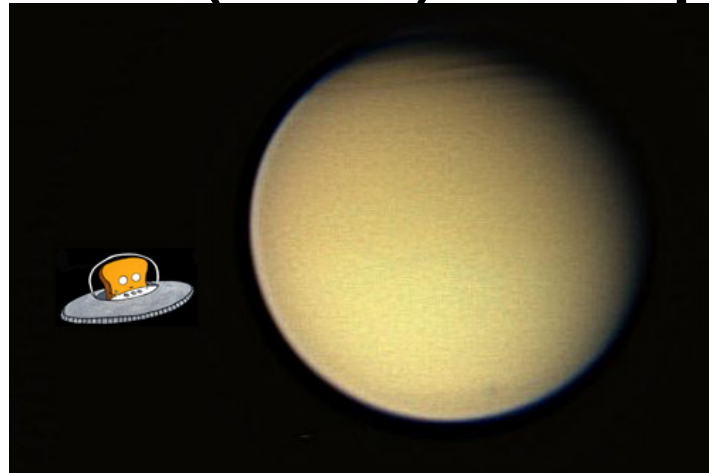


# TOST: Integration 116TI (T60) Wrapup



October 31, 2008

Jo Pitesky, Nora Kelly, Trina Ray, Kim Steadman,

# Segment Basics

Segment times:

BEG: 2009-221T01:05:00

END: 2009-222T02:05:00

Altitude: 970 km

Time of C/A: 2009-221T14:03:53

Epoch: GMB\_E116\_Titan60

Sequence: S52

<p>At least 2 weeks prior to the Kickoff Meeting make sure that all requests are in CIMS</p>	<p><b>Kickoff Meeting</b></p> <p><b><u>Present</u></b>  Master Timeline  Draft Op Modes  Draft Telem Modes  Draft RCS Deadband</p> <p><b><u>Discuss</u></b>  Timeline  Op Modes  Telem Modes  Deadbands for RCS</p> <p><b><u>Homework</u></b>  Custom Handoff Attitudes  Unique Op Mode Requirements (SCO)  Turn Assignments  CCRs  High Level Science</p>	<p><b>Detailed Meeting</b></p> <p><b><u>Present</u></b>  Master Timeline  SMT Report  Timeline Graphic  TOL  SPASS  DSN Reports  Dual Playback Science  Draft Data Volume Cuts</p> <p><b><u>Discuss</u></b>  Data Volume Cuts</p> <p><b><u>Homework</u></b>  CCRs  High Level Science Objectives</p>	<p><b>Wrap-up Meeting</b></p> <p><b><u>Present</u></b>  Wrap-up Package Checklist  High Level Science Objectives</p> <p><b><u>Discuss</u></b>  N/A</p> <p><b><u>Homework</u></b>  N/A</p>
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# High-level Science Objectives (1)

RADAR - Inbound radiometry, scatterometry, long altimetry. Long altimetry swath arcs down from Xanadu, crosses Ontario Lacus, and constrains Titan's shape. Altimetry swath runs along T58 SAR, facilitating interpretation and intercomparison (*DOY 221*)

INMS – INMS riding with RADAR on the night side outer flank at high Southern latitude. This is among the highest Southern latitude passes, and will be the first look at the atmosphere over the South pole. (*DOY 221*)

CIRS – Continued monitoring of stratospheric temperature field for seasonal changes. (*DOY 221*)

ISS – ISS will acquire high-resolution, low-phase-angle imaging of western Senkyo. (*DOY 221*)

VIMS – On the inbound, the phase angle is much larger than 90 degrees and VIMS prime observations will provide information on the composition of Titan's atmosphere. After C/A, VIMS will be riding along with ISS and will obtain several cubes at 10 km/pixel resolution in the southern hemisphere over the area mapped during T58. (*DOY 221*)

# High-level Science Objectives (2)

MIMI– Energetic ion and electron energy input to atmosphere--High value (*DOY 221*)

UVIS – UVIS will obtain an image cube of Titan's atmosphere at EUV and FUV wavelengths by sweeping its slit across the disk. These cubes provide spectral and spatial information on nitrogen emissions, H emission and absorption, absorption by simple hydrocarbons, and the scattering properties of haze aerosols. This is one of many such cubes gathered over the course of the mission to provide latitude and seasonal coverage of Titan's middle atmosphere and stratosphere. (*DOY 221*)

RPWS – 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 221*)

MAG – T60 is similar to T59. MAG measurements will provide a description of the draping and the pileup of the external magnetic field around Titan on the nightside hemisphere/terminator. It will be also a good complement to T52, T53, T54, T55, T56, T57, T58 and T59 in order to characterize the background field for a similar local time with respect to Saturn and different SKR longitudes. (*DOY 221*)

