CASSINI TOST SEGMENT

T100 Handoff Package

Segment Boundary 2014-096T19:45:00 – 2014-098T23:15:00

17 September 2013

Kim Steadman

SMT report and SPASS

Science Highlights

Notes & Liens

T100 Master Timeline

203TI_T100	963					
Start Time	**End Time**	**Prime Activity**	**Obs. Detail**	**Op Mode**	**TLM Mode**	**Comments**
2014-096T19:45:00	**014-096T20:25:0**	SP Turn to WP	**NEG_Y to Titan, NEG_X to SUN**	DFPW Normal	S_N_ER_3	
2014-096T20:25:00	C/A-17:01:15	OD Uncertainty Dead Time				
C/A-17:01:15	-14:00	CIRS	A3 (Tc1b)	DFPW Normal	S_N_ER_3	ISS rider
-14:00	-12:00	ISS	D2 (TC1a, TC1b, TN1a, TN2c (Could also use TN1c for limb haze layer, depending on geometry if along limb, or TN2d, depending	DFPW Normal	S_N_ER_3	
-12:00	-09:00	CIRS	D2 (TN1c)	DFPW Normal	S_N_ER_3	VIMS rider
-09:00	-05:00	VIMS	I (TC1a and TN2c)	DFPW Normal	S_N_ER_3	ISS rider
-05:00	-02:15	VIMS	Y (TC1a, TN1a (depending on pointing) and TN2c)	DFPW Normal	S_N_ER_3	
-02:15	**-01:22**	**CIRS**		DFPW Normal	S_N_ER_3	FIRLMB at 43S, 22S; best mid-mission south lats; cf T101
begin custom period						
-01:22	**-00:33**	**VIMS**	**stellar occ -01:02 to -00:53**	DFPW Normal	S_N_ER_3	
-00:33	**-00:32**	RWA to RCS Transition		ORSRCS	S_N_ER_3	
-00:32	**-00:12**	**VIMS**	**VIMS turning to INMS attitude**	ORSRCS	S_N_ER_3	
-00:12	**0**	**INMS**	**on point at -00:15**	ORSRCS	S_N_ER_3	INMS to look at CIRS heating
2014-097T13:41:14		**CLOSEST APPROACH**	**NEG_X to RAM, (Tc2a)**			
0	**+00:09**	**INMS**	**INMS turns to CIRS attitude**	ORSRCS	S_N_ER_3	**CIRS Heating: 10.6K** **VIMS Heating: 3.9K**
+00:09	**+01:15**	**CIRS**		ORSRCS	S_N_ER_3	
+01:15	**+01:37**	RCS to RWA Transition		ORSRCS	S_N_ER_3	
+01:37	**+02:15**	**CIRS**		DFPW Normal	S_N_ER_3	
end custom period						
+02:15	+09:00	**UVIS**	X (TN1c. ISS ridealong is photon WAC (TN1c and TC1a))	DFPW Normal	S_N_ER_3	
+09:00	+13:00	CIRS	N1 (Tc1b, TN1c aerosol)	DFPW Normal	S_N_ER_3	
+13:00	C/A+21:23:45	CIRS	M4 (Tc1b (TN1c on outbound))	DFPW Normal	S_N_ER_3	
C/A+21:23:45	2014-098T11:20:00	OD Uncertainty Dead Time				
2014-098T11:20:00	**014-098T12:00:0**	SP Turn to Earth for downlink		DFPW Normal	S_N_ER_3	
2014-098T12:00:00	**2014-098T21:00:**	Canberra 70M		DFPW Normal	RTE_N_SPB	
2014-098T21:00:00	**2014-098T23:15:**	Madrid 70M*		DFPW Normal	RTE_N_SPB	Dual playback for VIMS occ and INMS, -01:22 to +00:09

Deadband: (0.5,2,0.5) for VIMS Dual Playback: -01:22 to +00:09

T100 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_203EA_C70METNON098_PRIME	098 12:00	098 21:00	0	3134	183	3317	3322	5	0	199	53	3569	3688	118	118	3%	0
SP_203EA_M34BWGNON098_PRIME	098 21:00	098 23:15	0	0	0	0	3322	3322	0	482	13	496	143	-353	0	0%	353

