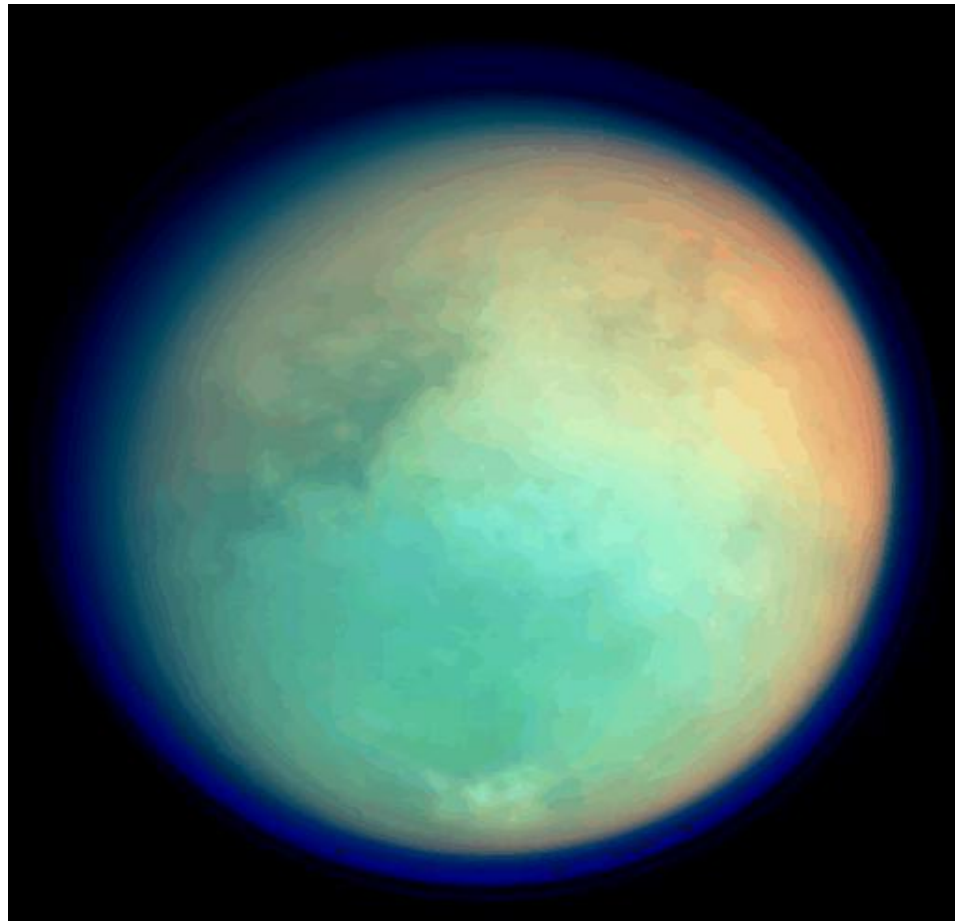




# Titan-3 Overview



Douglas Equils



- **Closest approach:**
  - Altitude: 1577km (746 miles)
  - Time: 2005-046T06:57:53 (Spacecraft Event Time, UTC)
  - Speed: 5.95 km/s (13,300 mph)
  - Phase 98.4 degrees at C/A (low phase inbound - ~20 degrees)
  - On thrusters
- **4361 Mbits received on Earth Feb 15 from 5:00pm to 2:00am (Pacific)**

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_003EA_G70METNON446_PRIME		046 02:27	046 05:27	0	2141	59	2200	3489	1289	0	150	18	2368	1496	-871	3	0%	871
SP_003EA_G70METNON046_PRIME		046 23:59	047 08:59	871	2550	65	3486	3489	3	0	885	53	4424	4361	-63	62	0%	64
SP_003EA_M34BWGRSS047_PRIME		047 17:43	047 21:50	64	652	30	745	3489	2744	0	168	24	938	422	-515	62	1%	516

### Science Highlights:

- Inbound Titan movies look for cloud motion and wind measurements
- Mid & far IR measurements to obtain information on the thermal structure of Titan's stratosphere.
- Investigate the formation and evolution of clouds on Titan.
- Further detailed studies of Titan's interaction with Saturn's magnetosphere
- Measurements of Titan's upper ionosphere and Cassini's crossing through Titan's plasma wake – ion and electron measurements.
- Study of the influence of the incident plasma flow on the highly dynamic outer magnetosphere.
- Examination of Titan's exosphere with energetic neutral atom imaging.
- Characterization of the ion composition and charge state near Titan.
- Density and temperature measurements of Titan's ionospheric electrons – as well as a search for lightning.



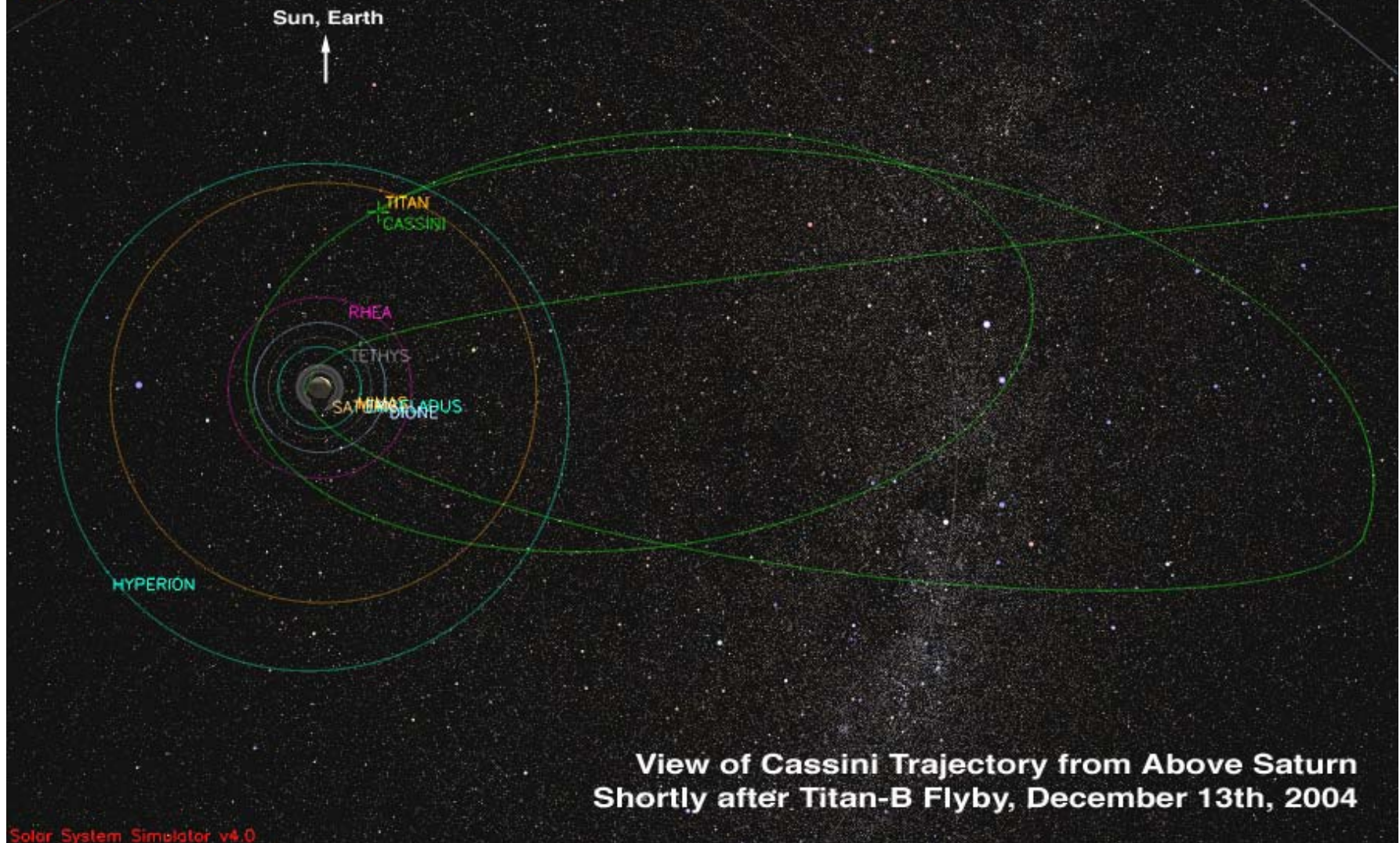
- Trajectory shift due to Probe/Iapetus GM issue.
  - T3 flyby was originally 950km (now 1577km).
- Some inbound/outbound science goals are similar to those for TA and TB.
  - Originally planned to be RSS Earth Occultation Flyby but Trajectory change eliminated the Occultation.
- RADAR is now Prime at Closest Approach
  