# Master Timeline for T60

<b>T60</b>	970
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Start Time	End Time	Prime Activity	Obs. Detail	Op Mode	TLM Mode	Comments
2009-221T01:05:00	2009-221T01:45:00	SP Turn to WP	NEG_Y to Titan, NEG_X to NEP	DFPW Normal		
2009-221T01:45:00	C/A - 12:02:04	OD Uncertainty Dead Time		DFPW Normal		
C/A - 12:02:04	-10:00	CIRS	Template N	DFPW Normal	S_N_ER_3	
-10:00	-09:00	ISS	Template N	DFPW Normal	S_N_ER_3	
-09:00	-05:10	UVIS	Template P	RADWU	S_N_ER_5a for 15 minutes, then S_N_ER_3	
begin custom period						
-05:10	-05:00	Turn to RADAR attitude		RADRWA	S_N_ER_8	
-05:00	-02:00	RADAR	Template L	RADRWA	S_N_ER_8	
-02:00	-01:12	RADAR	Scatterometry/Radiometry	RADRWA	S_N_ER_8	
-01:12	-01:11	RWA to RCS Transition		RADRCs	S_N_ER_8	
-01:11	-00:30	RADAR	Hi-SAR	RADRCs	S_N_ER_8	
-00:30	-00:18	RADAR	Altimetry	RADRCs	S_N_ER_8	
-00:18	0	RADAR	SAR	RADRCs	S_N_ER_8	
2009-221T14:03:53		CLOSEST APPROACH		RADRCs	S_N_ER_8	
0	+00:18	RADAR	SAR	RADRCs	S_N_ER_8	
+00:18	+00:26	RADAR Turn to ISS attitude	From Neg_Y to Titan, Neg_X to NEP	RADRCs	S_N_ER_8	
end custom period						
+00:26	+00:48	RCS to RWA Transition		RADRCs>ORSRCS end by +00:26 ORSRCS>DFPW Normal @ +00:26	S_N_ER_3	ISS Rider.
+00:48	C/A + 02:07:56	ISS		DFPW Normal	S_N_ER_3	
C/A + 02:07:56	2009-221T16:25:00	DEADTIME		DFPW Normal	S_N_ER_3	
2009-221T16:25:00	2009-221T17:05:00	SP Turn to Earth for downlink		DFPW Normal	S_N_ER_3	
2009-221T17:05:00	2009-222T02:05:00	70-m Array		DFPW Normal	RTE_N_SPB	

Deadband: (0.5, 0.5, 2) for RADAR.  
Tighten the walking deadband.

