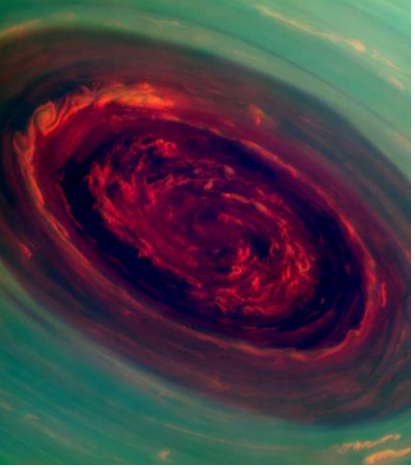

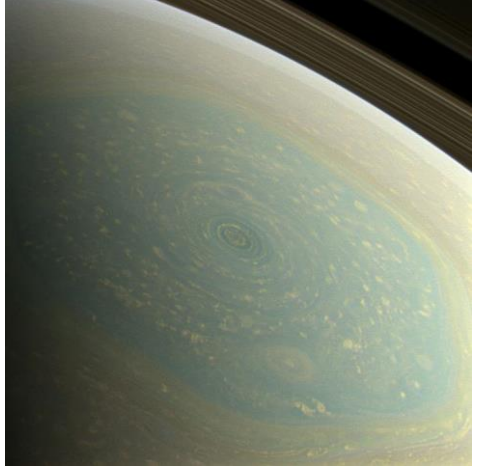
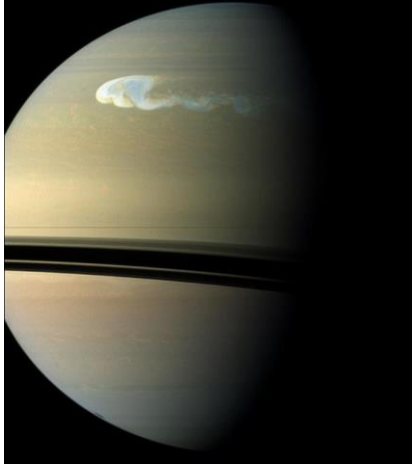

Science Planning & Sequence Team
CASSINI

SATURN TARGET WORKING TEAM

Rev 120_121 Segment Legacy Package

Segment Boundary: November 3, 2009 – November 13, 2009
2009-307T12:35:00 – 2009-317T19:21:00 (SCET)

Integration Began 09/08/2008
Segment Delivered to S54 Sequence 04/06/2009
Lead Integrator was Shawn Boll

Legacy Package Assembled by Shawn Boll

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

Segment Overview and Final Products

Segment Summary

- This segment was integrated simultaneously along with several others in Revs 119 – 122. They are all in an equatorial phase of the Equinox Mission. The inbound and outbound portions (days near periapse) of these orbits were Saturn discipline focused, while the apoapse periods, referred to as “pseudo-XD”, were of a multiple discipline flavor.

- The Rev 120_121 segment was over 10 days long. It began outbound from Rev 120 periapse and continued through Rev 121 apoapse, ending 2 days following apoapse. Here it came to the end of the S54 sequence boundary. The S55 sequence saw the remainder of this Saturn TWT assigned arc.

- Saturn science included ISS photopolarimetry and lightning searches, and CIRS Far-IR mapping and composition.

- Notable out-of-discipline activities included several apoapse UVIS system mosaics, CAPS prime magnetosphere measurements, CDA interstellar dust, observations of several icy satellites (Rhea, Dione, Tethys, Enceladus), and a look at the E-ring.

- NAC images of Titan's shadow on Saturn were also observed. Useful for Titan aerosol science, this is a unique geometry that occurred only a few times the mission.

- Data volume negotiations were challenging for all the segments in this series, with a lot of data requested and limited DSN resources, especially at apoapse where 70-meter station requests were limited.

Final Sequenced SPASS (1 of 2)

