



CASSINI TOST_261 SEGMENT

Rev 261 Handoff Package

Segment Boundary 2017-048T01:11:00 – 2017-049T18:01:00

08 Aug 2016

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SMT Report, Timeline, SPASS

Science Highlights

Notes & Liens

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

SMT Report

TOST 261

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 (Mb)	CPACTY (Mb)	MRGN (Mb)	OPNAV (Mb)	SCI (Mb)	ENGR (Mb)	TOTAL (Mb)	CPACTY (Mb)	MARGN (Mb)	NET_MARGN (Mb)	(%)	CAROVR (Mb)
SP_262EA_M34BWGNON049_PRIME	049 03:03	049 10:03	0	1842	109	1952	3322	1371	0	153	41	2145	340	-1805	267	10%	1805
SP_262EA_G70METNON049_PRIME	049 10:03	049 18:01	1805	0	0	1805	3322	1517	0	107	47	1959	2226	266	267	12%	0

SSR PARTITION SIZE SUMMARY - SELECTED SSR CONFIGURATION: DOUBLE

OBSERVATION PERIOD	SSR A/B		
	P4 Size (Frames)	P5 Size (Frames)	P6 Size (Frames)
SP_261NA_OBSERV048_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	048 01:11	049 03:03	0.0	48.8	304.6	9.3	800.0	46.0	79.2	0.0	230.0	137.7	170.0	0.0	108.1	1933.6
SP_262EA_M34BWGNON049_PRIME	049 03:03	049 10:03	0.0	13.2	64.8	2.5	0.0	12.4	21.4	0.0	33.0	3.8	0.0	0.0	0.0	151.2
SP_262EA_G70METNON049_PRIME	049 10:03	049 18:01	0.0	15.0	8.1	2.9	0.0	14.2	24.4	0.0	37.6	4.4	0.0	0.0	0.0	106.5
DAILY TOTAL SCIENCE	048 01:11	049 18:01	0.0	77.0	377.5	14.7	800.0	72.6	124.9	0.0	300.6	145.9	170.0	0.0	108.1	
TOTAL RECORDED (OPNAV data not included)			0.0	77.0	377.5	14.7	800.0	72.6	124.9	0.0	300.6	145.9	170.0	0.0		

TOST_261 Master Timeline

TOST 261

261TI	186799					
Start Time	End Time	Prime Activity	Obs. Detail	Op Mode	TLM Mode	Comments
2017-048T01:11:00	2017-048T01:51:00	SP Turn to WP	NEG_Y to Titan / NEG_Z to Sun	DFPW Normal	S_N_ER_3	Secondary is preferred by MIMI
2017-048T01:51:00	2017-048T02:31:00	ISS	(TC1a, TC1b, TN1a, TN2c, TN2d)	DFPW Normal	S_N_ER_3	
2017-048T02:31:00	2017-048T07:41:00	CIRS MID-IR T-MAP	(TC1b)	DFPW Normal	S_N_ER_3	If possible, ISS snapshot in the middle
2017-048T07:41:00	2017-048T08:41:00	ISS_261TI_CLOUD001_PIE	(TC1a, TC1b, TN1a, TN2c, TN2d)	DFPW Normal	S_N_ER_3	TOST priority 1: approaches south of Menrva, high northern lats from anti-Saturn side, recedes over trailing hemisphere: >60°N 130-260°W!! Ligeia!
2017-048T08:41:00	2017-048T12:41:00	CIRS MID-IR LIMB	(TN1c)	DFPW Normal	S_N_ER_3	
2017-048T12:41:00	2017-048T13:41:00	ISS_261TI_CLOUD002_PIE	(TC1a, TC1b, TN1a, TN2c, TN2d)	DFPW Normal	S_N_ER_3	
2017-048T13:10:20		CLOSEST APPROACH				
2017-048T13:41:00	2017-048T16:41:00	CIRS MID-IR LIMB	(TN1c)	DFPW Normal	S_N_ER_3	
2017-048T16:41:00	2017-048T17:41:00	ISS_261TI_CLOUD003_PIE	(TC1a, TC1b, TN1a, TN2c, TN2d)	DFPW Normal	S_N_ER_3	
2017-048T17:41:00	2017-048T20:41:00	ISS	(TC1a, TC1b, TN1a, TN2c, TN2d)	DFPW Normal	S_N_ER_3	CIRS collaborative rider
2017-048T20:41:00	2017-048T21:41:00	ISS_261TI_CLOUD004_PIE	(TC1a, TC1b, TN1a, TN2c, TN2d)	DFPW Normal	S_N_ER_3	
2017-048T21:41:00	2017-048T23:38:00	ISS	(TC1a, TC1b, TN1a, TN2c, TN2d)	DFPW Normal	S_N_ER_3	CIRS collaborative rider
2017-048T23:38:00	2017-049T00:53:00	ISS_262TI_CLOUD005_PIE	(TC1a, TC1b, TN1a, TN2c, TN2d)	DFPW Normal	S_N_ER_3	
2017-049T00:53:00	2017-049T01:33:00	SP Turn to Earth for downlink	XBAND to Earth / NEG_Y to Saturn (0.0, 0.0, -9.5 deg offset)	DFPW Normal	S_N_ER_3	MIMI Downlink. CIRS Heating up to 1.8 K.
2017-049T01:33:00	2017-049T03:03:00	Ybias Gap		DFPW Normal	S_N_ER_3	
2017-049T03:03:00	2017-049T10:03:00	Madrid 34M BWG		DFPW Normal	RTE N SPB	
2017-049T10:03:00	2017-049T18:01:00	Goldstone 70M		DFPW Normal	RTE N SPB	