- The T3 encounter is set up by two maneuvers – apoapse (Feb 1) and Titan approach (Feb 11).
- T3 is an inbound flyby – Saturn periapse occurs two days later.
- The live update capability is required to update the pointing vectors.



# Titan-3 Trajectory Overview

Titan-3 Preview Overview

View of CASSINI from SATURN  
2004 DEC 13 18:00:00 UTC  
90.0° field of view





# 003TI(T3) Timeline C/A=2005-046T06:58:50 Titan-3 Preview Overview

Start Time	End Time	Prime Activity	Op Mode	TLM Mode	Comments
045T09:07	045T09:39	SP Turn to waypoint	DFPW Normal	S_N_ER_3	-Y to Titan; +X to NTP
045T09:39	045T09:54	OD Uncertainty Dead Time	DFPW Normal	S_N_ER_3	
-21:00	-12:00	CIRS Mid-IR Nadir Temp Map	DFPW Normal	S_N_ER_3	sit and stare for 15 minutes at the beginning
-12:00	-11:00	ISS MONITOR_NA	DFPW Normal	S_N_ER_3	
-11:00	-7:00	CIRS Mid-IR Limb	DFPW Normal	S_N_ER_3	
-7:00	-5:00	ISS GLOBMAP_NA_LP	DFPW Normal	S_N_ER_3	
		Begin Custom Period			
-5:00	-4:30	SP Turn to Earth for downlink	DFPW Normal RADAR_WU	S_N_ER_3 S_N_ER_5A	2ndary axis MAPS preferred S_N_ER_5A for 15 mins. @ -4:45; 0:07 transition
-4:30	-1:30	XBAND to Earth (Pos X to NEP)	RADAR_WU	RTE_N_SPB	
-1:30	-1:09	ISS Turn to ISS Attitude	RADAR_WU	S_N_ER_3	Turn time 18:36
-1:09	-0:59	ISS NAC	RADAR_WU	S_N_ER_3	
-0:59	-0:38	Transition to RADAR RCS	RADAR RCS	S_N_ER_3	20:48
-0:38	-0:30	RADAR Turn	RADAR RCS	S_N_ER_8	Pick-up at ISS Attitude Turn to -Z to Titan
-0:30	-0:16	RADAR Inbound Altimetry	RADAR RCS	S_N_ER_8	
-0:16	+0:16	RADAR SAR	RADAR RCS	S_N_ER_8	
+0:16	+0:31	RADAR Outbound Altimetry	RADAR RCS	S_N_ER_8	
+0:31	+1:02	RADAR Scatterometry	RADAR RCS	S_N_ER_8	
+1:02	+1:10	RADAR Turn	RADAR RCS	S_N_ER_8	Turn to -Y to Titan; +X to NTP
		End Custom Period			
+1:10	+1:33	RCS to RWA Transition	DFPW Normal	S_N_ER_3	22:46
+1:33	+5:00	UVIS EUV-FUV	DFPW Normal	S_N_ER_3	
+5:00	+8:00	ISS NIGHT_WA	DFPW Normal	S_N_ER_3	
+8:00	+12:00	CIRS Far-IR Nadir Comp	DFPW Normal	S_N_ER_3	
+12:00	+16:20	CIRS Mid-IR Nadir Temp	DFPW Normal	S_N_ER_3	
046T23:14	046T23:29	OD Uncertainty Dead Time	DFPW Normal	S_N_ER_3	
046T23:29	046T23:59	SP Turn to Earth for downlink	DFPW Normal	S_N_ER_3	
046T23:59	047T08:59	Downlink over Goldstone	DFPW Normal	S_N_ER_3	



