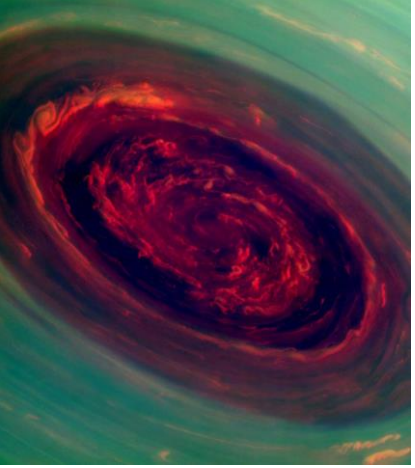

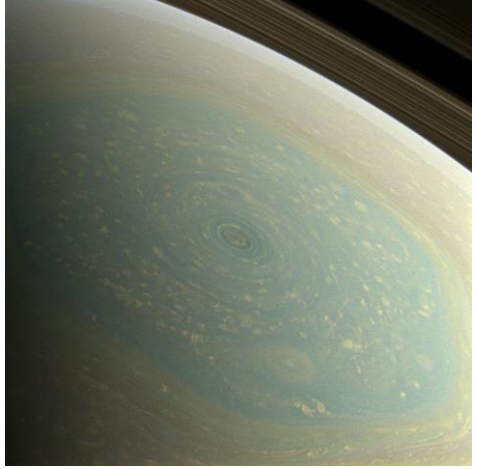
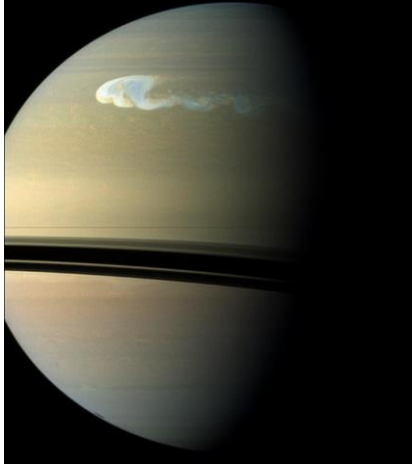

Science Planning & Sequence Team
CASSINI

SATURN TARGET WORKING TEAM

Rev 100_102 Segment Legacy Package

Segment Boundary: Jan 18, 2009 – Jan 30, 2009
2009-018T14:32:00 – 2009-030T06:18:00 (SCET)

Integration Began 02/04/2008
Segment Delivered to S47 Sequence 06/30/2008
Lead Integrator was Douglas Equils

Legacy Package Assembled by Keven Uchida

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*** N.A. = Slide present but content not available.**

Segment Overview and Final Products

Segment Summary

- This is an ~11.5 day long Equinox segment spanning two apoapses (one near the start and the other at the end) and one periapse (at the approximate mid-point). The segment spans a very broad range of both Saturn phase angles and sub-S/C latitudes.
- UVIS and VIMS lead the atmospheric studies. UVIS leads auroral observations distributed throughout the segment, an EUV/FUV observation near the start, and two Beta Cru atmospheric occultations. VIMS performs a number of imaging/mosaic activities, five of which study the structure and dynamics within the polar regions.
- This segment contains a good share of “out of discipline” studies as well. ISS focuses on satellite (Dione, Mimas, Titan and small moons) and ring observations. UVIS observes (Enceladus) and VIMS Saturn’s rings. CAPS conducts plasma/magnetospheric measurements and RSS a boresight calibration.
- There are no ORS boresight constraints/issues in this segment.
- No details are available, but it appears that selective upgrading of 34m stations to 70m stations alleviated any initial data volume overage.

Final Sequenced SPASS (1 of 2)

