Cassini Solstice Mission Titan Flyby Summary

TIMING — REFERENCE TRAJECTORY 091005

RANGE (KM) -------> 290k 200k 140k 81k 81k 140k 200k 290k

Angular Diameter (degrees) 0.5 0.7 1.1 1.8 33-degrees @ 15 mins

Inbound to c/a (hours) -22 -21 -20 -19 -18 -17 -16 -15 -14 -13 -12 -11 -10 -9 -8 -7 -6 -5 -4 -3 -2 -1

Outbound from c/a (hours) 1 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

Flyby		REV	SEQ	Date	DOY	C/A Time	Hyd gms	Alt	Inbound to c/a (hours)	Outbound from c/a (hours)	O/B Lit?	In/Out	Occ	LST	Recover?	C/A LAT	C/A LON	Phase @C/A	Flyby
											Illum. Bound			Dec-Hr		(deg)		(deg)	
T71	In - 0	134	S61	07/07/10	188	00:22:45	192	1004	Dual pb error; CIRS; RADAR; CAPS; IN; CAPS; RADAR; VIMS; C70		LIT OUTBOUND ILLUMINATION	Out		16.04		-56.2	304	82	T71
T72	In - 0	138	S63	09/24/10	267	18:38:41		8178	CIRS; VIMS; UVIS; VIMS; C70		LIT OUTBOUND ILLUMINATION	Out		15.96		-14.7	290	60	T72
T73	In - 0	140	S64	11/11/10	315	13:37:02		7926	Safing; CIRS; CAPS; CIRS; VIMS; G70		LIT OUTBOUND ILLUMINATION	Out		15.83		-35.5	108	121	T73
T74	Equatorial - 1	145	S66	02/18/11	049	16:04:11		3651	CIRS; CAPS with HGA to Earth for RSS; CIRS; C70		LIT OUTBOUND ILLUMINATION	IN		20.62		0.7	245	62	T74
T75	Equatorial - 1	147	S67	04/19/11	109	05:00:39		10053	CAPS; UVIS; G70		LIT OUTBOUND ILLUMINATION	Out		14.25		0.1	107	101	T75
T76	Equatorial - 1	148	S68	05/08/11	128	22:53:44		1873	CIRS; VIMS; UVIS; VIMS; CIRS; G70		LIT OUTBOUND ILLUMINATION	IN		19.79		0.0	248	47	T76
T77	Equatorial - 1	149	S68	06/20/11	171	18:32:01		1359	no dual pb, dsn negotiations; UVIS; RADAR; CIRS; VIMS; CIRS; G70		LIT OUTBOUND ILLUMINATION	Out		12.25		0.1	106	73	T77
T78	Equatorial - 1	153	S70	09/12/11	255	02:50:05		5821	CIRS; UVIS; CAPS; UVIS; G70		LIT OUTBOUND ILLUMINATION	IN	UV	17.55		-0.2	60.2	159	T78
T79	Equatorial - 1	158	S71	12/13/11	347	20:11:24		3586	originally CAPS; CIRS; VIMS; CIRS; C70		LIT OUTBOUND ILLUMINATION	Out		12.79		7.7	291	100	T79
T80	Equatorial - 1	159	S71	01/02/12	002	15:13:37		29415	CIRS; ISS; RADAR; VIMS; G70		LIT OUTBOUND ILLUMINATION	IN	V	18.65		-59.9	247	76	T80
T81	Equatorial - 1	160	S72	01/30/12	030	13:39:47		31131	CIRS; UVIS; ISS; UVIS; CIRS; G70		LIT OUTBOUND ILLUMINATION	Out		12.69		-60.0	105	96	T81
T82	Equatorial - 1	161	S72	02/19/12	050	08:43:17		3803	CIRS; ISS; CIRS; M70		LIT OUTBOUND ILLUMINATION	IN		18.34		9.8	61.4	143	T82
T83	Equatorial - 1	166	S73	05/22/12	143	01:10:11	405	955	VIMS; CIRS; RADAR; RADAR; VIMS; CIRS; M70		LIT OUTBOUND ILLUMINATION	Out		13.62		72.3	128	71	T83
T84	Inclined - 1	167	S73	06/06/12	159	00:07:21	391	959	CIRS; VIMS; CIRS; RADAR; UVIS; CIRS; G70		LIT OUTBOUND ILLUMINATION	Out		13.64		39.1	282	75	T84
T85	Inclined - 1	169	S74	07/24/12	206	20:03:08	383	1012	CIRS; VIMS; CIRS; VIMS; CIRS; VIMS; G70		LIT OUTBOUND ILLUMINATION	Out		13.69		61.6	149	58	T85
T86	Inclined - 1	172	S75	09/26/12	270	14:35:39	453	956	CIRS; UVIS; CIRS; IN; R; CIRS; UVIS; CIRS; C70		LIT OUTBOUND ILLUMINATION	Out		13.44		62.4	200	47	T86