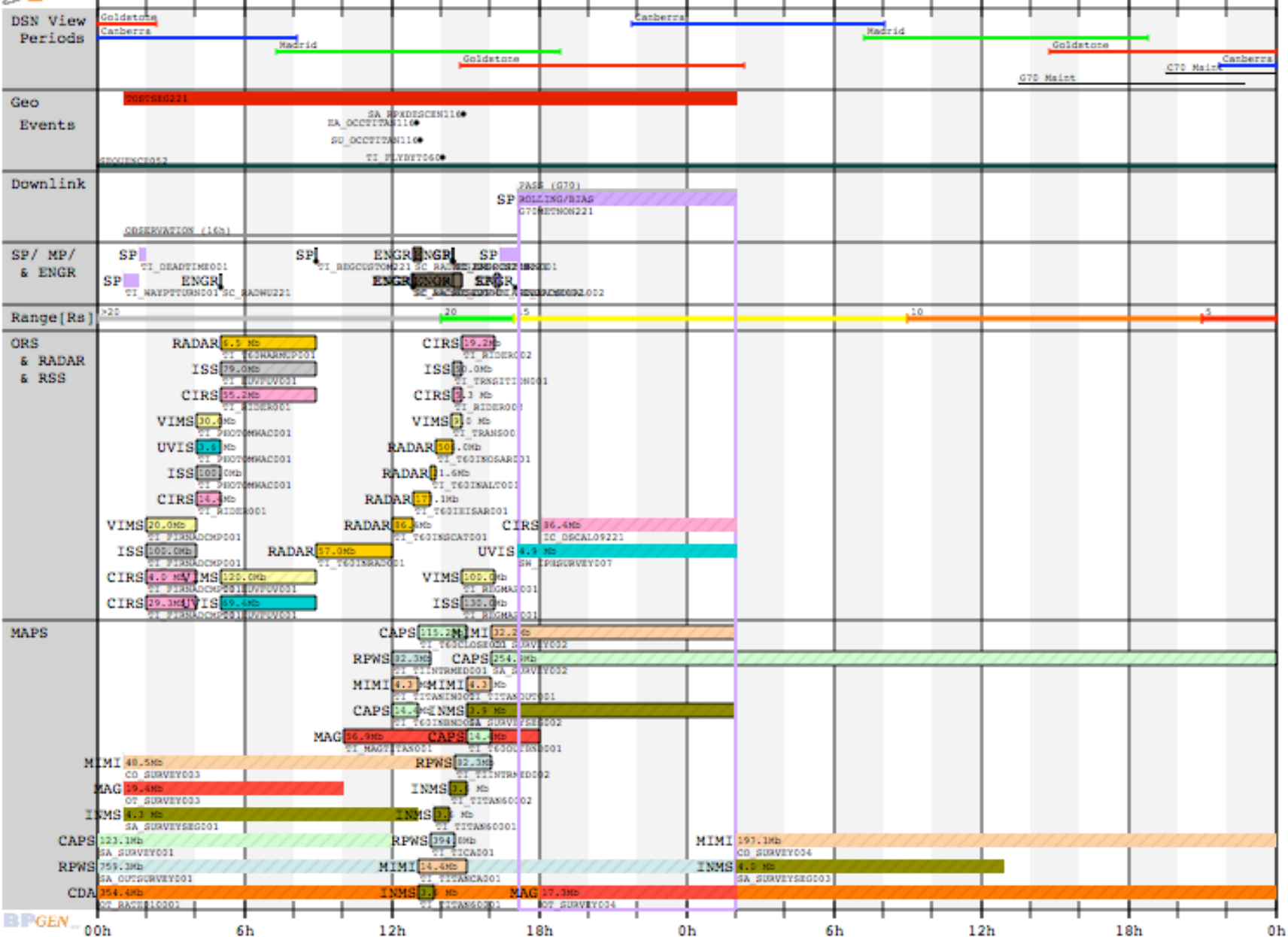


# T60-Wrapup

2009 DOY 221  
00h

DOY 222  
0h

DOY 223  
0h



# T60 Wrap-Up Telemetry Mode Report

## TELEMETRY MODE REPORT

EPOCH RELATIVE	UTC	DURATION	TELEMETRY MODE	REQUEST
	2009-221T01:05:00.000	07:48:53	S_N_ER_3	SP_116NA_G70OBSNON221_NA
GMB_E116_Titan60-000T05:10:00	2009-221T08:53:53.000	05:36:00	S_N_ER_8	SP_116NA_G70OBSNON221_NA
GMB_E116_Titan60+000T00:26:00	2009-221T14:29:53.000	02:35:07	S_N_ER_3	SP_116NA_G70OBSNON221_NA
	2009-221T17:05:00.000	06:45:00	RTE_N_SPB_124425	SP_116EA_G70METNON221_PRIME
	2009-221T23:50:00.000	01:00:00	RTE_N_SPB_110600	SP_116EA_G70METNON221_PRIME
	2009-222T00:50:00.000	00:30:00	RTE_N_SPB_99540	SP_116EA_G70METNON221_PRIME
	2009-222T01:20:00.000	00:30:00	RTE_N_SPB_82950	SP_116EA_G70METNON221_PRIME
	2009-222T01:50:00.000	00:15:00	RTE_N_SPB_66360	SP_116EA_G70METNON221_PRIME



# T60 Wrap-Up SMT Report

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 (Mb)
SP_116EA_G70METNON221_PRIME	221 17:05	222 02:05	0	2824	80	2904	3551	647	0	242	53	3199	3205	6	6	0%	0

# T60 Wrap-Up SMT Report (continued)

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	221 01:05	221 17:05	187.2	30.2	123.4	15.8	459.0	69.3	74.9	848.1	634.8	73.1	278.2	0.0	25.2	2819.1
OBSERVATION_SI	221 01:05	221 17:05	0.0	0.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0
SP_116EA_G70METNON221_PRIME	221 17:05	222 02:05	32.4	17.0	86.4	3.2	0.0	24.3	29.2	0.0	42.4	4.9	0.0	0.0	0.0	239.9
DAILY TOTAL SCIENCE	221 01:05	222 02:05	219.6	47.2	213.8	19.1	459.0	93.6	104.0	848.1	677.2	78.0	278.2	0.0		

	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)	219.6	47.2	213.8	19.1	459.0	93.6	104.0	848.1	677.2	78.0	278.2	0.0