TOST_261 SPASS

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Request	Riders	Start (SCET)	Start (Epoch)	Duration	End	Primary	Secondary	Comments
Sequence S98, length = 70 days		2017-034T07:05:00		070T07:50:00	2017-104T14:55:00			
TOST_261 Segment		2017-048T01:11:00		001T16:50:00	2017-049T18:01:00			
SP_261TI_WAYPTTURN048_PRIME		2017-048T01:11:00		000T00:40:00	2017-048T01:51:00	NEG_Y to Titan	NEG_Z to Sun	
NEW WAYPOINT		2017-048T01:51:00		000T23:42:00	2017-049T01:33:00	NEG_Y to Titan	NEG_Z to Sun	
ISS_261TI_LRMONITOR001_PRIME	V	2017-048T01:51:00		000T00:40:00	2017-048T02:31:00	ISS_NAC to Titan	NEG_Z to Sun	
CIRS_261TI_MIDIRTMAP001_PRIME	I, V	2017-048T02:31:00		000T05:10:00	2017-048T07:41:00	CIRS_FP8 to Titan	NEG_Z to Sun	Collaborative Rider(s): ISS. Template A2: CIRS-ISS
ISS_261TI_CLOUD001_PIE	C, V	2017-048T07:41:00		000T01:00:00	2017-048T08:41:00	ISS_NAC to Titan	NEG_Z to Sun	
CIRS_261TI_MIRLMBMAP001_PRIME	V	2017-048T08:41:00		000T04:00:00	2017-048T12:41:00	CIRS_FP8 to Titan	PIC	
ISS_261TI_CLOUD002_PIE	C, U, V	2017-048T12:41:00		000T01:00:00	2017-048T13:41:00	ISS_NAC to Titan	NEG_Z to Sun	
261TI (nt) TITAN Outbound 186798.6 km		2017-048T13:10:20		000T00:00:01	2017-048T13:10:21			
CIRS_261TI_MIRLMBINT001_PRIME	I, U, V	2017-048T13:41:00		000T03:00:00	2017-048T16:41:00	CIRS_FP8 to Titan	PIC	
ISS_261TI_CLOUD003_PIE	C, U, V	2017-048T16:41:00		000T04:00:00	2017-048T20:41:00	ISS_NAC to Titan	NEG_Z to Sun	Collaborative Rider(s): CIRS
Apoapse Per = 7.2 d, inc = 63.7 deg		2017-048T20:24:27		000T00:00:01	2017-048T20:24:28			
ISS_262TI_CLOUD004_PIE	C, V	2017-048T20:41:00		000T02:57:00	2017-048T23:38:00	ISS_NAC to Titan	NEG_Z to Sun	Collaborative Rider(s): CIRS
ISS_262TI_CLOUD005_PIE	C, V	2017-048T23:38:00		000T01:15:00	2017-049T00:53:00	ISS_NAC to Titan	NEG_Z to Sun	
SP_262EA_DLTURN049_PRIME		2017-049T00:53:00		000T00:40:00	2017-049T01:33:00	XBAND to Earth (0.0,0.0,-9.5 deg. offset)	NEG_Y to Saturn	
NEW WAYPOINT		2017-049T01:33:00		000T16:28:00	2017-049T18:01:00	XBAND to Earth (0.0,0.0,-9.5 deg. offset)	NEG_Y to Saturn	
SP_262EA_YGAP049_PRIME	E	2017-049T01:33:00		000T01:30:00	2017-049T03:03:00	XBAND to Earth (0.0,0.0,-9.5 deg. offset)	NEG_Y to Saturn	
SP_262EA_M34BWGNON049_PRIME	C	2017-049T03:03:00		000T07:00:00	2017-049T10:03:00	XBAND to Earth (0.0,0.0,-9.5 deg. offset)	NEG_Y to Saturn	MIMI. NEG_Y to SA (0.0,-9.5)
SP_262EA_G70METNON049_PRIME	C	2017-049T10:03:00		000T07:58:00	2017-049T18:01:00	XBAND to Earth (0.0,0.0,-9.5 deg. offset)	NEG_Y to Saturn	MIMI. NEG_Y to SA (0.0,-9.5)