Request	Riders	Start (SCET)	Start (Epoch)	Duration	End (SCET)	Primary	Secondary	Comments
Sequence S54, length = 40 days		2009-278T04:03:00		039T15:18:00	2009-317T19:21:00			
SATURN_120_121 Segment		2009-307T12:35:00		010T06:46:00	2009-317T19:21:00			
SP_120SA_WAYPTTURN307_PRIME	M	2009-307T12:35:00		000T00:40:00	2009-307T13:15:00	ISS_NAC to Saturn	NEG_Z to Sun	
NEW WAYPOINT		**2009-307T13:15:00**		**001T00:00:00**	**2009-308T13:15:00**	**ISS_NAC to Saturn**	**NEG_Z to Sun**	
ISS_120TI_M90R3CLD307_PRIME	C, M, U	2009-307T13:15:00		000T01:15:00	2009-307T14:30:00	ISS_NAC to Titan	NEG_Z to 36.5/83.7	
UVIS_120SA_EUVFUV001_PRIME	M	2009-307T14:30:00		000T11:05:00	2009-308T01:35:00	UVIS_FUV to Saturn (1.489,0.0,-3.494 deg. offset)	NEG_Z to 37.4/83.9	
ISS_120SA_1X2WPXX016_PRIME	M	2009-308T01:35:00		000T01:00:00	2009-308T02:35:00	ISS_NAC to Saturn	POS_X to 37.4/83.9	
NAV_120SK_OPNAV081_PRIME	M	2009-308T02:35:00		000T00:59:00	2009-308T03:34:00	ISS_NAC to Satellites	NEG_Z to Sun	
NAV_120EA_DLTURN081_PRIME	M	2009-308T03:34:00		000T00:01:00	2009-308T03:35:00	XBAND to Earth	POS_X to NEP	
SP_120EA_M34BWGNON308_PRIME	C, E, M	2009-308T03:35:00		000T09:00:00	2009-308T12:35:00	XBAND to Earth	Rolling/SRU	POS_X to NEP
SP_120SA_WAYPTTURN308_PRIME	M	2009-308T12:35:00		000T00:40:00	2009-308T13:15:00	ISS_NAC to Saturn	POS_X to NSP	
NEW WAYPOINT		**2009-308T13:15:00**		**000T23:45:00**	**2009-309T13:00:00**	**ISS_NAC to Saturn**	**POS_X to NSP**	
ISS_120OT_SATELLORB005_PRIME	M	2009-308T13:15:00		000T00:30:00	2009-308T13:45:00	ISS_NAC to Rocks	POS_X to NSP	
CIRS_120SA_FIRMAP001_PRIME	M, V	2009-308T13:45:00		000T11:55:00	2009-309T01:40:00	CIRS_FP1 to Saturn	POS_X to NSP	
ISS_120SA_1X2WPXX017_PRIME	M	2009-309T01:40:00		000T01:00:00	2009-309T02:40:00	ISS_NAC to Saturn	POS_X to 37.4/83.9	
SP_120EA_DLTURN309_PRIME	M	2009-309T02:40:00		000T00:40:00	2009-309T03:20:00	XBAND to Earth	NEG_X to NSP	
SP_120EA_M34HEFOTP309_PRIME	C, E, M, N	2009-309T03:20:00		000T09:00:00	2009-309T12:20:00	XBAND to Earth	4_Hr_Rolling	NEG_X to NSP; CAPS
SP_120SA_WAYPTTURN309_PRIME	M	2009-309T12:20:00		000T00:40:00	2009-309T13:00:00	ISS_NAC to Saturn	NEG_Z to NSP	
NEW WAYPOINT		**2009-309T13:00:00**		**008T06:21:00**	**2009-317T19:21:00**	**ISS_NAC to Saturn**	**NEG_Z to NSP**	
CAPS_120SA_MAGBNDPTG001_PRIME	M	2009-309T13:00:00		000T02:00:00	2009-309T15:00:00	POS_Y to COROT (0.0,0.0,40.0 deg. offset)	NEG_X to NSP	
ISS_120OT_SATELLORB006_PRIME	M	2009-309T15:00:00		000T00:30:00	2009-309T15:30:00	ISS_NAC to Rocks	NEG_Z to NSP	
ISS_120SA_NALGTNG008_PRIME	M, V	2009-309T15:30:00		000T02:11:00	2009-309T17:41:00	ISS_NAC to Saturn	NEG_Z to 37.4/83.9	
ISS_120SA_1X2WPXX018_PRIME	M	2009-309T17:41:00		000T01:00:00	2009-309T18:41:00	ISS_NAC to Saturn	NEG_Z to 37.4/83.9	
CIRS_120SA_COMPSIT003_PRIME	M, V	2009-309T18:41:00		000T08:00:00	2009-310T02:41:00	CIRS_FP1 to Saturn	NEG_X to Sun	
SP_120EA_DLTURN310_PRIME	M	2009-310T02:41:00		000T00:40:00	2009-310T03:21:00	XBAND to Earth	NEG_X to NSP	
SP_120EA_M70METOTB310_PRIME	C, M, N	2009-310T03:21:00		000T09:00:00	2009-310T12:21:00	XBAND to Earth	4_Hr_Rolling	NEG_X to NSP
SP_120SA_WAYPTTURN310_PRIME	M	2009-310T12:21:00		000T00:40:00	2009-310T13:01:00	ISS_NAC to Saturn	NEG_Z to NSP	
UVIS_120EN_ICYATM004_PRIME	M	2009-310T13:01:00		000T02:00:00	2009-310T15:01:00	UVIS_FUV to Enceladus	POS_X to 192.3/-57.1	See observation description. Duration of 4 hours allows for 30 min slew to and from Enceladus, and 3 integration sites.
CAPS_120SA_MAGBNDPTG002_PRIME	M	2009-310T15:01:00		000T02:18:00	2009-310T17:19:00	POS_Y to COROT (0.0,0.0,40.0 deg. offset)	NEG_X to NSP	
CDA_120OT_ISD000001007_PRIME	M	2009-310T17:19:00		000T02:00:00	2009-310T19:19:00	NEG_Z to Earth (0.0,0.0,16.0 deg. offset)	NEG_X to 271.0/-8.0	
ISS_120SA_TITANSHAD001_PRIME	M	2009-310T19:19:00		000T02:35:00	2009-310T21:54:00	ISS_NAC to Saturn	NEG_Z to 37.4/83.9	
ISS_120SA_NALGTNG009_PRIME	M, V	2009-310T21:54:00		000T03:17:00	2009-311T01:11:00	ISS_NAC to Saturn	NEG_Z to 37.4/83.9	
ISS_120SA_1X2WPXX019_PRIME	M	2009-311T01:11:00		000T01:00:00	2009-311T02:11:00	ISS_NAC to Saturn	NEG_Z to 37.4/83.9	
ISS_120OT_SATELLORB010_PRIME	M	2009-311T02:11:00		000T00:30:00	2009-311T02:41:00	ISS_NAC to Rocks	NEG_Z to NSP	
