TOST: RE-Delivery Package for 044TI (T30)

Segment Boundary 2007-132T04:59:00 – 2007-133T21:13:00

Titan C/A= 2007-132T20:08:58, Altitude = 960 km

Epoch = GMB_E044_Titan30

December 6, 2006

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044TI (T30)

- Science to be accomplished during this flyby:
  - RADAR will do high latitude SAR observations
  - ISS will perform imaging between 620 m/pixel and 1 km/pixel at phase angles less than 30°.
  - UVIS will measure dayside and nightside emissions
  - CIRS will measure stratospheric temperatures
  - VIMS will obtain surface observations (small solar phase angles) of the northern hemisphere

044TI (T30) Timeline
C/A= 132T20:09:58

Start Time	End Time	Prime Activity	Obs. Detail	Op Mode	TLM Mode	Comments
132T04:59	132T05:29	SP Turn to WP	NAC to TI, +X to NTP	DFPW Normal	S_N_ER_3	
132T05:29	132T05:44	OD Uncertainty Dead Time		DFPW Normal	S_N_ER_3	
-14:24	-13:00	CIRS	Mid-IR Temp Map	DFPW Normal	S_N_ER_3	Template M (modified)
-13:00	-09:00	VIMS	Cloud Map	DFPW Normal	S_N_ER_3	Template O
-09:00	-05:10	UVIS	EUVFUV	DFPW Normal / RADWU	S_N_ER_3 / S_N_ER_5a	Template P; RADWU & S_N_ER_5a at -07:50
-05:10	-04:50	SP turn to RADAR WP	-Z to Titan, -X to 35/-15			
-04:50	-01:15	RADAR	Radiometry	RADRWA	S_N_ER_8	Template S
-01:15	-00:52	RADAR	Scatterometry	RADRWA	S_N_ER_8	
-00:52	-00:30	RWA to RCS Transition		RADRCS	S_N_ER_8	Deadband = (2,2,20)
-00:30	-00:15	RADAR	Altimetry	RADRCS	S_N_ER_8	
-00:15	-00:07	RADAR	Low-Res SAR	RADRCS	S_N_ER_8	
-00:07	+00:07	RADAR	High-Res SAR	RADRCS	S_N_ER_8	
+00:07	+00:15	RADAR	Low-Res SAR	RADRCS	S_N_ER_8	
+00:15	+00:30	RADAR	Altimetry	RADRCS	S_N_ER_8	
+00:30	+00:54	RCS to RWA Transition		RADRWA	S_N_ER_8	
+00:54	+01:15	RADAR	Scatterometry	RADRWA	S_N_ER_8	
+01:15	+04:35	RADAR	Radiometry	RADRWA	S_N_ER_8	Template L
+04:35	+04:55	SP turn to WP	NAC to TI, -X to Sun			
+04:55	+08:36	ISS	Global Mosaic	DFPW Normal	S_N_ER_3	Template H
+08:36	+09:00	ISS	WAC Photometry	DFPW Normal	S_N_ER_3	Template H
+09:00	+11:00	CIRS	FP1	DFPW Normal	S_N_ER_3	Template D
+11:00	+13:00	ISS	Mosaic	DFPW Normal	S_N_ER_3	Template D
+13:00	+14:00	VIMS	Stare	DFPW Normal	S_N_ER_3	Template D
+14:00	+15:19	CIRS	Mid-IR Temp Map	DFPW Normal	S_N_ER_3	Template A (modified)
133T11:28	133T11:43	OD Uncertainty Dead Time		DFPW Normal	S_N_ER_3	
133T11:43	133T12:13	SP Turn to Earth for downlink		DFPW Normal	S_N_ER_3	
133T12:13	133T22:13	Madrid 70-m Array		DFPW Normal	RTE_N_SPB	