Request	Riders	Start (SCET)	Start (Epoch)	Duration	End (SCET)	Primary	Secondary	Comments
SATURN_100_102 Segment		2009-018T14:32:00		011T15:46:00	2009-030T06:18:00			
SP_100SA_WAYPTTURN018_PRIME	R	2009-018T14:32:00		000T00:30:00	2009-018T15:02:00	ISS_NAC to Saturn (0.0,-20.0,0.0 deg. offset)	NEG_X to Sun	
NEW WAYPOINT		**2009-018T15:02:00**		**002T00:11:00**	**2009-020T15:13:00**	**ISS_NAC to Saturn (0.0,-20.0,0.0 deg. offset)**	**NEG_X to Sun**	
ISS_100TI_M30R2CLDF018_PRIME	C, R, U	2009-018T15:02:00	E100_M30R2CLDF018+	000T01:25:00	2009-018T16:27:00	ISS_NAC to Titan (0.0,-15.0,0.0 deg. offset)	NEG_X to NTP	
RADAR_100OT_SRCRADCAL001_PRIME	C, I	2009-018T16:27:00		000T07:00:00	2009-018T23:27:00	NEG_Z to 274.971/-16.158	PIC	The CIMS RA/DEC is only for the 1st targeting source (of 4)
VIMS_100SA_SREGMAP001_PRIME	I	2009-018T23:27:00		000T03:25:00	2009-019T02:52:00	ISS_NAC to Saturn	NEG_X to NSP	
ISS_100DI_080W009PH001_PRIME	C, U, V	2009-019T02:52:00		000T02:00:00	2009-019T04:52:00	UVIS_FUV to Dione (0.0,-15.0,0.0 deg. offset)	NEG_X to Sun	Do (0,0,-1.03 mrad) offset for CIRS FP3 within the first approx. 10 percent of the tracking period (but at least for 5 min.)
Apoapse Per = 9.6 d, inc =...		2009-019T03:37:34		000T00:00:01	2009-019T03:37:35			
SP_101EA_DLTURN019_PRIME		2009-019T04:52:00		000T00:40:00	2009-019T05:32:00	XBAND to Earth	NEG_X to 275.9/67.2	
SP_101EA_G70METNON019_PRIME	C, E	2009-019T05:32:00		000T09:00:00	2009-019T14:32:00	XBAND to Earth	NEG_X to 275.9/67.2	MIMI NEG_Y to Saturn (0,0, -9.5)
SP_101SA_WAYPTTURN019_PRIME		2009-019T14:32:00		000T00:40:00	2009-019T15:12:00	ISS_NAC to Saturn (0.0,-20.0,0.0 deg. offset)	NEG_X to Sun	
UVIS_101SA_EUVFUV001_PRIME		2009-019T15:12:00		000T13:11:00	2009-020T04:23:00	UVIS_FUV to Saturn (-1.258,0.0,3.153 deg. offset)	POS_Z to 66.097/68.1	
ISS_101OT_SATELLORB004_PRIME		2009-020T04:23:00		000T00:30:00	2009-020T04:53:00	ISS_NAC to Rocks (0.0,-20.0,0.0 deg. offset)	NEG_X to Sun	
SP_101EA_DLTURN020_PRIME		2009-020T04:53:00		000T00:40:00	2009-020T05:33:00	XBAND to Earth (0.0,0.0,-15.0 deg. offset)	POS_X to NEP	
SP_101EA_G34BWGNON020_PRIME	C, E	2009-020T05:33:00		000T09:00:00	2009-020T14:33:00	XBAND to Earth (0.0,0.0,-15.0 deg. offset)	POS_X to NEP	POS_X to NEP
SP_101SA_WAYPTTURN020_PRIME		2009-020T14:33:00		000T00:40:00	2009-020T15:13:00	ISS_NAC to Saturn	POS_X to NSP	
NEW WAYPOINT		**2009-020T15:13:00**		**001T00:00:00**	**2009-021T15:13:00**	**ISS_NAC to Saturn**	**POS_X to NSP**	
CIRS_101SA_FIRMAP001_PRIME	V	2009-020T15:13:00		000T13:40:00	2009-021T04:53:00	CIRS_FP1 to Saturn	POS_X to NSP	
SP_101EA_DLTURN021_PRIME		2009-021T04:53:00		000T00:40:00	2009-021T05:33:00	XBAND to Earth	POS_X to NEP	
SP_101EA_G34BWGNON021_PRIME	C	2009-021T05:33:00		000T09:00:00	2009-021T14:33:00	XBAND to Earth	Rolling/Bias	POS_X to NEP
SP_101SA_WAYPTTURN021_PRIME		2009-021T14:33:00		000T00:40:00	2009-021T15:13:00	ISS_NAC to Saturn (0.0,-20.0,0.0 deg. offset)	NEG_X to Sun	
NEW WAYPOINT		**2009-021T15:13:00**		**004T16:05:00**	**2009-026T07:18:00**	**ISS_NAC to Saturn (0.0,-20.0,0.0 deg. offset)**	**NEG_X to Sun**	
UVIS_101SA_AURORA001_PRIME	C, I, M, V	2009-021T15:13:00		000T07:12:00	2009-021T22:25:00	ISS_NAC to Saturn	NEG_X to Sun	
VIMS_101RI_GAMCRUOCC016_PRIME	C, M	2009-021T22:25:00		000T04:50:00	2009-022T03:15:00	VIMS_IR to 187.791/-57.113	PIC	
VIMS_101SA_REGDYN001_PRIME		2009-022T03:15:00		000T00:42:00	2009-022T03:57:00	ISS_NAC to Saturn	NEG_X to Sun	
UVIS_101ST_BETCRU001_PRIME	C, I	2009-022T03:57:00		000T01:22:00	2009-022T05:19:00	UVIS_FUV to 191.93/-59.688 (0.082,-20.0,0.0 deg. offset)	NEG_X to Sun	
VIMS_101SA_REGDYN002_PRIME		2009-022T05:19:00		000T01:44:00	2009-022T07:03:00	ISS_NAC to Saturn	NEG_X to Sun	
UVIS_101ST_BETCRU002_PRIME	C, I	2009-022T07:03:00		000T01:30:00	2009-022T08:33:00	UVIS_FUV to 191.93/-59.688 (0.082,-20.0,0.0 deg. offset)	NEG_X to Sun	
VIMS_101SA_REGDYN003_PRIME		2009-022T08:33:00		000T12:00:00	2009-022T20:33:00	ISS_NAC to Saturn	NEG_X to Sun	
NAV_101SK_OPNAV221_PRIME	C	2009-022T20:33:00		000T01:14:00	2009-022T21:47:00	ISS_NAC to Satellites	NEG_X to Sun	Start at Waypoint, end at Earth point
NAV_101EA_DLTURN221_PRIME		2009-022T21:47:00		000T00:01:00	2009-022T21:48:00	XBAND to Earth	POS_X to NEP	
SP_101EA_M70METNON022_PRIME	C, E	2009-022T21:48:00		000T09:00:00	2009-023T06:48:00	XBAND to Earth	POS_X to NEP	POS_X to NEP
SP_101SA_WAYPTTURN023_PRIME		2009-023T06:48:00		000T00:40:00	2009-023T07:28:00	ISS_NAC to Saturn (0.0,-20.0,0.0 deg. offset)	NEG_X to Sun	
UVIS_101SA_AURORA002_PRIME	C, I, V	2009-023T07:28:00		000T06:47:00	2009-023T14:15:00	ISS_NAC to Saturn	NEG_X to 13.758/6.6	
ISS_101MI_086W151PH001_PRIME	C, U, V	2009-023T14:15:00		000T04:05:00	2009-023T18:20:00	UVIS_FUV to Mimas	NEG_X to Sun	Do (0,0,-1.03 mrad) offset for CIRS FP3 within the first approx. 10 percent of the tracking period (but at least for 5 min.)
CAPS_101SA_IMVP9PTG001_PRIME	M	2009-023T18:20:00		000T02:48:00	2009-023T21:08:00	POS_Y to COROT (0.0,-10.0,6.0 deg. offset)	NEG_X to North_Pole_Dir	
SP_101EA_DLTURN023_PRIME	M	2009-023T21:08:00		000T00:40:00	2009-023T21:48:00	XBAND to Earth	NEG_X to 261.1/-16.1	
SP_101EA_M70METOTP023_PRIME	C, E, M, N	2009-023T21:48:00		000T09:00:00	2009-024T06:48:00	XBAND to Earth	NEG_X to 261.1/-16.1	CDA
Periapse R = 9.100 Rs, lat ...		2009-023T22:29:13		000T00:00:01	2009-023T22:29:14			
SP_101SA_WAYPTTURN024_PRIME		2009-024T06:48:00		000T00:40:00	2009-024T07:28:00	ISS_NAC to Saturn (0.0,-20.0,0.0 deg. offset)	NEG_X to Sun	
VIMS_101SA_SPOLEDYN001_PRIME	I, U	2009-024T07:28:00		000T13:40:00	2009-024T21:08:00	ISS_NAC to Saturn	POS_X to NSP	
SP_101EA_DLTURN024_PRIME		2009-024T21:08:00		000T00:40:00	2009-024T21:48:00	XBAND to Earth	NEG_X to 261.1/-16.1	

Final Sequenced SPASS (2 of 2)