SP_120EA_DLTURN311_PRIME	M	2009-311T02:41:00		000T00:40:00	2009-311T03:21:00	XBAND to Earth	POS_X to NEP	
SP_120EA_M34HEFNON311_PRIME	C, M	2009-311T03:21:00		000T09:00:00	2009-311T12:21:00	XBAND to Earth	Rolling/SRU	POS_X to NEP
SP_120SA_WAYPTTURN311_PRIME	M	2009-311T12:21:00		000T00:40:00	2009-311T13:01:00	ISS_NAC to Saturn	NEG_Z to NSP	
ISS_120OT_SATELLORB012_PRIME	M	2009-311T13:01:00		000T00:30:00	2009-311T13:31:00	ISS_NAC to Rocks	NEG_Z to NSP	
CAPS_120SU_MAGBNDPTG001_PRIME	M	2009-311T13:31:00		000T02:00:00	2009-311T15:31:00	POS_Y to COROT (0.0,0.0,40.0 deg. offset)	NEG_X to NSP	
ISS_120SA_NALGTNG010_PRIME	M, V	2009-311T15:31:00		000T01:40:00	2009-311T17:11:00	ISS_NAC to Saturn	NEG_Z to 37.4/83.9	
UVIS_120SA_MOS120APO002_PRIME	M	2009-311T17:11:00		000T08:00:00	2009-312T01:11:00	ISS_NAC to Saturn	NEG_Z to 37.4/83.9	
ISS_120SA_1X2WPXX020_PRIME	M	2009-312T01:11:00		000T01:00:00	2009-312T02:11:00	ISS_NAC to Saturn	NEG_Z to 37.4/83.9	
ISS_120OT_SATELLORB014_PRIME	M	2009-312T02:11:00		000T00:30:00	2009-312T02:41:00	ISS_NAC to Rocks	NEG_Z to NSP	
SP_120EA_DLTURN312_PRIME	M	2009-312T02:41:00		000T00:40:00	2009-312T03:21:00	XBAND to Earth	POS_X to NEP	
SP_120EA_M70METSEQ312_PRIME	M	2009-312T03:21:00		000T09:00:00	2009-312T12:21:00	XBAND to Earth	Rolling/SRU	POS_X to NEP
SP_120SA_WAYPTTURN312_PRIME	M	2009-312T12:21:00		000T00:40:00	2009-312T13:01:00	ISS_NAC to Saturn	NEG_Z to NSP	
ISS_120OT_SATELLORB015_PRIME	M	2009-312T13:01:00		000T00:30:00	2009-312T13:31:00	ISS_NAC to Rocks	NEG_Z to NSP	
ISS_120SA_NALGTNG011_PRIME	M, V	2009-312T13:31:00		000T01:48:00	2009-312T15:19:00	ISS_NAC to Saturn	NEG_Z to 37.4/83.9	
CAPS_120SU_MAGBNDPTG004_PRIME	M	2009-312T15:19:00		000T02:00:00	2009-312T17:19:00	POS_Y to COROT (0.0,0.0,40.0 deg. offset)	NEG_X to NSP	
ISS_120RH_MUTUALEVE004_PRIME	M	2009-312T17:19:00		000T00:44:00	2009-312T18:03:00	ISS_NAC to Rhea	NEG_Z to NSP	ISS_NAC to Rhea control of secondary axis not required
ISS_120SA_NALGTNG012_PRIME	M, V	2009-312T18:03:00		000T01:35:00	2009-312T19:38:00	ISS_NAC to Saturn	NEG_Z to 37.4/83.9	
ISS_120RH_MUTUALEVE005_PRIME	M	2009-312T19:38:00		000T00:48:00	2009-312T20:26:00	ISS_NAC to Rhea	NEG_Z to NSP	ISS_NAC to Rhea control of secondary axis not required
UVIS_120SA_MOS120APO003_PRIME	M	2009-312T20:26:00		000T08:00:00	2009-313T04:26:00	ISS_NAC to Saturn	NEG_Z to 37.4/83.9	
ISS_120SA_1X2WPXX021_PRIME	M	2009-313T04:26:00		000T01:00:00	2009-313T05:26:00	ISS_NAC to Saturn	NEG_Z to 37.4/83.9	
ISS_120OT_OUTERSATS002_PRIME	M, U	2009-313T05:26:00		000T04:30:00	2009-313T09:56:00	UVIS_FUV to Rocks	NEG_X to Sun	
SP_120EA_DLTURN313_PRIME	M	2009-313T09:56:00		000T00:40:00	2009-313T10:36:00	XBAND to Earth	POS_X to NEP	
SP_120EA_G34BWGSEQ413_PRIME	M	2009-313T10:36:00		000T08:10:00	2009-313T18:46:00	XBAND to Earth	Rolling/SRU	POS_X to NEP
SP_120SA_WAYPTTURN313_PRIME	M	2009-313T19:36:00		000T00:40:00	2009-313T20:16:00	ISS_NAC to Saturn	NEG_Z to NSP	
UVIS_120SA_MOS120APO004_PRIME	M	2009-313T20:16:00		000T08:00:00	2009-314T04:16:00	ISS_NAC to Saturn	NEG_Z to 37.4/83.9	
ISS_120RE_LRLEMP001_PRIME	M, V	2009-314T04:16:00		000T09:34:00	2009-314T13:50:00	ISS_NAC to Rings	PIC	
CAPS_120SU_SWAURPTG006_PRIME	M	2009-314T13:50:00		000T01:36:00	2009-314T15:26:00	ISS_NAC to Saturn	NEG_X to Sun	
ISS_120SA_1X2WPXX022_PRIME	M	2009-314T15:26:00		000T01:00:00	2009-314T16:26:00	ISS_NAC to Saturn	NEG_Z to 37.4/83.9	
SP_120EA_DLTURN314_PRIME	M	2009-314T16:26:00		000T00:40:00	2009-314T17:06:00	XBAND to Earth	POS_X to NEP	
SP_120EA_C70METSEQ314_PRIME	C, M	2009-314T17:06:00		000T09:00:00	2009-315T02:06:00	XBAND to Earth	Rolling/SRU	POS_X to NEP
SP_120SA_WAYPTTURN315_PRIME	M	2009-315T02:06:00		000T00:40:00	2009-315T02:46:00	ISS_NAC to Saturn	NEG_Z to NSP	
ISS_120TI_M120R2HZ315_PRIME	C, M, U	2009-315T02:46:00	E120_M120R2HZ315+000T00:00:00	000T01:15:00	2009-315T04:01:00	ISS_NAC to Titan (0.0,52.0,0.0 deg. offset)	POS_X to 215.9/-83.7	
ISS_120RE_LRLEMP002_PRIME	M, V	2009-315T04:01:00		000T04:54:00	2009-315T08:55:00	ISS_NAC to Rings	PIC	
ISS_120JA_MUTUALEVE004_PRIME	M	2009-315T08:55:00		000T00:44:00	2009-315T09:39:00	ISS_NAC to Janus	NEG_Z to NSP	ISS_NAC to Janus control of secondary axis not required

