



CASSINI TOST SEGMENT

172TI_T86 Handoff Package

Segment Boundary 2012-270T00:16:00 – 2012-273T06:16:00

22 Feb 2012

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SMT report and SPASS

Science Highlights

Notes & Liens

T86 Master Timeline

172TI_T86

172TI_T86	956					
Start Time	End Time	Prime Activity	Obs. Detail	Op Mode	TLM Mode	Comments
2012-270T00:16:00	2012-270T00:56:00	SP Turn to WP	NEG_Y to Titan, NEG_X to 115.0/-2.0	DFPW Normal		
2012-270T00:56:00	C/A-13:24:39	OD Uncertainty Dead Time				
C/A-13:24:39	-13:00	CIRS	N1 extended, TN1c	DFPW Normal	S_N_ER3	
-13:00	-09:00	CIRS	N1, TN1c	DFPW Normal	S_N_ER3	
-09:00	-02:15	UVIS	X, TN1c	RADWU	S_N_ER5a for 15 min then S_N_ER3	RADAR warmup at -09:00:00
begin custom period						
-02:15	-00:50	CIRS	TN1c	RADWU	S_N_ER3	
-00:50	-00:49	RWA to RCS Transition		RADRCS	S_N_ER3	
-00:49	-00:18	CIRS	CIRS turn to INMS attitude, TN1c	RADRCS	S_N_ER3	deadband for CIRS 0.5, 2.0, 0.5
-00:18	0	INMS	RADAR riding along, TC2a	RADRCS	S_N_ER8	
2012-270T14:35:39		CLOSEST APPROACH	NEG_X to RAM, NEG_Z to Titan (Tc2a)			High solar activity; northern latitude; near noon
0	+00:18	INMS	RADAR riding along, RADAR turn to CIRS attitude, TC2a	RADRCS	S_N_ER8	minor CIRS heating possible
+00:18	+00:35	RADAR altimetry	TN2a	RADRCS	S_N_ER8	
+00:35	+01:15	CIRS	on CIRS point at +00:35, TN1c	ORSRCS	S_N_ER3	
+01:15	+01:37	RCS to RWA Transition		DFPW Normal	S_N_ER3	
+01:37	+02:15	CIRS	TN1c	DFPW Normal	S_N_ER3	
end custom period						
+02:15	+09:00	UVIS	X, TN1c	DFPW Normal	S_N_ER3	
+09:00	+14:00	CIRS	C, TN1c	DFPW Normal	S_N_ER3	VIMS rider
+14:00	C/A+28:45:21	CIRS	A2, TN1c	DFPW Normal	S_N_ER3	ISS rider
C/A+28:45:21	2012-271T19:36:00	OD Uncertainty Dead Time		DFPW Normal		
2012-271T19:36:00	2012-271T20:16:00	SP Turn to Earth for downlink		DFPW Normal		
2012-271T20:16:00	2012-272T07:46:00	Canberra 70M Madrid 70M		DFPW Normal	RTE_N_SPB	
2012-272T07:46:00	2012-272T09:46:00			DFPW Normal	RTE_N_SPB	Dual playback for RADAR/INMS, -00:05 to +00:05
2012-272T09:46:00	2012-272T10:26:00	SP Turn to WP	NEG_Y to Titan, NEG_X to NEP	DFPW Normal		
2012-272T10:26:00	2012-272T14:26:00	ISS	ISS mosaic at first, then sit and stare for CIRS and VIMS	DFPW Normal	S_N_ER3	
2012-272T14:26:00	2012-272T18:06:00	ISS	ISS mosaic at first, then sit and stare for CIRS and VIMS	DFPW Normal	S_N_ER3	
2012-272T18:06:00	2012-272T21:06:00	ISS mosaic	ISS mosaic	DFPW Normal	S_N_ER3	
2012-272T21:06:00	2012-272T21:46:00	SP Turn to Earth for		DFPW Normal	S_N_ER3	
2012-272T21:46:00	2012-272T23:16:00	Ybias window		DFPW Normal	S_N_ER3	
2012-272T23:16:00	2012-272T23:16:00	Canberra 70M				
2012-272T23:16:00	2012-273T06:16:00	Canberra 34M		DFPW Normal	RTE_N_SPB	