SPASS Continued

Request	Riders	Start (SCET)	Start (Epoch)	Duration	End (SCET)	Primary	Secondary	Comments
SP_101EA_M34BWGOTB024_PRIME	C, N	2009-024T21:48:00		000T09:00:00	2009-025T06:48:00	XBAND to Earth	NEG_X to 261.1/-16.1	no roll, sru/otb
SP_101SA_WAYPTTURN025_PRIME		2009-025T06:48:00		000T00:40:00	2009-025T07:28:00	ISS_NAC to Saturn (0.0,-20.0,0.0 deg. offset)	NEG_X to Sun	
ISS_101TI_M150R2HZ025_PRIME	C, U	2009-025T07:28:00	E101_M150R2HZ025+0	000T01:15:00	2009-025T08:43:00	ISS_NAC to Titan	NEG_X to Sun	
VIMS_101SA_SPOLEDYN002_PRIME	I, U	2009-025T08:43:00		000T12:10:00	2009-025T20:53:00	ISS_NAC to Saturn	NEG_X to Sun	
SP_101EA_DLTURN025_PRIME		2009-025T20:53:00		000T00:40:00	2009-025T21:33:00	XBAND to Earth	POS_X to NEP	
SP_101EA_M34BWGNON025_PRIME	C, E	2009-025T21:33:00		000T09:00:00	2009-026T06:33:00	XBAND to Earth	POS_X to NEP	POS_X to NEP
SP_101SA_WAYPTTURN026_PRIME	V	2009-026T06:33:00		000T00:45:00	2009-026T07:18:00	ISS_NAC to Saturn	NEG_X to NSP	
NEW WAYPOINT		**2009-026T07:18:00**		**001T07:25:00**	**2009-027T14:43:00**	**ISS_NAC to Saturn**	**NEG_X to NSP**	
CIRS_101SA_FIRMAP002_PRIME	V	2009-026T07:18:00		000T11:00:00	2009-026T18:18:00	CIRS_FP1 to Saturn	NEG_X to NSP	
CAPS_101SA_SURVEYPTG004_PRIME		2009-026T18:18:00		000T02:00:00	2009-026T20:18:00	POS_Y to COROT (10.0,40.0,0.0 deg. offset)	NEG_X to NSP	
MAG_101SU_CALROLL001_PRIME		2009-026T20:18:00		000T06:45:00	2009-027T03:03:00	NEG_X to Sun (0.0,0.0,-30.0 deg. offset)	Rolling	
ISS_101OT_SATELLORB013_PRIME		2009-027T03:03:00		000T00:30:00	2009-027T03:33:00	ISS_NAC to Rocks	NEG_X to NSP	
NAV_101SK_OPNAV271_PRIME		2009-027T03:33:00		000T01:29:00	2009-027T05:02:00	ISS_NAC to Satellites	POS_Z to NSP	Start at Waypoint, end at Earth point
NAV_101EA_DLTURN271_PRIME		2009-027T05:02:00		000T00:01:00	2009-027T05:03:00	XBAND to Earth	NEG_X to NEP	
SP_101EA_G70METNON027_PRIME	C	2009-027T05:03:00		000T09:00:00	2009-027T14:03:00	XBAND to Earth	NEG_X to NEP	
SP_101SA_WAYPTTURN027_PRIME		2009-027T14:03:00		000T00:40:00	2009-027T14:43:00	ISS_NAC to Saturn (0.0,-20.0,0.0 deg. offset)	NEG_X to Sun	
NEW WAYPOINT		**2009-027T14:43:00**		**001T14:05:00**	**2009-029T04:48:00**	**ISS_NAC to Saturn (0.0,-20.0,0.0 deg. offset)**	**NEG_X to Sun**	
UVIS_101SA_AURORA003_PRIME	C, I, V	2009-027T14:43:00		000T13:10:00	2009-028T03:53:00	ISS_NAC to Saturn	NEG_X to Sun	
ISS_101OT_SATELLORB016_PRIME		2009-028T03:53:00		000T00:30:00	2009-028T04:23:00	ISS_NAC to Rocks (0.0,-20.0,0.0 deg. offset)	NEG_X to Sun	
SP_101EA_DLTURN028_PRIME		2009-028T04:23:00		000T00:40:00	2009-028T05:03:00	XBAND to Earth	POS_X to NEP	
SP_101EA_G34BWGNON028_PRIME	C, E	2009-028T05:03:00		000T09:00:00	2009-028T14:03:00	XBAND to Earth	POS_X to NEP	POS_X to NEP
SP_101SA_WAYPTTURN028_PRIME		2009-028T14:03:00		000T00:40:00	2009-028T14:43:00	ISS_NAC to Saturn (0.0,-20.0,0.0 deg. offset)	NEG_X to Sun	
UVIS_101EN_ICYATM002_PRIME	I	2009-028T14:43:00		000T02:17:00	2009-028T17:00:00	UVIS_FUV to Enceladus (0.0,0.0,-0.17 deg. offset)	POS_Z to NSP	See observation description. Duration of 4 hours allows for 30 min slew to and from Enceladus, and 3 integration sites.
ISS_101TI_M60R3CLD028_PRIME	C, U	2009-028T17:00:00	E101_M60R3CLD028+0	000T01:15:00	2009-028T18:15:00	ISS_NAC to Titan	NEG_X to Sun	
Apoapse Per = 9.5 d, inc =...		2009-028T17:01:56		000T00:00:01	2009-028T17:01:57			
ISS_102RI_GRINGARC002_PRIME		2009-028T18:15:00		000T03:24:00	2009-028T21:39:00	ISS_NAC to Rings	PIC	
CAPS_102SA_SURVEYPTG006_PRIME		2009-028T21:39:00		000T02:00:00	2009-028T23:39:00	POS_X to North_Pole_Dir (0.0,-5.0,12.0 deg. offset)	POS_Z to Saturn	
CIRS_102RI_COMP029_PRIME	C, R	2009-028T23:39:00		000T04:29:00	2009-029T04:08:00	CIRS_FP1 to Rings	POS_Z to NSP	
ISS, UVIS & VIMS Sleep		2009-029T02:48:00		000T06:00:00	2009-029T08:48:00			ISS, UVIS & VIMS Sleep
SP_102EA_DLTURN029_PRIME	R	2009-029T04:08:00		000T00:40:00	2009-029T04:48:00	XBAND to Earth	POS_X to NEP	
NEW WAYPOINT		**2009-029T04:48:00**		**000T09:40:00**	**2009-029T14:28:00**	**XBAND to Earth**	**POS_X to NEP**	
SP_102EA_G34BWGNON029_PRIME	C, R	2009-029T04:48:00		000T03:00:00	2009-029T07:48:00	XBAND to Earth	POS_X to NEP	POS_X to NEP: No Roll Due to USO PIM.
RSS_102EA_BORESIGHT002_PRIME	C, R	2009-029T07:48:00		000T01:00:00	2009-029T08:48:00	XBAND to Earth	PIC	
SP_102EA_G34BWGNON429_PRIME	C	2009-029T08:48:00		000T05:00:00	2009-029T13:48:00	XBAND to Earth	Rolling	POS_X to NEP
SP_102SA_WAYPTTURN029_PRIME		2009-029T13:48:00		000T00:40:00	2009-029T14:28:00	ISS_NAC to Saturn	POS_Z to NSP	
NEW WAYPOINT		**2009-029T14:28:00**		**000T16:30:00**	**2009-030T06:58:00**	**ISS_NAC to Saturn**	**POS_Z to NSP**	
CIRS_102SA_COMPSIT001_PRIME	U	2009-029T14:28:00		000T06:10:00	2009-029T20:38:00	CIRS_FP1 to Saturn	POS_Z to NSP	
SP_102EA_DLTURN429_PRIME		2009-029T20:38:00		000T00:40:00	2009-029T21:18:00	XBAND to Earth	POS_X to NEP	
SP_102EA_M70METNON029_PRIME	C, E	2009-029T21:18:00		000T09:00:00	2009-030T06:18:00	XBAND to Earth	Rolling/Bias	POS_X to NEP

Final Sequenced SMT and Data Volume (1 of 2)

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 (Mb)
SP_101EA_G70METNON019_PRIME	019 05:32	019 14:32	284	1740	64	2089	3491	1402	0	1081	53	3223	4344	1121	1462	7%	0
SP_101EA_G34BWGNON020_PRIME	020 05:33	020 14:33	0	515	63	579	3491	2912	0	237	53	869	896	26	341	2%	0
SP_101EA_G34BWGNON021_PRIME	021 05:33	021 14:33	0	885	63	948	3491	2543	0	247	53	1248	902	-347	314	2%	347
SP_101EA_M70METNON022_PRIME	022 21:48	023 06:48	347	2699	132	3177	3491	314	21	1156	53	4407	4216	-191	336	2%	191
SP_101EA_M70METOTP023_PRIME	023 21:48	024 06:48	191	1930	63	2184	3491	1307	0	754	53	2992	3404	411	336	2%	0
SP_101EA_M34BWGOTB024_PRIME	024 21:48	025 06:48	0	1658	63	1721	3491	1770	0	605	53	2379	877	-1502	-75	0%	1502
SP_101EA_M34BWGNON025_PRIME	025 21:33	026 06:33	1502	1426	62	2990	3491	501	0	247	53	3290	881	-2409	-75	0%	2409
SP_101EA_G70METNON027_PRIME	027 05:03	027 14:03	2409	1064	95	3567	3491	-75	21	237	53	3803	4381	578	1816	8%	0
SP_101EA_G34BWGNON028_PRIME	028 05:03	028 14:03	0	1675	63	1738	3491	1753	0	237	53	2028	906	-1123	1237	6%	1123
SP_102EA_G34BWGNON029_PRIME	029 04:48	029 07:48	1123	536	62	1722	3491	1769	0	72	18	1811	286	-1525	1237	6%	1525
SP_102EA_G34BWGNON429_PRIME	029 08:48	029 13:48	1525	28	4	1557	3491	1934	0	138	29	1724	507	-1217	1237	5%	1217
SP_102EA_M70METNON029_PRIME	029 21:18	030 06:18	1217	423	32	1671	3491	1820	0	2064	53	3789	4291	502	1237	4%	0

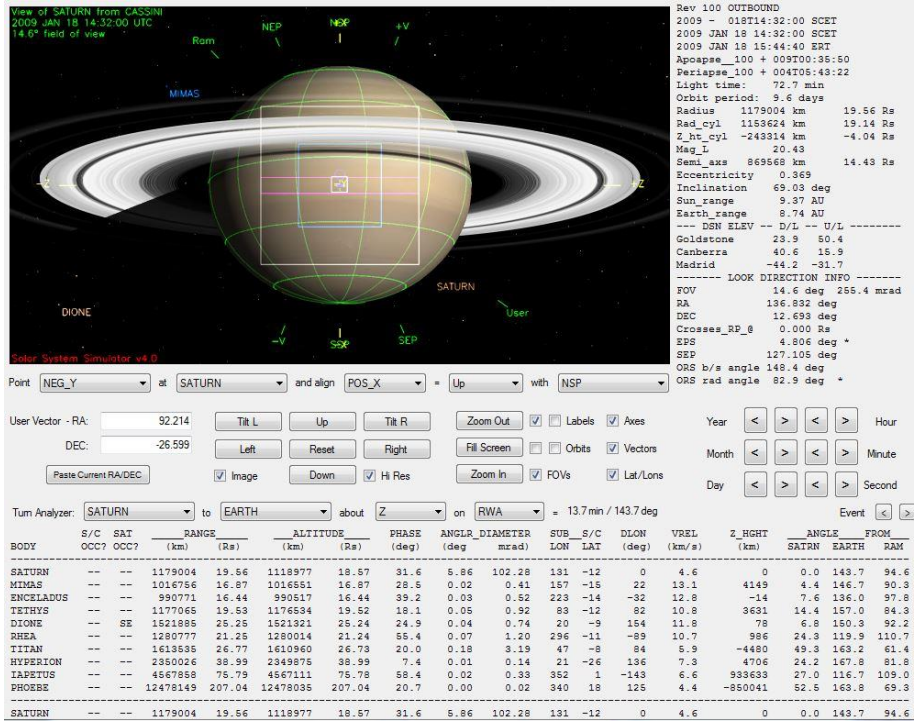
* NOTE: Negative SSR (P4) Margins did not result in data loss due to compression/under-utilization.

