CASSINI TOST SEGMENT

T88 Handoff Package

Segment Boundary 2012-333T20:32:00 – 2012-337T02:47:00

08 May 2012

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SMT report and SPASS

Science Highlights

Notes & Liens

175TI_T88	**1014**					

Start Time	End Time	Prime Activity	Obs. Detail	Op Mode	TLM Mode	Comments
2012-333T20:32:00	**2012-333T21:12:00**	SP Turn to WP	NEG_Y to Titan, NEG_X to NEP	DFPW Normal	S_N_ER_3	
2012-333T21:12:00	C/A-11:30:00	OD Uncertainty Dead Time				
begin custom period						
C/A-11:30:00	-9:00	CIRS	part N1 TC1b, TN1c	DFPW Normal	S_N_ER_3	
-09:00	-05:00	CIRS -FP1	R TN1c	DFPW Normal	S_N_ER_3	
-05:00	-02:15	CIRS	T TN2c	DFPW Normal	S_N_ER_3	
-02:15	-00:45	**CIRS**		DFPW Normal	S_N_ER_3	0.5, 2, 0.5 deadband for CIRS
-00:45	-00:44	RWA to RCS Transition		DFPW Normal	S_N_ER_3	
-00:44	-00:15	**CIRS**	**CIRS will turn to VIMS attitude**	DFPW Normal	S_N_ER_3	
-00:15	0	**VIMS**		DFPW Normal	S_N_ER_3	
2012-334T08:57:00		**CLOSEST APPROACH**	NEG_Y to Titan, (Tc2a)	DFPW Normal		**HLS at 2 km/pixel**
0	+01:00	**VIMS**		DFPW Normal	S_N_ER_3	
+01:00	+01:22	RCS to RWA Transition		DFPW Normal	S_N_ER_3	
+01:22	+02:15	**VIMS**		DFPW Normal	S_N_ER_3	
+02:15	+05:00	**VIMS**	Y TC1a, TN2c	DFPW Normal	S_N_ER_3	
+05:00	+09:00	VIMS	I TC1a, TN2c	DFPW Normal	S_N_ER_3	ISS rider
end custom period						
+09:00	+14:00	CIRS	C TN1c	DFPW Normal	S_N_ER_3	ISS rider
+14:00	C/A + 25:43:00	CIRS	A2 TC1a, TN2d	DFPW Normal	S_N_ER_3	
C/A + 25:43:00	2012-335T10:50:00	OD Uncertainty Dead Time				
2012-335T10:50:00	**2012-335T11:30:00**	SP Turn to Earth for downlink	XBAND to EARTH,NEG_Y to 293.0/25.0	DFPW Normal	S_N_ER_3	
2012-335T11:30:00	**2012-335T20:30:00**	Goldstone 70M	09:00 pass	DFPW Normal	RTE_N_SPB	
2012-335T20:30:00	**2012-336T04:00:00**	Canberra 34M HEF	07:30 pass	DFPW Normal	RTE_N_SPB	
2012-336T04:00:00	**2012-336T07:00:00**	Madrid 70M	03:00 pass	DFPW Normal	RTE_N_SPB	Dual playback for VIMS, -00:15 to +01:00
2012-336T07:00:00	**2012-336T07:42**	SP Turn to WP	NEG_Y to Titan, NEG_X to NEP	DFPW Normal	S_N_ER_3	
2012-336T07:42	2012-336T10:42:00	ISS	*ISS mosaic at first, then sit and stare for CIRS and VIMS*	DFPW Normal	S_N_ER_3	
2012-336T10:42:00	2012-336T14:37:00	ISS	*ISS mosaic at first, then sit and stare for CIRS and VIMS*	DFPW Normal	S_N_ER_3	
2012-336T14:37:00	2012-336T15:37:00	ISS mosaic	*ISS mosaic*	DFPW Normal	S_N_ER_3	
2012-336T15:37:00	**2012-336T16:17:00**	SP Turn to Earth for		DFPW Normal	S_N_ER_3	
2012-336T16:17:00	2012-336T17:47:00	Ybias window		DFPW Normal	S_N_ER_3	
2012-336T17:47:00	**2012-336T20:47:00**	Goldstone 70M	XBAND to EARTH,NEG_Y to 293.0/25.0	DFPW Normal	RTE_N_SPB	
2012-336T20:47:00	**2012-337T02:47:00**	Canberra 34M	XBAND to EARTH,NEG_Y to 293.0/25.0	DFPW Normal	RTE_N_SPB	

Deadband: (0.5,2,0.5)   Walking Deadband: no
Dual Playback: -00:15 to +01:00 (531 Mb)