# Titan-3 SPASS

## Titan-3 Preview Overview

Request	Riders	Start (SCET)	Start (Epoch)	Duration	End (SCET)	Primary	Secondary	Comments
Sequence S008, length = 36 ...		2005-022T10:38:00	E00C_SEQUENCE_008+000	035T13:58:00	2005-058T00:36:00			
TOST rev 3 Segment		2005-045T09:07:00		001T23:53:00	2005-047T09:00:00			
SP_003TI_WAYPTTURN045_PRIME	M	2005-045T09:07:00		000T00:30:00	2005-045T09:37:00	ISS_NAC to Titan	POS_X to North_Pole_Dir	
<b>NEW WAYPOINT</b>		<b>2005-045T09:37:00</b>		<b>001T23:43:00</b>	<b>2005-047T09:20:00</b>	<b>ISS_NAC to Titan</b>	<b>POS_X to North_Pole_Dir</b>	
<b>SP_003NA_DEADTIME045_PRIME</b>	<b>M</b>	<b>2005-045T09:37:00</b>		<b>000T00:20:53</b>	<b>2005-045T09:57:53</b>	<b>ISS_NAC to Titan</b>	<b>POS_X to North_Pole_Dir</b>	
CIRS_003TI_MIDIRTMAP002_PRIME	C, I, M, U, V	2005-045T09:57:53	GMB_E003_Titan3-000T21:00	000T09:00:00	2005-045T18:57:53	CIRS_FP1 to Titan	POS_X to North_Pole_Dir	
ISS_003TI_MONITORNA001_PRIME	C, M, U, V	2005-045T18:57:53	GMB_E003_Titan3-000T12:00	000T01:00:00	2005-045T19:57:53	ISS_NAC to Titan	NEG_X to Sun	
CIRS_003TI_MIRLMBINT002_PRIME	C, I, M, U, V	2005-045T19:57:53	GMB_E003_Titan3-000T11:00	000T04:00:00	2005-045T23:57:53	CIRS_FP1 to Titan	PIC	
ISS_003TI_COMBINED001_PRIME	C, M, U, V	2005-045T23:57:53	GMB_E003_Titan3-000T07:00	000T02:00:00	2005-046T01:57:53	ISS_NAC to Titan	NEG_X to Sun	
<b>Begin Custom</b>		<b>2005-046T01:57:53</b>	<b>GMB_E003_Titan3-000T05:00</b>	<b>000T00:01:00</b>	<b>2005-046T01:58:53</b>	<b>ISS_NAC to Titan</b>	<b>POS_X to NTP</b>	
SP_003EA_DLTURN045_PRIME	M, R	2005-046T01:57:53	GMB_E003_Titan3-000T05:00	000T00:30:00	2005-046T02:27:53	XBAND to Earth	POS_X to NEP	Pick up at ISS_NAC to Titan, POS_X to NTP; Hand off at XBAND to Earth, POS_X to NEP.
SP_003EA_G70METNON446_PRIME	M, R	2005-046T02:27:53	GMB_E003_Titan3-000T04:30	000T03:00:00	2005-046T05:27:53	XBAND to Earth	POS_X to NEP	Pick up at XBAND to Earth, POS_X to NEP; Hand off at XBAND to Earth, POS_X to NEP.
ISS_003TI_HIGHRESNA001_PRIME	M, R, V	2005-046T05:27:53	GMB_E003_Titan3-000T01:30	000T00:31:00	2005-046T05:58:53	ISS_NAC to Titan	NEG_X to Sun	Pick up at XBAND to Earth, POS_X to NEP; Hand off at ISS_NAC to Titan, NEG_X to Sun.
ENGR_003SC_RADRCS046_PPS	I, M, R, V	2005-046T05:58:53	GMB_E003_Titan3-000T00:55	000T00:20:48	2005-046T06:19:41			Pick up at ISS_NAC to Titan, POS_X to North_Pole_Dir; Hand off at ISS_NAC to Titan, POS_X to North_Pole_Dir. Deadband = (2, 2, 20)
RADAR_003TI_T3INALT001_PRIME	M	2005-046T06:19:53	GMB_E003_Titan3-000T00:36	000T00:18:00	2005-046T06:37:53	NEG_Z to Titan	POS_X to North_Pole_Dir	Pick up at ISS_NAC to Titan, NEG_X to Sun; Hand off at NEG_Z to Titan, POS_X to Titan_SC_RAM.
RADAR_003TI_T3INLSAR001_PRIME	M	2005-046T06:37:53	GMB_E003_Titan3-000T00:20	000T00:13:00	2005-046T06:50:53	NEG_Z to Titan	POS_X to Titan_SC_RAM	Pick up at NEG_Z to Titan, POS_X to Titan_SC_RAM; Hand off at NEG_Z to Titan, POS_X to Titan_SC_RAM.
RADAR_003TI_T3HISAR001_PRIME	M	2005-046T06:50:53	GMB_E003_Titan3-000T00:07	000T00:14:00	2005-046T07:04:53	NEG_Z to Titan	POS_X to Titan_SC_RAM	Pick up at NEG_Z to Titan, POS_X to Titan_SC_RAM; Hand off at NEG_Z to Titan, POS_X to Titan_SC_RAM.
RADAR_003TI_T3OTLSAR001_PRIME	M	2005-046T07:04:53	GMB_E003_Titan3+000T00:00	000T00:13:00	2005-046T07:17:53	NEG_Z to Titan	POS_X to Titan_SC_RAM	Pick up at NEG_Z to Titan, POS_X to Titan_SC_RAM; Hand off at NEG_Z to Titan, POS_X to Titan_SC_RAM.
RADAR_003TI_T3OUTALT001_PRIME	M	2005-046T07:17:53	GMB_E003_Titan3+000T00:20	000T00:12:00	2005-046T07:29:53	NEG_Z to Titan (0.0,0.0,-10.0 deg.	POS_X to Titan_SC_RAM	Pick up at NEG_Z to Titan, POS_X to Titan_SC_RAM; Hand off at NEG_Z to Titan, POS_X to North_Pole_Dir.
RADAR_003TI_T3OUTSCAT001_PRIME	M	2005-046T07:29:53	GMB_E003_Titan3+000T00:30	000T00:38:00	2005-046T08:07:53	NEG_Z to Titan	POS_X to North_Pole_Dir	Pick up at NEG_Z to Titan, POS_X to North_Pole_Dir; Hand off at NEG_Y to Titan, POS_X to North_Pole_Dir. Handoff to UVIS. Tracking 23 min for RCS_RWA transition.
<b>End Custom</b>		<b>2005-046T08:07:53</b>	<b>GMB_E003_Titan3+000T01:00</b>	<b>000T00:01:00</b>	<b>2005-046T08:08:53</b>	<b>ISS_NAC to Titan</b>	<b>POS_X to NTP</b>	
ENGR_003SC_DFPWBIAS046_PPS	M	2005-046T08:07:53	GMB_E003_Titan3+000T01:00	000T00:22:46	2005-046T08:30:39			
UVIS_003TI_EUVFUV001_PRIME	C, I, M, V	2005-046T08:30:53	GMB_E003_Titan3+000T01:30	000T03:27:00	2005-046T11:57:53	ISS_NAC to Titan	NEG_Z to North_Pole_Dir	
ISS_003TI_NIGHTWAC001_PRIME	C, M, U, V	2005-046T11:57:53	GMB_E003_Titan3+000T05:00	000T01:30:00	2005-046T13:27:53	ISS_NAC to Titan	NEG_X to Sun	
ISS_003TI_PHOTOMWAC001_PRIME	C, M, U, V	2005-046T13:27:53	GMB_E003_Titan3+000T06:30	000T01:30:00	2005-046T14:57:53	ISS_NAC to Titan	NEG_X to Sun	
CIRS_003TI_FIRNADCMP002_PRIME	C, I, M, U, V	2005-046T14:57:53	GMB_E003_Titan3+000T08:00	000T04:00:00	2005-046T18:57:53	CIRS_FP1 to Titan	PIC	
CIRS_003TI_MIDIRTMAP003_PRIME	C, M, U, V	2005-046T18:57:53	GMB_E003_Titan3+000T12:00	000T04:20:00	2005-046T23:17:53	CIRS_FP1 to Titan	POS_X to North_Pole_Dir	
<b>SP_003NA_DEADTIME046_PRIME</b>	<b>M</b>	<b>2005-046T23:17:53</b>	<b>GMB_E003_Titan3+000T16:00</b>	<b>000T00:12:07</b>	<b>2005-046T23:30:00</b>	<b>ISS_NAC to Titan</b>	<b>POS_X to North_Pole_Dir</b>	
SP_003EA_DLTURN046_PRIME	M	2005-046T23:30:00		000T00:29:00	2005-046T23:59:00	XBAND to Earth	POS_X to NEP	
SP_003EA_G70METNON46_PRIME	C, M	2005-046T23:59:00		000T09:00:00	2005-047T08:59:00	XBAND to Earth	POS_X to NEP	