044TI T30 Attitude Strategy

Request	Riders	Start (SCET)	Start (Epoch)	Duration	End (SCET)	Primary	Secondary	Comments
Sequence S030, length = 37 ...		2007-124T22:00:00	E044_SEQUENCE_030+000T00:00:00	037T05:10:00	2007-162T03:10:00			
TOST rev 44 Segment		2007-132T04:59:00		001T16:14:00	2007-133T21:13:00			
SP_044TI_WAYPTTURN132_PRIME	M	2007-132T04:59:00		000T00:30:00	2007-132T05:29:00	ISS_NAC to Titan	POS_X to North_Pole_Dir	18.34 min turn from +X to NEP
NEW WAYPOINT		2007-132T05:29:00		000T09:50:58	2007-132T15:19:58	ISS_NAC to Titan	POS_X to North_Pole_Dir	
SP_044TI_DEADTIME132_PRIME	C, M	2007-132T05:29:00		000T00:16:58	2007-132T05:45:58	ISS_NAC to Titan	POS_X to North_Pole_Dir	
CIRS_044TI_MIDIRTMAP001_PRIME	C, I, M, V	2007-132T05:45:58	GMB_E044_Titan30-000T14:24:00	000T01:24:00	2007-132T07:09:58	CIRS_FPB to Titan	POS_X to North_Pole_Dir	
VIMS_044TI_CLOUDMAP001_PRIME	C, I, M, U	2007-132T07:09:58	GMB_E044_Titan30-000T13:00:00	000T04:00:00	2007-132T11:09:58	ISS_NAC to Titan	POS_X to North_Pole_Dir	
UVIS_044TI_EUVFUV001_PRIME	C, I, M, R, V	2007-132T11:09:58	GMB_E044_Titan30-000T09:00:00	000T03:50:00	2007-132T14:59:58	UVIS_FUV to Titan	POS_X to North_Pole_Dir	
SP_044TI_WAYPTTURN432_PRIME	C, M, R	2007-132T14:59:58	GMB_E044_Titan30-000T05:10:00	000T00:20:00	2007-132T15:19:58	NEG_Z to Titan	NEG_X to 35.0/-15.0	18.3 min turn
NEW WAYPOINT		2007-132T15:19:58		000T09:45:00	2007-133T01:04:58	NEG_Z to Titan	NEG_X to 35.0/-15.0	
RADAR_044TI_T30INRAD001_PRIME	M	2007-132T15:19:58	GMB_E044_Titan30-000T04:50:00	000T03:35:00	2007-132T18:54:58	NEG_Z to Titan	POS_Y to North_Pole_Dir	Use +Y_NTP and +X_NTP for the two polarizations.
RADAR_044TI_T30INSCAT001_PRIME	M	2007-132T18:54:58	GMB_E044_Titan30-000T01:15:00	000T00:23:00	2007-132T19:17:58	NEG_Z to Titan	POS_X to North_Pole_Dir	
ENGR_044SC_RADRCS132_PPS	M	2007-132T19:17:58	GMB_E044_Titan30-000T00:52:00	000T00:21:15	2007-132T19:39:13	NEG_Z to Titan	PIC	Deadband = (2, 2, 20)
RADAR_044TI_T30INALT001_PRIME	M	2007-132T19:39:58	GMB_E044_Titan30-000T00:30:00	000T00:14:00	2007-132T19:53:58	NEG_Z to Titan (0.0,0.0,20.0 deg. offse	NEG_X to Titan_SC_RAM	
RADAR_044TI_T30INLSAR001_PRIME	M	2007-132T19:53:58	GMB_E044_Titan30-000T00:16:00	000T00:09:00	2007-132T20:02:58	NEG_Z to Titan	NEG_X to Titan_SC_RAM	
RADAR_044TI_T30HISAR001_PRIME	M	2007-132T20:02:58	GMB_E044_Titan30-000T00:07:00	000T00:14:00	2007-132T20:16:58	NEG_Z to Titan	NEG_X to Titan_SC_RAM	
44TI (t) T30 TITAN outboun...		2007-132T20:09:58		000T00:00:01	2007-132T20:09:59			
RADAR_044TI_T30OTLSAR001_PRIME	M	2007-132T20:16:58	GMB_E044_Titan30+000T00:07:00	000T00:09:00	2007-132T20:25:58	NEG_Z to Titan	NEG_X to Titan_SC_RAM	
RADAR_044TI_T30OUTALT001_PRIME	M	2007-132T20:25:58	GMB_E044_Titan30+000T00:16:00	000T00:14:00	2007-132T20:39:58	NEG_Z to Titan	NEG_X to Titan_SC_RAM	
ENGR_044SC_RADRWBIAS432_PPS	M	2007-132T20:39:58	GMB_E044_Titan30+000T00:30:00	000T00:21:41	2007-132T21:01:39	NEG_Z to Titan	PIC	
RADAR_044TI_T30OTSCAT001_PRIME	M	2007-132T21:03:58	GMB_E044_Titan30+000T00:54:00	000T00:23:00	2007-132T21:26:58	NEG_Z to Titan	POS_X to North_Pole_Dir	
RADAR_044TI_T30OUTRAD001_PRIME	M	2007-132T21:26:58	GMB_E044_Titan30+000T01:17:00	000T03:18:00	2007-133T00:44:58	NEG_Z to Titan	POS_X to North_Pole_Dir	Use +X_NTP and -Y_NTP for the two polarizations.
SP_044TI_WAYPTTURN532_PRIME	C, M	2007-133T00:44:58	GMB_E044_Titan30+000T04:35:00	000T00:20:00	2007-133T01:04:58	ISS_NAC to Titan	NEG_X to Sun	18.22 min turn
NEW WAYPOINT		2007-133T01:04:58		000T20:08:02	2007-133T21:13:00	ISS_NAC to Titan	NEG_X to Sun	
ISS_044TI_GLOBMAP001_PRIME	C, M, V	2007-133T01:04:58	GMB_E044_Titan30+000T04:55:00	000T03:41:00	2007-133T04:45:58	ISS_NAC to Titan	NEG_X to Sun	
ISS_044TI_PHOTOMWAC001_PRIME	C, M, V	2007-133T04:45:58	GMB_E044_Titan30+000T08:36:00	000T00:24:00	2007-133T05:09:58	ISS_NAC to Titan	NEG_X to Sun	
CIRS_044TI_FIRNADCMP002_PRIME	C, I, M, U, V	2007-133T05:09:58	GMB_E044_Titan30+000T09:00:00	000T02:00:00	2007-133T07:09:58	CIRS_FP1 to Titan	PIC	
ISS_044TI_MONITORNA001_PRIME	C, M, V	2007-133T07:09:58	GMB_E044_Titan30+000T11:00:00	000T02:00:00	2007-133T09:09:58	ISS_NAC to Titan	NEG_X to Sun	
VIMS_044TI_GLOBMAP001_PRIME	C, I, M	2007-133T09:09:58	GMB_E044_Titan30+000T13:00:00	000T01:00:00	2007-133T10:09:58	ISS_NAC to Titan	NEG_X to Sun	
CIRS_044TI_MIDIRTMAP002_PRIME	C, I, M, V	2007-133T10:09:58	GMB_E044_Titan30+000T14:00:00	000T01:19:00	2007-133T11:28:58	CIRS_FPB to Titan	NEG_X to Sun	
SP_044TI_DEADTIME133_PRIME	M	2007-133T11:28:58	GMB_E044_Titan30+000T15:19:00	000T00:15:46	2007-133T11:44:44	ISS_NAC to Titan	NEG_X to Sun	
SP_044EA_DLTURN133_PRIME	M	2007-133T11:43:00		000T00:30:00	2007-133T12:13:00	XBAND to Earth	POS_X to NEP	16.51 min turn
SP_044EA_M70ARRNON133_PRIME	C, M	2007-133T12:13:00		000T09:00:00	2007-133T21:13:00	XBAND to Earth	Rolling	