# T60 Wrap-Up DSN Report

CASSINI DOWNLINK/DSN COVERAGE SUMMARY for 116TI\_T60\_080929.apf on 2008-Sep-29 15:44:23  
 (+ = pass overlaps with previous pass; \* = conflicts with DSN maintenance; o = overlaps occultation)

DOWNLINK PASS					DSN PASS						
NAME	START_TO_END SCET	START_TO_END ERT	DUR hh:mm	DATA_RATES kbps	ID	START_TO_END SCET	START_TO_END ERT	DUR hh:mm	CALS min	LABEL	CNFG
G70METNON221	221T17:05-02:05	221T18:30-03:30	09:00	124,110,99,82,66	14	221T17:05-02:05	221T18:30-03:30	09:00	60 /15	TP	N003

# TOL for T60 (1 of 2)

Request	Start Time	Epoch	Duration	End Time	Rate	Data Volume	SPASS Type	Primary Pointin	Secondary Pointing	Pointing Agreement
MP 115NA_SEQUENCE052_NA	2009-204T21:51:00	E115_SEQUENCE_052+000T00:00:00	032T02:13:00	2009-237T00:04:00	0	0	SPASS Note			
CDA 116OT_RATE010001_RIDER	2009-215T15:23:00		007T19:52:59	2009-223T11:15:59	524	354.423	Non-SPASS			
RPWS 116SA_OUTSURVEY001_PRIME	2009-215T15:23:00		006T17:00:00	2009-222T08:23:00	1310	759.283	Non-SPASS			
CAPS 116SA_SURVEY001_PRIME	2009-220T01:52:00		001T10:11:53	2009-221T12:03:53	1000	123.114	Non-SPASS			
INMS 116SA_SURVEYSEG001_INMS	2009-221T01:05:00		000T11:58:53	2009-221T13:03:53	100	4.313	Non-SPASS			
MAG 116OT_SURVEY003_PRIME	2009-221T01:05:00		000T08:58:53	2009-221T10:03:53	600	19.4	Non-SPASS			
MIMI 116CO_SURVEY003_RIDER	2009-221T01:05:00		000T14:58:53	2009-221T16:03:53	900	48.541	Non-SPASS			
SP 116NA_G70OBSNON221_NA	2009-221T01:05:00		000T16:00:00	2009-221T17:05:00	0	0	Non-SPASS			
SP 116NA_TOSTSEG221_NA	2009-221T01:05:00		001T01:00:00	2009-222T02:05:00	0	0	SPASS Note			
SP 116TI_WAYPTTURN001_PRIME	2009-221T01:05:00		000T00:40:00	2009-221T01:45:00	0	0	New Waypoint	NEG_Y to Titan	NEG_X to NEP	
SP 116TI_DEADTIME001_PRIME	2009-221T01:45:00		000T00:16:49	2009-221T02:01:49	0	0	Prime	NEG_Y to Titan	NEG_X to NEP	
CIRS 116TI_FIRNADCMP001_PRIME	2009-221T02:01:49	GMB_E116_Titan60-000T12:02:04	000T02:02:04	2009-221T04:03:53	4000	29.296	Prime	CIRS_FP1 to Titan	PIC	
CIRS 116TI_FIRNADCMP001_SI	2009-221T02:01:49	GMB_E116_Titan60-000T12:02:04	000T02:02:04	2009-221T04:03:53	0	4	SPASS Rider			
ISS 116TI_FIRNADCMP001_CIRS	2009-221T02:01:49	GMB_E116_Titan60-000T12:02:04	000T02:02:04	2009-221T04:03:53	0	100	SPASS Rider			
VIMS 116TI_FIRNADCMP001_CIRS	2009-221T02:01:49	GMB_E116_Titan60-000T12:02:04	000T02:02:04	2009-221T04:03:53	2730.7	20	SPASS Rider			
CIRS 116TI_RIDER001_ISS	2009-221T04:03:53	GMB_E116_Titan60-000T10:00:00	000T01:00:00	2009-221T05:03:53	4000	14.4	SPASS Rider			
ISS 116TI_PHOTOMWAC001_PRIME	2009-221T04:03:53	GMB_E116_Titan60-000T10:00:00	000T01:00:00	2009-221T05:03:53	0	100	Prime	ISS_NAC to Titan	NEG_X to Sun	