## OpModes

START	END	MODE
2005-045T09:07:00	2005-045T09:07:32	<u>ENGR 003SC DFPW045 PPS</u>
2005-046T02:12:53	2005-046T05:12:55	<u>ENGR 003SC URADWU046 PPS</u>
2005-046T05:58:53	2005-046T06:19:41	<u>ENGR 003SC RADRCS046 PPS</u>
2005-046T07:24:53	2005-046T07:29:53	<u>ENGR 003SC DEADBAND001 AACS</u>
2005-046T08:06:53	2005-046T08:06:59	<u>ENGR 003SC ORSRCS046 PPS</u>
2005-046T08:07:53	2005-046T08:30:39	<u>ENGR 003SC DFPWBIAS046 PPS</u>



## Telem Modes

### TELEMETRY MODE REPORT

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SCET	TELEMETRY MODE	REQUEST
2005-045T09:07:00.000	S_N_ER_3	SP_003NA_G70OBSNON446_NA
2005-046T02:12:53.000	S_N_ER_5A	SP_003NA_G70OBSNON446_NA
2005-046T02:27:53.000	RTE_N_SPB_165900	SP_003EA_G70METNON446_PRIME
2005-046T05:27:53.000	S_N_ER_3	SP_003NA_G70OBSNON046_NA
2005-046T06:19:53.000	S_N_ER_8	SP_003NA_G70OBSNON046_NA
2005-046T08:07:53.000	S_N_ER_3	SP_003NA_G70OBSNON046_NA
2005-046T23:59:00.000	RTE_N_SPB_142200	SP_003EA_G70METNON046_PRIME
2005-047T01:07:00.000	RTE_N_SPB_165900	SP_003EA_G70METNON046_PRIME
2005-047T07:22:00.000	RTE_N_SPB_142200	SP_003EA_G70METNON046_PRIME

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RADAR movie

[https://cassini.jpl.nasa.gov/radar/tour\\_htmls/anim\\_T3/T3\\_anim.html](https://cassini.jpl.nasa.gov/radar/tour_htmls/anim_T3/T3_anim.html)

MP/NAV movie

TBD



# T3 NEW Tabular Data

T-3 Special Topic

## T3 Tabular Data

Event Name: T3\_3TI, Targeted Titan, Central Body: Titan File Creation Date (YYMMDD.HHMMSS): 41028, 41001AP S DUT = ET - UTC, (sec) = 64.184