Final Sequenced SPASS (2 of 2)

Request	Riders	Start (SCET)	Start (Epoch)	Duration	End (SCET)	Primary	Secondary	Comments
CAPS_120SU_SWAURPTG005_PRIME	M	2009-315T09:39:00		000T01:43:00	2009-315T11:22:00	ISS_NAC to Saturn	NEG_X to Sun	
UVIS_120IC_ALPVIR001_PRIME	I, M	2009-315T11:22:00		000T03:00:00	2009-315T14:22:00	UVIS_FUV to Star	NEG_X to Sun	
UVIS_120SA_MOS120APO005_PRIME	M	2009-315T14:22:00		000T08:00:00	2009-315T22:22:00	ISS_NAC to Saturn	NEG_Z to 37.4/83.9	
Apoapse Per = 19.0 d, inc ...		2009-315T16:57:04		000T00:00:01	2009-315T16:57:05			
ISS_121DI_MUTUALEVE001_PRIME	M	2009-315T22:22:00		000T00:48:00	2009-315T23:10:00	ISS_NAC to Dione	NEG_Z to NSP	ISS_NAC to Dione control of secondary axis not required
ISS_121TE_MUTUALEVE001_PRIME	M	2009-315T23:10:00		000T00:47:00	2009-315T23:57:00	ISS_NAC to Tethys	NEG_Z to NSP	ISS_NAC to Tethys control of secondary axis not required
ISS_121OT_SATELLORB001_PRIME	M	2009-315T23:57:00		000T01:29:00	2009-316T01:26:00	ISS_NAC to Rocks	NEG_Z to NSP	
ISS_121SA_1X2WPXX023_PRIME	M	2009-316T01:26:00		000T01:00:00	2009-316T02:26:00	ISS_NAC to Saturn	NEG_Z to 37.4/83.9	
SP_121EA_DLTURN316_PRIME	M	2009-316T02:26:00		000T00:40:00	2009-316T03:06:00	XBAND to Earth	POS_X to 95.37/-63.17	
SP_121EA_M34OTPSEQ316_PRIME	C, E, M, N	2009-316T03:06:00		000T09:00:00	2009-316T12:06:00	XBAND to Earth	POS_X to 95.37/-63.17	POS_X to 95.37/-63.17; CAPS NEG_X to NSP (0,0,-30)
SP_121SA_WAYPTTURN316_PRIME	M	2009-316T12:06:00		000T00:40:00	2009-316T12:46:00	ISS_NAC to Saturn	NEG_Z to NSP	
ISS_121OT_OUTERSATS001_PRIME	M, U	2009-316T12:46:00		000T03:00:00	2009-316T15:46:00	UVIS_FUV to Rocks	NEG_Z to NSP	
ISS_121SA_1X2WPXX001_PRIME	M	2009-316T15:46:00		000T01:00:00	2009-316T16:46:00	ISS_NAC to Saturn	NEG_Z to 37.4/83.9	
ISS_121SA_NALGTNG001_PRIME	M, V	2009-316T16:46:00		000T05:55:00	2009-316T22:41:00	ISS_NAC to Saturn	NEG_Z to 37.4/83.9	
CAPS_121SU_SWAURPTG001_PRIME	M	2009-316T22:41:00		000T02:00:00	2009-317T00:41:00	ISS_NAC to Saturn	NEG_X to Sun	
UVIS_121SA_MOS120APO006_PRIME	M	2009-317T00:41:00		000T08:00:00	2009-317T08:41:00	ISS_NAC to Saturn	NEG_Z to 37.4/83.9	
ISS_121SA_1X2WPXX002_PRIME	M	2009-317T08:41:00		000T01:00:00	2009-317T09:41:00	ISS_NAC to Saturn	NEG_Z to 37.4/83.9	
SP_121EA_DLTURN317_PRIME	M	2009-317T09:41:00		000T00:40:00	2009-317T10:21:00	XBAND to Earth	POS_X to 95.37/-63.17	
SP_121EA_G70OTBSEQ317_PRIME	M, N	2009-317T10:21:00		000T09:00:00	2009-317T19:21:00	XBAND to Earth	4_Hr_Rolling	POS_X to 95.37/-63.17

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 (%)	CAROVR (Mb)
SP_120EA_M34BWGNON308_PRIME	308 03:35	308 12:35	145	1288	63	1496	3544	2048	0	406	53	1956	570	-1387	105	1386
SP_120EA_M34HEFOTP309_PRIME	309 03:20	309 12:20	1386	1086	62	2534	3544	1010	0	325	53	2912	572	-2340	105	2339
SP_120EA_M70METOTB310_PRIME	310 03:21	310 12:21	2339	1036	63	3439	3544	105	0	575	53	4067	3146	-922	721	922
SP_120EA_M34HEFNON311_PRIME	311 03:21	311 12:21	922	1334	63	2319	3544	1225	0	281	53	2653	686	-1968	721	1968
SP_120EA_M70METSEQ312_PRIME	312 03:21	312 12:21	1968	793	63	2824	3544	721	0	205	53	3082	3146	64	1214	0
SP_120EA_G34BWGSEQ413_PRIME	313 10:36	313 18:46	0	1357	94	1451	3544	2094	0	156	48	1655	595	-1061	1150	1061
SP_120EA_C70METSEQ314_PRIME	314 17:06	315 02:06	1061	989	94	2144	3544	1400	0	216	53	2413	3114	700	1150	0
SP_121EA_M34OTPSEQ316_PRIME	316 03:06	316 12:06	0	1550	106	1656	3544	1888	0	216	53	1925	495	-1431	449	1430
SP_121EA_G70OTBSEQ317_PRIME	317 10:21	317 19:21	1430	1269	94	2793	3544	752	0	172	53	3018	3467	448	449	0

