



**CASSINI TOST SEGMENT
T101
Rev 204 Handoff Package**

Segment Boundary 2014-136T17:01:00 – 2014-139T16:46:00

17 Sept 2013

J. Pitesky

SMT report and SPASS

Science Highlights

Notes & Liens

This document has been reviewed and determined not to contain export controlled technical data

SMT report

TOST rev 204

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)	NET_MARGN (%)	CAROVN (Mb)
SP_204EA_C70METSEQ138_PRIME	138 09:01	138 18:01	0	3103	210	3313	3322	9	0	196	53	3562	3734	171	172	3%	0
SP_204EA_M34BWGNON138_PRIME	138 18:01	138 22:01	0	0	0	0	3322	3322	0	369	24	392	296	-97	0	0%	96
SP_204EA_C34BWGSEQ139_PRIME	139 07:46	139 16:46	96	535	41	672	3322	2650	0	199	53	924	919	-5	0	0%	5

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	136 17:01	138 09:01	0.0	75.5	411.4	24.5	426.0	85.4	131.8	0.0	1171.2	545.1	204.0	0.0	208.6	3283.3
SP_204EA_C70METSEQ138_PRIME	138 09:01	138 18:01	0.0	17.0	83.7	3.2	0.0	16.0	27.5	0.0	42.4	4.3	0.0	0.0	0.0	194.2
SP_204EA_M34BWGNON138_PRIME	138 18:01	138 22:01	0.0	7.5	0.0	1.4	0.0	7.1	12.2	0.0	18.9	0.0	0.0	0.0	318.0	365.2
DAILY TOTAL SCIENCE	136 17:01	138 22:01	0.0	100.0	495.1	29.1	426.0	108.5	171.5	0.0	1232.5	549.4	204.0	0.0	526.6	
OBSERVATION_NOR	138 22:01	139 07:46	0.0	18.4	99.6	3.5	300.0	17.3	29.8	0.0	46.0	0.0	15.0	0.0	40.7	570.4
SP_204EA_C34BWGSEQ139_PRIME	139 07:46	139 16:46	0.0	17.0	86.4	3.2	0.0	16.0	27.5	0.0	42.4	4.9	0.0	0.0	0.0	197.5
DAILY TOTAL SCIENCE	138 22:01	139 16:46	0.0	35.4	186.0	6.7	300.0	33.3	57.4	0.0	88.4	4.9	15.0	0.0	40.7	

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) 0.0 135.3 681.1 35.9 726.0 141.8 228.9 0.0 1320.9 554.3 219.0 0.0