Event Name at Event Time Only	SCET Date (YYYY-DOYTHH:MM:SS.FF) UTC	Hours wrt Event Epoch	Minutes wrt Event Epoch	S/C Range (km)	S/C Altitude (km)	S/C North Latitude (deg)	S/C West Longitude SMEQPM Date (deg)	S/C Inertial Velocity (km/s)	S/C Radial Inertial Velocity (km/s)	S/C Tangential Inertial Velocity (km/s)	Central Body Angular Diameter (mrad)	Phase = Sun-Central_Body-S/C Angle (deg)	Sun-S/C-Central_Body Angle (deg)	S/C Local True Solar Time wrt Central Body (hh:mm)	Sub-solar Latitude wrt Central Body (deg)	Sub-solar West Longitude wrt Central Body SMEQPM Date (deg)
	2005-045T06:57:52.81	-24	-1440	496,925.8	494,350.8	-3.2	139.6	5.999	-5.990	0.333	10	20.0	160.0	11.35	-22.2	133.4
	2005-045T10:57:52.81	-20	-1200	411,374.2	408,799.2	-3.2	142.9	5.899	-5.893	0.258	13	19.8	160.1	11.37	-22.2	137.2
	2005-045T12:57:52.81	-18	-1080	369,112.6	366,537.6	-3.2	144.5	5.851	-5.847	0.227	14	19.8	160.2	11.38	-22.2	139.1
	2005-045T14:57:52.81	-16	-960	327,180.1	324,605.1	-3.1	146.1	5.805	-5.802	0.201	16	19.8	160.2	11.39	-22.2	140.9
	2005-045T16:57:52.81	-14	-840	285,561.6	282,986.6	-3.1	147.7	5.762	-5.759	0.182	18	19.7	160.3	11.4	-22.2	142.8
	2005-045T18:57:52.81	-12	-720	244,238.1	241,663.1	-3.0	149.4	5.723	-5.720	0.170	21	19.7	160.3	11.41	-22.2	144.7
	2005-045T20:57:52.81	-10	-600	203,185.1	200,610.1	-2.9	150.9	5.687	-5.684	0.169	25	19.8	160.2	11.42	-22.2	146.6
	2005-045T22:57:52.81	-8	-480	162,372.5	159,797.5	-2.8	152.5	5.656	-5.653	0.182	32	19.8	160.2	11.43	-22.2	148.4
	2005-046T00:57:52.81	-6	-360	121,762.9	119,187.9	-2.6	153.8	5.632	-5.628	0.220	42	20.0	160.0	11.46	-22.2	150.3
	2005-046T01:57:52.81	-5	-300	101,520.7	98,945.7	-2.3	154.4	5.624	-5.618	0.256	51	20.1	159.9	11.47	-22.2	151.3
	2005-046T02:57:52.81	-4	-240	81,312.0	78,737.0	-2.0	154.7	5.618	-5.609	0.312	63	20.3	159.6	11.49	-22.2	152.2
	2005-046T03:57:52.81	-3	-180	61,131.8	58,556.8	-1.5	154.8	5.617	-5.602	0.409	84	20.8	159.2	11.53	-22.2	153.1
	2005-046T04:57:52.81	-2	-120	40,981.3	38,406.3	-0.5	153.9	5.624	-5.591	0.606	126	21.7	158.3	12	-22.2	154.1
	2005-046T05:57:52.81	-1	-60	20,919.4	18,344.4	2.4	149.7	5.658	-5.533	1.183	247	25.2	154.8	12.21	-22.2	155.0
	2005-046T06:27:52.81	-1	-30	11,116.3	8,541.3	7.9	140.5	5.723	-5.274	2.224	468	33.5	146.5	12.59	-22.2	155.5
	2005-046T06:42:52.81	0	-15	6,636.9	4,061.9	15.9	124.8	5.818	-4.469	3.725	797	48.7	131.3	14.03	-22.2	155.7
	2005-046T06:52:52.81	0	-5	4,497.7	1,922.7	26.4	95.1	5.927	-2.217	5.497	1219	76.3	103.7	16.03	-22.2	155.9
T3_3TI	2005-046T06:57:52.81	0	0	4,151.5	1,576.5	29.8	68.9	5.955	0.000	5.955	1338	98.4	81.6	17.48	-22.2	156.0
	2005-046T07:02:52.81	0	5	4,497.7	1,922.7	27.9	42.4	5.927	2.217	5.497	1219	120.4	59.6	19.34	-22.2	156.0
	2005-046T07:12:52.81	0	15	6,636.9	4,061.9	18.9	11.6	5.818	4.469	3.725	797	146.7	33.3	21.38	-22.2	156.2
	2005-046T07:27:52.81	1	30	11,116.6	8,541.6	11.2	-4.5	5.724	5.274	2.224	468	158.7	21.3	22.43	-22.2	156.4
	2005-046T07:57:52.81	1	60	20,920.6	18,345.6	5.9	-13.8	5.658	5.534	1.182	247	161.4	18.6	23.22	-22.2	156.9
	2005-046T08:57:52.81	2	120	40,986.5	38,411.5	3.0	-18.0	5.625	5.593	0.602	126	160.3	19.7	23.43	-22.2	157.8
	2005-046T09:57:52.81	3	180	61,144.4	58,569.4	2.0	-18.9	5.619	5.605	0.401	84	159.6	20.4	23.5	-22.2	158.8
	2005-046T10:57:52.81	4	240	81,338.1	78,763.1	1.4	-18.8	5.622	5.614	0.297	63	159.1	20.9	23.54	-22.2	159.7
	2005-046T11:57:52.81	5	300	101,570.5	98,995.5	1.1	-18.4	5.631	5.626	0.232	51	158.9	21.1	23.56	-22.2	160.7
	2005-046T12:57:52.81	6	360	121,852.4	119,277.4	0.9	-17.7	5.645	5.642	0.186	42	158.7	21.3	23.57	-22.2	161.6
	2005-046T14:57:52.81	8	480	162,620.1	160,045.1	0.7	-16.2	5.687	5.685	0.123	32	158.4	21.6	23.58	-22.2	163.5
	2005-046T16:57:52.81	10	600	203,766.2	201,191.2	0.5	-14.5	5.748	5.748	0.079	25	158.3	21.7	23.59	-22.2	165.4
	2005-046T18:57:52.81	12	720	245,438.9	242,863.9	0.4	-12.7	5.833	5.832	0.053	21	158.2	21.8	23.59	-22.2	167.2
	2005-046T20:57:52.81	14	840	287,815.1	285,240.1	0.3	-10.8	5.944	5.944	0.059	18	158.1	21.9	23.59	-22.2	169.1
	2005-046T22:57:52.81	16	960	331,106.8	328,531.8	0.3	-8.8	6.088	6.088	0.085	16	158.0	22.0	23.59	-22.2	171.0
	2005-047T00:57:52.81	18	1080	375,570.2	372,995.2	0.2	-6.8	6.272	6.271	0.117	14	158.0	22.0	23.58	-22.2	172.9
	2005-047T02:57:52.81	20	1200	421,518.1	418,943.1	0.2	-4.8	6.503	6.502	0.147	12	157.9	22.1	23.58	-22.2	174.8
	2005-047T06:57:52.81	24	1440	519,502.2	516,927.2	0.1	-0.8	7.159	7.157	0.173	10	157.9	22.1	23.57	-22.2	178.5