044TI (T30) Telemetry Modes

TELEMETRY MODE REPORT

EPOCH RELATIVE	UTC	DURATION	TELEMETRY MODE	REQUEST
	2007-132T04:59:00.000	07:20:58	S_N_ER_3	SP_044NA_M70OBSNON133_NA
GMB_E044_Titan30-000T07:50:00	2007-132T12:19:58.000	00:15:00	S_N_ER_5A	SP_044NA_M70OBSNON133_NA
GMB_E044_Titan30-000T07:35:00	2007-132T12:34:58.000	02:45:00	S_N_ER_3	SP_044NA_M70OBSNON133_NA
GMB_E044_Titan30-000T04:50:00	2007-132T15:19:58.000	09:25:00	S_N_ER_8	SP_044NA_M70OBSNON133_NA
GMB_E044_Titan30+000T04:35:00	2007-133T00:44:58.000	11:28:02	S_N_ER_3	SP_044NA_M70OBSNON133_NA
	2007-133T12:13:00.000	01:30:00	RTE_N_SPB_142200	SP_044EA_M70ARRNON133_PRIME
	2007-133T13:43:00.000	06:30:00	RTE_N_SPB_165900	SP_044EA_M70ARRNON133_PRIME
	2007-133T20:13:00.000	01:00:00	RTE_N_SPB_142200	SP_044EA_M70ARRNON133_PRIME

DSN Requests

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
M70ARRNON133	133T12:13-21:13	133T13:30-22:30	09:00	142,165,142 ^-- and also -->	54	133T12:13-21:13	133T13:30-22:30	09:00	60/15	Ranging_ X_up_on
					63	133T12:13-21:13	133T13:30-22:30	09:00	60/15	Ranging_ X_up_on

044TI (T30) 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 (%)	CAROVR (Mb)
SP_044EA_M70ARRNON133_PRIME	133 12:13	133 21:13	0	3474	118	3592	3516	-75	0	400	53	3969	4379	410	360	8%	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	132 04:59	133 12:13	242.5	32.5	259.4	20.0	715.0	107.1	117.0	827.5	358.8	147.1	609.0	0.0	10.8	3446.8
OBSERVATION_SI	132 04:59	133 12:13	0.0	0.0	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.0
SP_044EA_M70ARRNON133_PRIME	133 12:13	133 21:13	43.5	9.1	86.4	2.3	0.0	38.7	33.5	0.0	150.1	32.7	0.0	0.0	0.0	396.3
DAILY TOTAL SCIENCE	132 04:59	133 21:13	285.9	41.6	351.8	22.3	715.0	145.8	150.6	827.5	508.9	179.8	609.0	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)	285.9	41.6	351.8	22.3	715.0	145.8	150.6	827.5	508.9	179.8	609.0	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_044NA_M70OBSNON133_NA	132 04:59	133 12:13	2156.3	289.5	177.9	952.4	1040.9	3191.4	1307.9
SP_044EA_M70ARRNON133_PRIME	133 12:13	133 21:13	1342.1	280.9	71.8	1193.7	1034.4	4632.3	1009.0

TWT/OST Integration Constraint and Guideline Checklist

Below are Target Working Team (TWT) and Orbiter Science Team (OST) constraints that must be followed during segment implementation. Any exceptions to constraint numbers 3, 4, 6, or 7 must be approved by the Science Planning Manager.

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.			
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	C		
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 T30 is 15 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)