Deadband: (0.5,0.5,0.5)

Walking Deadband: no

Dual Playback: -00:05 to +00:05

T86 SMT report

172TI_T86

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_172EA_C70METNON271_PRIME	271 20:16	272 07:46	0	291.2	201	3113	3322	209	0	267	68	3447	3316	-132	81	2%	131
SP_172EA_M70METNON272_PRIME	272 07:46	272 09:46	131	0	0	131	3322	3191	0	246	12	389	463	74	81	5%	0
SP_172EA_C70METNON272_PRIME	272 21:16	272 23:16	0	774	49	823	3322	2499	0	49	12	884	566	-319	7	1%	318
SP_172EA_C34HEFNON272_PRIME	272 23:16	273 06:16	318	0	0	318	3322	3004	0	169	41	528	535	7	7	1%	0

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	270 00:16	271 20:16	244.8	68.9	385.5	25.9	750.0	92.5	108.9	172.0	552.7	175.4	309.0	0.0	198.6	3084.2
SP_172EA_C70METNON271_PRIME	271 20:16	272 07:46	29.0	18.0	113.4	4.1	0.0	20.5	35.6	0.0	37.3	6.5	0.0	0.0	0.0	264.3
SP_172EA_M70METNON272_PRIME	272 07:46	272 09:46	5.0	3.1	21.6	0.7	0.0	3.6	6.2	0.0	6.5	1.1	0.0	0.0	196.4	244.2
DAILY TOTAL SCIENCE	270 00:16	272 09:46	278.8	90.0	520.5	30.8	750.0	116.5	150.7	172.0	596.5	183.0	309.0	0.0	395.0	
OBSERVATION_NOR	272 09:46	272 21:16	29.0	18.0	156.0	4.1	450.0	20.5	27.5	0.0	37.3	0.0	25.0	0.0	48.1	815.4
SP_172EA_C70METNON272_PRIME	272 21:16	272 23:16	5.0	3.1	22.8	0.7	0.0	3.6	6.2	0.0	6.5	1.1	0.0	0.0	0.0	49.0
SP_172EA_C34HEFNON272_PRIME	272 23:16	273 06:16	17.6	11.0	75.6	2.5	0.0	12.4	21.7	0.0	22.7	3.8	0.0	0.0	0.0	167.4
DAILY TOTAL SCIENCE	272 09:46	273 06:16	51.7	32.1	254.4	7.4	450.0	36.5	55.4	0.0	66.4	4.9	25.0	0.0	48.1	

CAPS (Mb)	CDA (Mb)	CIRS (Mb)	INMS (Mb)	ISS (Mb)	MAG (Mb)	MIMI (Mb)	RADAR (Mb)	RPWS (Mb)	UVIS (Mb)	VIMS (Mb)	PROBE (Mb)
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TOTAL RECORDED (OPNAV data not included) 330.5 122.1 774.9 38.1 1200.0 152.9 206.0 172.0 662.9 187.9 334.0 0.0