# Titan-3 Playback Summary

Titan-3 Preview Overview

Titan Tb Approximate Playback Timeline

Event or Observation	Observation Type (AGPEN)	Observation Record Start Time (SCET)	Start Playback of Downlink Event (Monday is 2004-348, Dec. 13)		
			Orbiter UTC	Ground UTC	Pacific Time
BEGIN P5 Playback of Critical UVIS Data			Mon 10:52 PM	Tue 12:00 AM	Mon 04:00 PM
BEGIN A4 Playback			Mon 11:02 PM	Tue 12:10 AM	Mon 04:10 PM
CDA_00BDR_SURVEY005_RIDER	CDA_524	2004-345T07:52:00	Mon 11:02 PM	Tue 12:10 AM	Mon 04:10 PM
CAPS_00BSA_SURVEY001_RIDER	CAPS_16000	2004-345T11:00:00	Mon 11:02 PM	Tue 12:10 AM	Mon 04:10 PM
INMS_00BSA_PSTOTM7BU001_RIDER	INMS_1498	2004-346T06:05:00	Mon 11:02 PM	Tue 12:10 AM	Mon 04:10 PM
MAG_00BOT_SURVEY008_PRIME	MAG_1976	2004-347T06:17:00	Mon 11:02 PM	Tue 12:10 AM	Mon 04:10 PM
MAG_00BOT_SURVEY009_PRIME	MAG_1976	2004-347T13:36:00	Mon 11:02 PM	Tue 12:10 AM	Mon 04:10 PM
MIMI_00BCO_SURVEY006_RIDER	MIMI_8000	2004-347T04:21:00	Mon 11:02 PM	Tue 12:10 AM	Mon 04:10 PM
RPWS_00BSA_OUTSURVEY004_PRIME	RPWS_30464	2004-347T04:21:00	Mon 11:02 PM	Tue 12:10 AM	Mon 04:10 PM
RPWS_00BSA_OUTSURVEY007_PRIME	RPWS_30464	2004-347T07:17:00	Mon 11:02 PM	Tue 12:10 AM	Mon 04:10 PM
UVIS_00BSW_IPHSURVEY052_RIDER	UVIS_5032	2004-347T04:36:00	Mon 11:02 PM	Tue 12:10 AM	Mon 04:10 PM
CIRS_00BTI_MIDIRTMAP001_PRIME	CIRS_4000	2004-347T15:13:13	Mon 11:06 PM	Tue 12:14 AM	Mon 04:14 PM
ISS_00BTI_MIDIRTMAP001_CIRS	ISS_Phot_1_by_1	2004-347T15:13:13	Mon 11:06 PM	Tue 12:14 AM	Mon 04:14 PM
VIMS_00BTI_MIDIR005_CIRS	VIMS_18432	2004-347T15:13:13	Mon 11:06 PM	Tue 12:14 AM	Mon 04:14 PM
CIRS_00BTI_FIRNADCMP001_PRIME	CIRS_4000	2004-347T23:38:13	Mon 11:39 PM	Tue 12:47 AM	Mon 04:47 PM
INMS_00BTI_TBINBD001_RSS	INMS_1498	2004-347T23:38:13	Mon 11:39 PM	Tue 12:47 AM	Mon 04:47 PM
ISS_00BTI_FIRNADCMP001_CIRS	ISS_Phot_1_by_1	2004-347T23:38:13	Mon 11:39 PM	Tue 12:47 AM	Mon 04:47 PM
CIRS_00BTI_FIRNADMAP001_UVIS	CIRS_4000	2004-348T03:38:13	Tue 12:15 AM	Tue 01:23 AM	Mon 05:23 PM
ISS_00BTI_EUFUV002_UVIS	ISS_Phot_1_by_1	2004-348T03:38:13	Tue 12:15 AM	Tue 01:23 AM	Mon 05:23 PM
UVIS_00BTI_EUFUV002_PRIME	UVIS_5032	2004-348T03:38:13	Tue 12:15 AM	Tue 01:23 AM	Mon 05:23 PM
VIMS_00BTI_EUVFUV004_UVIS	VIMS_18432	2004-348T03:38:13	Tue 12:15 AM	Tue 01:23 AM	Mon 05:23 PM
CIRS_00BTI_FIRNADMAP003_ISS	CIRS_4000	2004-348T07:38:13	Tue 01:00 AM	Tue 02:08 AM	Mon 06:08 PM
ISS_00BTI_REGMAP001_PRIME	ISS_Phot_1_by_1	2004-348T07:38:13	Tue 01:00 AM	Tue 02:08 AM	Mon 06:08 PM
VIMS_00BTI_HIRES004_ISS	VIMS_18432	2004-348T07:38:13	Tue 01:00 AM	Tue 02:08 AM	Mon 06:08 PM
CAPS_00BTI_TBINBND001_RIDER	CAPS_16000	2004-348T09:38:13	Tue 01:27 AM	Tue 02:35 AM	Mon 06:35 PM
ISS_00BTI_HIRESNAC001_PRIME	ISS_Phot_1_by_1	2004-348T09:38:13	Tue 01:27 AM	Tue 02:35 AM	Mon 06:35 PM
MAG_00BTI_MAGTITAN001_PRIME	MAG_1976	2004-348T09:38:13	Tue 01:27 AM	Tue 02:35 AM	Mon 06:35 PM
MIMI_00BTI_TBINBND001_RIDER	MIMI_8000	2004-348T09:38:13	Tue 01:27 AM	Tue 02:35 AM	Mon 06:35 PM
RPWS_00BTI_TIINTRMED001_PRIME	RPWS_30464	2004-348T09:38:13	Tue 01:27 AM	Tue 02:35 AM	Mon 06:35 PM
CAPS_00BTI_TBCLOSE001_RIDER	CAPS_16000	2004-348T10:38:13	Tue 02:24 AM	Tue 03:32 AM	Mon 07:32 PM
INMS_00BTI_TBCLOSE001_RSS	INMS_1498	2004-348T10:38:13	Tue 02:24 AM	Tue 03:32 AM	Mon 07:32 PM
MIMI_00BTI_TBCLOSE001_RIDER	MIMI_8000	2004-348T10:38:13	Tue 02:24 AM	Tue 03:32 AM	Mon 07:32 PM
BEGIN A4 Playback of D/L Science & Engr.			Tue 02:26 AM	Tue 03:34 AM	Mon 07:34 PM



