



## **CASSINI TOST SEGMENT**

### **167TI\_T84 Handoff Package**

**Segment Boundary 2012-158T07:29:00 – 2012-161T07:14:00**

**11 October 2011**

Kim Steadman

SMT report and SPASS

Science Highlights

Notes & Liens

# SMT report

167TI\_T84

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 (%)	
SP_167EA_G70METSEQ159_PRIME	159 22:14	160 07:14	0	3132	174	3307	3322	15	0	212	53	3571	3692	120	374	6%	0
SP_167EA_C70METNON160_PRIME	160 07:14	160 09:14	0	0	0	0	3322	3322	0	679	12	691	870	179	253	11%	0
SP_167EA_G34BWGSEQ160_PRIME	160 22:14	161 05:14	0	998	55	1053	3322	2269	0	162	41	1256	625	-632	74	5%	631
SP_167EA_G70METSEQ160_PRIME	161 05:14	161 07:14	631	0	0	631	3322	2691	0	49	12	693	767	74	74	10%	0

DSS14 on DOY 159 overlaps weekly maintenance.

# SPASS

167TI\_T84

Request	Riders	Start (SCET)	Start (Epoch)	Duration	End (SCET)	Primary	Secondary
Sequence S73, length = 73 days		2012-097T11:47:00		073T11:11:00	2012-170T22:58:00		
Titan Flyby T84 Segment		2012-158T07:29:00		002T23:45:00	2012-161T07:14:00		
SP_167TI_WAYPTTURN158_PRIME		2012-158T07:29:00		000T00:40:00	2012-158T08:09:00	NEG_Y to Titan	NEG_X to 90.0/50.0
<b>NEW WAYPOINT</b>		<b>2012-158T08:09:00</b>		<b>002T01:45:00</b>	<b>2012-160T09:54:00</b>	<b>NEG_Y to Titan</b>	<b>NEG_X to 90.0/50.0</b>
<b>SP_167NA_DEADTIME158_PRIME</b>		<b>2012-158T08:09:00</b>		<b>000T00:15:00</b>	<b>2012-158T08:24:00</b>	<b>NEG_Y to Titan</b>	<b>NEG_X to 90.0/50.0</b>
CIRS_167TI_MIDIRTMAP001_PRIME	I, V	2012-158T08:24:00	GMB_E167_TITAN_T84-000T15:43:21	000T02:43:21	2012-158T11:07:21	CIRS_FP1 to Titan	PIC
VIMS_167TI_GLOMAP001_PRIME	C, I	2012-158T11:07:21	GMB_E167_TITAN_T84-000T13:00:00	000T04:00:00	2012-158T15:07:21	VIMS_IR to Titan	NEG_X to Sun
CIRS_167TI_MIRLMBINT001_PRIME	I, V	2012-158T15:07:21	GMB_E167_TITAN_T84-000T09:00:00	000T04:00:00	2012-158T19:07:21	CIRS_FP1 to Titan	PIC
CIRS_167TI_FIRNADMAP001_PRIME	I, V	2012-158T19:07:21	GMB_E167_TITAN_T84-000T05:00:00	000T02:45:00	2012-158T21:52:21	CIRS_FP1 to Titan	PIC
RADAR_167TI_T84INSCAT001_PRIME	M	2012-158T21:52:21	GMB_E167_TITAN_T84-000T02:15:00	000T01:03:00	2012-158T22:55:21	NEG_Z to Titan	NEG_X to NTP
RADAR_167TI_T84IHISAR001_PRIME	M	2012-158T22:55:21	GMB_E167_TITAN_T84-000T01:12:00	000T00:41:00	2012-158T23:36:21	NEG_Z to Titan	NEG_X to NTP
ENGR_167SC_RADRCS159_PRIME	M	2012-158T23:36:21	GMB_E167_TITAN_T84-000T00:31:00	000T00:01:00	2012-158T23:37:21	NEG_X to Titan_SC_RAM	POS_Y to COROT
RADAR_167TI_T84INALT001_PRIME	M	2012-158T23:37:21	GMB_E167_TITAN_T84-000T00:30:00	000T00:12:00	2012-158T23:49:21	NEG_Z to Titan	NEG_X to Titan_SC_RAM
Begin Dual Playback Science		2012-158T23:49:21	GMB_E167_TITAN_T84-000T00:18:00	000T00:00:01	2012-158T23:49:22		
RADAR_167TI_T84INOSAR001_PRIME	M	2012-158T23:49:21	GMB_E167_TITAN_T84-000T00:18:00	000T00:36:00	2012-159T00:25:21	NEG_Z to Titan	NEG_X to Titan_SC_RAM
167TI (t) T84 TITAN Outbou...		2012-159T00:07:21		000T00:00:01	2012-159T00:07:22		
End Dual Playback Science		2012-159T00:25:21	GMB_E167_TITAN_T84+000T00:18:00	000T00:00:01	2012-159T00:25:22		