SPASS

TOST rev 204

Request	Riders	Start (SCET)	Start (Epoch)	Duration	End (SCET)	Primary	Secondary	Comments
Sequence S83, length = 72 days		2014-072721:12:00		071T12:49:00	2014-144T10:01:00			
Titan Flyby T101 Segment		2014-136T17:01:00		002T23:45:00	2014-139T16:46:00			
SP_204TI_WAYPTTURN136_PRIME		2014-136T17:01:00		000T00:40:00	2014-136T17:41:00	NEG_Y to Titan	NEG_X to NTP	
NEW WAYPOINT		2014-136T17:41:00		000T05:31:15	2014-136T23:12:15	NEG_Y to Titan	NEG_X to NTP	
SP_204TI_DEADTIME136_PRIME		2014-136T17:41:00		000T00:14:59	2014-136T17:55:59	NEG_Y to Titan	NEG_X to NTP	
CIRS_204TI_MIDIRTMAP001_PRIME	I, V	2014-136T17:55:59	GMB_E204_TITAN_T101-000T0003:46:16	2014-136T21:42:15	2014-136T21:42:15	CIRS_FPB to Titan	PIC	Collaborative Rider(s): ISS. Template A
ISS_204TI_MONITORNA001_PRIME	C, V	2014-136T21:42:15	GMB_E204_TITAN_T101-000T0000:50:00	2014-136T22:32:15	2014-136T22:32:15	ISS_NAC to Titan	NEG_X to NTP	No Preference to secondary pointing
SP_204EA_WAYPTTURN436_PRIME	C	2014-136T22:32:15	GMB_E204_TITAN_T101-000T0000:40:00	2014-136T23:12:15	2014-136T23:12:15	UVIS_FUV to 206.885/49.313 (0.08 POS_Z to NEP		
NEW WAYPOINT		2014-136T23:12:15		000T12:55:00	2014-137T12:07:15	UVIS_FUV to 206.885/49.313 (0.08 POS_Z to NEP		
Begin Dual Playback Science		2014-136T23:12:15	GMB_E204_TITAN_T101-000T0000:00:01	2014-136T23:12:16	2014-136T23:12:16			
UVIS_204ST_ETAUATI001_PRIME	C, I, V	2014-136T23:12:15	GMB_E204_TITAN_T101-000T0003:00:00	2014-137T02:12:15	2014-137T02:12:15	UVIS_FUV to 206.885/49.313 (0.08 POS_Z to NEP		
End Dual Playback Science		2014-137T02:12:15	GMB_E204_TITAN_T101-000T0000:00:01	2014-137T02:12:16	2014-137T02:12:16			
UVIS_204TI_EUVFUV001_PRIME	C, I, V	2014-137T02:12:15	GMB_E204_TITAN_T101-000T0005:15:00	2014-137T07:27:15	2014-137T07:27:15	UVIS_FUV to Titan	NEG_Z to Earth	
UVIS_204ST_ETAUATI002_PRIME	C, I, V	2014-137T07:27:15	GMB_E204_TITAN_T101-000T0004:29:00	2014-137T11:56:15	2014-137T11:56:15	UVIS_FUV to 206.885/49.313 (0.08 POS_Z to NEP		
ENGR_204SC_ORSRCS137_PRIME		2014-137T11:56:15	GMB_E204_TITAN_T101-000T0000:01:00	2014-137T11:57:15	2014-137T11:57:15	UVIS_FUV to 206.885/49.313 (0.08 POS_Z to NEP		deadband=(0.5,0.5,2)
SP_204TI_WAYPTTURN137_PRIME	C	2014-137T11:57:15	GMB_E204_TITAN_T101-000T0000:10:00	2014-137T12:07:15	2014-137T12:07:15	XBAND to Earth	NEG_Y to NSP	on thrusters.
NEW WAYPOINT		2014-137T12:07:15		000T06:28:00	2014-137T18:35:15	XBAND to Earth	NEG_Y to NSP	
RSS_204TI_BISTATIN001_PRIME	M	2014-137T14:02:15	LUB_E204_TITAN_T101-000T0001:58:00	2014-137T16:00:15	2014-137T16:00:15	XBAND to Titan	NEG_Y to NSP	
RSS_204TI_OCC001_PRIME	M	2014-137T16:00:15	LUB_E204_TITAN_T101-000T0000:37:00	2014-137T16:37:15	2014-137T16:37:15	XBAND to Earth	NEG_Y to NSP	
204TI (t) T101 TITAN Outbou...		2014-137T16:12:15		000T00:00:01	2014-137T16:12:16			
RSS_204TI_BISTATOUT002_PRIME	M, V	2014-137T16:37:15	LUB_E204_TITAN_T101+000T0001:45:00	2014-137T18:22:15	2014-137T18:22:15	XBAND to Titan	NEG_Y to NSP	
SP_204TI_WAYPTTURN437_PRIME	C, V	2014-137T18:22:15	GMB_E204_TITAN_T101+000T0000:13:00	2014-137T18:35:15	2014-137T18:35:15	NEG_Y to Titan	NEG_Z to Earth	on thrusters.
NEW WAYPOINT		2014-137T18:35:15		000T14:25:45	2014-138T09:01:00	NEG_Y to Titan	NEG_Z to Earth	
ENGR_204SC_DFPWBIAS137_PPS	V	2014-137T18:35:15	GMB_E204_TITAN_T101+000T0000:21:07	2014-137T18:56:22	2014-137T18:56:22	NEG_Y to Titan	NEG_Z to Earth	Deadband: (2,2,2).
CIRS_204TI_FIRNADMAP002_PRIME	I, V	2014-137T18:57:15	GMB_E204_TITAN_T101+000T0002:15:00	2014-137T21:12:15	2014-137T21:12:15	CIRS_FP1 to Titan	PIC	Collaborative Rider(s): VIMS
CIRS_204TI_MIRLMBINT002_PRIME	I, V	2014-137T21:12:15	GMB_E204_TITAN_T101+000T0004:00:00	2014-138T01:12:15	2014-138T01:12:15	CIRS_FPB to Titan	PIC	
CIRS_204TI_FIRNADCMP002_PRIME	I, U, V	2014-138T01:12:15	GMB_E204_TITAN_T101+000T0004:00:00	2014-138T05:12:15	2014-138T05:12:15	CIRS_FP1 to Titan	PIC	
CIRS_204TI_MIDIRTMAP002_PRIME	I, V	2014-138T05:12:15	GMB_E204_TITAN_T101+000T0002:53:44	2014-138T08:05:59	2014-138T08:05:59	CIRS_FPB to Titan	PIC	Collaborative Rider(s): ISS. Template M4
SP_204TI_DEADTIME138_PRIME		2014-138T08:06:00	GMB_E204_TITAN_T101+000T0000:15:00	2014-138T08:21:00	2014-138T08:21:00	NEG_Y to Titan	NEG_Z to Earth	
SP_204EA_DLTURN138_PRIME	C	2014-138T08:21:00		000T00:40:00	2014-138T09:01:00	XBAND to Earth	NEG_Y to 296.0/39.0	
NEW WAYPOINT		2014-138T09:01:00		000T13:40:00	2014-138T22:41:00	XBAND to Earth	NEG_Y to 296.0/39.0	
SP_204EA_C70METSEQ138_PRIME	C	2014-138T09:01:00		000T09:00:00	2014-138T18:01:00	XBAND to Earth	NEG_Y to 296.0/39.0	MIMI. NEG_Y to Saturn (0,0,-9.5).
Pointer Reset in preparatio...		2014-138T18:01:00		000T00:00:01	2014-138T18:01:01			
SP_204EA_M34BWGNON138_PRIME		2014-138T18:01:00		000T04:00:00	2014-138T22:01:00	XBAND to Earth	NEG_Y to 296.0/39.0	
SP_204TI_WAYPTTURN138_PRIME		2014-138T22:01:00		000T00:40:00	2014-138T22:41:00	NEG_Y to Titan	NEG_Z to 347.0/32.0	
NEW WAYPOINT		2014-138T22:41:00		000T07:35:00	2014-139T06:16:00	NEG_Y to Titan	NEG_Z to 347.0/32.0	
ISS_204TI_CLOUD001_PRIME	C, V	2014-138T22:41:00		000T03:00:00	2014-139T01:41:00	ISS_NAC to Titan	NEG_X to Sun	
ISS_204TI_CLOUD002_PRIME	C, V	2014-139T01:41:00		000T02:55:00	2014-139T04:36:00	ISS_NAC to Titan	NEG_X to Sun	
ISS_204TI_CLOUD003_PRIME	C, V	2014-139T04:36:00		000T01:00:00	2014-139T05:36:00	ISS_NAC to Titan	NEG_X to Sun	
SP_204EA_DLTURN139_PRIME		2014-139T05:36:00		000T00:40:00	2014-139T06:16:00	XBAND to Earth (0,0,0,0,-9.5 deg. o	NEG_Y to Saturn	
NEW WAYPOINT		2014-139T06:16:00		000T10:30:00	2014-139T16:46:00	XBAND to Earth (0,0,0,0,-9.5 deg. o	NEG_Y to Saturn	
SP_204EA_YGAP139_PRIME	E	2014-139T06:16:00		000T01:30:00	2014-139T07:46:00	XBAND to Earth (0,0,0,0,-9.5 deg. o	NEG_Y to Saturn	
SP_204EA_C34BWGSEQ139_PRIME	C	2014-139T07:46:00		000T09:00:00	2014-139T16:46:00	XBAND to Earth (0,0,0,0,-9.5 deg. o	Rolling	MIMI. NEG_Y to Saturn (0,0,-9.5).