# Titan-3 Playback Summary

Titan-3 Preview Overview

Event or Observation	Observation Type (AGPEN)	Observation Record Start Time (SCET)	Start Playback of Downlink Event (Monday is 2004-348, Dec. 13)		
			Orbiter UTC	Ground UTC	Pacific Time
ISS_00BSC_ORSRCS348_ENGR	ISS_Phot_1_by_1	2004-348T11:08:13	Tue 02:35 AM	Tue 03:43 AM	Mon 07:43 PM
RPWS_00BTI_TICA001_PRIME	RPWS_182784	2004-348T11:08:13	Tue 02:35 AM	Tue 03:43 AM	Mon 07:43 PM
<b>BEGIN B4 Playback</b>			<b>Tue 02:39 AM</b>	<b>Tue 03:47 AM</b>	<b>Mon 07:47 PM</b>
UVIS_00BST_TWOSTOCCS001_PRIME	UVIS_32096	2004-348T11:29:13	Tue 03:21 AM	Tue 04:29 AM	Mon 08:29 PM
UVIS_00BST_TWOSTOCCS002_RIDER	UVIS_32096	2004-348T12:05:13	Tue 04:01 AM	Tue 05:09 AM	Mon 09:09 PM
RPWS_00BTI_TIINTRMED002_PRIME	RPWS_30464	2004-348T12:08:13	Tue 04:04 AM	Tue 05:12 AM	Mon 09:12 PM
CIRS_00BTI_FIRLMB AER002_VIMS	CIRS_4000	2004-348T12:28:13	Tue 04:12 AM	Tue 05:20 AM	Mon 09:20 PM
ISS_00BTI_DARKSIDE003_VIMS	ISS_Phot_1_by_1	2004-348T12:28:13	Tue 04:12 AM	Tue 05:20 AM	Mon 09:20 PM
VIMS_00BTI_DARKSIDE003_PRIME	VIMS_18432	2004-348T12:28:13	Tue 04:12 AM	Tue 05:20 AM	Mon 09:20 PM
CAPS_00BTI_TBOU TBN D001_RIDER	CAPS_16000	2004-348T12:38:13	Tue 04:15 AM	Tue 05:23 AM	Mon 09:23 PM
<b>INMS_00BTI_TBOU TBN D001_RSS</b>	<b>INMS_1498</b>	<b>2004-348T12:38:13</b>	<b>Tue 04:15 AM</b>	<b>Tue 05:23 AM</b>	<b>Mon 09:23 PM</b>
<b>MIMI_00BTI_TBOU TBN D001_RIDER</b>	<b>MIMI_8000</b>	<b>2004-348T12:38:13</b>	<b>Tue 04:15 AM</b>	<b>Tue 05:23 AM</b>	<b>Mon 09:23 PM</b>
CAPS_00BSA_SURVEY003_RIDER	CAPS_16000	2004-348T13:38:13	Tue 04:28 AM	Tue 05:36 AM	Mon 09:36 PM
MAG_00BOT_SURVEY001_PRIME	MAG_1976	2004-348T13:38:13	Tue 04:28 AM	Tue 05:36 AM	Mon 09:36 PM
<b>MIMI_00BCO_SURVEY002_RIDER</b>	<b>MIMI_8000</b>	<b>2004-348T13:38:13</b>	<b>Tue 04:28 AM</b>	<b>Tue 05:36 AM</b>	<b>Mon 09:36 PM</b>
RPWS_00BSA_OUTSURVEY006_PRIME	RPWS_30464	2004-348T13:38:13	Tue 04:28 AM	Tue 05:36 AM	Mon 09:36 PM
CIRS_00BTI_FIRNADMAP002_UVIS	CIRS_4000	2004-348T14:08:13	Tue 04:32 AM	Tue 05:40 AM	Mon 09:40 PM
ISS_00BTI_EUVFUV001_UVIS	ISS_Phot_1_by_1	2004-348T14:08:13	Tue 04:32 AM	Tue 05:40 AM	Mon 09:40 PM
UVIS_00BTI_EUVFUV001_PRIME	UVIS_5032	2004-348T14:08:13	Tue 04:32 AM	Tue 05:40 AM	Mon 09:40 PM
CIRS_00BTI_MIRLMBINT002_PRIME	CIRS_4000	2004-348T16:38:13	Tue 04:46 AM	Tue 05:54 AM	Mon 09:54 PM
ISS_00BTI_MIRLMBINT002_CIRS	ISS_Phot_1_by_1	2004-348T16:38:13	Tue 04:46 AM	Tue 05:54 AM	Mon 09:54 PM
VIMS_00BTI_MIDIR004_CIRS	VIMS_18432	2004-348T16:38:13	Tue 04:46 AM	Tue 05:54 AM	Mon 09:54 PM
CIRS_00BTI_FIRNADCMP002_VIMS	CIRS_4000	2004-348T18:38:13	Tue 05:02 AM	Tue 06:10 AM	Mon 10:10 PM
ISS_00BTI_DARKSIDE004_VIMS	ISS_Phot_1_by_1	2004-348T18:38:13	Tue 05:02 AM	Tue 06:10 AM	Mon 10:10 PM
VIMS_00BTI_DARKSIDE004_PRIME	VIMS_18432	2004-348T18:38:13	Tue 05:02 AM	Tue 06:10 AM	Mon 10:10 PM
UVIS_00BSW_IPHSURVEY053_RIDER	UVIS_5032	2004-348T22:52:00	Tue 05:42 AM	Tue 06:50 AM	Mon 10:50 PM
<b>BEGIN B4 Playback of D/L Science &amp; Engr.</b>			<b>Tue 06:02 AM</b>	<b>Tue 07:10 AM</b>	<b>Mon 11:10 PM</b>
<b>BEGIN P5 Playback of Critical UVIS Data</b>			<b>Tue 07:12 AM</b>	<b>Tue 08:20 AM</b>	<b>Tue 12:20 AM</b>
<b>END P5 Playback</b>			<b>Tue 07:17 AM</b>	<b>Tue 08:25 AM</b>	<b>Tue 12:25 AM</b>
<b>BEGIN B4 Playback of D/L Science &amp; Engr. (cont.)</b>			<b>Tue 07:17 AM</b>	<b>Tue 08:25 AM</b>	<b>Tue 12:25 AM</b>
<b>END DOWNLINK</b>			<b>Tue 07:52 AM</b>	<b>Tue 09:00 AM</b>	<b>Tue 01:00 AM</b>