TOST_261 High-Priority Observations

TOST 261

TOST_261: 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	ISS_261TI_CLOUD001_PIE	2017-048T07:41:00	2017-048T08:41:00	Flexible		TC1a, TC1b, TN1a, TN2c, TN2d	Jason Perry <volcanopele@gmail.com>
Titan	CIRS_261TI_MIRLMBMAP001_PRIME	2017-048T08:41:00	2017-048T12:41:00	Significant Science Impact if Secondary Changed	Significant Impact to Science	TN1c	Todd Ansty <tma22@cornell.edu>
Titan	ISS_261TI_CLOUD002_PIE	2017-048T12:41:00	2017-048T13:41:00	Flexible		TC1a, TC1b, TN1a, TN2c, TN2d	Jason Perry <volcanopele@gmail.com>
Titan	CIRS_261TI_MIRLMBINT001_PRIME	2017-048T13:41:00	2017-048T16:41:00	Significant Science Impact if Secondary Changed	Significant Impact to Science	TN1c	Todd Ansty <tma22@cornell.edu>
Titan	ISS_261TI_CLOUD003_PIE	2017-048T16:41:00	2017-048T20:41:00	Flexible	Includes CIRS Collaborative	TC1a, TC1b, TN1a, TN2c, TN2d	Jason Perry <volcanopele@gmail.com>
Titan	ISS_261TI_CLOUD004_PIE	2017-048T20:41:00	2017-048T23:38:00	Flexible	Includes CIRS Collaborative	TC1a, TC1b, TN1a, TN2c, TN2d	Jason Perry <volcanopele@gmail.com>
Titan	ISS_261TI_CLOUD005_PIE	2017-048T23:38:00	2017-049T00:53:00	Flexible		TC1a, TC1b, TN1a, TN2c, TN2d	Jason Perry <volcanopele@gmail.com>

February 17 (DOY 048) – TOST_261 is a 186,799 km Titan flyby with ISS and CIRS as Prime Observers. ISS will begin the segment with imaging of Titan's surface over high northern latitudes, to compare with ISS images from late 2013 and early 2014 to look for surface changes. CIRS follows as Prime, creating a distant mid-infrared temperature map in nadir mode, which will cover the entire visible hemisphere and complement its later (and closer-altitude) limb-sounding data.

Next, ISS will begin its PIE campaign: a series of medium-resolution (~1-2 km) global-scale mosaics, observing Titan's surface and atmosphere over northern Xanadu on Titan's leading hemisphere during inbound, over northern mid-latitudes near C/A, then climbing to high northern latitudes over the anti-Saturnian hemisphere near Titan's lake district; and finally, over northern mid-latitudes on the trailing hemisphere during outbound. The series of observations over ~23 hours allows ISS to monitor Titan to track clouds and the evolution thereof, which is of particular scientific interest as Titan's northern summer equinox approaches.

Between the first 3 ISS PIE mosaics, CIRS will twice take over as Prime: performing (the aforementioned) limb sounding of the atmosphere in the mid-infrared, for measurement of temperature and trace gas abundances (hydrocarbons, nitriles). This fills in an important temporal gap between T125 and T126. Between the other ISS mosaics, ISS will remain Prime: again performing imaging of Titan's surface over high northern latitudes, to compare with ISS images from late 2013 and early 2014 to look for surface changes.

February 17 (DOY 048) continued – In addition, VIMS will ride along throughout the segment, monitoring the evolution of cloud coverage at the North Pole. UVIS will ride along with CIRS and ISS near closest approach. The UVIS rider during CIRS Limb sounding will provide limb viewing at the highest spatial resolution available outside of occultations. Such 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. UVIS riders during the closest two ISS mosaics will provide long integration times and therefore high signal/noise data on hydrocarbon emissions, nitrogen airglow, and haze properties, although with lower vertical resolution relative to limb observations or occultations.

February 18 (DOY 049) – ISS completes the final mosaic scan (with CIRS and VIMS riding), and then playback will occur over two tracks: a Madrid 34M BWG, followed immediately by the Goldstone 70M.

Notes (1/2)

TOST 261

- Pointing:
 - Observation Period Waypoint: secondary chosen per MIMI science request, RBOT-friendly for Titan inbound.
 - Downlink Waypoint will require a CIRS Heating Waiver
 - MIMI-preferred Secondary (NEG_Y to Saturn, -9.5 deg Z-axis offset) requested, but induces CIRS heating
 - Note - Rolling did not improve the situation: +Z offset increases temperature, -Z offset induces Titan-SRU FOV violations at EOT
 - Max CIRS delta-T is 1.82 K
 - CIRS delta-T at end of waypoint turn following downlink (in Rings_262) is 1.53 K
 - CIRS has given OK for this heating by e-mail (S. Brooks, G. Bjoraker)
- Data Volume:
 - No carryover to next segment
 - No SMT warnings
- DSN:
 - Original DSN plan was M70/G70 – downgraded M70 to M34 to avoid over-request of 70M tracking
 - No extended DSN maintenance
 - AP Downlink report check warning:
 - SP_262EA_G70METNON049_PRIME: has an unusual DSN lockup time; usual for post-handover passes is 60 sec. OK and expected – Second track responsible for downlink at BOT; post-handover lockup does not apply, using 300 sec.

Notes (2/2)

TOST 261

- Resource Checker:
 - No open items
- Opmodes:
 - ORS only – no issues
- Hydrazine:
 - No RCS, not applicable
- Special Activities:
 - Waiver likely for SP Downlink Heating

Sequence Liens (should all be SPLAT items):

- None