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	096 19:45	098 12:00	0.0	75.9	500.5	24.6	793.0	114.3	132.5	0.0	902.2	132.5	430.0	0.0	181.3	3286.8
SP_203EA_C70METNON098_PRIME	098 12:00	098 21:00	0.0	17.0	86.4	3.2	0.0	16.0	27.5	0.0	42.2	4.9	0.0	0.0	0.0	197.3
SP_203EA_M34BWGNON098_PRIME	098 21:00	098 23:15	0.0	4.2	18.0	0.8	0.0	4.0	6.9	0.0	10.5	1.2	0.0	0.0	432.2	477.9
DAILY TOTAL SCIENCE	096 19:45	098 23:15	0.0	97.1	604.9	28.6	793.0	134.3	166.9	0.0	955.0	138.6	430.0	0.0	613.5	

	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	97.1	604.9	28.6	793.0	134.3	166.9	0.0	955.0	138.6	430.0	0.0

TOST is handing over 353 Mb to the following Saturn segment. S. Brooks has approved the data volume hand over.

Request	Riders	Start (SCET)	Start (Epoch)	Duration	End (SCET)	Primary	Secondary	Comments
Sequence S83, length = 72 days		2014-072T21:12:00		071T12:49:00	2014-144T10:01:00			
Titan Flyby T100 Segment		2014-096T19:45:00		002T03:30:00	2014-098T23:15:00			
SP_203TI_WAYPTTURN096_PRIME		2014-096T19:45:00		000T00:12:00	2014-096T19:57:00	NEG_Z to Earth	NEG_X to Sun	
SP_203TI_WAYPTTURN196_PRIME		2014-096T19:57:00		000T00:30:00	2014-096T20:27:00	NEG_Y to Titan	NEG_X to Sun	
NEW WAYPOINT		**2014-096T20:27:00**		**001T15:33:00**	**2014-098T12:00:00**	**NEG_Y to Titan**	**NEG_X to Sun**	
SP_203NA_DEADTIME096_PRIME		**2014-096T20:27:00**		**000T00:12:59**	**2014-096T20:39:59**	**NEG_Y to Titan**	**NEG_X to Sun**	
CIRS_203TI_MIDIRTMAP001_PRIME	I, V	2014-096T20:39:59	GMB_E203_TITAN_T100-000T17:01:15	000T03:01:15	2014-096T23:41:14	CIRS_FPB to Titan	PIC	Collaborative Rider(s): ISS. Template A2: CIRS-ISS. Time (30 mins) for ISS dwells at start and end.
ISS_203TI_MONITORNA001_PRIME	C, V	2014-096T23:41:14	GMB_E203_TITAN_T100-000T14:00:00	000T02:00:00	2014-097T01:41:14	ISS_NAC to Titan	NEG_X to Sun	No Preference to secondary pointing
CIRS_203TI_FIRNADCMP001_PRIME	I, U, V	2014-097T01:41:14	GMB_E203_TITAN_T100-000T12:00:00	000T03:00:00	2014-097T04:41:14	CIRS_FP1 to Titan	PIC	
VIMS_203TI_MEDRES001_PRIME	C, I	2014-097T04:41:14	GMB_E203_TITAN_T100-000T09:00:00	000T04:00:00	2014-097T08:41:14	VIMS_IR to Titan	NEG_X to Titan_SC_RAM	
VIMS_203TI_REGMAP001_PRIME	C, I	2014-097T08:41:14	GMB_E203_TITAN_T100-000T05:00:00	000T02:45:00	2014-097T11:26:14	VIMS_IR to Titan	NEG_X to Titan_SC_RAM	
CIRS_203TI_FIRLMBWTR001_PRIME	I, M, V	2014-097T11:26:14	GMB_E203_TITAN_T100-000T02:15:00	000T00:53:00	2014-097T12:19:14	CIRS_FP1 to Titan	PIC	
Begin Dual Playback Science		2014-097T12:19:14	GMB_E203_TITAN_T100-000T01:22:00	000T00:00:01	2014-097T12:19:15			