T87	Inclined - 1	174	S76	11/13/12	318	10:22:10	300	973	CIRS; VIMS; NAV w INMS riding along; VIMS; CIRS; G70		LIT OUTBOUND ILLUMINATION	Out		13.22		11.4	125	68	T87
T88	Inclined - 1	175	S76	11/29/12	334	08:57:00	472	1014	CIRS; VIMS; CIRS; C70; CIRS; C70		LIT OUTBOUND ILLUMINATION	Out		13.24		25.6	148	44	T88
T89	Inclined - 1	181	S77	02/17/13	048	01:56:37		1978	RSS; CIRS; M70		LIT OUTBOUND ILLUMINATION	Out		13.19		20.7	155	35	T89
T90	Inclined - 1	185	S78	04/05/13	095	21:43:32		1400	CIRS; VIMS; CIRS; M70		LIT OUTBOUND ILLUMINATION	Out		12.87		-16.8	130	69	T90
T91	Inclined - 1	190	S78	05/23/13	143	17:32:55	352	970	CIRS; RADAR; ISS; CIRS; M70		LIT OUTBOUND ILLUMINATION	Out		12.86		46.2	240	50	T91
T92	Inclined - 1	194	S79	07/10/13	191	13:21:48	441	964	ISS; CIRS; RADAR; VIMS; ISS; C70		LIT OUTBOUND ILLUMINATION	Out		12.91		37.0	234	46	T92
T93	Inclined - 1	195	S79	07/26/13	207	11:56:23		1400	CIRS; ISS; CIRS; UVIS; ISS; VIMS; ISS; CIRS; VIMS; C70		ILLUMINATION	Out		12.84		28.2	249	58	T93
T94	Inclined - 1	197	S80	09/12/13	255	07:43:57		1400	CIRS; ISS; VIMS; CIRS; UVIS; VIMS; C70		ILLUMINATION	Out		12.5		17.1	206	21	T94
T95	Inclined - 1	198	S80	10/14/13	287	04:56:28	391	961	CIRS; ISS; CIRS; RADAR; IN; RADAR; CIRS; C70		ILLUMINATION	Out		12.4		8.2	205	25	T95
T96	Inclined - 1	199	S81	12/01/13	335	00:41:19		1400	CIRS; ISS; VIMS; CIRS; VIMS; C70		ILLUMINATION	IN		12.52		-13.9	143	50	T96
T97	Inclined - 1	200	S82	01/01/14	001	21:59:42		1400	CIRS; ISS; CIRS; UVIS; VIMS; CIRS; UVIS; CIRS; C70		ILLUMINATION	IN		12.5		-14.3	177	35	T97
T98	Inclined - 1	201	S82	02/02/14	033	19:12:39	352	1236	CIRS; ISS; RADAR; CIRS; C70		ILLUMINATION	IN		12.29		-22.9	177	44	T98
T99	Inclined - 1	202	S82	03/06/14	065	16:26:48		1500	RSS; C70		ILLUMINATION	IN		12.05		-31.4	177	53	T99
T100	Inclined - 1	203	S83	04/07/14	097	13:41:15	518	963	CIRS; ISS; CIRS; VIMS; CIR; VI; IN; CIRS; UVIS; CIRS; C70		ILLUMINATION	IN	V	12		-37.0	188	60	T100
T101	Inclined - 1	204	S83	05/17/14	137	16:12:16	580	2994	CIRS; WP; UVIS; WP; RSS; WP; CIRS; C70		ILLUMINATION	Out	R	23.97		-37.0	162	158	T101
T102	Inclined - 1	205	S84	06/18/14	169	13:28:25	580	3659	CIRS; ISS; CIRS; RSS; CIRS; ISS; C70		ILLUMINATION	Out	R	23.77		-36.6	178	165	T102
T103	Inclined - 1	206	S84	07/20/14	201	10:40:59		5103	CIRS; ISS; CIRS; VIMS; UVIS; CIRS; ISS; C70		ILLUMINATION	Out	UV	23.76		-31.5	179	171	T103
T104	Inclined - 1	207	S85	08/21/14	233	08:09:10	406	964	CIRS; ISS; CIRS; VIMS; RADAR; RAD; VIMS; CIRS; ISS; CIRS; C70		ILLUMINATION	Out		23.87		34.2	360	12	T104
T105	Inclined - 1	208	S85	09/22/14	265	05:23:20		1400	CIRS; UVIS; VIMS; CIRS; UVIS; CIRS; C70		ILLUMINATION	Out	U	23.9		43.5	0.31	21	T105
T106	Inclined - 1	209	S86	10/24/14	297	02:40:31	459	1013	CIRS; ISS; CIRS; VIMS; RSS; VIMS; CIRS; C70		ILLUMINATION	Out		23.71		37.1	322	31	T106
T107	Inclined - 1	210	S86	12/10/14	344	22:26:36	300	980	CIRS; ISS; NAV / INMS; VIMS; CIRS; C70		ILLUMINATION	Out		23.35		53.8	57	56	T107
T108	Inclined - 1	211	S87	01/11/15	011	19:48:36	391	970	RINGS PIE; CIRS; VIMS; RADAR; CIRS; C70		ILLUMINATION	Out		23.35		69.0	1.16	46	T108