Final Sequenced SMT and Data Volume (2 of 2)

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	018 14:32	019 05:32	481.4	28.3	128.4	14.5	585.0	32.4	48.6	223.9	70.7	35.9	75.2	0.0	12.3	1736.6
SP_101EA_G70METNON019_PRIME	019 05:32	019 14:32	123.0	17.0	86.4	4.2	0.0	19.4	29.2	0.0	787.4	4.9	0.0	0.0	0.0	1071.5
DAILY TOTAL SCIENCE	018 14:32	019 14:32	604.4	45.3	214.8	18.6	585.0	51.8	77.8	223.9	858.2	40.9	75.2	0.0		
OBSERVATION_NOR	019 14:32	020 05:33	54.1	28.3	0.0	5.4	32.0	32.4	48.7	0.0	70.8	238.8	0.0	0.0	12.3	522.8
SP_101EA_G34BWGNON020_PRIME	020 05:33	020 14:33	32.4	17.0	86.4	3.2	0.0	19.4	29.2	0.0	42.4	4.9	0.0	0.0	0.0	235.0
DAILY TOTAL SCIENCE	019 14:32	020 14:33	86.5	45.3	86.4	8.6	32.0	51.9	77.8	0.0	113.3	243.8	0.0	0.0		
OBSERVATION_NOR	020 14:33	021 05:33	54.0	28.3	196.8	5.4	0.0	32.4	56.8	0.0	70.7	0.0	432.6	0.0	12.3	889.3
SP_101EA_G34BWGNON021_PRIME	021 05:33	021 14:33	32.4	17.0	86.4	3.2	0.0	19.4	38.9	0.0	42.4	4.9	0.0	0.0	0.0	244.7
DAILY TOTAL SCIENCE	020 14:33	021 14:33	86.4	45.3	283.2	8.6	0.0	51.8	95.6	0.0	113.2	4.9	432.6	0.0		
OBSERVATION_NOR	021 14:33	022 21:48	213.3	58.9	232.3	11.3	301.9	87.3	143.6	0.0	472.4	296.0	856.9	0.0	25.5	2699.5
OBSERVATION_OPN	021 14:33	022 21:48	0.0	0.0	0.0	0.0	21.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	21.0
SP_101EA_M70METNON022_PRIME	022 21:48	023 06:48	123.0	17.0	86.4	3.2	0.0	19.4	38.9	0.0	852.2	4.9	0.0	0.0	0.0	1145.1
DAILY TOTAL SCIENCE	021 14:33	023 06:48	336.3	75.9	318.7	14.5	301.9	106.8	182.5	0.0	1324.5	301.0	856.9	0.0		
OBSERVATION_NOR	023 06:48	023 21:48	347.0	28.3	156.5	9.4	331.0	46.7	64.8	0.0	513.0	185.8	230.0	0.0	12.3	1924.6
SP_101EA_M70METOTP023_PRIME	023 21:48	024 06:48	178.1	17.0	86.4	9.3	0.0	48.1	38.9	0.0	364.9	4.9	0.0	0.0	0.0	747.6
DAILY TOTAL SCIENCE	023 06:48	024 06:48	525.1	45.3	242.9	18.7	331.0	94.8	103.7	0.0	877.9	190.7	230.0	0.0		
OBSERVATION_NOR	024 06:48	024 21:48	54.0	28.3	0.0	5.4	180.0	32.4	64.8	0.0	610.3	247.6	420.0	0.0	12.3	1655.0
SP_101EA_M34BWGOTB024_PRIME	024 21:48	025 06:48	63.1	17.0	86.4	3.2	0.0	19.4	38.9	0.0	366.2	4.9	0.0	0.0	0.0	599.2
DAILY TOTAL SCIENCE	024 06:48	025 06:48	117.1	45.3	86.4	8.6	180.0	51.8	103.7	0.0	976.4	252.5	420.0	0.0		
OBSERVATION_NOR	025 06:48	025 21:33	53.1	27.8	18.0	5.3	497.0	31.9	63.7	0.0	76.2	224.9	415.0	0.0	12.1	1425.0
SP_101EA_M34BWGNON025_PRIME	025 21:33	026 06:33	32.4	17.0	86.4	3.2	0.0	19.4	38.9	0.0	42.4	4.9	0.0	0.0	0.0	244.7
DAILY TOTAL SCIENCE	025 06:48	026 06:33	85.5	44.8	104.4	8.6	497.0	51.3	102.6	0.0	118.7	229.9	415.0	0.0		
OBSERVATION_NOR	026 06:33	027 05:03	102.6	42.4	158.4	8.1	32.0	82.0	97.1	0.0	106.1	0.0	425.0	0.0	18.4	1072.2
OBSERVATION_OPN	026 06:33	027 05:03	0.0	0.0	0.0	0.0	21.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	21.0
SP_101EA_G70METNON027_PRIME	027 05:03	027 14:03	32.4	17.0	86.4	3.2	0.0	19.4	29.2	0.0	42.4	4.9	0.0	0.0	0.0	235.0
DAILY TOTAL SCIENCE	026 06:33	027 14:03	135.0	59.4	244.8	11.3	32.0	101.5	126.3	0.0	148.6	4.9	425.0	0.0		
OBSERVATION_NOR	027 14:03	028 05:03	54.0	28.3	189.6	5.4	592.0	32.4	48.6	0.0	70.7	238.5	400.0	0.0	12.3	1671.8
SP_101EA_G34BWGNON028_PRIME	028 05:03	028 14:03	32.4	17.0	86.4	3.2	0.0	19.4	29.2	0.0	42.4	4.9	0.0	0.0	0.0	235.0
DAILY TOTAL SCIENCE	027 14:03	028 14:03	86.4	45.3	276.0	8.6	592.0	51.8	77.8	0.0	113.2	243.5	400.0	0.0		
OBSERVATION_NOR	028 14:03	029 04:48	74.7	27.8	82.6	15.4	127.0	31.9	47.8	0.0	69.6	45.9	0.0	0.0	12.1	534.6
OBSERVATION_SI	028 14:03	029 04:48	0.0	0.0	9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.0
SP_102EA_G34BWGNON029_PRIME	029 04:48	029 07:48	10.8	5.7	21.6	1.1	0.0	6.5	9.7	0.0	14.1	1.6	0.0	0.0	0.0	71.1
DAILY TOTAL SCIENCE	028 14:03	029 07:48	85.5	33.5	113.2	16.5	127.0	38.3	57.5	0.0	83.7	47.5	0.0	0.0		
OBSERVATION_NOR	029 07:48	029 08:48	3.6	1.9	10.8	0.4	0.0	2.2	3.2	0.0	4.7	0.5	0.0	0.0	0.8	28.1
SP_102EA_G34BWGNON429_PRIME	029 08:48	029 13:48	18.0	9.4	54.0	1.8	0.0	10.8	16.2	0.0	23.6	2.7	0.0	0.0	0.0	136.6
DAILY TOTAL SCIENCE	029 07:48	029 13:48	21.6	11.3	64.8	2.2	0.0	13.0	19.4	0.0	28.3	3.3	0.0	0.0		
OBSERVATION_NOR	029 13:48	029 21:18	215.2	14.1	88.8	2.7	0.0	16.2	24.3	0.0	35.4	22.3	0.0	0.0	6.1	425.1
SP_102EA_M70METNON029_PRIME	029 21:18	030 06:18	123.0	17.0	86.4	3.2	0.0	19.4	29.2	0.0	1762.4	4.9	0.0	0.0	0.0	2045.6
DAILY TOTAL SCIENCE	029 13:48	030 06:18	338.2	31.1	175.2	5.9	0.0	35.6	53.5	0.0	1797.8	27.3	0.0	0.0		