## Titan-3 Press Conference Schedule

- Feb ? – (AGU)
- PSG?



- **46 Titan flybys**
  - Scattered throughout the tour but 2006 and 2007 are the heaviest
  - T0 July 1 2004 (350,000 km) flyby - hours after SOI
  - TA Oct of 2004 - first RADAR SAR image, Huygens Landing site imaging
  - TB Dec of 2004 - ORS flyby, UVIS stellar occultations
  - Huygens mission Jan 2005
- **Mainly ORS observations during the inbound and outbound time wings**
  - Closest approach varies between RADAR observations of the surface, ORS observations of the surface, limb, or upper atmosphere, Radio Science occultations and bi-static observations, or INMS in-situ observations of the atmosphere.
- **Pushing the spacecraft**
  - Over half of the Titan flybys are on thrusters (hydrazine usage is an issue)
  - Power modes during Radio Science experiments usually unique
  - Attitude profile during a Titan flyby is ambitious (e.g. TB)
  - Always fill both SSRs!
- **4 broad science themes:**
  - Interior Structure
  - Surface Characterization
  - Atmospheric Properties
  - Magnetospheric Interactions



# TOST Summary

## Titan-3 Preview Overview

Flyby Day	REV	SE0	Date	Hyd (gms)	Alt	REFERENCE TRAJECTORY 041210																																					Outbound Illumination	In Orbit	Driving Instrument
						Inbound to c/a (hours)																		Outbound from c/a (hours)																					
RANGE (KM)					290k 200k 140k 81k 140k 200k 290k																																								
T0	194	S2	3-Jul-04	341900	1474	ISS C I C V I 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37																		Unit	IN	ISS																			
TA	300	A	S5	26-Oct-04	1290	CIRSR I CIRSR VIMS ISS RADAR V I RADAR UVIS DSN Pass																		Unit	IN	RADAR																			
TE	348	B	S6	13-Dec-04	1200	CIRSR MidIR CIRSR FarIR VIMS ISS U V UVIS CIRSR VIMS DSN Pass																		Unit	IN	ISS																			
TC	14	C	S7	13-Jan-05	60900	Flare Contour																																					Unit	IN	
T3	46	3	S8	14-Feb-05	150	1577	CIRSR I CIRSR ISS DSN Pass I RADAR UVIS ISS CIRSR DSN Pass																		Unit	IN	RSS																		
T4	90	5	S9	30-Mar-05	2402	CIRSR ISS RADAR CIRSR UVIS CIRSR DSN Pass																		Unit	Out	RADAR																			
T5	108	6	S10	15-Apr-05	275	1025	CIRSR I UVIS ISS M MAPS DSN Pass																		Unit	Out	ISS																		
T6	234	13	S13	21-Aug-05	3758	CIRSR M DSN Pass																		Unit	Out	CIRSR																			
T7	250	14	S14	6-Sep-05	340	1025	I VIMS ISS RADAR CIRSR DSN Pass																		Unit	Out	RADAR																		
T8	301	17	S15	27-Oct-05	1570	1451	I VIMS I RADAR CIRSR M DSN Pass																		Unit	IN	RADAR																		
T9	360	19	S17	25-Dec-05	10409	CIRSR VIMS I UVIS G DSN Pass																		Unit	Out	UVIS																			
T10	15	20	S17	14-Jan-06	2043	CIRSR I CIRSR ISS UVIS C V UVIS ISS G DSN Pass																		Unit	IN	ISS																			
T11	58	21	S18	26-Feb-06	1813	VIMS ISS Glob. RSS ISS RSS UVIS CIRSR FP1 DSN Pass																		Unit	Out	RSS																			
T12	77	22	S19	17-Mar-06	500	1951	VIMS CIRSR FP1 ISS Global V RADAR VIMS Cloud Map CIRSR M DSN Pass																		Unit	IN	RADAR																		
T13	90	23	S20	30-Mar-06	1855	CIRSR FP1 FP3 V CIRSR ISS Reg. U RADAR UVIS CIRSR FP1 M DSN Pass																		Unit	Out	RADAR																			
T14	140	24	S20	19-May-06	320	1879	CIRSR FP1 FP3 UVIS FP1 RSS CIRSR M DSN Pass																		Lit	IN	RSS																		
T15	183	25	S21	1-Jul-06	1906	VIMS CIRSR FP1 ISS Glob. CIRSR FPB RADAR MAPS FP1 UVIS I CIRSR FP1 FPB M DSN Pass																		Unit	Out	CIRSR																			
T16	203	26	S22	21-Jul-06	340	950	VIMS CIRSR VIMS RADAR U CIRSR VIMS G DSN Pass																		Lit	IN	RADAR																		
T17	250	28	S23	6-Sep-06	500	950	I CIRSR I UVIS CIRSR ISS ISS VIMS G DSN Pass																		Lit	IN	CIRSR																		
T18	266	29	S23	22-Sep-06	275	950	CIRSR I CIRSR I UVIS I CIRSR INMS VIMS CIRSR DSN Pass																		Lit	IN	CIRSR																		
T19	282	30	S24	8-Oct-06	340	950	CIRSR I CIRSR RADAR CIRSR I CIRSR G-DSN Pass																		Lit	IN	RADAR																		
T20	298	31	S25	24-Oct-06	1610	950	"ORS Option" VIMS Cloud Map RADAR ISS CIRSR I VIMS M-DSN Pass G-DSN Pass																		Lit	IN	VIMS																		
T21	298	31	S25	24-Oct-06	264	950	"RADAR Option" VIMS Cloud Map RADAR ISS CIRSR VIMS M-DSN Pass G-DSN Pass																		Lit	IN	RADAR																		
T21	346	35	S26	11-Dec-06	275	950	CIRSR I CIRSR UVIS I I U RADAR ISS CIRSR I DSN Pass																		Lit	IN	RADAR																		
T22	362	36	S26	27-Dec-06	1500	1500	CIRSR FP1 RSS CIRSR RSS ISS Reg. CIRSR RSS CIRSR M DSN Pass																		Unit	Out	Driving RSS																		
T23	13	37	S27	12-Jan-07	340	950	CIRSR I CIRSR FP1 I CIRSR RADAR ISS CIRSR ISS V UVIS G-DSN Pass																		Lit	IN	RADAR																		
T24	29	38	S27	28-Jan-07	2776	CIRSR I CIRSR FP1 I UVIS I CIRSR ISS CIRSR G-DSN Pass																		Lit	IN	CIRSR																			
T25	53	39	S28	21-Feb-07	340	950	I CIRSR FP1 I CIRSR RADAR ISS CIRSR ISS V CIRSR G-DSN Pass																		Lit	Out	RADAR																		
T26	69	40	S28	9-Mar-07	264	950	I CIRSR FP1 I CIRSR UVIS CIRSR ISS C UVIS I CIRSR ISS VIMS M DSN Pass																		Lit	Out	UVIS																		
T27	85	41	S28	25-Mar-07	150	950	CIRSR FP1 I CIRSR I UVIS RSS CIRSR UVIS I CIRSR ISS VIMS G-DSN Pass																		Lit	Out	RSS																		
T28	100	42	S29	9-Apr-07	340	950	I CIRSR FP1 VIMS VIMS RADAR ISS C ISS CIRSR G-DSN Pass																		Lit	Out	RADAR																		
T29	116	43	S29	25-Apr-07	340	950	CIRSR FP1 I VIMS CIRSR RADAR VIMS I CIRSR ISS M DSN Pass																		Lit	Out	RADAR																		
T30	132	44	S30	11-May-07	340	950	CIRSR FP1 VIMS UVIS RADAR ISS CIRSR ISS V M DSN Pass																		Lit	Out	RADAR																		
T31	148	45	S30	27-May-07	2425	CIRSR FP1 I UVIS I RSS ISS VIMS I CIRSR M DSN Pass																		Lit	Out	RSS																			
T32	164	46	S31	12-Jun-07	500	950	"INMS Option" C VIMS CIRSR UVIS I UVIS C V CIRSR VIMS I CIRSR ISS V CIRSR G-DSN Pass																		Lit	Out	UVIS																		
T33	164	46	S31	13-Jun-07	500	950	"Solar Occ Option" C VIMS CIRSR UVIS I UVIS V CIRSR VIMS I CIRSR ISS V CIRSR G-DSN Pass																		Lit	Out	UVIS																		
T33	180	47	S31	29-Jun-07	1942	CIRSR FP1 I RSS UVIS I RSS ISS C RSS CIRSR VIMS M-DSN G-DSN Pass																		Lit	Out	RSS																			
T34	200	48	S32	19-Jul-07	1302	CIRSR I CIRSR VIMS UVIS I RSS ISS C ISS CIRSR G-DSN Pass																		Lit	IN	RSS																			
T35	243	49	S33	31-Aug-07	3227	CIRSR I CIRSR I CIRSR I U ISS C ISS CIRSR G DSN Pass																		Lit	Out	ISS																			
T36	275	50	S34	2-Oct-07	340	950	CIRSR I UVIS RADAR RADAR VIMS I CIRSR ISS V CIRSR M DSN Pass																		Lit	Out	RADAR																		
T37	323	52	S35	19-Nov-07	500	1950	VIMS CIRSR ISS C ISS CIRSR M DSN Pass																		Lit	Out	CIRSR																		
T38	339	53	S35	5-Dec-07	1300	CIRSR I RSS CIRSR RSS ISS C RSS CIRSR ISS V CIRSR M DSN Pass																		Lit	Out	RSS																			
T39	354	54	S36	20-Dec-07	340	950	VIMS CIRSR RADAR RADAR CIRSR ISS V I Rhea VIMS M DSN Pass																		Lit	Out	RADAR																		
T40	5	55	S36	5-Jan-08	500	950	CIRSR I UVIS I C U V ISS C VIMS I CIRSR M DSN Pass																		Lit	Out	UVIS																		
T41	53	59	S38	22-Feb-08	880	950	CIRSR I VIMS RADAR UVIS ISS CIRSR ISS V DSN CIRSR UVIS M DSN 9 hours																		Lit	Out	RADAR																		
T42	85	62	S39	25-Mar-08	500	950	VIMS CIRSR ISS CIRSR ISS VIMS M DSN Pass																		Lit	Out	CIRSR																		
T43	133	67	S40	12-May-08	340	950	C I VIMS RADAR CIRSR G DSN M DSN Pass																		Lit	Out	RADAR																		
T44	149	69	S40	28-May-08	200	1316	CIRSR I CIRSR VIMS UVIS I RADAR ISS CIRSR ISS VIMS M DSN Pass																		Lit	Out	RADAR																		
T44	149	69	S40	28-May-08	1010	1316	CIRSR I CIRSR VIMS UVIS I CIRSR ISS CIRSR ISS VIMS M DSN Pass																		Lit	Out	ISS																		