DATA VOLUME REPORT --- TRANSFER FRAME OVERHEAD NOT INCLUDED

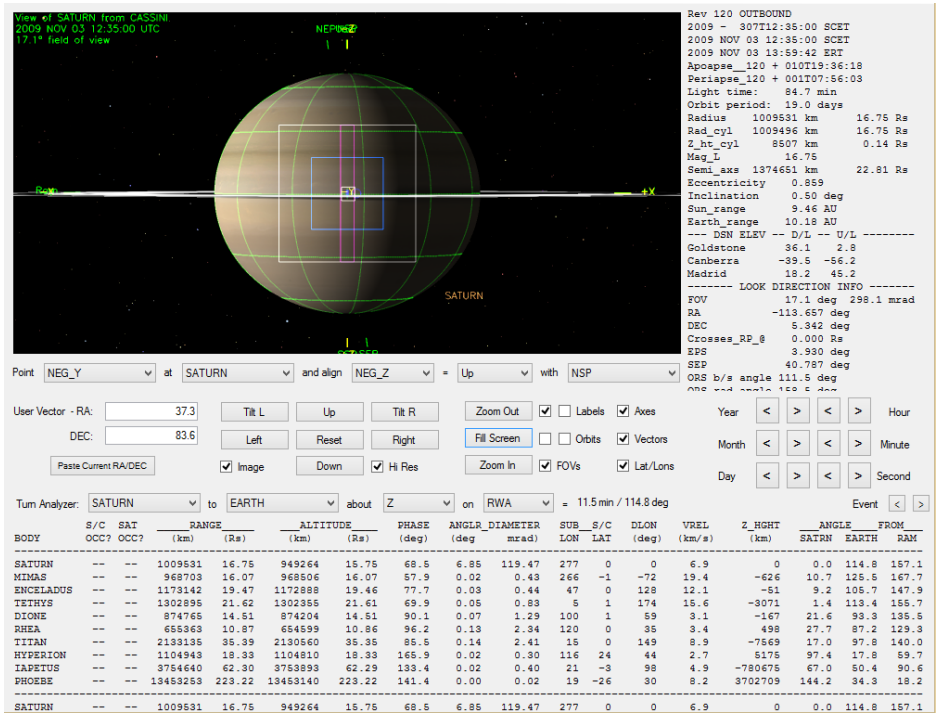
Event	Start doy hh:mm	End doy hh:mm	CAPS (Mb)	CDA (Mb)	CIRS (Mb)	INMS (Mb)	ISS (Mb)	MAG (Mb)	MIMI (Mb)	RADAR (Mb)	RPWS (Mb)	UVIS (Mb)	VIMS (Mb)	PROBE (Mb)	ENGR (Mb)	TOTAL (Mb)
OBSERVATION_NOR	307 12:35	308 03:35	108.0	28.3	18.0	15.5	173.1	106.7	64.8	0.0	556.7	205.3	0.0	0.0	62.7	1339.1
SP_120EA_M34BWGNON308_PRIME	308 03:35	308 12:35	64.8	17.0	43.2	3.2	0.0	64.0	38.9	0.0	166.7	4.9	0.0	0.0	0.0	402.8
DAILY TOTAL SCIENCE	307 12:35	308 12:35	172.8	45.3	61.2	18.7	173.1	170.7	103.7	0.0	723.4	210.2	0.0	0.0	62.7	
OBSERVATION_NOR	308 12:35	309 03:20	106.2	27.8	171.6	5.3	135.1	104.9	63.7	0.0	211.0	0.0	250.0	0.0	61.6	1137.3
SP_120EA_M34HEFOTP309_PRIME	309 03:20	309 12:20	64.8	17.0	86.4	3.2	0.0	64.0	38.9	0.0	42.4	4.9	0.0	0.0	0.0	321.7
DAILY TOTAL SCIENCE	308 12:35	309 12:20	171.0	44.8	258.0	8.6	135.1	168.9	102.6	0.0	253.5	4.9	250.0	0.0	61.6	
OBSERVATION_NOR	309 12:20	310 03:21	108.1	28.3	57.6	5.4	192.1	106.8	64.9	0.0	213.4	0.0	250.0	0.0	62.8	1089.3
SP_120EA_M70METOTB310_PRIME	310 03:21	310 12:21	64.8	17.0	43.2	3.2	0.0	64.0	38.9	0.0	334.0	4.9	0.0	0.0	0.0	570.1
DAILY TOTAL SCIENCE	309 12:20	310 12:21	172.9	45.3	100.8	8.6	192.1	170.8	103.8	0.0	547.4	4.9	250.0	0.0	62.8	
OBSERVATION_NOR	310 12:21	311 03:21	108.0	32.1	0.0	5.4	504.8	106.7	64.8	0.0	414.2	36.2	50.0	0.0	62.7	1384.9
SP_120EA_M34HEFNON311_PRIME	311 03:21	311 12:21	64.8	17.0	43.2	3.2	0.0	64.0	38.9	0.0	42.4	4.9	0.0	0.0	0.0	278.5
DAILY TOTAL SCIENCE	310 12:21	311 12:21	172.8	49.0	43.2	8.6	504.8	170.7	103.7	0.0	456.6	41.2	50.0	0.0	62.7	

Final Sequenced SMT and Data Volume (2 of 2)

