TOST: Delivery Package for 039TI (T25)

Segment Boundary 2007-052T10:37:00 – 2007-054T10:11:00

Titan C/A= 2007-053T03:10:59, Altitude = 950 km

Epoch = GMB_E039_Titan25

March 9, 2004

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039TI (T25)

- Science to be accomplished during this flyby:
  - RADAR will be doing SAR measurements over the Courtin cold spot (~40°N, 0°W), an anomalous region from Voyager infrared observations.
  - ISS will be observing new territory, in the second-most northern latitude observation in the tour, at 650 m/pixel resolution.
  - CIRS will obtain the highest latitude coverage in the north and south on the asymptotes, will perform temperature maps and do limb mapping for hydrocarbons.
  - VIMS will obtain their first view of the northern hemisphere.

039TI (T25) Timeline
C/A= 053T03:10:59

Start Time	Duration	End Time	Prime Activity	Obs. Detail	Op Mode	TLM Mode	Comments
2007-052T10:37:00	00T00:30:00	2007-052T11:07:00	SP turn to WP	NAC to Titan, +X to NTP	DFPW Normal	S&ER-3	
2007-052T11:07:00	00T00:15:00	2006-052T11:22:00	OD Uncertainty Dead Time		DFPW Normal	S&ER-3	
TI-15:49	00T00:49	TI-15:00	ISS	monitor	DFPW Normal	S&ER-3	template M
TI-15:00	00T02:00	TI-13:00	CIRS	Mid IR temp map	DFPW Normal	S&ER-3	template M
TI-13:00	00T03:00	TI-10:00	CIRS	FP1	DFPW Normal	S&ER-3	template N
TI-10:00	00T01:00	TI-09:00	ISS	Photometry	DFPW Normal	S&ER-3	template N
TI-09:00	00T01:00	TI-08:00	CIRS	Mid IR Limb	DFPW Normal	S&ER-3	template R
TI-08:00	00T02:50	TI-05:10	CIRS	Mid IR Limb	RADARWU	S&ER-5a/S&ER-3	template R; S&ER-5a at TI-07:45 for 15 min
TI-05:10	00T00:22	TI-04:48	SP turn to RADAR WP	+X to 223/-12, -Z to Titan	RADARWU	S&ER-8	
TI-04:48	00T03:33	TI-01:15	RADAR	radiometry (inbound)	RADAR_RWA	S&ER-8	template S
TI-01:15	00T00:23	TI-00:52	RADAR	scatterometry (inbound)			
TI-00:52	00T00:22	TI-00:30	RWA to RCS transition				opmode transition is 21 min 13 sec; SPASS NOTE; (2,2,20) deadband
TI-00:30	00T00:14	TI-00:16	RADAR	altimetry (inbound)	RADAR_RCS	S&ER-8	
TI-00:16	00T00:10	TI-00:06	RADAR	low-res SAR imaging (inbound)			
TI-00:06	00T00:12	TI+00:06	RADAR	high-res SAR imaging			
TI+00:06	00T00:10	TI+00:16	RADAR	low-res SAR imaging (outbound)			
TI+00:16	00T00:14	TI+00:30	RADAR	altimetry (outbound)			
TI+00:30	00T00:24	TI+00:52	RCS to RWA transition				opmode transition is 23 min 18 sec; SPASS NOTE
TI+00:54	00T00:23	TI+01:17	RADAR	scatterometry (outbound)			
TI+01:17	00T03:32	TI+04:49	RADAR	radiometry (outbound)	RADAR_RWA	S&ER-8	template L
TI+04:49	00T00:22	TI+05:11	SP turn to WP	NAC to Titan, -X to Sun	DFPW Normal	S&ER-3	
TI+05:11	00T03:49	TI+09:00	ISS	global mosaic	DFPW Normal	S&ER-3	template H
TI+09:00	00T02:00	TI+11:00	CIRS	FP1 stare	DFPW Normal	S&ER-3	template D
TI+11:00	00T02:00	TI+13:00	ISS	mosaic	DFPW Normal	S&ER-3	template D
TI+13:00	00T01:00	TI+14:00	VIMS	stare	DFPW Normal	S&ER-3	template D
TI+14:00	00T07:15	2006-054T00:26:00	CIRS	mid IR temp map with slow scans	DFPW Normal	S&ER-3	template A
2006-054T00:26:00	00T00:15	2006-054T00:41:00	OD Uncertainty Dead Time		DFPW Normal	S&ER-3	
2006-054T00:41:00	00T00:30	2006-054T01:11:00	SP turn to Earth		DFPW Normal	S&ER-3	
2006-054T01:11:00	00T09:00	2006-054T10:11:00	Goldstone DL		DFPW Normal	RTE&SPB	