UVIS 116TI_PHOTOMWAC001_ISS	2009-221T04:03:53	GMB_E116_Titan60-000T10:00:00	000T01:00:00	2009-221T05:03:53	1006.4	3.623	SPASS Rider			
VIMS 116TI_PHOTOMWAC001_ISS	2009-221T04:03:53	GMB_E116_Titan60-000T10:00:00	000T01:00:00	2009-221T05:03:53	8333.3	30	SPASS Rider			
CIRS 116TI_RIDER001_UVIS	2009-221T05:03:53	GMB_E116_Titan60-000T09:00:00	000T03:50:00	2009-221T08:53:53	4000	55.2	SPASS Rider			
ENGR 116SC_RADWU221_PPS	2009-221T05:03:53	GMB_E116_Titan60-000T09:00:00	000T00:00:07	2009-221T05:04:00	0	0	Non-SPASS			
ISS 116TI_EUVFUV001_UVIS	2009-221T05:03:53	GMB_E116_Titan60-000T09:00:00	000T03:50:00	2009-221T08:53:53	0	79	SPASS Rider			
RADAR 116TI_T60WARMUP001_RIDE	2009-221T05:03:53	GMB_E116_Titan60-000T09:00:00	000T03:50:00	2009-221T08:53:53	474.2	6.545	SPASS Rider			
UVIS 116TI_EUVFUV001_PRIME	2009-221T05:03:53	GMB_E116_Titan60-000T09:00:00	000T03:50:00	2009-221T08:53:53	5032	69.442	Prime	UVIS_FUV to Titan	NEG_X to Sun	
VIMS 116TI_EUVFUV001_UVIS	2009-221T05:03:53	GMB_E116_Titan60-000T09:00:00	000T03:50:00	2009-221T08:53:53	8695.7	120	SPASS Rider			
RADAR 116TI_T60INRAD001_PRIME	2009-221T08:53:53	GMB_E116_Titan60-000T05:10:00	000T03:10:00	2009-221T12:03:53	4997.8	56.974	Prime	NEG_Z to Titan	NEG_X to NTP	X_NTP and +Y_NTP for polarizations.
SP 116TI_BEGCUSTOM221_NA	2009-221T08:53:53	GMB_E116_Titan60-000T05:10:00	000T00:00:01	2009-221T08:53:54	0	0	SPASS Note			
MAG 116TI_MAGTITAN001_PRIME	2009-221T10:03:53	GMB_E116_Titan60-000T04:00:00	000T08:00:00	2009-221T18:03:53	1976	56.909	Non-SPASS			
CAPS 116TI_T60INBND001_PRIME	2009-221T12:03:53	GMB_E116_Titan60-000T02:00:00	000T01:00:00	2009-221T13:03:53	4000	14.4	SPASS Rider			
MIMI 116TI_TITANIN001_RIDER	2009-221T12:03:53	GMB_E116_Titan60-000T02:00:00	000T01:00:00	2009-221T13:03:53	1200	4.32	SPASS Rider			
RADAR 116TI_T60INSCAT001_PRIME	2009-221T12:03:53	GMB_E116_Titan60-000T02:00:00	000T00:48:00	2009-221T12:51:53	30001.2	86.403	Prime	NEG_Z to Titan	POS_Y to NTP	
RPWS 116TI_TIINTRMED001_PRIME	2009-221T12:03:53	GMB_E116_Titan60-000T02:00:00	000T01:30:00	2009-221T13:33:53	15232	82.253	Non-SPASS			
ENGR 116SC_AACSDUAL001_CDS	2009-221T12:48:53	GMB_E116_Titan60-000T01:15:00	000T02:03:00	2009-221T14:51:53	1638	12.088	Non-SPASS			
ENGR 116SC_RADRCS221_PPS	2009-221T12:51:53	GMB_E116_Titan60-000T01:12:00	000T00:20:50	2009-221T13:12:43	0	0	Non-SPASS			
ENGR 116SC_RADRCS221_PRIME	2009-221T12:51:53	GMB_E116_Titan60-000T01:12:00	000T00:01:00	2009-221T12:52:53	0	0	Prime	NEG_Z to Titan	POS_Y to NTP	
RADAR 116TI_T60IHISAR001_PRIME	2009-221T12:52:53	GMB_E116_Titan60-000T01:11:00	000T00:41:00	2009-221T13:33:53	72000.6	177.121	Prime	NEG_Z to Titan	POS_Y to NTP	

