



## **CASSINI TOST\_285 SEGMENT**

### **Rev 285 Handoff Package**

**Segment Boundary 2017-207T16:13:00 – 2017-209T05:06:00**

**19 Jan 2017**

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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 285

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

DOWNLINK PASS NAME	Start		End		OBSERVATION_PERIOD						DOWNLINK_PASS								
	doy hh:mm		doy hh:mm		P4			P5	RECORDED		PLAYBACK								
	doy	hh:mm	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_285EA_M70METNON208_PRIME	208	16:13	208	23:58	0	2062	101	2163	3322	1159	0	185	46	2394	2163	-231	1	0%	231
SP_285EA_G34BWGNON208_PRIME	208	23:58	209	05:06	231	0	0	231	3322	3091	0	128	30	389	391	1	1	0%	0

SSR PARTITION SIZE SUMMARY - SELECTED SSR CONFIGURATION: DOUBLE

OBSERVATION PERIOD	SSR A/B		
	P4 Size (Frames)	P5 Size (Frames)	P6 Size (Frames)
SP_285NA_OBSERV207_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	207 16:13	208 16:13	0.0	62.7	302.6	8.6	1150.0	42.7	73.4	0.0	347.8	0.0	55.0	0.0	100.3	2143.1
SP_285EA_M70METNON208_PRIME	208 16:13	208 23:58	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_285EA_G34BWGNON208_PRIME	208 23:58	209 05:06	0.0	19.4	54.0	1.8	0.0	9.1	15.7	0.0	24.2	2.8	0.0	0.0	0.0	127.1
DAILY TOTAL SCIENCE	207 16:13	209 05:06	0.0	111.3	429.5	13.3	1150.0	65.6	112.9	0.0	408.5	7.1	55.0	0.0	100.3	
			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	111.3	429.5	13.3	1150.0	65.6	112.9	0.0	408.5	7.1	55.0	0.0		

# TOST\_285 Master Timeline

TOST 285

285TI	494302					
Start Time	End Time	Prime Activity	Obs. Detail	Op Mode	TLM Mode	Comments
2017-207T16:13	2017-207T16:53	SP Turn to WP	NEG_Y to Titan / NEG_Z to NTP	DFPW Normal	S_N_ER_3	Secondary is preferred by CDA
2017-207T16:53	2017-207T21:51	ISS	TC1a, TC1b, TN1a, TN2c, TN2d	DFPW Normal	S_N_ER_3	CDA collaborative rider for vertical stream scan (NEG_Z to NTP preferred).
2017-207T21:51	2017-207T23:21	CIRS COMPMAP	TC1b, TN1c	DFPW Normal	S_N_ER_3	
2017-207T23:20:01		<b>CLOSEST APPROACH</b>				
2017-207T23:21	2017-207T03:21	ISS	TC1a, TC1b, TN1a, TN2c, TN2d	DFPW Normal	S_N_ER_3	CDA collaborative rider for vertical stream scan (NEG_Z to NTP preferred).
2017-208T03:21	2017-208T07:21	ISS	TC1a, TC1b, TN1a, TN2c, TN2d	DFPW Normal	S_N_ER_3	
2017-208T07:21	2017-208T11:21	ISS	TC1a, TC1b, TN1a, TN2c, TN2d	DFPW Normal	S_N_ER_3	
2017-208T11:21	2017-208T14:03	ISS	TC1a, TC1b, TN1a, TN2c, TN2d	DFPW Normal	S_N_ER_3	
2017-208T14:03	2017-208T14:43	SP Turn to Earth for downlink	XBAND to Earth / NEG_X to Saturn	DFPW Normal	S_N_ER_3	
2017-208T14:43	2017-208T16:13	Ybias Gap		DFPW Normal	S_N_ER_3	
2017-208T16:13	2017-208T23:58	Madrid 70M	Rolling for CDA w/SRU gap	DFPW Normal	RTE_N_SPB	
2017-208T23:58	2017-209T05:06	Goldstone 34M BWG	Rolling for CDA	DFPW Normal	RTE_N_SPB	