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_175EA_G70METNON335_PRIME	335 11:30	335 20:30	0	3116	177	3294	3322	28	0	156	53	3503	2704	-800	29 1%	799
SP_175EA_C34HEFNON335_PRIME	335 20:30	336 04:00	799	0	0	799	3322	2523	0	194	44	1038	534	-504	29 1%	504
SP_175EA_M70METNON336_PRIME	336 04:00	336 07:00	504	0	0	504	3322	2818	0	611	18	1132	769	-364	29 1%	364
SP_175EA_G70METNON336_PRIME	336 17:47	336 20:47	364	534	46	944	3322	2378	0	67	18	1028	788	-241	29 2%	240
SP_175EA_C34HEFNON336_PRIME	336 20:47	337 02:47	240	0	0	240	3322	3082	0	155	35	431	460	28	29 6%	0

Request	Riders	Start (SCET)	Start (Epoch)	Duration	End (SCET)	Primary	Secondary	Comments
Sequence S76, length = 72 days		2012-307T14:30:00		072T03:21:00	2013-013T17:51:00			
Titan Flyby T88 Segment		2012-333T20:32:00		003T06:15:00	2012-337T02:47:00			
SP_175TI_WAYPTTURN333_PRIME		2012-333T20:32:00		000T00:40:00	2012-333T21:12:00	NEG_Y to Titan	NEG_X to NEP	
NEW WAYPOINT		2012-333T21:12:00		001T14:18:00	2012-335T11:30:00	NEG_Y to Titan	NEG_X to NEP	
SP_175NA_DEADTIME333_PRIME		2012-333T21:12:00		000T00:14:59	2012-333T21:26:59	NEG_Y to Titan	NEG_X to NEP	
Begin custom period		2012-333T21:26:59	GMB_E175_TITAN_T88-000T11:30:00	000T00:00:01	2012-333T21:27:00			
CIRS_175TI_FIRNADCMP001_PRIME	I, U, V	2012-333T21:26:59	GMB_E175_TITAN_T88-000T11:30:00	000T02:30:00	2012-333T23:56:59	CIRS_FP1 to Titan	PIC	Pick up at NEG_Y to Titan, NEG_X to NEP; Hand off at CIRS_FPB to Titan, PIC.
CIRS_175TI_MIRLMBMAP001_PRIME	V	2012-333T23:56:59	GMB_E175_TITAN_T88-000T09:00:00	000T04:00:00	2012-334T03:56:59	CIRS_FPB to Titan	PIC	Pick up at CIRS_FPB to Titan, PIC; Hand off at CIRS_FP1 to Titan, PIC.
CIRS_175TI_FIRNADMAP001_PRIME	I, V	2012-334T03:56:59	GMB_E175_TITAN_T88-000T05:00:00	000T02:45:00	2012-334T06:41:59	CIRS_FP1 to Titan	PIC	Pick up at CIRS_FP1 to Titan, PIC; Hand off at CIRS_FP1 to Titan, PIC.
CIRS_175TI_FIRLMBINT001_PRIME	I, M, V	2012-334T06:41:59	GMB_E175_TITAN_T88-000T02:15:00	000T01:00:00	2012-334T07:41:59	CIRS_FP1 to Titan	PIC	Pick up at CIRS_FP1 to Titan, PIC; Hand off at CIRS_FP1 to Titan, PIC.
CIRS_175TI_FIRLMBAER001_PRIME	I, M, V	2012-334T07:41:59	GMB_E175_TITAN_T88-000T01:15:00	000T00:30:00	2012-334T08:11:59	CIRS_FP1 to Titan	PIC	Pick up at CIRS_FP1 to Titan, PIC; Hand off at CIRS_FP1 to Titan, PIC.
ENGR_175SC_ORSRCS335_PRIME	M	2012-334T08:11:59	GMB_E175_TITAN_T88-000T00:45:00	000T00:01:00	2012-334T08:12:59	CIRS_FP1 to Titan	PIC	Pick up at CIRS_FP1 to Titan, PIC; Hand off at CIRS_FP1 to Titan, PIC. deadband =(0.5,2,0.5)
CIRS_175TI_FIRLMBT001_PRIME	M, V	2012-334T08:12:59	GMB_E175_TITAN_T88-000T00:44:00	000T00:29:00	2012-334T08:41:59	CIRS_FP1 to Titan	PIC	Pick up at CIRS_FP1 to Titan, PIC; Hand off at VIMS_IR to Titan, POS_Z to SC_RAM. Handoff to VIMS at VIMS_IR to Titan, LAT_SSCLON 89N; POS_Z to Titan SC_RAM.
Begin Dual Playback Science		2012-334T08:41:59	GMB_E175_TITAN_T88-000T00:15:00	000T00:00:01	2012-334T08:42:00			
VIMS_175TI_HIRES001_PRIME	C, I, M	2012-334T08:41:59	GMB_E175_TITAN_T88-000T00:15:00	000T01:15:00	2012-334T09:56:59	VIMS_IR to Titan	POS_Z to SC_RAM	Pick up at VIMS_IR to Titan, POS_Z to Titan_SC_RAM; Hand off at VIMS_IR to Titan, POS_Z to Titan_SC_RAM. Primary pointing to lat/lon = 89N/SSC long
175TI (t) T88 TITAN Outbou...		2012-334T08:56:59		000T00:00:01	2012-334T08:57:00			
End Dual Playback Science		2012-334T09:56:59	GMB_E175_TITAN_T88+000T01:00:00	000T00:00:01	2012-334T09:57:00			
ENGR_175SC_DFPWBIAS335_PPS	C, M, V	2012-334T09:56:59	GMB_E175_TITAN_T88+000T01:00:00	000T00:21:05	2012-334T10:18:04	VIMS_IR to Titan	POS_Z to Titan_SC_RAM	Pick up at VIMS_IR to Titan, POS_Z to Titan_SC_RAM; Hand off at VIMS_IR to Titan, POS_Z to Titan_SC_RAM.
VIMS_175TI_HIRES002_PRIME	C, I, M	2012-334T10:18:59	GMB_E175_TITAN_T88+000T01:22:00	000T00:53:00	2012-334T11:11:59	VIMS_IR to Titan	NEG_X to Sun	Pick up at VIMS_IR to Titan, POS_Z to Titan_SC_RAM; Hand off at NEG_Y to Titan, NEG_X to Sun.
VIMS_175TI_MEDRES001_PRIME	C, I	2012-334T11:11:59	GMB_E175_TITAN_T88+000T02:15:00	000T02:45:00	2012-334T13:56:59	VIMS_IR to Titan	NEG_X to Sun	Pick up at NEG_Y to Titan, NEG_X to Sun; Hand off at NEG_Y to Titan, NEG_X to Sun.
VIMS_175TI_GLOBMAP001_PRIME	C, I	2012-334T13:56:59	GMB_E175_TITAN_T88+000T05:00:00	000T04:00:00	2012-334T17:56:59	VIMS_IR to Titan	NEG_X to Sun	Collaborative Rider(s): ISS. Pick up at NEG_Y to Titan, NEG_X to Sun; Hand off at NEG_Y to Titan, NEG_X to NEP. Collaborative Rider(s): ISS
End custom period		2012-334T17:56:59	GMB_E175_TITAN_T88+000T09:00:00	000T00:00:01	2012-334T17:57:00			