DATA VOLUME REPORT --- TRANSFER FRAME OVERHEAD NOT INCLUDED

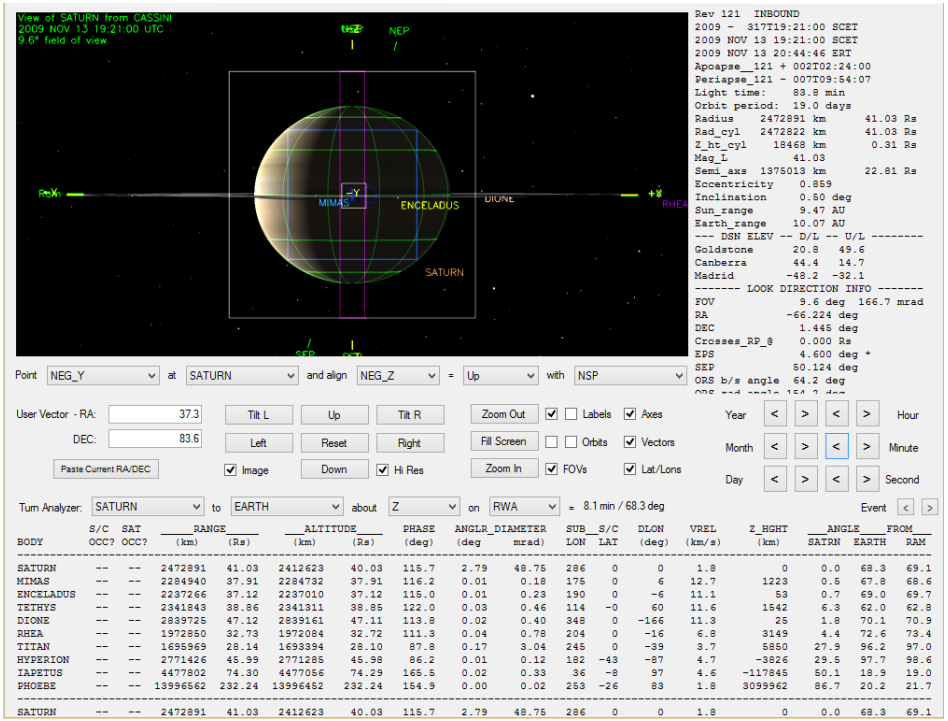
Event	Start doy hh:mm	End doy hh:mm	CAPS (Mb)	CDA (Mb)	CIRS (Mb)	INMS (Mb)	ISS (Mb)	MAG (Mb)	MIMI (Mb)	RADAR (Mb)	RPWS (Mb)	UVIS (Mb)	VIMS (Mb)	PROBE (Mb)	ENGR (Mb)	TOTAL (Mb)
OBSERVATION_NOR	311 12:21	312 03:21	108.0	28.3	0.0	5.4	212.1	94.8	64.8	0.0	70.7	151.4	50.0	0.0	62.7	848.2
SP_120EA_M70METSEQ312_PRIME	312 03:21	312 12:21	64.8	17.0	0.0	3.2	0.0	32.0	38.9	0.0	42.4	4.9	0.0	0.0	0.0	203.3
DAILY TOTAL SCIENCE	311 12:21	312 12:21	172.8	45.3	0.0	8.6	212.1	126.8	103.7	0.0	113.2	156.4	50.0	0.0	62.7	
OBSERVATION_NOR	312 12:21	313 10:36	118.3	42.0	0.0	8.0	563.1	79.1	96.1	0.0	104.9	233.0	100.0	0.0	93.0	1437.4
SP_120EA_G34BWGSEQ413_PRIME	313 10:36	313 18:46	29.4	15.4	0.0	2.9	0.0	29.0	35.3	0.0	38.5	4.5	0.0	0.0	0.0	155.1
DAILY TOTAL SCIENCE	312 12:21	313 18:46	147.7	57.4	0.0	11.0	563.1	108.2	131.4	0.0	143.4	237.4	100.0	0.0	93.0	
OBSERVATION_NOR	313 18:46	314 17:06	80.4	42.1	0.0	8.0	343.1	79.4	96.5	0.0	105.3	151.9	73.0	0.0	93.3	1073.1
SP_120EA_C70METSEQ314_PRIME	314 17:06	315 02:06	32.4	17.0	43.2	3.2	0.0	32.0	38.9	0.0	42.4	4.9	0.0	0.0	0.0	214.1
DAILY TOTAL SCIENCE	313 18:46	315 02:06	112.8	59.1	43.2	11.3	343.1	111.4	135.4	0.0	147.8	156.8	73.0	0.0	93.3	
OBSERVATION_NOR	315 02:06	316 03:06	90.0	47.2	18.0	19.1	738.4	88.9	108.0	0.0	117.9	275.9	33.0	0.0	104.5	1640.8
SP_121EA_M34OTPSEQ316_PRIME	316 03:06	316 12:06	32.4	17.0	43.2	3.2	0.0	32.0	38.9	0.0	42.4	4.9	0.0	0.0	0.0	214.1
DAILY TOTAL SCIENCE	315 02:06	316 12:06	122.4	64.1	61.2	22.3	738.4	120.9	146.9	0.0	160.3	280.8	33.0	0.0	104.5	
OBSERVATION_NOR	316 12:06	317 10:21	80.1	42.0	0.0	8.0	541.1	79.1	96.1	0.0	104.9	205.8	100.0	0.0	93.0	1350.2
SP_121EA_G70OTBSEQ317_PRIME	317 10:21	317 19:21	32.4	17.0	0.0	3.2	0.0	32.0	38.9	0.0	42.4	4.9	0.0	0.0	0.0	170.9
DAILY TOTAL SCIENCE	316 12:06	317 19:21	112.5	58.9	0.0	11.3	541.1	111.1	135.0	0.0	147.4	210.7	100.0	0.0	93.0	

Segment Geometry



Seg Start (Left)

Seg End (below)



	Saturn Range	Phase Angle	Sub-S/C Lat.
Segment Start	16.75	68.5	0
Apoapse	42.41	109.7	0
Segment End	41.03	115.7	0

Solar Geometry – ORS Boresight Concerns

No ORS Boresight Solar Constraints on Science Pointing.

Daily Science Highlights

DOY 307: The Saturn 120_121 segment began mid-day with a Titan cloud monitoring campaign request, followed by a UVIS EUV/FUV of Saturn consisting of several slow scans across the visible hemisphere to form spectral images. Meanwhile, MAPS instruments were conducting a dusk magnetosphere campaign.

DOY 308: ISS conducted a Saturn WAC photopolarimetry 1x2 mosaic and a set of satellite orbit determination images. CIRS performed a far-IR scan of the northern hemisphere and pole of Saturn. MAPS began a magnetospheric boundaries campaign.

DOY 309: Following the wrap up of the CIRS FIRMAP, ISS conducted another Saturn WAC photopolarimetry 1x2 mosaic. MAPS measured the magnetospheric boundaries with some CAPS prime-pointing time. ISS conducted more satellite orbit determination and Saturn 1x2 mosaics. ISS also spent some time looking for lightning on Saturn while CIRS measured oxygen compounds (H2O, CO2) in the planet's stratosphere as a function of latitude.