Begin Custom Period		**2014-097T12:19:14**	**GMB_E203_TITAN_T100-000T01:22:00**	**000T00:00:01**	**2014-097T12:19:15**			
VIMS_203TI_ALPSCOOCC001_PRIME	C, I, M	2014-097T12:19:14	GMB_E203_TITAN_T100-000T01:22:00	000T00:49:00	2014-097T13:08:14	VIMS_IR to 247.352/-26.432	PIC	Pick up at NEG_Y to Titan, NEG_X to Sun; Hand off at VIMS_IR to 247.352/-26.432, NEG_X to Titan_SC_RAM.
ENGR_203SC_ORSRCS097_PRIME	M	2014-097T13:08:14	GMB_E203_TITAN_T100-000T00:33:00	000T00:01:00	2014-097T13:09:14	VIMS_IR to 247.352/-26.432	NEG_X to Titan_SC_RAM	Pick up at VIMS_IR to 247.352/-26.432, NEG_X to Titan_SC_RAM; Hand off at VIMS_IR to 247.352/-26.432, NEG_X to Titan_SC_RAM. deadband =(0.5,2,0.5)
VIMS_203TI_REGMAP002_PRIME	C, I, M	2014-097T13:09:14	GMB_E203_TITAN_T100-000T00:32:00	000T00:20:00	2014-097T13:29:14	VIMS_IR to Titan	NEG_X to Titan_SC_RAM	Pick up at VIMS_IR to 247.352/-26.432, NEG_X to Titan_SC_RAM; Hand off at NEG_X to Titan_SC_RAM, CIRS_FP1 to Titan.
INMS_203TI_TITAN100001_PRIME	C, M	2014-097T13:29:14	GMB_E203_TITAN_T100-000T00:12:00	000T00:21:00	2014-097T13:50:14	NEG_X to Titan_SC_RAM	CIRS_FP1 to Titan	Pick up at NEG_X to Titan_SC_RAM, CIRS_FP1 to Titan; Hand off at CIRS_FP1 to Titan, NEG_Z to Earth.
203TI (t) T100 TITAN Inboun...		2014-097T13:41:14		000T00:00:01	2014-097T13:41:15			
End Dual Playback Science		2014-097T13:50:14	GMB_E203_TITAN_T100+000T00:09:00	000T00:00:01	2014-097T13:50:15			
CIRS_203TI_FIRLMBAER002_PRIME	M, V	2014-097T13:50:14	GMB_E203_TITAN_T100+000T00:09:00	000T01:06:00	2014-097T14:56:14	CIRS_FP1 to Titan	PIC	Pick up at CIRS_FP1 to Titan, NEG_Z to Earth; Hand off at CIRS_FP1 to Titan, PIC. Pickup at CIRS_FP1 to Titan center; NEG_Z to Earth. Handoff at CIRS_FP1 to Titan Lat_View, 40S, 90 degree view angle, RHS, altitude 0 km; NEG_Z to Titan, FOV_Limb, 40S, RHS.
ENGR_203SC_DFPWBIAS097_PPS	C, I, M, \	2014-097T14:56:14	GMB_E203_TITAN_T100+000T01:15:00	000T00:21:05	2014-097T15:17:19	CIRS_FP1 to Titan	PIC	Pick up at CIRS_FP1 to Titan, PIC; Hand off at CIRS_FP1 to Titan, PIC. Deadband=(2,2,20)
CIRS_203TI_FIRLMBINT002_PRIME	I, M, V	2014-097T15:18:14	GMB_E203_TITAN_T100+000T01:37:00	000T00:38:00	2014-097T15:56:14	CIRS_FP1 to Titan	PIC	Pick up at CIRS_FP1 to Titan, PIC; Hand off at NEG_Y to Titan, NEG_X to Sun. Pickup at CIRS_FP1 to Titan, Lat_View, 40S, 90 degree view angle, RHS, altitude 0 km; NEG_Z to Titan, FOV_Limb, 40S, RHS. Handoff at NEG_Y to Titan, POS_X to NEP.
End Custom Period		**2014-097T15:56:14**	**GMB_E203_TITAN_T100+000T02:15:00**	**000T00:00:01**	**2014-097T15:56:15**			