Segment Geometry (1 of 2)

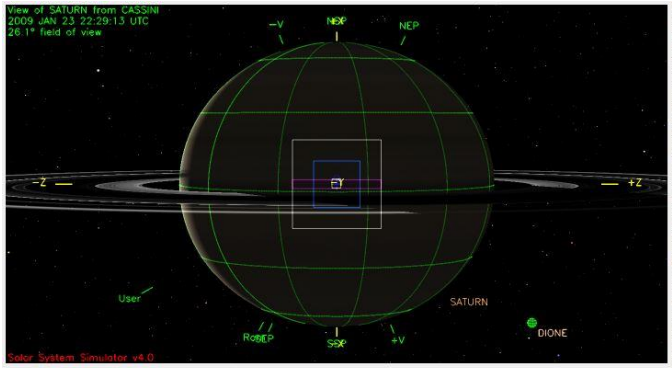



```
Rev 100 OUTBOUND
2009 -  018T14:32:00 SCET
2009 JAN 18 14:32:00 SCET
2009 JAN 18 15:44:40 ERT
Apoapse__100 + 009T00:35:50
Periapse_100 + 004T05:43:22
Light time:     72.7 min
Orbit period:   9.6 days
Radius     1179004 km       19.56 Rs
Rad_cyl    1153624 km       19.14 Rs
Z_ht_cyl   -243314 km       -4.04 Rs
Mag_L           20.43
Semi_axs    869568 km       14.43 Rs
Eccentricity     0.369
Inclination     69.03 deg
Sun_range        9.37 AU
Earth_range      8.74 AU
--- DSN ELEV -- D/L -- U/L --------
Goldstone       23.9   50.4
Canberra        40.6   15.9
Madrid         -44.2  -31.7
------- LOOK DIRECTION INFO -------
FOV              14.6 deg  255.4 mrad
RA              136.832 deg
DEC              12.693 deg
Crosses_RP_@      0.000 Rs
EPS               4.806 deg *
SEP             127.105 deg
ORS b/s angle   148.4 deg
ORS rad angle    82.9 deg  *
```

BODY	S/C OCC?	SAT OCC?	RANGE (km)	RANGE (Rs)	ALTITUDE (km)	ALTITUDE (Rs)	PHASE (deg)	ANGLR_DIAMETER (deg)	ANGLR_DIAMETER (mrad)	SUB_S/C LON	SUB_S/C LAT	DLON (deg)	VREL (km/s)	Z_HGHT (km)	ANGLE FROM SATURN	ANGLE FROM EARTH	ANGLE FROM RAM
SATURN	--	--	1179004	19.56	1118977	18.57	31.6	5.86	102.28	131	-12	0	4.6	0	0.0	143.7	94.6
MIMAS	--	--	1016756	16.87	1016551	16.87	28.5	0.02	0.41	157	-15	22	13.1	4149	4.4	146.7	90.3
ENCELADUS	--	--	990771	16.44	990517	16.44	39.2	0.03	0.52	223	-14	-32	12.8	-14	7.6	136.0	97.8
TETHYS	--	--	1177065	19.53	1176534	19.52	18.1	0.05	0.92	83	-12	82	10.8	3631	14.4	157.0	84.3
DIONE	--	SE	1521885	25.25	1521321	25.24	24.9	0.04	0.74	20	-9	154	11.8	78	6.8	150.3	92.2
RHEA	--	--	1280777	21.25	1280014	21.24	55.4	0.07	1.20	296	-11	-89	10.7	986	24.3	119.9	110.7
TITAN	--	--	1613535	26.77	1610960	26.73	20.0	0.18	3.19	47	-8	84	5.9	-4480	49.3	163.2	61.4
HYPERION	--	--	2350026	38.99	2349875	38.99	7.4	0.01	0.14	21	-26	136	7.3	4706	24.2	167.8	81.8
IAPETUS	--	--	4567858	75.79	4567111	75.78	58.4	0.02	0.33	352	1	-143	6.6	933633	27.0	116.7	109.0
PHOEBE	--	--	12478149	207.04	12478035	207.04	20.7	0.00	0.02	340	18	125	4.4	-850041	52.5	163.8	69.3
SATURN	--	--	1179004	19.56	1118977	18.57	31.6	5.86	102.28	131	-12	0	4.6	0	0.0	143.7	94.6

← Seg Start (Left)

↓ Periapse (below)



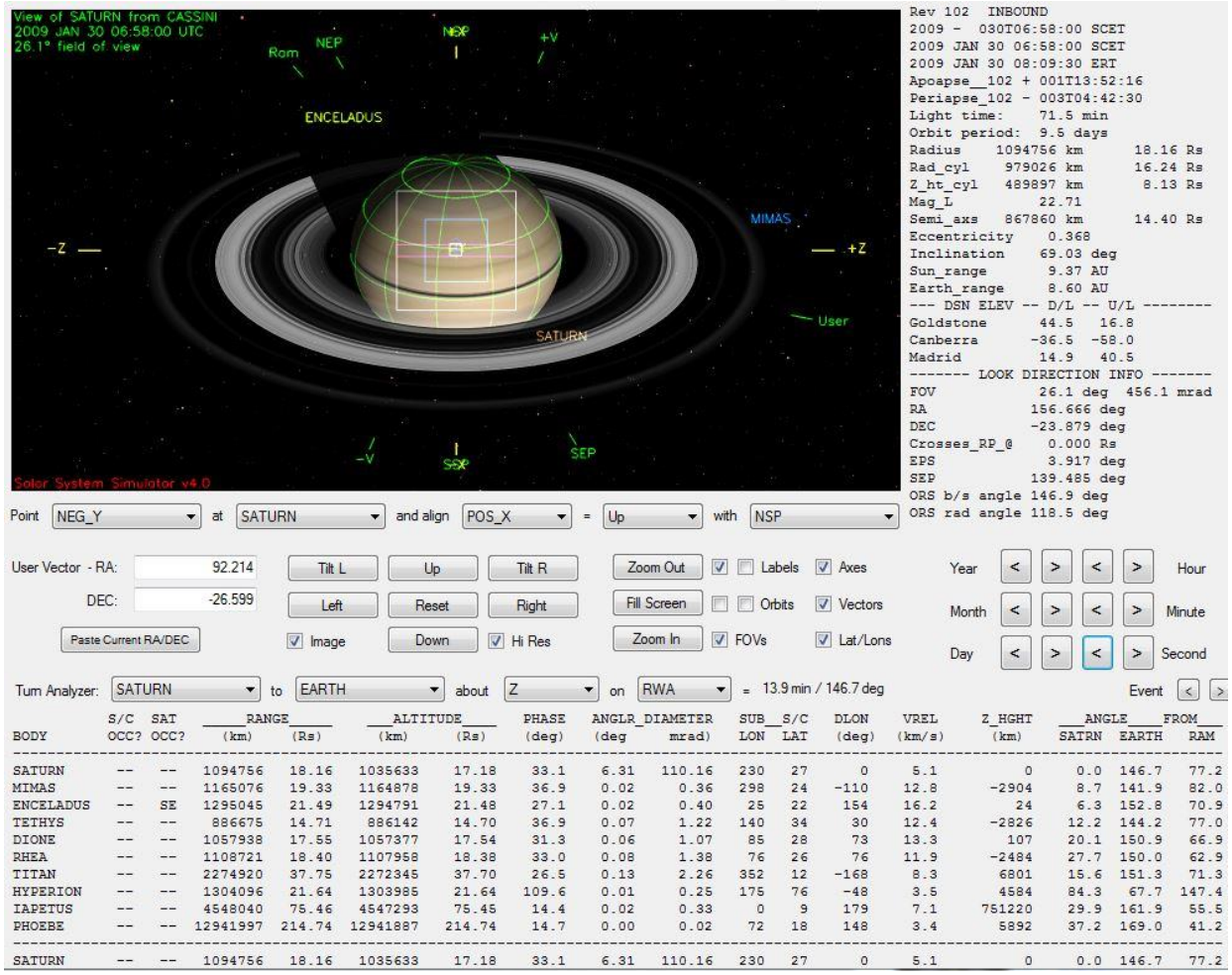

```
Rev 101  INBOUND
2009 -  023T22:29:13 SCET
2009 JAN 23 22:29:13 SCET
2009 JAN 23 23:41:24 ERT
Apoapse__101 + 004T18:48:09
Periapse_101 - 00:03:33
Light time:     72.2 min
Orbit period:   9.6 days
Radius      549014 km       9.11 Rs
Rad_cyl     548469 km       9.10 Rs
Z_ht_cyl     24450 km       0.41 Rs
Mag_L           9.13
Semi_axs    870020 km      14.44 Rs
Eccentricity     0.369
Inclination     69.03 deg
Sun_range        9.38 AU
Earth_range      8.68 AU
--- DSN ELEV -- D/L -- U/L --------
Goldstone      -48.3  -41.8
Canberra        -7.1   21.5
Madrid          27.3    0.1
------- LOOK DIRECTION INFO -------
FOV             26.1 deg  456.1 mrad
RA             -38.470 deg
DEC             -3.801 deg
Crosses_RP_@     0.000 Rs
EPS              4.420 deg
SEP            132.760 deg
ORS b/s angle   27.1 deg
ORS rad angle   90.8 deg
```