DOY 310: CIRS finished up their Saturn COMPSIT and UVIS mapped volatiles in the immediate neighborhood of Enceladus. These ICYATM Observations will test the connection of volatile changes to plume eruptions. MAPS continued to look at the magnetospheric boundaries with more CAPS prime-pointing time and CDA conducted an observation that is part of their ISD survey campaign. ISS continued its search for Saturn lightning and took NAC images of Titan's shadow on Saturn. Looking at Titan's shadow on Saturn is useful for Titan aerosol science. This is a unique geometry that occurred only a few times the XM and not at all in the nominal mission or XXM. MAPS began a southwest auroral campaign to observe the auroral magnetosphere (e.g. the acceleration region) and SKR source regions.

DOY 311: ISS conducted a Saturn WAC photopolarimetry 1x2 mosaic and set of satellite orbit determination images. The MAPS magnetospheric boundaries campaign continued with more prime-pointing for CAPS, while ISS continued their lightning search. The MAPS southwest auroral campaign continued as well. UVIS performed an apoapse system scan of Saturn's magnetosphere to wrap up the day.

DOY 312: ISS began the day with a Saturn WAC photopolarimetry 1x2 mosaic and a set of satellite orbit determination images followed by more lightning detection efforts. MAPS continued to look at the magnetospheric boundaries with more CAPS prime-pointing time. ISS took advantage of a couple mutual event opportunities, both imaging the transit of Rhea across Janus for orbit determination purposes. UVIS began another apoapse system scan of Saturn's magnetosphere that continued into the next day.

DOY 313: Following the completion of the UVIS apoapse system scan, ISS took another Saturn WAC photopolarimetry 1x2 mosaic followed by a look at the outer moon Bestla. The MAPS southwest auroral campaign continued while UVIS began another apoapse system scan of Saturn's magnetosphere that continues into the next day.

DOY 314: Following the completion of the UVIS scan, the bulk of the day was spent by a ISS observation of the E-ring at low resolution, low elevation, and high-phase. ISS took another Saturn WAC photopolarimetry 1x2 mosaic while the MAPS southwest auroral campaign continued.

DOY 315: The day began with a Titan cloud monitoring request followed by more ISS time on the E-ring, performing similar measurements as the day before. Meanwhile the MAPS southwest auroral campaign continued with CAPS getting some more prime-pointing time. ISS imaged several mutual events for orbit determination purposes including the transit of Janus across Rhea, the transit of Dione across Rhea, and the transit of Tethys across Enceladus. Additionally, UVIS conducted a stellar calibration and another apoapse system scan.

DOY 316: ISS executed more Saturn WAC photopolarimetry 1x2 mosaics, an observation of the outer moon Kiviuq, as well as lightning searches on Saturn. The MAPS southwest auroral campaign rolled on with another CAPS prime-pointing opportunity.

DOY 317: UVIS kicked off the day with another apoapse system scan and ISS conducted another Saturn WAC photopolarimetry 1x2 mosaic. Meanwhile, the southwest auroral campaign continued for the MAPS instruments. This day marked the end of both the Saturn 120_121 segment and the S54 sequence.

Segment Integration Planning

Timeline Gaps and Suggested Observations

Saturn_120 Outbound

Request	Riders	Start (SCET)	Duration	End (SCET)	Primary	Secondary	Comments
Sequence S54, length = 40 days		2009-278T04:03:00	039T15:18:00	2009-317T19:21:00			
SATURN_120_121 Segment		2009-307T12:35:00	010T06:46:00	2009-317T19:21:00			
SP_120SA_WAYPTTURN307_PRIME		2009-307T12:35:00	000T00:40:00	2009-307T13:15:00	ISS_NAC to Saturn		SP Turn to Waypoint
ISS_120TI_M90R3CLD307_PRIME	C, M, U	2009-307T13:15:00	000T01:15:00	2009-307T14:30:00	ISS_NAC to Titan	NEG_X to Sun	
UVIS_121SA_EUVFUV001_PRIME		2009-307T14:30:00	000T12:25:00	2009-308T02:55:00	UVIS_FUV to Saturn	NEG_Z to Sun	Moved from Rev 121 Outbound
SP_120EA_DLTURN308_PRIME		2008-308T02:55:00	000T00:40:00	2009-308T03:35:00	XBAND to Earth	POS_X to NEP	
SP_120EA_M34BWGNON308_PRIME	C, M	2009-308T03:35:00	000T09:00:00	2009-308T12:35:00	XBAND to Earth	Rolling	POS_X to NEP