Request	Riders	Start (SCET)	Start (Epoch)	Duration	End (SCET)	Primary	Secondary	Comments
CIRS_175TI_FIRNADCMP002_PRIME	I, U, V	2012-334T17:56:59	GMB_E175_TITAN_T88+000T09:00:00	000T05:00:00	2012-334T22:56:59	CIRS_FP1 to Titan	PIC	Collaborative Rider(s): ISS
CIRS_175TI_MIDIRTMAP002_PRIME	I, V	2012-334T22:56:59	GMB_E175_TITAN_T88+000T14:00:00	000T11:43:00	2012-335T10:39:59	CIRS_FPB to Titan	PIC	
SP_175NA_DEADTIME335_PRIME		2012-335T10:39:59	GMB_E175_TITAN_T88+001T01:43:00	000T00:10:00	2012-335T10:49:59	NEG_Y to Titan	NEG_X to NEP	
SP_175EA_DLTURN335_PRIME		2012-335T10:50:00		000T00:40:00	2012-335T11:30:00	XBAND to Earth	NEG_Y to 293.0/25.0	
NEW WAYPOINT		**2012-335T11:30:00**		**000T20:12:00**	**2012-336T07:42:00**	**XBAND to Earth**	**NEG_Y to 293.0/25.0**	
SP_175EA_G70METNON335_PRIME	C	2012-335T11:30:00		000T09:00:00	2012-335T20:30:00	XBAND to Earth	Rolling	MIMI. NEG_Y to Saturn (0,0,-9.5).
SP_175EA_C34HEFNON335_PRIME	C	2012-335T20:30:00		000T07:30:00	2012-336T04:00:00	XBAND to Earth	Rolling	MIMI. NEG_Y to Saturn (0,0,-9.5).
Pointer Reset in preparatio...		2012-336T04:00:00		000T00:00:01	2012-336T04:00:01			
SP_175EA_M70METNON336_PRIME	C	2012-336T04:00:00		000T03:00:00	2012-336T07:00:00	XBAND to Earth	Rolling	MIMI. NEG_Y to Saturn (0,0,-9.5).
SP_175TI_WAYPTTURN336_PRIME		2012-336T07:00:00		000T00:42:00	2012-336T07:42:00	NEG_Y to Titan	NEG_X to NEP	
NEW WAYPOINT		**2012-336T07:42:00**		**000T08:35:00**	**2012-336T16:17:00**	**NEG_Y to Titan**	**NEG_X to NEP**	
ISS_175TI_CLOUD001_PRIME	V	2012-336T07:42:00		000T03:00:00	2012-336T10:42:00	ISS_NAC to Titan	NEG_X to NEP	No Preference to secondary pointing
ISS_175TI_CLOUD002_PRIME	V	2012-336T10:42:00		000T03:55:00	2012-336T14:37:00	ISS_NAC to Titan	NEG_X to NEP	No Preference to secondary pointing
ISS_175TI_CLOUD003_PRIME	V	2012-336T14:37:00		000T01:00:00	2012-336T15:37:00	ISS_NAC to Titan	NEG_X to NEP	No Preference to secondary pointing
SP_175EA_DLTURN336_PRIME		2012-336T15:37:00		000T00:40:00	2012-336T16:17:00	XBAND to Earth	NEG_Y to 293.0/25.0	
NEW WAYPOINT		**2012-336T16:17:00**		**000T10:30:00**	**2012-337T02:47:00**	**XBAND to Earth**	**NEG_Y to 293.0/25.0**	
SP_175EA_YGAP336_PRIME	E	2012-336T16:17:00		000T01:30:00	2012-336T17:47:00	XBAND to Earth	NEG_Y to 293.0/25.0	
SP_175EA_G70METNON336_PRIME	C	2012-336T17:47:00		000T03:00:00	2012-336T20:47:00	XBAND to Earth	NEG_Y to 293.0/25.0	MIMI. NEG_Y to Saturn (0,0,-9.5).
SP_175EA_C34HEFNON336_PRIME	C	2012-336T20:47:00		000T06:00:00	2012-337T02:47:00	XBAND to Earth	Rolling/SRU	MIMI. NEG_Y to Saturn (0,0,-9.5). SID suspend