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Request	Riders	Start (SCET)	Start (Epoch)	Duration	End (SCET)	Primary	Secondary	Comments
Sequence S75, length = 69 days		2012-238T02:19:00		069T12:11:00	2012-307T14:30:00			
Titan Flyby T86 Segment		2012-270T00:16:00		003T06:00:00	2012-273T06:16:00			
SP_172TI_WAYPTTURN270_PRIME		2012-270T00:16:00		000T00:40:00	2012-270T00:56:00	NEG_Y to Titan	NEG_X to 115.0/-2.0	
NEW WAYPOINT		2012-270T00:56:00		001T19:20:00	2012-271T20:16:00	NEG_Y to Titan	NEG_X to 115.0/-2.0	
SP_172NA_DEADTIME270_PRIME		2012-270T00:56:00		000T00:15:00	2012-270T01:11:00	NEG_Y to Titan	NEG_X to 115.0/-2.0	
CIRS_172TI_FIRNADCMP001_PRIME	I, V	2012-270T01:11:00	GMB_E172_TITAN_T86-C	000T04:24:39	2012-270T05:35:39	CIRS_FP1 to Titan	PIC	
UVIS_172TI_EUVFUV001_PRIME	C, I, V	2012-270T05:35:39	GMB_E172_TITAN_T86-C	000T06:45:00	2012-270T12:20:39	UVIS_FUV to Titan	NEG_X to 115.0/-2.0	No Preference to secondary pointing
Begin custom period		2012-270T12:20:39	GMB_E172_TITAN_T86-C	000T00:00:01	2012-270T12:20:40			
CIRS_172TI_FIRLMBINT001_PRIME	I, M, V	2012-270T12:20:39	GMB_E172_TITAN_T86-C	000T01:00:00	2012-270T13:20:39	CIRS_FP1 to Titan	PIC	Pick up at NEG_Y to Titan, NEG_X to 115.0/-2.0; Hand off at CIRS_FP1 to Titan, PIC.
CIRS_172TI_FIRLMBIAER001_PRIME	I, M, V	2012-270T13:20:39	GMB_E172_TITAN_T86-C	000T00:25:00	2012-270T13:45:39	CIRS_FP1 to Titan	PIC	Pick up at CIRS_FP1 to Titan, PIC; Hand off at CIRS_FP1 to Titan, PIC.
ENGR_172SC_RADRCS270_PRIME	M	2012-270T13:45:39	GMB_E172_TITAN_T86-C	000T00:01:00	2012-270T13:46:39	CIRS_FP1 to Titan	PIC	Pick up at CIRS_FP1 to Titan, PIC; Hand off at CIRS_FP1 to Titan, PIC. Deadband = (0.5,0.5,0.5)
CIRS_172TI_FIRLMBT001_PRIME	I, M, V	2012-270T13:46:39	GMB_E172_TITAN_T86-C	000T00:31:00	2012-270T14:17:39	CIRS_FP1 to Titan	PIC	Pick up at CIRS_FP1 to Titan, PIC; Hand off at NEG_Z to Titan, NEG_X to Titan_SC_RAM. Handoff at NEG_Z to Titan Lat/Lon 77N/240W, NEG_X to Titan SC_RAM
RADAR_172TI_T86RASAR001_PRIME	M	2012-270T14:17:39	GMB_E172_TITAN_T86-C	000T00:13:00	2012-270T14:30:39	NEG_X to Titan_SC_RAM	NEG_Z to Titan	Pick up at NEG_Z to Titan, NEG_X to Titan_SC_RAM; Hand off at NEG_X to Titan_SC_RAM, NEG_Z to Titan. Custom pickup is actually -Z to 77N/240W (not Titan_center), -X to SC_RAM.
Begin Dual Playback Science		2012-270T14:30:39	GMB_E172_TITAN_T86-C	000T00:00:01	2012-270T14:30:40			
RADAR_172TI_T86RASAR002_PRIME	M	2012-270T14:30:39	GMB_E172_TITAN_T86-C	000T00:10:00	2012-270T14:40:39	NEG_X to Titan_SC_RAM	NEG_Z to Titan	Pick up at NEG_X to Titan_SC_RAM, NEG_Z to Titan; Hand off at NEG_X to Titan_SC_RAM, NEG_Z to Titan.
172TI (t) T86 TITAN Outbou...		2012-270T14:35:39		000T00:00:01	2012-270T14:35:40			
End Dual Playback Science		2012-270T14:40:39	GMB_E172_TITAN_T86-H	000T00:00:01	2012-270T14:40:40			
RADAR_172TI_T86RASAR003_PRIME	M	2012-270T14:40:39	GMB_E172_TITAN_T86-H	000T00:13:00	2012-270T14:53:39	NEG_X to Titan_SC_RAM	NEG_Z to Titan	Pick up at NEG_X to Titan_SC_RAM, NEG_Z to Titan; Hand off at NEG_X to Titan_SC_RAM, NEG_Z to Titan.
RADAR_172TI_T86OUTALT001_PRIM	M	2012-270T14:53:39	GMB_E172_TITAN_T86-H	000T00:17:00	2012-270T15:10:39	NEG_Z to Titan	NEG_X to Titan_SC_RAM	Pick up at NEG_X to Titan_SC_RAM, NEG_Z to Titan; Hand off at CIRS_FP1 to Titan, POS_Z to NTP.
CIRS_172TI_FIRLMBIAER002_PRIME	I, M, V	2012-270T15:10:39	GMB_E172_TITAN_T86-H	000T00:40:00	2012-270T15:50:39	CIRS_FP1 to Titan	PIC	Pick up at CIRS_FP1 to Titan, POS_Z to NTP; Hand off at CIRS_FP1 to 201.2/35.4, POS_Z to 248.0/-44.0. Pickup at FP1 to Titan, POS_Z to NTP. Handoff at FP1 to 201.2/35.4, POS_Z to 248.0/-44.0.