Science Highlights (1 of 3)

TOST rev 204

DOY 136: CIRS continues monitoring of surface and atmospheric temperatures. 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. UVIS begins its stellar occultation of Eta Ursa Majoris, with an ingress latitude between 46.4° to 28.1° . The stellar occultations are special, relative to all other UVIS observations, because they provide a high-resolution vertical profiles of hydrocarbons, haze, and temperature (and nitrogen when the EUV channel is used). The information from one occultation is equivalent to the information coming from an INMS sample of the upper atmosphere, except that the FUV stellar occultation probes to pressures in the range 200-1600 km whereas the INMS does not go below the minimum trajectory altitude, around 950 km.

Science Highlights (2 of 3)

TOST rev 204

DOY 137: UVIS continues its stellar occultation of Eta Ursa Majoris. Ingress latitude between 46.4° to 28.1° , egress latitude between 42.7° to 46.6° . The stellar occultations are special, relative to all other UVIS observations, because they provide a high-resolution vertical profiles of hydrocarbons, haze, and temperature (and nitrogen when the EUV channel is used). The information from one occultation is equivalent to the information coming from an INMS sample of the upper atmosphere, except that the FUV stellar occultation probes to pressures in the range 200-1600 km whereas the INMS does not go below the minimum trajectory altitude, around 950 km. Nearing closest approach, RSS begins its Titan bistatic and occultation observations. The occultation will 1) determine seasonal changes in the high latitude atmosphere, specifically the temperature structure and formation and breakup of the winter polar vortex; 2) determine tropospheric winds from radio occultation measurements of tropospheric temperature profiles; and 3) determine the atmospheric and ionospheric structure at all levels. The bistatic observation is the first of two northern lake-crossing bistatic scattering observations implemented in association with RSS Titan occultations on relatively distant flybys. The T101 outbound bistatic ground track is the only Solstice Mission track that crosses Ligeia Mare, covering roughly the 75N to 78N latitude region between 225W and 300W longitude. It terminates within the northern tip of Kraken Mare. It captures scattering angles decreasing from about 80 to 60 degrees, partly within the Brewster angle range. The associated inbound bistatic covers the region (20S, 15W) to (40S, 25W) and covers incidence angle increasing from about 40° to 70° , also partly within the Brewster angle range. Measurements of the absolute strength of the echo and its polarization properties, when detectable, yield important information about the surface status (liquid/solid), surface reflectivity, surface dielectric constant and implied composition, and surface roughness. The day closes out with CIRS continuing monitoring of surface and atmospheric temperatures, and tracing gas vertical profiles. T101 is a high altitude (2994 km) flyby occurring in the midnight sector of Saturn's magnetosphere on the side facing away from Saturn. Cassini might marginally explore Titan's induced magnetosphere and its behavior in a highly variable magnetic environment.

