	Rolling	
SP_275EA_G70METNON145_PRIME	C	2017-145T04:29:00		000T04:28:00	2017-145T08:57:00	XBAND to Earth	Rolling	
Apoapse Per = 6.5 d, inc = 62.0 deg		2017-145T08:50:37		000T00:00:01	2017-145T08:50:38			

TOST_275 High-Priority Observations

TOST_275: Summary of PIEs and Other High Priority Observations

Discipline	CIMS Request Name	Start Time	End Time	Flexibility in secondary pointing	Comments (e.g., pointing tolerance, uniqueness; relative priority)	Science Traceability Matrix Code(s)	Pointing designer POC
Titan	VIMS_275DI_HIPHASE001_PIE	2017-143T14:44:00	2017-143T16:44:00	Flexible		IC1a	Edward Audi <edaudi@lpl.arizona.edu>
Titan	CIRS_275TI_MIRLMBINT001_PRIME	2017-143T16:44:00	2017-143T23:18:00	Significant Science Impact if Secondary Changed		TN1c	Todd Ansty <tma22@cornell.edu>
Titan	RADAR_275TI_ALTIMETRY001_PIE	2017-143T23:18:00	2017-144T01:18:00	Flexible		TC1a, TN1a	Yanhua Anderson <Yanhua.Z.Anderson@jpl.nasa.gov>
Titan	CIRS_275TI_MIRLMBMAP002_PRIME	2017-144T06:33:00	2017-144T10:33:00	Significant Science Impact if Secondary Changed		TC1b	Todd Ansty <tma22@cornell.edu>

TOST_275 Science Highlights (1/2)

May 23 (DOY 143) – TOST_275 is a Titan 117,954 km flyby with RADAR at closest approach. This is the second-closest approach of the FRPO non-targeted Titan flybys. ISS begins the campaign with the first of its series of medium- to high-resolution (~1 km) global-scale mosaics, observing Titan's surface and atmosphere over Shiwanni Virgae at low southern latitudes on Titan's sub-Saturnian hemisphere on inbound. The ISS observations will target south of Yalaing Terra near C/A, and Titan's limb hazes at high phase-angle from an equatorial vantage point on outbound. The series of observations over ~31 hours allows ISS to monitor Titan to track clouds and haze and the evolution thereof, of particular scientific interest as Titan's northern summer equinox approaches. CIRS and VIMS ride along as non-collaborative observers on ISS primes. CIRS will continue monitoring the evolution of the global temperature and wind field, as the northern hemisphere approaches summer solstice. VIMS will monitor the evolution of cloud coverage at the North Pole.

VIMS follows as Prime with an out-of-discipline Dione PIE to search for activity on Dione by observing forward-scattered radiation from a plume or atmosphere. ISS will also ride along on the VIMS Dione PIE to perform a plume search on Dione (Phase angle of ~162° is very good for this purpose, as is the sub-S/C longitude of ~200° W). CIRS and UVIS also ride along.

CIRS then takes over as Prime back on Titan with a rare opportunity in the later stages of the mission to make limb sounding observations, measuring vertical profiles of temperature and gas abundances. ISS, VIMS, and UVIS ride along as well. In particular, UVIS riders to CIRS Limb Primes provide limb viewing at the highest spatial resolution available outside of occultations. These observations provide vertical profiles of emissions of nitrogen and hydrocarbons and these are diagnostic of temperature and of excitation processes in the high atmosphere of Titan.

TOST_275 Science Highlights (2/2)

May 23 (DOY 143) continued – RADAR takes over as Prime at C/A. RADAR will use Altimetry mode from long range (~120,000 km) on a location south of Sankyo, at ~340 W, ~25S, with parallel bright streaks to detect a specular nadir echo.

May 24 (DOY 144) – After RADAR Altimetry at closest approach, CIRS and ISS will alternate as Prime observer for the remainder of the observation period. CIRS will its Prime allocations to make a map of surface temperatures to determine the changes due to seasonal insolation, and an atmospheric map of stratospheric temperatures, providing constraint on general circulation models. ISS will use its Prime allocations to continue its objectives at C/A and outbound, as described on DOY 143. ISS, UVIS, and VIMS will ride along with CIRS Primes, and CIRS & VIMS will ride along with ISS Primes.

Playback of the observation data follows, and will occur over a split Madrid 70M/Goldstone 70M downlink. Note that RSS is requesting a shadow 34M over Madrid for an Occultation ORT, and will power Ka-band on at this time.

May 25 (DOY 145) – Playback will continue over the Goldstone 70M downlink.

Notes (1/2)

- Pointing:
  - Waypoint secondary chosen per science request, but close to RBOT-friendly RA/DECs
  - SCO Rolling Guidelines not met:
    - Rolling during last downlink in sequence – approved by SCO/AACS
    - Rolling longer than 9hr – approved by SCO/AACS (SIP discretion to edit spturn output SASF roll to 9 hours)

- Data Volume:
  - No carryover to next segment
  - SMT Warnings (**OK and expected**. RADAR Warmup in S_N_ER_5A for 1st 15 minutes):
    - RADAR_275TI_WRMUP4ALT001_RIDER: Found an activity whose data are NOT recorded in this telemetry mode "S_N_ER_3" commanded at 2017-143T16:59:00.000. Volume of 10.78422 Mb not given data policing space.

- DSN:
  - JUNO contention on DSS-14 (2nd track of split-pass downlink) for 4 hours at BOA: PJ-6d.
  - DSN maintenance: SPC-60 complex down from 144T04:44 – 10:44: OK, during observation period.
  - RSS requesting DSS-55 shadow track during DSS-63 downlink for OCC ORT
  - ap_downlink report check warnings:
    - SP_275EA_M70METSEQ044_PRIME: SP_275EA_M70METSEQ144_PRIME is a SEQ upload pass and should be at least 9 hours in duration – **OK**. SEQ Pass is 7h45m, and followed immediately by 4h28 pass.

Notes (2/2)

- Resource checker:
  - ISS_275TI_MIRLMBINT001_CIRS: Telemetry mode change must occur at the beginning or end of affected ISS request – **OK and intentional**. Telemetry mode transition to S_N_ER_5A for 15m to see RADAR Warmup. OK with ISS.

- Opmodes:
  - No RWA-slow or unique opmodes requested
  - RADRWA requested for RADAR Altimetry – no issues (ISS/VIMS in sleep mode, OK)
  - RSSKRWAF requested during downlink (Gravity warmup) – no issues (no RADAR or MAG SCAS at this time)

- Hydrazine:
  - No RCS, not applicable

- Special Activities:
  - None

Liens

Sequence Liens (should all be SPLAT items):

- None