039TI (T25) Attitude Strategy

Request	Riders	Start(SCET)	Start(Epoch)	Duration	End(SCET)	Primary Pointing	Secondary Pointing	Comments
Sequence S028, length = 39 ...		2007-048T10:52:00	E039_SEQUENCE_028+000T00:00:00	038T21:12:00	2007-087T08:04:00			
TOST rev 39 Segment		2007-052T10:37:00		001T23:34:00	2007-054T10:11:00			
SP_039TI_WAYPTTURN052_PRIME	M	2007-052T10:37:00		000T00:30:00	2007-052T11:07:00	ISS_NAC to Titan	POS_X to North_Pole_Dir	15.5 min turn from +X to NEP
NEW WAYPOINT		**2007-052T11:07:00**		**000T11:15:59**	**2007-052T22:22:59**	**ISS_NAC to Titan**	**POS_X to North_Pole_Dir**	
SP_039TI_DEADTIME052_PRIME	**C, M**	**2007-052T11:07:00**		**000T00:15:00**	**2007-052T11:22:00**	**ISS_NAC to Titan**	**POS_X to North_Pole_Dir**	
ISS_039TI_NIGHTNAC001_PRIME	C, M	2007-052T11:21:59	GMB_E039_Titan25-000T15:49:00	000T00:49:00	2007-052T12:10:59	ISS_NAC to Titan	NEG_X to Sun	
CIRS_039TI_MIDIRTMAP001_PRIME	C, I, M, V	2007-052T12:10:59	GMB_E039_Titan25-000T15:00:00	000T02:00:00	2007-052T14:10:59	CIRS_FPB to Titan	POS_X to North_Pole_Dir	
CIRS_039TI_FIRNADCMP001_PRIME	C, I, M, V	2007-052T14:10:59	GMB_E039_Titan25-000T13:00:00	000T03:00:00	2007-052T17:10:59	CIRS_FP1 to Titan	PIC	
ISS_039TI_PHOTOMWAC001_PRIME	C, M, V	2007-052T17:10:59	GMB_E039_Titan25-000T10:00:00	000T01:00:00	2007-052T18:10:59	ISS_WAC to Titan	NEG_X to Sun	
CIRS_039TI_MIRLMBINT001_PRIME	C, I, M, R, V	2007-052T18:10:59	GMB_E039_Titan25-000T09:00:00	000T03:50:00	2007-052T22:00:59	CIRS_FPB to Titan	PIC	
SP_039TI_WAYPTTURN452_PRIME	M, R	2007-052T22:00:59	GMB_E039_Titan25-000T05:10:00	000T00:22:00	2007-052T22:22:59	POS_X to 223.0/-12.0	NEG_Z to Titan	20.04 min turn
NEW WAYPOINT		**2007-052T22:22:59**		**000T09:59:00**	**2007-053T08:21:59**	**POS_X to 223.0/-12.0**	**NEG_Z to Titan**	
RADAR_039TI_T25INRAD001_PRIME	M, R	2007-052T22:22:59	GMB_E039_Titan25-000T04:48:00	000T03:33:00	2007-053T01:55:59	NEG_Z to Titan	POS_Y to North_Pole_Dir	Use +Y_NTP and +X_NTP for the two polarizations.
RADAR_039TI_T25INSCAT001_PRIME	M	2007-053T01:55:59	GMB_E039_Titan25-000T01:15:00	000T00:23:00	2007-053T02:18:59	NEG_Z to Titan	POS_X to North_Pole_Dir	
RADRWA to RADRCS. Deadband ...		2007-053T02:18:59	GMB_E039_Titan25-000T00:52:00	000T00:21:13	2007-053T02:40:12			Deadband = (2,2,20)
RADAR_039TI_TI25INALT001_PRIME	M	2007-053T02:40:59	GMB_E039_Titan25-000T00:30:00	000T00:14:00	2007-053T02:54:59	NEG_Z to Titan (0.0,0.0,-25.0 d	NEG_Y to North_Pole_Dir	
RADAR_039TI_TI25ILSAR001_PRIME	M	2007-053T02:54:59	GMB_E039_Titan25-000T00:16:00	000T00:09:00	2007-053T03:03:59	NEG_Z to Titan	NEG_X to Titan_SC_RAM	