# TOL for T60 (2 of 2)

Request	Start Time	Epoch	Duration	End Time	Rate	Data Volume	SPASS Type	Primary Pointing	Secondary Pointing	Pointing Agreement
MP_116EA_OCCTITAN116_NA	2009-221T13:02:04		000T00:00:01	2009-221T13:02:05	0	0	Non-SPASS			
CAPS_116TI_T60CLOSE001_PRIME	2009-221T13:03:53	GMB_E116_Titan60-000T01:00:00	000T02:00:00	2009-221T15:03:53	16000	115.2	SPASS Rider			
INMS_116TI_TITAN60001_INMS	2009-221T13:03:53	GMB_E116_Titan60-000T01:00:00	000T00:40:00	2009-221T13:43:53	1498	3.595	Non-SPASS			
MIMI_116TI_TITANCA001_RIDER	2009-221T13:03:53	GMB_E116_Titan60-000T01:00:00	000T02:00:00	2009-221T15:03:53	2000	14.4	SPASS Rider			
MP_116SU_OCCTITAN116_NA	2009-221T13:09:10		000T00:00:01	2009-221T13:09:11	0	0	Non-SPASS			
RADAR_116TI_T60INALT001_PRIME	2009-221T13:33:53	GMB_E116_Titan60-000T00:30:00	000T00:12:00	2009-221T13:45:53	30001.2	21.601	Prime	NEG_Z to Titan	POS_X to NTP	
RPWS_116TI_TICA001_PRIME	2009-221T13:33:53	GMB_E116_Titan60-000T00:30:00	000T01:00:00	2009-221T14:33:53	109670.4	394.813	Non-SPASS			
INMS_116TI_TITAN60001_RIDER	2009-221T13:43:53	GMB_E116_Titan60-000T00:20:00	000T00:40:00	2009-221T14:23:53	1498	3.595	Non-SPASS			
RADAR_116TI_T60INOSAR001_PRIME	2009-221T13:45:53	GMB_E116_Titan60-000T00:18:00	000T00:44:00	2009-221T14:29:53	191665.9	505.998	Prime	NEG_Z to Titan	NEG_X to Titan_SC_RAM	
MP_116TI_FLYBYT060_NA	2009-221T14:03:53		000T00:00:01	2009-221T14:03:54	0	0	SPASS Note			
INMS_116TI_TITAN60002_INMS	2009-221T14:23:53	GMB_E116_Titan60+000T00:20:00	000T00:40:00	2009-221T15:03:53	1498	3.595	Non-SPASS			
VIMS_116TI_TRANS001_ENGR	2009-221T14:27:53	GMB_E116_Titan60+000T00:24:00	000T00:24:00	2009-221T14:51:53	6250	9	SPASS Rider			
ENGR_116SC_ORSRCS221_PPS	2009-221T14:29:45	GMB_E116_Titan60+000T00:25:52	000T00:00:06	2009-221T14:29:51	0	0	Non-SPASS			
CIRS_116TI_RIDER002_ENGR	2009-221T14:29:53	GMB_E116_Titan60+000T00:26:00	000T00:22:00	2009-221T14:51:53	4000	5.28	SPASS Rider			
ENGR_116SC_DFPWBIAS221_PPS	2009-221T14:29:53	GMB_E116_Titan60+000T00:26:00	000T00:21:05	2009-221T14:50:58	0	0	Prime	NEG_Y to Titan	NEG_X to NEP	
ISS_116TI_TRANSITION001_ENGR	2009-221T14:29:53	GMB_E116_Titan60+000T00:26:00	000T00:22:00	2009-221T14:51:53	0	50	SPASS Rider			
SP_116TI_ENDCUSTOM221_NA	2009-221T14:29:53	GMB_E116_Titan60+000T00:26:00	000T00:00:01	2009-221T14:29:54	0	0	SPASS Note			