RADAR_167TI_T84OUTALT001_PRIME	M	2012-159T00:25:21	GMB_E167_TITAN_T84+000T00:18:00	000T00:12:00	2012-159T00:37:21	NEG_Z to Titan	NEG_X to Titan_SC_RAM
RADAR_167TI_T84OHISAR001_PRIME	M	2012-159T00:37:21	GMB_E167_TITAN_T84+000T00:30:00	000T00:20:00	2012-159T00:57:21	NEG_Z to Titan	NEG_X to NTP
ENGR_167SC_RADRWBIAS159_PPS	M	2012-159T00:57:21	GMB_E167_TITAN_T84+000T00:50:00	000T00:21:41	2012-159T01:19:02	NEG_X to Titan_SC_RAM (	POS_Y to COROT
RADAR_167TI_T84OUTSCT001_PRIME	M	2012-159T01:19:21	GMB_E167_TITAN_T84+000T01:12:00	000T01:03:00	2012-159T02:22:21	NEG_Z to Titan	NEG_X to NTP
UVIS_167TI_EUVFUV001_PRIME	C, I, V	2012-159T02:22:21	GMB_E167_TITAN_T84+000T02:15:00	000T06:45:00	2012-159T09:07:21	UVIS_FUV to Titan	NEG_X to 90.0/50.0
CIRS_167TI_FIRNADCMPO02_PRIME	I, V	2012-159T09:07:21	GMB_E167_TITAN_T84+000T09:00:00	000T05:00:00	2012-159T14:07:21	CIRS_FP1 to Titan	PIC
CIRS_167TI_MIDIRTMAP002_PRIME	I, V	2012-159T14:07:21	GMB_E167_TITAN_T84+000T14:00:00	000T07:11:39	2012-159T21:19:00	CIRS_FP1 to Titan	PIC
<b>SP_167NA_DEADTIME159_PRIME</b>		<b>2012-159T21:19:00</b>	<b>GMB_E167_TITAN_T84+000T21:11:39</b>	<b>000T00:15:00</b>	<b>2012-159T21:34:00</b>	<b>NEG_Y to Titan</b>	<b>NEG_X to 90.0/50.0</b>
SP_167EA_DLTURN159_PRIME		2012-159T21:34:00		000T00:40:00	2012-159T22:14:00	XBAND to Earth	NEG_X to NEP
SP_167EA_G70METSEQ159_PRIME	C	2012-159T22:14:00		000T09:00:00	2012-160T07:14:00	XBAND to Earth	Rolling
Pointer Reset in preparatio...		2012-160T07:14:00		000T00:00:01	2012-160T07:14:01		
SP_167EA_C70METNON160_PRIME	C	2012-160T07:14:00		000T02:00:00	2012-160T09:14:00	XBAND to Earth	Rolling
SP_167TI_WAYPTTURN160_PRIME		2012-160T09:14:00		000T00:40:00	2012-160T09:54:00	NEG_Y to Titan	NEG_X to 90.0/50.0
<b>NEW WAYPOINT</b>		<b>2012-160T09:54:00</b>		<b>000T10:50:00</b>	<b>2012-160T20:44:00</b>	<b>NEG_Y to Titan</b>	<b>NEG_X to 90.0/50.0</b>
ISS_167TI_CLOUD001_PRIME	V	2012-160T09:54:00		000T03:00:00	2012-160T12:54:00	ISS_NAC to Titan	NEG_X to Sun
ISS_167TI_CLOUD002_PRIME	V	2012-160T12:54:00		000T03:10:00	2012-160T16:04:00	ISS_NAC to Titan	NEG_X to Sun
ISS_167TI_CLOUD003_PRIME	V	2012-160T16:04:00		000T01:00:00	2012-160T17:04:00	ISS_NAC to Titan	NEG_X to Sun
RADAR_167TI_RADIOMCAL125_PRIME		2012-160T17:04:00		000T02:00:00	2012-160T19:04:00	NEG_Z to Titan	NEG_X to 90.0/50.0
ISS_167TI_CLOUD004_PRIME	V	2012-160T19:04:00		000T01:00:00	2012-160T20:04:00	ISS_NAC to Titan	NEG_X to Sun
SP_167EA_DLTURN160_PRIME		2012-160T20:04:00		000T00:40:00	2012-160T20:44:00	XBAND to Earth	NEG_X to NEP
<b>NEW WAYPOINT</b>		<b>2012-160T20:44:00</b>		<b>000T10:30:00</b>	<b>2012-161T07:14:00</b>	<b>XBAND to Earth</b>	<b>NEG_X to NEP</b>
SP_167EA_YBIAS160_PRIME	E	2012-160T20:44:00		000T01:30:00	2012-160T22:14:00	XBAND to Earth	NEG_X to NEP
SP_167EA_G34BWGSEQ160_PRIME	C	2012-160T22:14:00		000T07:00:00	2012-161T05:14:00	XBAND to Earth	Rolling
SP_167EA_G70METSEQ160_PRIME	C	2012-161T05:14:00		000T02:00:00	2012-161T07:14:00	XBAND to Earth	Rolling