DOY 334 – On DOY 334, the T88 flyby occurs at an altitude of 1014 km.

Inbound to Titan, ISS will ride along with CIRS' and VIMS' observations to image Titan's surface and atmosphere. CIRS will carry out far-infrared vertical mapping of the atmosphere near the probe entry latitude at 11S to characterize vertical aerosol and gas profiles.

VIMS is prime at C/A and will acquire 1km/pix images of Adiri, west of the Huygens Landing site.

Outbound from Titan, VIMS will look for clouds and monitor climatic changes after equinox. ISS will image the region where extensive surface changes were observed in Fall 2010 and an area at mid-southern latitudes on the trailing hemisphere that has only been imaged at lower resolution

During the flyby, 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. MIMI will measure energetic ion and electron energy input to atmosphere. 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.

For MAG, T88 is another high inclination (1164 km) flyby in the post noon sector of Saturn's magnetosphere. With closest approach near the day/night terminator, Cassini will be able to study the diffusion of the external magnetic field at low altitudes and high solar zenith angles. A comparison with T83, T84, T85, T86, and T87 will be very useful. We assign grade one priority. Data rate: 1976bps (32vps).

DOY 335 -
CIRS will obtain information on the thermal structure of Titan's stratosphere with a slew across Titan's disk at 4 microrad/s. ISS and VIMS will look for clouds and monitor climatic changes after equinox.

Downlink of the T88 flyby data will occur over the Goldstone 70M with the dual playback of c/a data on the Madrid 70M. ISS will also monitor Titan to track clouds and the evolution thereof for an extra day after the Titan encounter.

DOY 336:
ISS will also 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 during this "caboose" day. VIMS will look for clouds and will monitor climatic changes after the equinox. CIRS will perform Far-infrared vertical mapping of the atmosphere.

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?
T88	VIMS	T88-15 min	T88+60 min	531.4 Mb	Yes	There are two downlink tracks that prior to the dual playback pass. 500Mb is carried over into the dual pb pass.

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

Notes

- Pointing:
  - None
- Data Volume:
  - None
- DSN:
  - Dual playback for T88. See dual playback page.
  - Downlinks were reworked from the original strawman due to C70 being down for maintenance.
- Resource checker:
  - Continuity broken between CIRS_175TI_FIRLMBT001_PRIME and VIMS_175TI_HIRES001_PRIME. The pick up and hand off match, CIRS has just added extra information to their CIMS entry.
  - Custom period request is using PIC in secondary BV of handoff pointing. This is regular procedure for CIRS and is ok.
- Opmodes:
  - None
- Hydrazine:
  - 472 g
- Special Activities:
  - None

Liens

Sequence Liens (should all be SPLAT items):

- List any Liens to be worked in SIP, ie

    - Dual Playback passes need to be tracked

    - AACS does **not** require early delivery of T88 to check duty cycle. At the S76 EAR, Tom Burk said he was not concerned about this flyby and that no early delivery was required by AACS.