Cassini Solstice Mission Titan Flyby Summary

TIMING — **REFERENCE TRAJECTORY 091005**

RANGE (KM) -------> 290k 200k 140k 81k 81k 140k 200k 290k

Angular Diameter (degrees) 0.5 0.7 1.1 1.8 33-degrees @ 15 mins

Inbound to c/a (hours): -22 -21 -20 -19 -18 -17 -16 -15 -14 -13 -12 -11 -10 -9 -8 -7 -6 -5 -4 -3 -2 -1

Outbound from c/a (hours): 1 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

Flyby		REV	SEQ	Date	DOY	C/A Time	Hyd gms	Alt	Inbound to c/a (hours)	Outbound from c/a (hours)	O/B Lit?	In/Out	Occ	LST	Recover?	C/A LAT (deg)	C/A LON (deg)	Phase @C/A (deg)	Flyby
									Illum. Bound					Dec-Hr					
T109		212	S87	02/12/15	043	17:08:05	431	1200	VIMS, UVIS	VIMS, CIRS, UVIS, CIRS, C70	UNLIT OUTBOUND	Out		23.49		78.4	3.14	55	T109
T110		213	S88	03/16/15	075	14:29:49		2275	CIRS, VIMS	CIRS, CIRS, C70		Out		23.52		75.0	94	70	T110
T111	Equatorial - 2	215	S89	05/07/15	127	22:50:25		2722	CIRS, VIMS	CIRS, M70		IN		6.235		-1.1	67	34	T111
T112		218	S89	07/07/15	188	08:09:51		10953	CIRS, ISS	CIRS, VIMS, CIRS, C70		Out		0.919		0.6	294	78	T112
T113		222	S91	09/28/15	271	21:37:14	302	1036	MAG, CIRS, CAPS	R, CAPS, CIRS, G70		IN		6.711		-1.1	61.4	42	T113
T114		225	S91	11/13/15	317	05:46:35		11920	CIRS, VIMS, CIRS, VIMS, ISS	CIRS, UVIS, VIMS, C70		Out		2.548		-14.4	122	92	T114
T115		230	S92	01/16/16	016	02:20:52		3817	CIRS, UVIS	CIRS, VIMS, C70		Out		2.668		-8.4	300	99	T115
T116		231	S92	02/01/16	032	01:01:26		1400	CIRS	UVIS, ISS, CIRS, C70		Out	UV	2.635		-83.6	175	120	T116
T117		232	S93	02/16/16	047	23:52:04	412	1018	CIRS, VIMS	RSS, CIRS, C70		Out	R	2.587		-38.7	285	122	T117
T118		234	S93	04/04/16	095	19:48:00	143	990	CIRS, UVIS, ISS	V, UVIS, CIR, UVIS, VIMS, G70		Out	UV	2.243		-63.0	245	138	T118
T119	Inclined - 2	235	S94	05/06/16	127	17:00:45	415	971	CIRS, ISS, CIRS, CIRS, CAPS	RSS, VIMS, CIRS, C70		Out	R	2.08		-59.9	178	138	T119
T120		236	S94	06/07/16	159	14:12:38	524	975	CIRS	R, RADAR, CIRS, G70		Out		2.183		-36.6	147	124	T120
T121		238	S95	07/25/16	207	10:04:40	391	976	CIRS, VIM	RADAR, VIMS, CIRS, C70		Out	V	2.237		-7.0	129	101	T121
T122		239	S95	08/10/16	223	08:37:15		1599		RSS, ISS, C70		Out		2.152		9.3	126	92	T122
T123		243	S96	09/27/16	271	04:23:01		1737	CIRS, VIMS, UVIS	VIMS, CIRS, UVIS, VIMS, G70		Out	UV	1.755		21.0	126	88	T123
T124		248	S96	11/14/16	319	00:01:44	459	1582	CIRS, ISS, CIRS, VIMS	RSS, CIRS, ISS, CIRS, C70		Out		1.725		36.2	122	80	T124
T125		250	S97	11/29/16	334	22:20:20		3223	VIMS	ISS, V, CIRS, G70		Out		1.814		41.4	128	82	T125
T126	F rin	270	S99	04/22/17	112	06:19:46	409	979	D/L unknown, CIRS, ISS, CIRS, ISS	RADAR, VIMS, CIRS, D/L unknown		Out		1.323		66.4	94.3	61	T126

10.47342 — Predict

Average hydrazine use : — As-flown

Engine day; Caboose day; Instrument 10 Pointer

Please direct questions or comments regarding this Summary to **Kim Steadman (x3-2403)**

Stellar & Solar

UV	Earth	R	INMS	I
	Solar	UV	+MAG	I+M
	Stellar	U	Hi-Res	

Flank In; Tail; Flank Out; Nose