RPWS_116TI_TIIINTRMED002_PRIME	2009-221T14:33:53	GMB_E116_Titan60+000T00:30:00	000T01:30:00	2009-221T16:03:53	15232	82.253	Non-SPASS			
CIRS_116TI_RIDER002_ISS	2009-221T14:51:53	GMB_E116_Titan60+000T00:48:00	000T01:19:56	2009-221T16:11:49	4000	19.184	SPASS Rider			
ISS_116TI_REGMAP001_PRIME	2009-221T14:51:53	GMB_E116_Titan60+000T00:48:00	000T01:19:56	2009-221T16:11:49	0	130	Prime	ISS_NAC to Titan	NEG_X to Sun	
VIMS_116TI_REGMAP001_ISS	2009-221T14:51:53	GMB_E116_Titan60+000T00:48:00	000T01:19:56	2009-221T16:11:49	20850.7	100	SPASS Rider			
MP_116SA_RPXDESCEN116_NA	2009-221T14:54:46		000T00:00:01	2009-221T14:54:47	0	0	Non-SPASS			
CAPS_116TI_T60OUTBND001_PRIME	2009-221T15:03:53	GMB_E116_Titan60+000T01:00:00	000T01:00:00	2009-221T16:03:53	4000	14.4	SPASS Rider			
INMS_116SA_SURVEYSEG002_INMS	2009-221T15:03:53	GMB_E116_Titan60+000T01:00:00	000T10:56:06	2009-222T01:59:59	100	3.937	Non-SPASS			
MIMI_116TI_TITANOUT001_RIDER	2009-221T15:03:53	GMB_E116_Titan60+000T01:00:00	000T01:00:00	2009-221T16:03:53	1200	4.32	SPASS Rider			
CAPS_116SA_SURVEY002_PRIME	2009-221T16:03:53	GMB_E116_Titan60+000T02:00:00	002T22:48:06	2009-224T14:51:59	1000	254.886	Non-SPASS			
MIMI_116CO_SURVEY002_RIDER	2009-221T16:03:53	GMB_E116_Titan60+000T02:00:00	000T09:56:06	2009-222T01:59:59	900	32.189	Non-SPASS			
SP_116TI_DEADTIME002_PRIME	2009-221T16:11:49	GMB_E116_Titan60+000T02:07:56	000T00:13:10	2009-221T16:24:59	0	0	Prime	NEG_Y to Titan	NEG_X to NEP	
SP_116EA_DLTURN001_PRIME	2009-221T16:25:00		000T00:40:00	2009-221T17:05:00	0	0	Prime	XBAND to Earth	POS_X to NEP	
ENGR_116SC_AACSDUAL002_CDS	2009-221T17:04:47		000T00:00:02	2009-221T17:04:49	0	0	Non-SPASS			
SP_116EA_G70METNON221_PRIME	2009-221T17:05:00		000T09:00:00	2009-222T02:05:00	0	0	Prime	XBAND to Earth	Rolling/Bias	POS_X to NEP
SP_116NA_G70METNON221_SP	2009-221T17:05:00		000T09:00:00	2009-222T02:05:00	0	0	Non-SPASS			
UVIS_116SW_IPHSURVEY007_RIDER	2009-221T17:05:00		000T09:00:00	2009-222T02:05:00	152.5	4.94	Non-SPASS			
MAG_116OT_SURVEY004_PRIME	2009-221T18:03:54		000T08:01:06	2009-222T02:05:00	600	17.32	Non-SPASS			
CIRS_116IC_DSCAL09221_SP	2009-221T18:05:00		000T08:00:00	2009-222T02:05:00	3000	86.4	SPASS Rider			
INMS_116SA_SURVEYSEG003_INMS	2009-222T02:00:00		000T10:58:59	2009-222T12:58:59	100	3.954	Non-SPASS			
MIMI_116CO_SURVEY004_RIDER	2009-222T02:00:00		002T12:50:00	2009-224T14:50:00	900	197.1	Non-SPASS			