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Request	Riders	Start (SCET)	Start (Epoch)	Duration	End (SCET)	Primary	Secondary	Comments
Sequence S83, length = 72 days		2014-072T21:12:00		071T12:49:00	2014-144T10:01:00			
Titan Flyby T100 Segment		2014-096T19:45:00		002T03:30:00	2014-098T23:15:00			
UVIS_203TI_EUVFUV001_PRIME	C, I, V	2014-097T15:56:14	GMB_E203_TITAN_T100+000T02:15:00	000T06:45:00	2014-097T22:41:14	UVIS_FUV to	NEG_Z to Earth	
CIRS_203TI_FIRNADCMP002_PRIME	I, U, V	2014-097T22:41:14	GMB_E203_TITAN_T100+000T09:00:00	000T04:00:00	2014-098T02:41:14	CIRS_FP1 to Titan	PIC	
CIRS_203TI_MIDIRTMAP002_PRIME	I, V	2014-098T02:41:14	GMB_E203_TITAN_T100+000T13:00:00	000T08:23:45	2014-098T11:04:59	CIRS_FPB to Titan	PIC	Collaborative Rider(s): ISS. Template A2: CIRS-ISS. Time (30 mins) for ISS dwells at start and end.
SP_203NA_DEADTIME098_PRIME		**2014-098T11:04:59**	**GMB_E203_TITAN_T100+000T21:23:45**	**000T00:15:00**	**2014-098T11:19:59**	**NEG_Y to Titan**	**NEG_X to Sun**	
SP_203EA_DLTURN098_PRIME		2014-098T11:20:00		000T00:40:00	2014-098T12:00:00	XBAND to Earth	NEG_Y to 302.0/50.0	
NEW WAYPOINT		**2014-098T12:00:00**		**000T11:15:00**	**2014-098T23:15:00**	**XBAND to Earth**	**NEG_Y to 302.0/50.0**	
SP_203EA_C70METNON098_PRIME	C	2014-098T12:00:00		000T09:00:00	2014-098T21:00:00	XBAND to Earth	Rolling/SRU	MIMI. NEG_Y to Saturn (0,0,-9.5). SID suspend
Pointer Reset in preparatio...		2014-098T21:00:00		000T00:00:01	2014-098T21:00:01			
SP_203EA_M34BWGNON098_PRIME	C	2014-098T21:00:00		000T02:15:00	2014-098T23:15:00	XBAND to Earth	Rolling/SRU	CAPS. POS_X to NSP. SID suspend

Science Highlights

DOY 096 – Inbound:

ISS will acquire a mosaic of northern latitudes on Titan's leading hemisphere, approaching northern summer (multiple observations of northern latitudes may be needed in case of cloud cover obscuring the surface). ISS will ride along with CIRS on approach to track clouds at high northern latitudes, as well as with VIMS', UVIS', and CIRS' observations to image Titan's surface and atmosphere.

DOY 097 - T100 is another high inclination flyby in the noon sector of Saturn's magnetosphere, very similar to T99 but at lower altitude (963 km). With closest approach marginally in the dayside, Cassini will be able to study the draping and the diffusion of the external magnetic field within the ionosphere and over the flank facing away from Saturn. A comparison with flybys at similar local times (T83-T99) will be very useful.
VIMS will conduct global and regional mapping of Titan at medium resolution and will observe ingress occultation of AlpSco by Titan.
At C/A, INMS is the prime instrument. T100 is local noon (Cassini relative to Titan) in the mid Southern latitudes. It is also in the noon local time for Titan relative to Saturn and in the outer flank of the magnetosphere. This is a key observation for the magnetospheric interaction region and understanding solar input effects on Titan ion and neutral atmospheres
Outbound:
For CIRS, the highlight is the vertical mapping near 43S in the far-infrared: the most southerly latitude reached with far-IR limb sounding during the inclined central part of the CSM.

Science Highlights

DOY 97 cont:

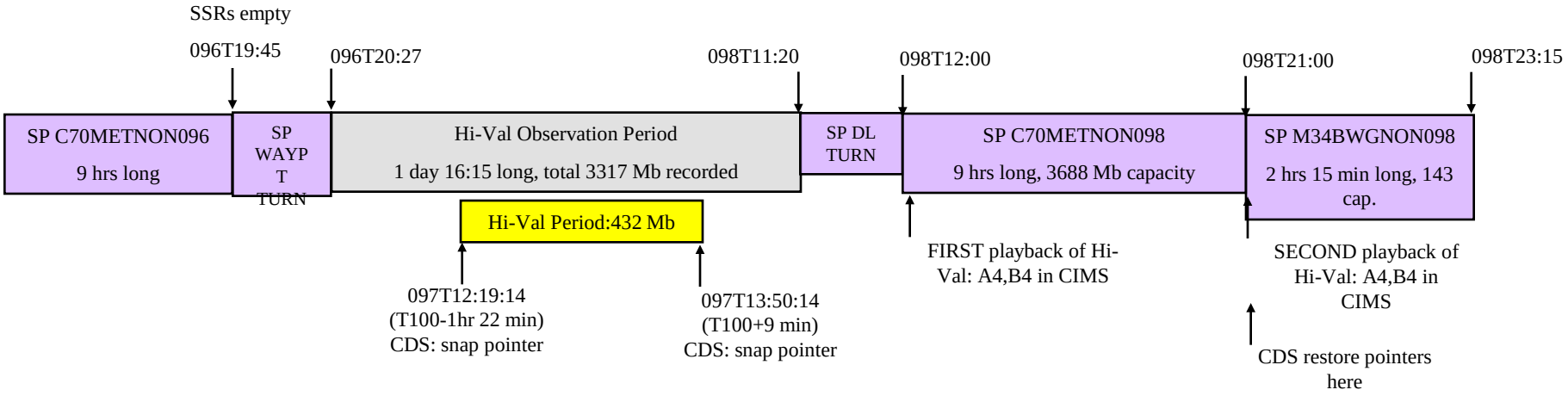
Analysis of the UVIS EUVFUV observations has led to the team to adopt a new strategy to achieve higher signal/noise ratio and higher vertical resolution at the limb to measure nitrogen emission features. In the original strategy UVIS maps the entire disk of Titan, from exobase to exobase, over a 7-hour period 2 to 9 hours from closest approach (Template X). In the new strategy some of that time will be devoted to a stare with the slit in the radial direction, centered on the emission altitude (about 800 km) of the nitrogen features. The remaining time will be devoted to the spectral image as described above. The generic mapping employed to date is still the best for measurements of aerosol scattering and gaseous absorption features. This is one of many such observations gathered over the course of the mission to provide latitude and seasonal coverage of Titan's middle atmosphere and stratosphere.

DOY 98: CIRS will obtain information on the thermal structure of Titan's stratosphere. ISS will ride along with CIRS to image Titan. Playback of T100 data will occur over the Canberra 70M antenna. The dual playback of the VIMS occultation and the INMS c/a data will occur over a Madrid 34M.

T100 Dual Playback

Flyby	BEGHIVAL	ENDHIVAL	P4 Dual Playback Data Volume	SSR empty before hi-val observation period? (if not verify any carryover on A fits with Hi-Val data)	SSR-A empty after first playback?	PPL set to A4,B4 for first AND second playbacks?	SSRs empty after second playback? (if not does any Hi-Val data carry over?)
T100	T100-1hr 22 min	T100+9 min	432 Mb	Yes	Yes	Yes	No, carryover.

Playbacks contiguous:



Reminder - ALL instruments' data is played back twice during P4 dual playback periods

Notes

- Pointing:
  - NO VALID WAYPOINT 13:45 to 14:50 during custom period.
  - CIRS heating of 10.6K and VIMS heating of 3.9K during INMS observation at C/A. CIRS and VIMS approved the heating during TOST integration.
  - Waypoint secondary is neg_x to sun which TOST notes is “bad for RBOT”. I talked to Dave Bates from AACS and he doesn’t feel that this secondary is “bad” for RBOT so he said it’s ok to use.
- Data Volume:
  - carryover agreements: Handing over 353 Mb to SATURN segment. S. Brooks approved.
  - Warning: SP_203NA_M34BWGNON098_SP seems to be a handover pass and should overlap previous DSN pass by 15 min. Overlap is as big as it can be due to view period issues.
- Resource checker:
  - PIC as a secondary is ok and has been used on many Titan flybys.
- Opmodes:
  - None.
- Hydrazine:
  - AACS KPT run: 330g, TOST predict: 518g MP: 456g,
- Special Activities:
  - None

Liens

Sequence Liens (should all be SPLAT items):

- List any Liens to be worked in SIP, ie
  - T100 dual playback. The dual playback is for the VIMS occultation and the INMS c/a data.