BODY	S/C OCC?	SAT OCC?	RANGE (km)	RANGE (Rs)	ALTITUDE (km)	ALTITUDE (Rs)	PHASE (deg)	ANGLR_DIAMETER (deg	ANGLR_DIAMETER (mrad)	SUB_S/C LON	SUB_S/C LAT	DLON (deg)	VREL (km/s)	Z_HGHT (km)	ANGLE FROM SATURN	ANGLE FROM EARTH	ANGLE FROM RAM
SATURN	--	--	549014	9.11	488757	8.11	152.9	12.60	219.99	310	3	0	9.7	0	0.0	31.1	89.9
MIMAS	--	SE	402837	6.68	402635	6.68	138.3	0.06	1.03	228	5	-32	14.8	-4493	14.7	45.7	95.3
ENCELADUS	--	--	782566	12.98	782310	12.98	149.4	0.04	0.66	356	2	-168	18.6	12	3.5	34.6	92.2
TETHYS	--	SE	332730	5.52	332197	5.51	125.8	0.19	3.25	238	4	-31	12.7	5477	27.1	58.2	101.4
DIONE	--	--	174677	2.90	174113	2.89	144.9	0.37	6.46	192	8	-4	11.2	37	9.5	39.4	88.7
RHEA	--	--	280988	4.66	280226	4.65	136.4	0.31	5.46	82	4	30	10.6	3285	70.6	39.7	60.3
TITAN	--	--	1659932	27.54	1657357	27.50	177.3	0.18	3.10	8	1	143	12.5	-2715	25.6	5.6	79.5
HYPERION	--	--	1924920	31.94	1924785	31.94	125.8	0.01	0.17	244	-17	-143	12.3	-26272	27.0	58.1	103.0
IAPETUS	--	--	3088588	51.25	3087840	51.24	46.6	0.03	0.48	3	-2	15	8.9	945389	156.8	128.9	95.0
PHOEBE	--	--	11567154	191.93	11567044	191.93	23.1	0.00	0.02	264	17	-48	10.9	-460753	130.0	161.0	107.2
SATURN	--	--	549014	9.11	488757	8.11	152.9	12.60	219.99	310	3	0	9.7	0	0.0	31.1	89.9

	Saturn Range	Phase Angle	Sub-S/C Lat.
Segment Start	19.56	31.6	-12
Periapse	9.11	152.9	+3
Segment End	18.16	33.1	+27

Segment Geometry (2 of 2)

Seg End (below)



BODY	S/C OCC?	SAT OCC?	RANGE (km)	RANGE (Rs)	ALTITUDE (km)	ALTITUDE (Rs)	PHASE (deg)	ANGLR_DIAMETER (deg	mrad)	SUB_S/C LON	SUB_S/C LAT	DLON (deg)	VREL (km/s)	Z_HGHT (km)	ANGLE FROM SATRN	ANGLE FROM EARTH	ANGLE FROM RAM
SATURN	--	--	1094756	18.16	1035633	17.18	33.1	6.31	110.16	230	27	0	5.1	0	0.0	146.7	77.2
MIMAS	--	--	1165076	19.33	1164878	19.33	36.9	0.02	0.36	298	24	-110	12.8	-2904	8.7	141.9	82.0
ENCELADUS	--	SE	1295045	21.49	1294791	21.48	27.1	0.02	0.40	25	22	154	16.2	24	6.3	152.8	70.9
TETHYS	--	--	886675	14.71	886142	14.70	36.9	0.07	1.22	140	34	30	12.4	-2826	12.2	144.2	77.0
DIONE	--	--	1057938	17.55	1057377	17.54	31.3	0.06	1.07	85	28	73	13.3	107	20.1	150.9	66.9
RHEA	--	--	1108721	18.40	1107958	18.38	33.0	0.08	1.38	76	26	76	11.9	-2484	27.7	150.0	62.9
TITAN	--	--	2274920	37.75	2272345	37.70	26.5	0.13	2.26	352	12	-168	8.3	6801	15.6	151.3	71.3
HYPERION	--	--	1304096	21.64	1303985	21.64	109.6	0.01	0.25	175	76	-48	3.5	4584	84.3	67.7	147.4
IAPETUS	--	--	4548040	75.46	4547293	75.45	14.4	0.02	0.33	0	9	179	7.1	751220	29.9	161.9	55.5
PHOEBE	--	--	12941997	214.74	12941887	214.74	14.7	0.00	0.02	72	18	148	3.4	5892	37.2	169.0	41.2
SATURN	--	--	1094756	18.16	1035633	17.18	33.1	6.31	110.16	230	27	0	5.1	0	0.0	146.7	77.2

Solar Geometry – ORS Boresight Concerns

No ORS Boresight Solar Constraints on Science Pointing.

Daily Science Highlights (1 of 2)

DOY 18 – The day kicked off with ISS performing a Titan Monitoring Campaign followed by a RADAR calibration. VIMS concluded DOY 18 with a Southern Regional Map of Saturn.

DOY 19 – We began this day out at Apoapse and ISS led the ORS instruments, capturing images of Saturn's moon, Dione. UVIS also be performed an EUV FUV observation that will involve several slow scans across Saturn's visible hemisphere to form spectral images

DOY 20 – CIRS performed a Far IR Map of Saturn's Northern Hemisphere to generate a temperature map. CIRS also be performed a composition measurement of low northern latitudes to study oxygen compounds, in particular, looking for the signature of ring rain.

DOY 21 – On this day, UVIS targeted Saturn's auroral zone at high Northern latitudes. UVIS made repeated slow continuous slews across the auroral zone, with a fly back between slow slews. VIMS observed Gama Cru as it passed behind Saturn's rings.

DOY 22 - UVIS began the day observing Beta Cru as it became occulted by Saturn.
VIMS Dynamic Mosaic - VIMS acquirde 3-D imagery of the polar regions, to study the structure and dynamics of the polar vortices, and their variability over time, including seasonal changes. The poles were experiencing drastic changes in seasonal lighting, with the north polar region experiencing sunlight for the first time in over a decade and the south polar region about to enter over a decade of polar winter. VIMS studies of these regions over the next few years were planned to reveal changes in Saturn's meteorology and circulation produced by such seasonal changes, including solar heat deposition. In addition, images of the north pole –where sunlight was just beginning to illuminate features - revealed the structure and microphysical nature of upper tropospheric clouds that help form the bizarre hexagonal feature there.