RADAR_039TI_TI25HISAR001_PRIME	M	2007-053T03:03:59	GMB_E039_Titan25-000T00:07:00	000T00:14:00	2007-053T03:17:59	NEG_Z to Titan	NEG_X to Titan_SC_RAM	
RADAR_039TI_TI25OLSAR001_PRIME	M	2007-053T03:17:59	GMB_E039_Titan25+000T00:07:00	000T00:09:00	2007-053T03:26:59	NEG_Z to Titan	NEG_X to Titan_SC_RAM	
RADAR_039TI_TI25OTALT001_PRIME	M	2007-053T03:26:59	GMB_E039_Titan25+000T00:16:00	000T00:14:00	2007-053T03:40:59	NEG_Z to Titan (0.0,0.0,-10.0 d	NEG_X to Titan_SC_RAM	
RADRCS to RADRWBIAS. Requir...		2007-053T03:40:59	GMB_E039_Titan25+000T00:30:00	000T00:23:18	2007-053T04:04:17			
RADAR_039TI_T25OTSCAT001_PRIME	M	2007-053T04:04:59	GMB_E039_Titan25+000T00:54:00	000T00:23:00	2007-053T04:27:59	NEG_Z to Titan	POS_X to North_Pole_Dir	
RADAR_039TI_T25OUTRAD001_PRIME	M	2007-053T04:27:59	GMB_E039_Titan25+000T01:17:00	000T03:32:00	2007-053T07:59:59	NEG_Z to Titan	POS_X to North_Pole_Dir	Secondary axis: +X_NTP and -Y_NTP for the 1st and 2nd polarization, respectively.
SP_039TI_WAYPTTURN552_PRIME		2007-053T07:59:59	GMB_E039_Titan25+000T04:49:00	000T00:22:00	2007-053T08:21:59	ISS_NAC to Titan	NEG_X to Sun	19.25 min turn
NEW WAYPOINT		**2007-053T08:21:59**		**001T01:49:01**	**2007-054T10:11:00**	**ISS_NAC to Titan**	**NEG_X to Sun**	
ISS_039TI_GLOBMAP001_PRIME	C, V	2007-053T08:21:59	GMB_E039_Titan25+000T05:11:00	000T03:25:00	2007-053T11:46:59	ISS_NAC to Titan	NEG_X to Sun	
ISS_039TI_PHOTOMWAC002_PRIME	C	2007-053T11:46:59	GMB_E039_Titan25+000T08:36:00	000T00:24:00	2007-053T12:10:59	ISS_WAC to Titan	NEG_X to Sun	
CIRS_039TI_FIRNADCMP002_PRIME	C, I, V	2007-053T12:10:59	GMB_E039_Titan25+000T09:00:00	000T02:00:00	2007-053T14:10:59	CIRS_FP1 to Titan	PIC	
ISS_039TI_MONITORNA001_PRIME	C, V	2007-053T14:10:59	GMB_E039_Titan25+000T11:00:00	000T02:00:00	2007-053T16:10:59	ISS_NAC to Titan	NEG_X to Sun	
VIMS_039TI_GLOBMAP001_PRIME	C, I	2007-053T16:10:59	GMB_E039_Titan25+000T13:00:00	000T01:00:00	2007-053T17:10:59	ISS_NAC to Titan	NEG_X to Sun	
CIRS_039TI_MIDIRTMAP002_PRIME	C, I, V	2007-053T17:10:59	GMB_E039_Titan25+000T14:00:00	000T07:15:00	2007-054T00:25:59	CIRS_FPB to Titan	NEG_X to Sun	
SP_039TI_DEADTIME054_PRIME		**2007-054T00:26:00**		**000T00:15:00**	**2007-054T00:41:00**	**ISS_NAC to Titan**	**NEG_X to Sun**	
SP_039EA_DLTURN054_PRIME		2007-054T00:41:00		000T00:30:00	2007-054T01:11:00	XBAND to Earth	POS_X to NEP	17.47 min turn
SP_039EA_G70METNON054_PRIME	C, M	2007-054T01:11:00		000T09:00:00	2007-054T10:11:00	XBAND to Earth	Rolling	