Science Highlights (3 of 3)

TOST rev 204

DOY 138: CIRS continues monitoring of surface and atmospheric temperatures, and trace gas vertical profiles. ISS will ride along with CIRS on approach to track clouds at high northern latitudes, as well as with VIMS', UVIS', and CIRS' observations, inbound and outbound, to image Titan's surface and atmosphere.

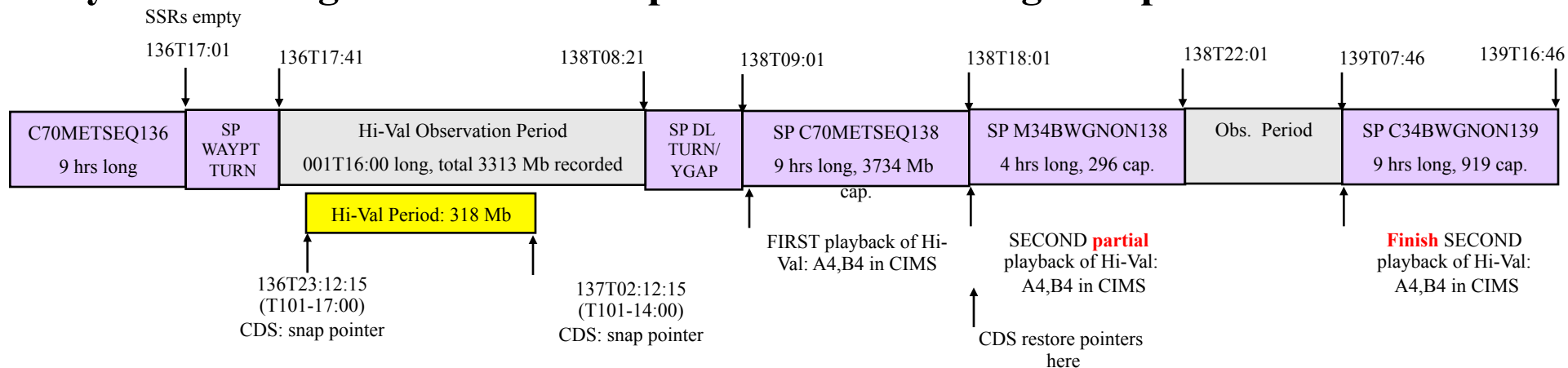
DOY 139: ISS conducts its ongoing Titan Monitoring Campaign observations.

Dual Playback (UVIS—ORS)

TOST rev 204

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?)
T101	T101-17:00	T101 – 14:00	333 Mb	Yes	NO	Yes; for all three passes	No; no hi-val data carryover

Playbacks contiguous but second p/b over 2 non-contiguous passes:



NOTE: Dual PB is NOT at closest approach. In addition to the P4 dual PB, SCO/AACS asked for P6 playback

Notes

TOST rev 204

- Pointing:
 - No issues
 - 01:55 gap in SPASS due to RSS warmup
- Data Volume:
 - TOST expects 5 Mb carryover to disappear with data compression. TOST accepts possible risk of losing this data.
 - SMT warnings about priority list are due to dual playback priority listing for all three DSN DL passes
 - See DSN item about short overlap, below
- DSN:
 - Level 3 requests: C70 and C34BWG passes on DOY 137 in support of RSS bistat
 - C70 D/L pass on DOY 138 moved 01:15 later to accommodate integration changes. M34BWG pass on DOY 138 added for dual P/B.
 - Short overlap between C70/M34 stations on DOY 138; treated as two separate downlink blocks (5 minute playback delay on M34 downlink)
- Resource checker:
 - RSS activities referenced to LUB inside of GMB
- Opmodes:
 - No issues
- Hydrazine:
 - KPT Estimate: 391g (per R.Lim analysis)
 - FSDS Estimate: 408g
 - Deadband (per RSS): (0.5, 0.5, 2.0)
 - Steps for walking deadband = 3
- Special Activities:
 - CMT management needed during RSS bistat (NEG_X to Sun drops to 73 degrees)

Liens

TOST rev 204

Sequence Liens (should all be SPLAT items):

- List any Liens to be worked in SIP
 - Dual PB for UVIS