DOY 23 – We swung by Saturn on DOY 23, reaching Periapse. The concerted effort by several Cassini remote sensing instruments - in particular, ISS, UVIS, and VIMS – was to enable the multifaceted nature of polar aurorae to be revealed. All three instruments imaged the aurorae over a variety of wavelengths, thus quantitatively mapping their power over the polar regions. Multiple images acquired regularly over short periods of time spanning minutes to hours characterized the transient nature of auroral phenomena. Correlations of auroral activity with underlying hazes will help our understanding of the role aurorae play in generating polar hazes and clouds. ISS also led the ORS instruments in observing Mimas on DOY 23.

Daily Science Highlights (2 of 2)

DOY 24 – VIMS South Pole Dynamic Mosaic. VIMS acquired 3-D imagery of the polar regions, to study the structure and dynamics of the polar vortices, and their variability over time, including seasonal changes. The poles were experiencing drastic changes in seasonal lighting, with the north polar region experiencing sunlight for the first time in over a decade and the south polar region about to enter over a decade of polar winter. VIMS studies of these regions over the next few years were planned to reveal changes in Saturn's meteorology and circulation produced by such seasonal changes, including solar heat deposition.

DOY 25 - The day kicked off with ISS performing a Titan Monitoring Campaign. VIMS also captured a South Pole Dynamic Mosaic. VIMS acquired more 3-D imagery of the polar regions, to study the structure and dynamics of the polar vortices, and their variability over time, including seasonal changes.

DOY 26 – CIRS performed a Far IR Map of Saturn's Southern Hemisphere to generate a temperature map. CIRS also performed a composition measurement of low latitudes to study oxygen compounds, in particular, looking for the signature of ring rain. CAPS also conducted survey as Cassini flew past Saturn.

DOY 27 –The concerted effort by several Cassini remote sensing instruments - in particular, ISS, UVIS, and VIMS – was planned to enable the multifaceted nature of polar aurorae to be revealed. All three instruments imaged the aurorae over a variety of wavelengths, thus quantitatively mapping their power over the polar regions. Multiple images were acquired regularly over short periods of time, spanning minutes to hours, to characterize the transient nature of auroral phenomena. Correlations of auroral activity with underlying hazes will help our understanding of the role aurorae play in generating polar hazes and clouds.

DOY 28 – On this day we once again moved out to Apoapse where UVIS mapped volatiles in the system in the immediate neighborhood of Enceladus. Observations will test connection of volatile changes to plume eruptions. Additionally, ISS captured both distant images of Titan as well as images of Saturn's G-ring.

DOY 29 – On the final day of the Saturn Segment, CIRS constructed a composition map of Saturn's rings. Meanwhile, the ISS, UVIS and VIMS instruments went to sleep so that RSS could perform a boresight calibration.

Segment Integration Planning

Timeline Gaps and Suggested Observations

Info on Suggested Observations was Not Available

Initial SMT and Data Volume

Beginning of Integration:

Saturn_100_102 Data Volume (prelim)

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 (%) (Mb)
SP_101EA_G34BWGNON019_PRIME	019 05:32	019 14:32	0	1228	64	1292	3503	2211	0	238	53	1583	896	-688	-1203	-11% 687
SP_101EA_G34BWGNON020_PRIME	020 05:33	020 14:33	687	515	63	1266	3503	2237	0	237	53	1556	896	-661	-1203	-11% 660
SP_101EA_G34BWGNON021_PRIME	021 05:33	021 14:33	660	448	63	1172	3503	2331	0	247	53	1472	902	-571	-1203	-11% 570
SP_101EA_M70METNON022_PRIME	022 21:48	023 06:48	570	2933	132	3635	3503	-131	21	574	53	4151	4216	64	-1203	-12% 0
SP_101EA_M34BWGOTP023_PRIME	023 21:48	024 06:48	0	1821	63	1884	3503	1619	0	787	53	2724	728	-1996	-1268	-13% 1996
SP_101EA_M34BWGOTB024_PRIME	024 21:48	025 06:48	1996	1658	63	3717	3503	-213	0	605	53	4161	877	-3284	-1268	-14% 3284
SP_101EA_M34BWGNON025_PRIME	025 21:33	026 06:33	3284	1426	62	4772	3503	-1268	0	247	53	3803	881	-2922	-1156	-14% 2922
SP_101EA_G34BWGNON027_PRIME	027 05:03	027 14:03	2922	636	95	3652	3503	-148	21	237	53	3815	909	-2906	-1156	-16% 2905
SP_101EA_G34BWGNON028_PRIME	028 05:03	028 14:03	2905	1692	63	4660	3503	-1156	0	237	53	3793	906	-2888	17	0% 2888
SP_102EA_G34BWGNON029_PRIME	029 04:48	029 07:48	2888	536	62	3487	3503	17	0	99	18	3604	286	-3318	186	4% 3318
SP_102EA_G34BWGNON429_PRIME	029 08:48	029 13:48	3318	0	0	3318	3503	186	0	138	29	3485	507	-2978	261	5% 2977
SP_102EA_M70METNON029_PRIME	029 21:18	030 06:18	2977	233	32	3242	3503	261	0	237	53	3532	4291	759	759	18% 0

Wow!!! Looks like 1 or 2 strategically placed 70m stations would alleviate data volume issues.

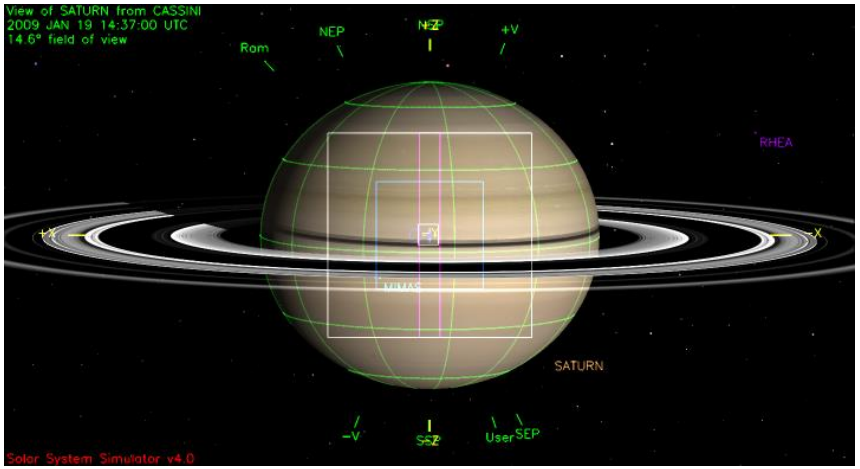
Waypoint Selection

Saturn_100_102 Waypoint Options

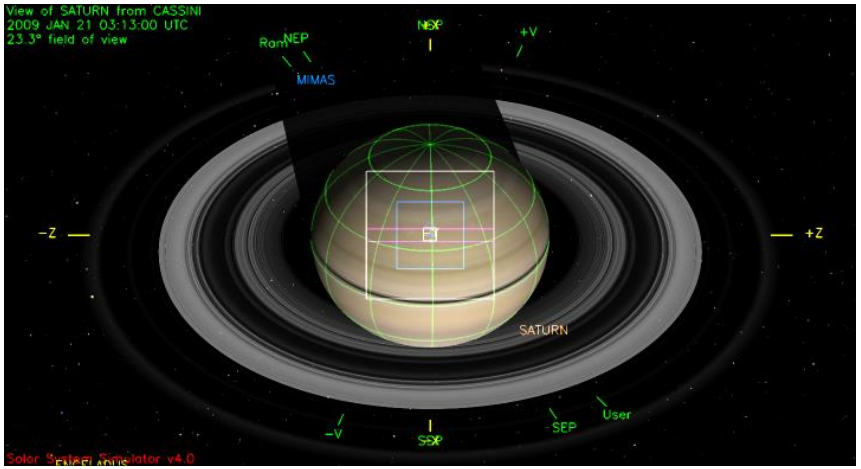
- ISS_NAC to Saturn, NEG_X to Sun
  - Good for then entire 11.75 days of the segment
- ISS_NAC to Saturn, POS_X to NEP
  - Good for 2009-018T14:32:00 to 2009-022T21:22:00
  - Good for 2009-023T17:22:00 to 2009-025T12:42:00
  - Good for 2009-027T17:22:00 to 2009-030T06:18:00
- ISS_NAC to Saturn, POS_X to NSP
  - Good for 2009-019T02:02:00 to 2009-022T22:32:00
  - Good for 2009-023T22:12:00 to 2009-025T12:52:00
  - Good for 2009-028T15:52:00 to 2009-030T06:18:00
- ISS_NAC to Saturn, POS_Z to NEP
  - Good for 2009-018T14:32:00 to 2009-020T15:12:00
  - Good for 2009-024T06:52:00 to 2009-030T05:02:00
- ISS_NAC to Saturn, POS_Z to NSP
  - Good for 2009-018T14:32:00 to 2009-021T17:32:00
  - Good for 2009-024T15:32:00 to 2009-030T06:18:00