039TI (T25) Telemetry Modes

TELEMETRY MODE REPORT

SCET	TELEMETRY MODE	REQUEST
2007-052T10:37:00.000	S_N_ER_3	SP_039NA_G70OBSNON054_NA
2007-052T19:25:59.000	S_N_ER_5A	SP_039NA_G70OBSNON054_NA
2007-052T19:40:59.000	S_N_ER_3	SP_039NA_G70OBSNON054_NA
2007-052T22:10:59.000	S_N_ER_8	SP_039NA_G70OBSNON054_NA
2007-053T08:10:59.000	S_N_ER_3	SP_039NA_G70OBSNON054_NA
2007-054T01:11:00.000	RTE_N_SPB_124425	SP_039EA_G70METNON054_PRIME
2007-054T01:26:00.000	RTE_N_SPB_142200	SP_039EA_G70METNON054_PRIME
2007-054T02:22:00.000	RTE_N_SPB_165900	SP_039EA_G70METNON054_PRIME
2007-054T09:37:00.000	RTE_N_SPB_142200	SP_039EA_G70METNON054_PRIME

039TI (T25) DSN Requests

CASSINI DSN COVERAGE SUMMARY for T25_030729_v2.apf generated on 2003-Jul-29 11:56:26
(+ = pass overlaps with previous pass; * = in conflict with DSN weekly maintenance)

C ANT ID	BOT_TO_EOT ERT	DUR hh:mm	XMT_AT ERT	2WAY_PERIOD ERT	DUR hh:mm	DL_PERIOD ERT	DL_PERIOD SCET	DUR hh:mm	NOT CALS min	RADIO_CONFG UD D UD MAR	DATA_RATES kbps
G 70MET 14	054T02:15-11:20	09:05	054T02:25	04:41-11:19	06:38	054T02:19-11:19	054T01:11-10:11	09:00	---	15/15 XX - -- --0	124,142,165,142

039TI (T25) Data Volume

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 (%)	
SP_039EA_G70METNON054_PRIME	054 01:11	054 10:11	0	3392	141	3532	3567	35	0	226	53	3811	4418	608	607	14%	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	052 10:37	054 01:11	268.4	21.9	350.3	23.3	701.0	117.9	156.0	814.0	361.9	0.0	528.0	0.0	0.0	3342.8
OBSERVATION_SI	052 10:37	054 01:11	0.0	0.0	18.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.0
SP_039EA_G70METNON054_PRIME	054 01:11	054 10:11	32.4	4.9	86.4	1.6	0.0	19.4	36.6	0.0	42.4	0.0	0.0	0.0	0.0	223.7
DAILY TOTAL SCIENCE	052 10:37	054 10:11	300.8	26.7	454.7	24.9	701.0	137.4	192.6	814.0	404.3	0.0	528.0	0.0		

AVERAGE DATA RATE REPORT (calculated over observation periods and downlink passes)

Event	Start doy hh:mm	End doy hh:mm	CAPS (bps)	CDA (bps)	INMS (bps)	MAG (bps)	MIMI (bps)	RPWS (bps)	UVIS (bps)
SP_039NA_G70OBSNON054_NA	052 10:37	054 01:11	1933.4	157.5	167.8	849.4	1123.9	2606.4	0.0
SP_039EA_G70METNON054_PRIME	054 01:11	054 10:11	1000.0	149.9	50.0	600.0	1128.3	1310.0	0.0

Open Issues

- During the C/A-00:30 - C/A+00:30 period, the RADAR observation causes the CIRS radiators to be heated by slightly more than 5K.
  - The right-look scenario results in an increase of 5.70 K
  - The left-look scenario results in an increase of 5.13 K.
- Which scenario RADAR actually executes is based on what look direction they choose (or are forced to choose) on other flybys in that sector so as to achieve desirable stereo / tiepoints and coverage.
- For now, RADAR will design the observation including the left-look scenario, with the recognition that a science trade may need to be made in the future.

Constraint	C=Comply V=Violate N/A=Not Applicable	Comments	Disposition
1. A. SP has checked all waypoints turns to and from waypoints.	C		
B. All initial downlink attitudes have been checked as waypoints.	C		
2. All turns to and from waypoints checked for violations and margins. ☐CAPS ☐CDA ☐CIRS ☐INMS ☐ISS ☐MIMI ☐MAG ☐NAV ☐RADAR ☐RPWS ☐RSS ☐UVIS ☐VIMS Each Prime Instrument agrees to accept a reduction in observation time during implementation if problems arise.	C		
3. Custom handoffs limited to:			
A. ±3 hours from targeted Icy Satellite flyby	N/A		
B. ±3 hours from targeted Titan Flyby	N/A		
C. OpNavs preceding/following a downlink	N/A		
4. Minimum 30 min SPASS Prime request duration outside ±5 hours from targeted satellite flyby (5 min. integer duration if >30 min.)	C		
5. Live and Ground Movable Blocks include appropriate time margins.	C	K. Klaasen's margin for flyby T25 is 15 min min. according to memo dated .	
6. Waypoints changes are ≤3 per day	C		
A. All turns that accomplish the waypoint strategy are requested by SP or OpNav.	C		
7. Live Movable Blocks limited to the following orbits: 7, 8, 9, 10, 12, 28, 51, 56, 57, 60, 63, 64	N/A		

Guideline	Yes / No	Comments
1. Were repeatable/reusable templates used where possible?	Yes	
2. During Pre-Integration: Was 30 min. used for 90° RWA turns and/or 10 min. for RCS turns?	Yes	

(DOUBLE-CLICK TO MAKE CHANGES)