# T60 Wrapup SPASS

Request	Riders	Start (SCET)	Start (Epoch)	Duration	End (SCET)	Primary	Secondary	Comments
Sequence S52, length = 32 days		2009-204T21:51:00	E115_SEQUENCE_052	032T02:13:00	2009-237T00:04:00			
Titan Flyby T60 Segment		2009-221T01:05:00		001T01:00:00	2009-222T02:05:00			
SP_116TI_WAYPTTURN001_PRIME		2009-221T01:05:00		000T00:40:00	2009-221T01:45:00	NEG_Y to Titan	NEG_X to NEP	
<b>NEW WAYPOINT</b>		<b>2009-221T01:45:00</b>		<b>001T00:20:00</b>	<b>2009-222T02:05:00</b>	<b>NEG_Y to Titan</b>	<b>NEG_X to NEP</b>	
<b>SP_116TI_DEADTIME001_PRIME</b>		<b>2009-221T01:45:00</b>		<b>000T00:16:49</b>	<b>2009-221T02:01:4</b>	<b>NEG_Y to Titan</b>	<b>NEG_X to NEP</b>	
CIRS_116TI_FIRNADCOMP001_PRIME	C, I, V	2009-221T02:01:49	GMB_E116_Titan60-000T12:02:04	000T02:02:04	2009-221T04:03:53	CIRS_FP1 to Titar	PIC	
ISS_116TI_PHOTOMWAC001_PRIME	C, U, V	2009-221T04:03:53	GMB_E116_Titan60-000T10:00:00	000T01:00:00	2009-221T05:03:53	ISS_NAC to Titan	NEG_X to Sun	
UVIS_116TI_EUVFUV001_PRIME	C, I, R, V	2009-221T05:03:53	GMB_E116_Titan60-000T09:00:00	000T03:50:00	2009-221T08:53:53	UVIS_FUV to Titan	NEG_X to Sun	
<b>Begin custom period</b>		<b>2009-221T08:53:5</b>	<b>GMB_E116_Titan60-000T05:10:0</b>	<b>000T00:00:01</b>	<b>2009-221T08:53:54</b>			
RADAR_116TI_T60INRAD001_PRIME		2009-221T08:53:53	GMB_E116_Titan60-000T05:10:00	000T03:10:00	2009-221T12:03:53	NEG_Z to Titan	NEG_X to NTP	Pick up at NEG_Y to Titan, NEG_X to NEP; Hand off at NEG_Z to Titan, POS_Y to NTP. Use 2ndary - X_NTP and +Y_NTP for polarizations.
RADAR_116TI_T60INSCAT001_PRIME	M	2009-221T12:03:53	GMB_E116_Titan60-000T02:00:00	000T00:48:00	2009-221T12:51:53	NEG_Z to Titan	POS_Y to NTP	Pick up at NEG_Z to Titan, POS_Y to NTP; Hand off at NEG_Z to Titan, POS_Y to NTP.
ENGR_116SC_RADRCS221_PRIME	M	2009-221T12:51:53	GMB_E116_Titan60-000T01:12:00	000T00:01:00	2009-221T12:52:53	NEG_Z to Titan	POS_Y to NTP	Pick up at NEG_Z to Titan, POS_Y to NTP; Hand off at NEG_Z to Titan, POS_Y to NTP.
RADAR_116TI_T60IHISAR001_PRIME	M	2009-221T12:52:53	GMB_E116_Titan60-000T01:11:00	000T00:41:00	2009-221T13:33:53	NEG_Z to Titan	POS_Y to NTP	Pick up at NEG_Z to Titan, POS_Y to NTP; Hand off at NEG_Z to Titan, POS_Y to NTP.
RADAR_116TI_T60INALT001_PRIME	M	2009-221T13:33:53	GMB_E116_Titan60-000T00:30:00	000T00:12:00	2009-221T13:45:53	NEG_Z to Titan	POS_X to NTP	Pick up at NEG_Z to Titan, POS_Y to NTP; Hand off at NEG_Z to Titan, NEG_X to Titan_SC_RAM.
RADAR_116TI_T60INOSAR001_PRIME	M, V	2009-221T13:45:53	GMB_E116_Titan60-000T00:18:00	000T00:44:00	2009-221T14:29:53	NEG_Z to Titan	NEG_X to Titan_SC_RAM	Pick up at NEG_Z to Titan, NEG_X to Titan_SC_RAM; Hand off at NEG_Y to Titan, NEG_X
116TI (t) T60 TITAN Inbou...		2009-221T14:03:53		000T00:00:01	2009-221T14:03:54			
<b>End custom period</b>		<b>2009-221T14:29:5</b>	<b>GMB_E116_Titan60+000T00:26:0</b>	<b>000T00:00:01</b>	<b>2009-221T14:29:54</b>			
ENGR_116SC_DFPWBIAS221_PPS	C, I, M, \	2009-221T14:29:53	GMB_E116_Titan60+000T00:26:00	000T00:21:05	2009-221T14:50:58	NEG_Y to Titan	NEG_X to NEP	
ISS_116TI_REGMAP001_PRIME	C, M, V	2009-221T14:51:53	GMB_E116_Titan60+000T00:48:00	000T01:19:56	2009-221T16:11:49	ISS_NAC to Titan	NEG_X to Sun	
<b>SP_116TI_DEADTIME002_PRIME</b>		<b>2009-221T16:11:4</b>	<b>GMB_E116_Titan60+000T02:07:0</b>	<b>000T00:13:10</b>	<b>2009-221T16:24:5</b>	<b>NEG_Y to Titan</b>	<b>NEG_X to NEP</b>	
SP_116EA_DLTURNO01_PRIME		2009-221T16:25:00		000T00:40:00	2009-221T17:05:00	XBAND to Earth	POS_X to NEP	
SP_116EA_G70METNON221_PRIME	C	2009-221T17:05:00		000T09:00:00	2009-222T02:05:00	XBAND to Earth	Rolling/Bias	POS_X to NEP

# T60 Wrapup Open Issues

- Waypoint fails during custom period
  - **This is OK per change in XM guidelines and constraints**
- CIRS secondaries are PIC
  - Flagged as error by CRC, but as CIRS hands off to itself, no issue.

Smaller open issues:

VIMS outbound transition rider misaligned with prime observation (losing a little data, but no DV issues)