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Request	Riders	Start (SCET)	Start (Epoch)	Duration	End (SCET)	Primary	Secondary	Comments
ENGR_172SC_DFPWBIAS270_PPS	M, V	2012-270T15:50:39	GMB_E172_TITAN_T86+	000T00:21:05	2012-270T16:11:44	CIRS_FP1 to 201.2/35.4	POS_Z to 248.0/-44.0	Pick up at CIRS_FP1 to 201.2/35.4, POS_Z to 248.0/-44.0; Hand off at CIRS_FP1 to 201.2/35.4, POS_Z to 248.0/-44.0. Deadband=(2,2,20)
CIRS_172TI_FIRLMBINT002_PRIME	I, M, V	2012-270T16:12:39	GMB_E172_TITAN_T86+	000T00:38:00	2012-270T16:50:39	CIRS_FP1 to Titan	PIC	Pick up at CIRS_FP1 to 201.2/35.4, POS_Z to 248.0/-44.0; Hand off at NEG_Y to Titan, NEG_X to 115.0/-2.0. Pickup at CIRS_FP1 to 201.2/35.4, POS_Z to 248.0/-44.0. Handoff at NEG_Y to Titan, NEG_X to 115.0/-2.0.
End custom period		2012-270T16:50:39	GMB_E172_TITAN_T86+	000T00:00:01	2012-270T16:50:40			
UVIS_172TI_EUVFUV002_PRIME	C, I, V	2012-270T16:50:39	GMB_E172_TITAN_T86+	000T06:45:00	2012-270T23:35:39	UVIS_FUV to Titan	NEG_X to 115.0/-2.0	No Preference to secondary pointing
CIRS_172TI_FIRNADCMP002_PRIME	I, V	2012-270T23:35:39	GMB_E172_TITAN_T86+	000T05:00:00	2012-271T04:35:39	CIRS_FP1 to Titan	PIC	
CIRS_172TI_MIDIRTMAP002_PRIME	I, V	2012-271T04:35:39	GMB_E172_TITAN_T86+	000T14:45:21	2012-271T19:21:00	CIRS_FPB to Titan	PIC	Collaborative Rider(s): ISS
SP_172NA_DEADTIME271_PRIME		2012-271T19:21:00	GMB_E172_TITAN_T86+	000T00:15:00	2012-271T19:36:00	NEG_Y to Titan	NEG_X to 115.0/-2.0	
SP_172EA_DLTURN271_PRIME		2012-271T19:36:00		000T00:40:00	2012-271T20:16:00	XBAND to Earth	NEG_X to NSP	
NEW WAYPOINT		2012-271T20:16:00		000T14:10:00	2012-272T10:26:00	XBAND to Earth	NEG_X to NSP	
SP_172EA_C70METNON271_PRIME	C	2012-271T20:16:00		000T11:30:00	2012-272T07:46:00	XBAND to Earth	Rolling	NEG_X to NSP
Pointer Reset in preparatio...		2012-272T07:46:00		000T00:00:01	2012-272T07:46:01			
SP_172EA_M70METNON272_PRIME	C	2012-272T07:46:00		000T02:00:00	2012-272T09:46:00	XBAND to Earth	Rolling	NEG_X to NSP
SP_172TI_WAYPTTURN272_PRIME		2012-272T09:46:00		000T00:40:00	2012-272T10:26:00	NEG_Y to Titan	NEG_X to NEP	
NEW WAYPOINT		2012-272T10:26:00		000T09:20:00	2012-272T19:46:00	NEG_Y to Titan	NEG_X to NEP	
ISS_172TI_CLOUD001_PRIME	C, V	2012-272T10:26:00		000T04:00:00	2012-272T14:26:00	ISS_NAC to Titan	NEG_X to NEP	No Preference to secondary pointing
ISS_172TI_CLOUD002_PRIME	C, V	2012-272T14:26:00		000T03:40:00	2012-272T18:06:00	ISS_NAC to Titan	NEG_X to NEP	No Preference to secondary pointing
ISS_172TI_CLOUD003_PRIME	C, V	2012-272T18:06:00		000T01:00:00	2012-272T19:06:00	ISS_NAC to Titan	NEG_X to NEP	No Preference to secondary pointing
SP_172EA_DLTURN272_PRIME	C, V	2012-272T19:06:00		000T00:40:00	2012-272T19:46:00	XBAND to Earth	NEG_Y to 293.0/25.0	
NEW WAYPOINT		2012-272T19:46:00		000T10:30:00	2012-273T06:16:00	XBAND to Earth	NEG_Y to 293.0/25.0	
SP_172EA_YGAP272_PRIME	C, E, V	2012-272T19:46:00		000T01:30:00	2012-272T21:16:00	XBAND to Earth	NEG_Y to 293.0/25.0	
SP_172EA_C70METNON272_PRIME	C	2012-272T21:16:00		000T02:00:00	2012-272T23:16:00	XBAND to Earth	Rolling	NEG_Y to 293/25
SP_172EA_C34HEFNON272_PRIME	C	2012-272T23:16:00		000T07:00:00	2012-273T06:16:00	XBAND to Earth	Rolling/SRU	MIMI. NEG_Y to 293/25. SID suspend