# TOST\_285 SPASS

TOST 285

Request	Riders	Start (SCET)	Start (Epoch)	Duration	End	Primary	Secondary	Comments
Sequence S101, length = 67 days		2017-191T01:14:00		067T19:22:00	2017-258T20:36:00			
TOST_285_OUT Segment		2017-207T16:13:00		001T12:53:00	2017-209T05:06:00			
SP_285TI_WAYPTTURN207_PRIME		2017-207T16:13:00		000T00:40:00	2017-207T16:53:00	NEG_Y to Titan	NEG_Z to NTP	
NEW WAYPOINT		2017-207T16:53:00		000T21:50:00	2017-208T14:43:00	NEG_Y to Titan	NEG_Z to NTP	
ISS_285TI_LRMONITOR001_PRIME	C, M, V	2017-207T16:53:00		000T04:58:00	2017-207T21:51:00	ISS_NAC to Titan	NEG_Z to NTP	Collaborative Rider(s): CDA
CIRS_285TI_COMPMAP001_PRIME	I, V	2017-207T21:51:00		000T01:30:00	2017-207T23:21:00	CIRS_FPB to Titan	NEG_Z to NTP	CIRS_FPB to 60S; arrays span 40S-90S; FP1 not on disk
285TI (nt) TITAN Outbound		2017-207T23:20:01		000T00:00:01	2017-207T23:20:02			
ISS_285TI_LRMONITOR002_PRIME	C, M, V	2017-207T23:21:00		000T04:00:00	2017-208T03:21:00	ISS_NAC to Titan	NEG_Z to NTP	Collaborative Rider(s): CDA
ISS_285TI_LRMONITOR003_PRIME	C, V	2017-208T03:21:00		000T04:00:00	2017-208T07:21:00	ISS_NAC to Titan	NEG_Z to NTP	
ISS_285TI_LRMONITOR004_PRIME	C, V	2017-208T07:21:00		000T04:00:00	2017-208T11:21:00	ISS_NAC to Titan	NEG_Z to NTP	
ISS_285TI_LRMONITOR005_PRIME	C, V	2017-208T11:21:00		000T02:42:00	2017-208T14:03:00	ISS_NAC to Titan	NEG_Z to NTP	
SP_285EA_DLTURN208_PRIME		2017-208T14:03:00		000T00:40:00	2017-208T14:43:00	XBAND to Earth	NEG_X to Saturn	
NEW WAYPOINT		2017-208T14:43:00		000T14:23:00	2017-209T05:06:00	XBAND to Earth	NEG_X to Saturn	
SP_285EA_YGAP208_PRIME	E	2017-208T14:43:00		000T01:30:00	2017-208T16:13:00	XBAND to Earth	NEG_X to Saturn	
SP_285EA_M70METNON208_PRIME	C	2017-208T16:13:00		000T07:45:00	2017-208T23:58:00	XBAND to Earth	Rolling/SRU	Roll for MAPS CDA Titan, plus preceding 4 hours for CDA
SP_285EA_G34BWGNON208_PRIME	C	2017-208T23:58:00		000T05:08:00	2017-209T05:06:00	XBAND to Earth	Rolling	Roll for MAPS CDA Titan

# TOST\_285 High-Priority Observations

TOST 285

TOST_285: 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_285TI_LRMONITOR001_PRIME	2017-207T16:53:00	2017-207T21:51:00	Significant Science Impact if Secondary Changed	Secondary requested by CDA	TC1a, TC1b, TN1a, TN2c, TN2d	Jason Perry <volcanopele@gmail.com>
Titan	ISS_285TI_LRMONITOR002_PRIME	2017-207T23:21:00	2017-208T03:21:00	Significant Science Impact if Secondary Changed	Secondary requested by CDA	TC1a, TC1b, TN1a, TN2c, TN2d	Jason Perry <volcanopele@gmail.com>

# TOST\_285 Science Highlights (1/2)

TOST 285

July 26 (DOY 207) – TOST\_285 is a Titan 494,302 km flyby with ISS and CIRS as Prime observers. ISS will be the Prime observer for the first 5 hours on inbound and the full 14+ hours on outbound – acquiring a series of medium-resolution (~3 km) global-scale images and mosaics to observe Titan's surface and atmosphere: inbound, over Garotman Terra at low southern latitudes on Titan's sub-Saturnian hemisphere; near C/A, over northeastern Yalaing Terra; and outbound, west of the Belet sand sea near the equator. This series of observations over the full ~21 hour observation period will allow ISS to monitor Titan to track clouds and the evolution thereof, of particular scientific interest as Titan's northern summer equinox approaches.

CIRS and VIMS will each ride along with ISS. 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.

In addition, for the 4 hours nearest closest approach, CDA will be a collaborative with ISS. CDA will be monitoring the nano-dust stream activity at low inclinations within Titan's orbit. Strong focusing towards the ring plane (as expected) will allow CDA to use the observation results to determine the input parameters for the stream models.

For the 1hr 30min just before closest approach, CIRS will take over as Prime observer, making composition observations at high spectral resolution to map the distributions of trace gases and provide an insight into the stratospheric chemistry. ISS and VIMS will ride along as well.

July 27 (DOY 208) – ISS will return as Prime Observer at closest approach, and continue with its series of observations on the outbound, as noted on DOY 207. CIRS and VIMS will again ride along with ISS. In addition, for the first 4 hours of ISS outbound, CDA will be a collaborative rider, continuing with its nano-dust stream Titan campaign (as described on DOY 207)

Playback of the observation data follows, and will occur over a split Madrid 70M/Goldstone 34M BWG downlink. The downlink will occur during a ring plane crossing at Titan's orbit – CDA will use this opportunity to measure the background dust density at Titan's orbit, but without the gravitation influence of Titan. These measurements – which are only possible in the FRPO mission phase where Cassini crosses the ring plane at Titan's orbit without Titan being there – provide input parameters for the E-ring outskirts dust density model. Note that CDA is requesting these observations in different local time quadrants (dawn, dusk, noon, midnight) to test ideas about Titan's influence on the dust environment.

July 28 (DOY 209) – Playback, and CDA dust density measurements, will continue over the Goldstone 34M BWG downlink.

# Notes

TOST 285

- Pointing:
  - Waypoint secondary chosen per science request, but close to RBOT-friendly RA/DECs
  - Rolling Downlink requires SRU gap: first 2 rolls have Bright Body violations, Titan in SRU FOV
- Data Volume:
  - No carryover to next segment
  - No SMT warnings
- DSN:
  - Original DSN plan was M70/G70 – downgraded G70 to G34 to avoid over-request of 70M tracking
  - No extended DSN maintenance
    - NOTE: DSS-14 maintenance was moved earlier (now ends DOY 2017-202), could upgrade TOST DSS-25 to 70M to alleviate downlink contention (e.g. with Juno) in preceding MAPS 285, if needed
  - No ap\_downlink report check warnings
- Resource checker:
  - No open items
- Opmodes:
  - No RWA-slow or unique opmodes requested
- Hydrazine:
  - No RCS, not applicable
- Special Activities:
  - None



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Sequence Liens (should all be SPLAT items):

- None