# Science Highlights

167TI\_T84

DOY 158: Inbound to T84, CIRS focuses on mid-infrared limb sounding to determine vertical atmospheric structure of temperature and minor gas composition and VIMS will monitor climatic changes after the equinox and look for specular reflection on the Northern lakes. RADAR is prime around closest approach and will acquire SAR of the sparsely-covered Northwest quadrant (plus global shape from SARTopo), altimetry on Adiri, and HiSAR on equatorial regions.

Inbound and outbound: RPWS will measure thermal plasmas in Titan's ionosphere and surrounding environment; search for lightning in Titan's atmosphere; investigate the interaction of Titan with Saturn's magnetosphere. CAPS will measure the ion and electron temperatures, densities and the ion composition and flow field in the vicinity of Titan, to characterize and understand its interaction with the magnetosphere of Saturn. Observe any seasonal or other long-term variability in the characteristics of this interaction, and study the processes by which Titan's atmosphere and ionosphere are lost to the magnetosphere. Measure the heavy ions and nanometer-sized aerosols (both positively and negatively charged) in Titan's upper atmosphere and observe seasonal variability in Titan's ionosphere. MIMI will measure the energetic ion and electron energy input to atmosphere.

For MAG, T84 is another low altitude north polar flyby in the post noon sector of Saturn's magnetosphere. With closest approach slightly in the dayside ionosphere, Cassini will be able to study the diffusion of the external magnetic field at low altitudes and high solar zenith angles.

DOY 159: Outbound from T84, RADAR will do altimetry on Adiri, and HiSAR on equatorial regions. UVIS will obtain an image cube of Titan's atmosphere at EUV and FUV wavelengths by sweeping its slit across the disk. ISS will ride along with CIRS and UVIS and their outbound leg includes low-phase-angle observations of Adiri and the region where extensive surface changes were observed in Fall 2010.

DOY 160: ISS will monitor Titan to track clouds and the evolution thereof for an extra day after the Titan encounter. CIRS and VIMS will ride along with ISS and monitor seasonal change. RADAR will perform a radiometry calibration.

# Y bias windows & data volume

---

167TI\_T84

If you have YGAP windows that overlap the first 90 minutes of a 70M downlink, your TWT/OST must have a plan for handling the potential loss of that portion of downlink at port 2. If the only impact is SSR overflow in this segment, indicate if you plan to write an SSR margin waiver or cut data, and how you plan to cut data. If the impact would be to the following segment you **MUST** provide a data cut plan *or you agree that the sequence lead can implement across the board data volume cuts.*

If your YGAP windows only precede/follow downlinks, or if they only overlap 34M BWG or HEF stations, you can delete this page, but your segment should still provide enough data volume margin to absorb some losses.

# Dual playbacks

- A Dual Playback for High Value Science has been planned
- Based on DSN requests, SMT results indicate it will fit within this segment
- A SPLAT item has been opened until the DSN negotiations for this time period are complete

Flyby	Driving Instrument	BEGHIVAL	ENDHIVAL	P4 Dual Playback	SSR-A empty after first playback?	Anything nonstandard?
T84	RADAR	T84 – 18min	T84+18 min	625.3Mb	Yes	

A “standard” dual playback: no carryover coming in, single observation period, first downlink empties SSR, no caboose observation period, second downlink empties SSR

# Notes

167TI\_T84

- Pointing:
  - None
- Data Volume:
  - Dual Playback for T84. Implemented per rules.
- DSN:
  - DSS14 on DOY159 overlaps with weekly maintenance. It was in the strawman DSN plan.
- Resource checker:
  - Telemetry Mode change during an ISS observation: This is ok per ISS.
  - SP\_167EA\_G34BWGSEQ160\_PRIME and SP\_167EA\_G70METSEQ160\_PRIME: Downlink Pass for sequence request has a duration of 000T07:00:00, Downlink Pass for sequence request has a duration of 000T02:00:00. Ok per Bill Heventhal.
- Opmodes:
  - none
- Hydrazine:
  - Deadband is (2,2,20). The TOST Hydrazine usage predict is 391 grams.
- Special Activities:
  - None

# Liens

---

## Sequence Liens (should all be SPLAT items):

- List any Liens to be worked in SIP, ie
  - None