Waypoints Chosen (1 of 3)

Waypoint 1 (2009-018T15:02:00 – 020T15:13:00): NEG_Y to Saturn (0,0,-20), Neg_X to Sun

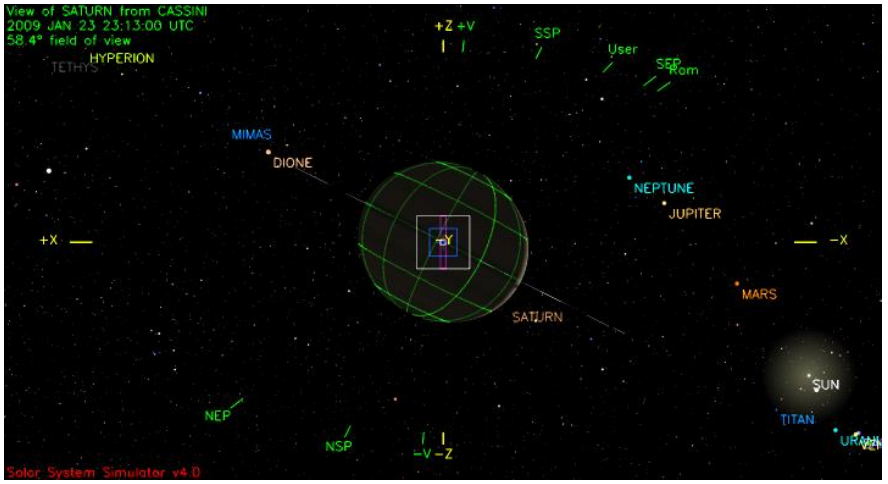


Waypoint 2 (2009-020T15:13:00 – 021T15:13:00): NEG_Y to Saturn, POS_X to NSP

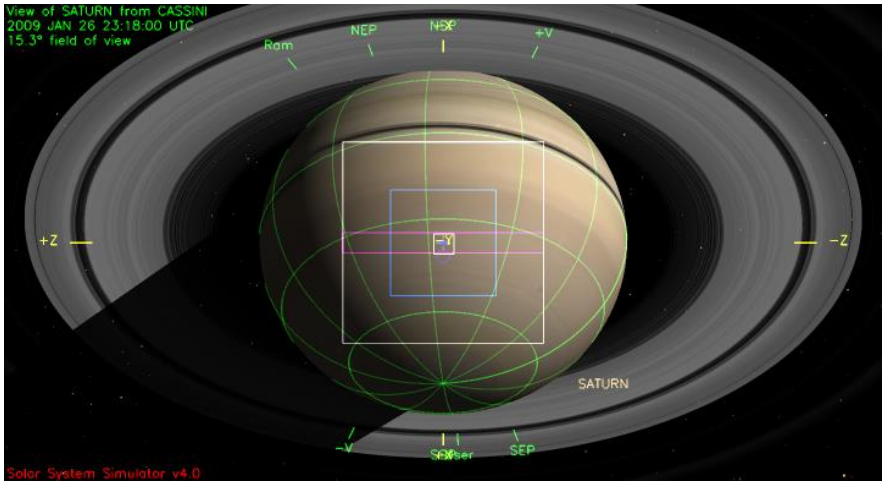


Waypoints Chosen (2 of 3)

Waypoint 3 (2009-021T15:13:00 – 026T07:18:00): NEG_Y to Saturn (0,-20,0), Neg_X to Sun

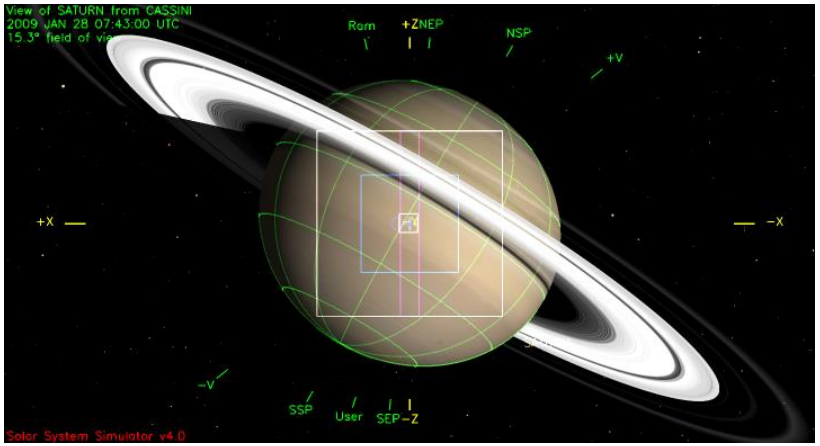


Waypoint 4 (2009-026T07:18:00 – 027T14:43:00): NEG_Y to Saturn, NEG_X to NSP



Waypoints Chosen (3 of 3)

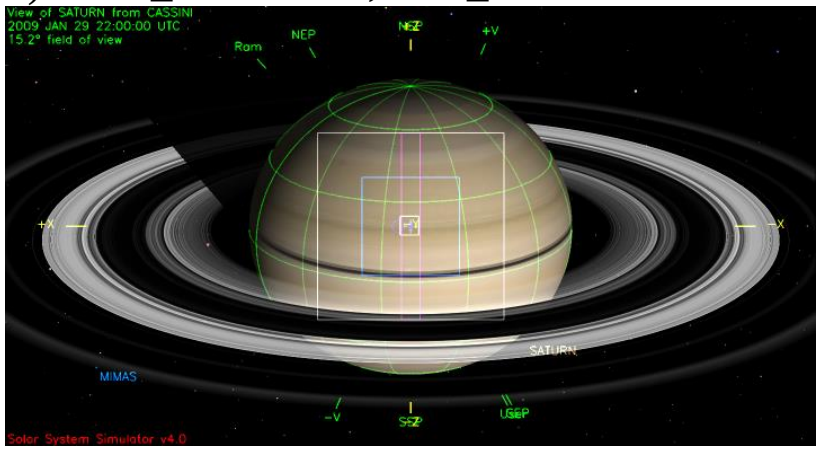
Waypoint 5 (2009-027T14:43:00 – 029T04:48:00): NEG_Y to Saturn (0,-20,0), Neg_X to Sun



Waypoint 6 (2009-029T04:48:00 – 029T14:28:00): XBAND to Earth, POS_X to NEP

Not shown here since ORS is not pointed toward any object at this waypoint

Waypoint 7 (2009-029T14:28:00 – 030T06:58:00): NEG_Y to Saturn, POS_Z to NSP



Notes and Liens

Notes:

- Pointing:
  - Needed to shorten OTM-180 Backup to 4 hour roll.
  - Secondary attitude for OTM-180 Backup also changed to Neg_X to 261/-16
- Data Volume:

  CDA_101DR_RPX0200003_PRIME has no data volume allocated.
  - -63Mb on DOY 27. Not a problem.
- DSN:
  - OK
- Opmodes:
  - RADAR Warm-up @ 2009-018T14:32:00
- Special Activities:
  - ISS,UVIS,VIMS sleep at 2009-029T02:48:00

Sequence Liens:

- None