Science Highlights

172TI_T86

DOY 270 – Inbound to Titan, CIRS will make a variety of observations are made on this flyby, including distant temperature and gas abundance mapping, but also mapping of detailed vertical profiles at mid-northern latitudes (50N) near the edge of the former winter polar vortex. 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' observations, inbound and outbound, to image Titan's surface and atmosphere. VIMS will also ride along and will look for specular reflection on the Northern lakes.

RADAR will perform ride along SAR for change detection on southwestern part of Ligeia Mare (seen on T28). Outbound from Titan RADAR will perform altimetry.

T86 is dayside pass through the mid and high Northern latitudes. This pass will be critical to monitoring the effect of solar input on Titan's atmosphere. T86 also part of the strategy which is intended to determine latitude dependence on the atmosphere. INMS is prime inbound and outbound, so this will be one of a handful of opportunities to profile the ionosphere through the exobase, to closest approach and back out through the egress exobase crossing. 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.

For MAG, T86 is another low altitude (990 km) north polar flyby in the post noon sector of Saturn's magnetosphere. With closest approach in the dayside ionosphere, Cassini will be able to study the diffusion of the external magnetic field at low altitudes and low solar zenith angles. A comparison with T83, T84 and T85 will be very useful. We assign grade one priority. 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.

DOY 271 – CIRS observations outbound and downlink of Titan data over Canberra with the dual playback over Madrid.

DOY 272 - ISS will also monitor Titan to track clouds and the evolution thereof for an extra day after the Titan encounter. VIMS will ridealong with ISS for detection of clouds to monitor climatic changes after the equinox.

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?
T86	RADAR/IN MS	T86-05 min	T86+05 min	196.4 Mb	Yes	Some carryover into the dual playback dsn 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

172TI_T86

- Pointing:
 - nothing
- Data Volume:
 - SMT warning: 2012-270T05:35:39 RADAR_172TI_T86WARMUP001_RIDER Found an activity whose data are NOT recorded in this telemetry mode "S_N_ER_3" commanded at 2012-270T05:50:39.000. Volume of 14.42638 Mb not given data policing space. This is ok. No RADAR data will be lost.
- Resource checker:
 - Custom period request is using PIC in secondary BV of handoff pointing. This is ok, CIRS does this often.
 - Telemetry Mode change during an ISS observation. This is ok per ISS.
 - Hydrazine estimate: 453 g
- Special Activities:
 - None

Liens

172TI_T86

Sequence Liens (should all be SPLAT items):

- List any Liens to be worked in SIP,
 - dual playback for RADAR/INMS
 - AACS wants to confirm that the pointing at c/a is safe so they will be looking at the duty cycle predict prior to Port 1.
 - RADAR has delivered an sasf to AACS.