Rev 120-121/121 Statistics

- UVIS System Scan Flavor

Saturn Rev 120_121/121 (pseudo-xd portion) Strawman Statistics

2009-308T12:35:00 --> 2009-323T02:17:00

	Requested in CIMS				Allocated in Timeline						
Prime Pointing Request Type	Requests	Min. Duration	Max. Duration	Total Duration	Requests	Min. Duration	Max. Duration	Total Duration	% Alloc. Req.	% Alloc. Time	Notes
CAPS											
SA_MAGBNDPTG	2	000T02:00:00		000T04:00:00	2	000T02:00:00		000T04:00:00	100.00%	100.00%	
SU_SWAURPTG	2	002T15:31:00	006T20:24:00	009T11:55:00	6	000T01:43:00	000T02:00:00	000T11:43:00	300.00%	4.22%	2 hr. blocks in place of continuous coverage.
SA_SURVEYPTG	3	000T02:00:00		000T06:00:00	2	000T02:00:00		000T04:00:00	66.67%	66.67%	
CIRS											
OT_1STAROBS	1	000T06:00:00		000T06:00:00	0				0.00%	0.00%	UVIS focused segment
SA_COMPSIT	2	000T10:00:00	000T20:10:00	001T06:10:00	0				0.00%	0.00%	UVIS focused segment
SA_FIRMAP	1	000T12:00:00		000T12:00:00	1	000T11:55:00		000T11:55:00	100.00%	99.31%	
SA_MIRMAP	1	000T22:00:00		000T22:00:00	0				0.00%	0.00%	UVIS focused segment
OT_STRALTCAL	1	000T05:00:00		000T05:00:00	0				0.00%	0.00%	UVIS focused segment
ISS											
MUTUALEVE	20	000T00:40:00	000T01:45:00	000T17:23:00	7	000T00:44:00	000T01:08:00	000T05:46:00	35.00%	33.17%	Conflicts with each other and downlinks.
MI_PHOTOOP	1	000T01:10:00		000T01:10:00	0				0.00%	0.00%	Conflict with downlink.
TI_PHOTOOP	1	000T01:05:00		000T01:05:00	0				0.00%	0.00%	Cleared for TI mutual evt.
OT_OUTERSATS	2	000T03:00:00		000T06:00:00	1	000T03:00:00		000T03:00:00	50.00%	50.00%	
OT_SATELLORB	11	000T00:30:00		000T05:30:00	7	000T00:29:00	000T00:30:00	000T03:29:00	63.64%	63.33%	
RE_LRLEMP	2	000T17:30:00	000T17:48:00	001T11:18:00	2	000T04:54:00	000T12:52:00	000T17:46:00	100.00%	50.33%	
SA_1X2WPXX	14	000T01:00:00		000T14:00:00	14	000T01:00:00	000T01:18:00	000T14:18:00	100.00%	102.14%	
SA_NALGTNG	12	000T14:45:00	001T01:00:00	009T01:17:00	11	000T01:11:00	000T05:55:00	001T04:09:00	91.67%	12.96%	
SA_TITANSHAD	1	000T02:35:00		000T02:35:00	1	000T02:35:00		000T02:35:00	100.00%	100.00%	
ST_CHARGEXF	1	000T07:30:00		000T07:30:00	1	000T07:30:00		000T07:30:00	100.00%	100.00%	
TI_CLD_MONTIOR	3	000T01:15:00		000T03:45:00	3	000T01:15:00		000T03:45:00	100.00%	100.00%	
NAV											
SK_SFAD	1	000T01:36:00		000T01:36:00	1	000T01:36:00		000T01:36:00	100.00%	100.00%	
UVIS											
EN_ICYATM	2	000T04:00:00		000T08:00:00	2	000T04:00:00		000T08:00:00	100.00%	100.00%	
SA_MOS120APO	10	000T08:00:00		003T08:00:00	9	000T08:00:00		003T00:00:00	90.00%	90.00%	
IC_ALPVIR	1	000T03:00:00		000T03:00:00	1	000T03:00:00		000T03:00:00	100.00%	100.00%	
VIMS											
RI_EG130PHAS	1	000T12:00:00		000T12:00:00	1	000T11:40:00		000T11:40:00	100.00%	97.22%	

Initial SMT and Data Volume (1 of 2)

Integration (Following Timeline Completion):

First look at the whole segment, 120 Outbound (first day) was worked earlier.

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_120EA_M34BWGNON308_PRIME	308 03:35	308 12:35	0	1397	63	1460	3544	2083	0	641	53	2154	570	-1585	-1508	-11%	1585
SP_120EA_M34HEFOTP309_PRIME	309 03:20	309 12:20	1585	1532	62	3179	3544	365	0	684	53	3917	572	-3345	-1508	-11%	3344
SP_120EA_M70METOTB310_PRIME	310 03:21	310 12:21	3344	1645	63	5052	3544	-1508	0	641	53	4238	3146	-1092	-38	0%	1092
SP_120EA_M34HEFNON311_PRIME	311 03:21	311 12:21	1092	1535	63	2691	3544	853	0	281	53	3025	686	-2340	-38	0%	2339
SP_120EA_M70METNON312_PRIME	312 03:21	312 12:21	2339	840	63	3243	3544	301	0	237	53	3533	3146	-387	-38	0%	387
SP_120EA_G34HEFNON313_PRIME	313 10:36	313 19:36	387	1540	94	2020	3544	1523	0	237	53	2311	801	-1511	-38	0%	1510
SP_120EA_C70METNON314_PRIME	314 17:06	315 02:06	1510	1234	91	2835	3544	709	0	281	53	3169	3114	-56	-38	0%	55
SP_121EA_M34BWGOTP316_PRIME	316 03:06	316 12:06	55	1731	106	1892	3544	1652	0	281	53	2226	495	-1731	-38	-2%	1731
SP_121EA_G34BWGOTB317_PRIME	317 10:21	317 19:21	1731	1757	94	3582	3544	-38	0	281	53	3878	655	-3223	0	0%	3223

Cuts made so far:
RPWS – 5.3 Gbits
CIRS – 575 Mbits
MIMI – 738 Mbits (All 3 segments Combined)

Initial SMT and Data Volume (2 of 2)

Integration (Following Timeline Completion):

First look at the whole segment, 120 Outbound (first day) was worked earlier.

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	307 12:35	308 03:35	216.0	28.3	18.0	15.5	173.1	106.7	64.8	0.0	556.7	205.3	0.0	0.0	12.3	1396.6
SP_120EA_M34BWGNON308_PRIME	308 03:35	308 12:35	129.6	17.0	43.2	3.2	0.0	64.0	38.9	0.0	334.0	4.9	0.0	0.0	0.0	634.9
DAILY TOTAL SCIENCE	307 12:35	308 12:35	345.6	45.3	61.2	18.7	173.1	170.7	103.7	0.0	890.8	210.2	0.0	0.0		
OBSERVATION_NOR	308 12:35	309 03:20	212.4	27.8	171.6	5.3	135.1	104.9	63.7	0.0	547.5	0.0	250.0	0.0	12.1	1530.4
SP_120EA_M34HEFOTP309_PRIME	309 03:20	309 12:20	129.6	17.0	86.4	3.2	0.0	64.0	38.9	0.0	334.0	4.9	0.0	0.0	0.0	678.1
DAILY TOTAL SCIENCE	308 12:35	309 12:20	342.0	44.8	258.0	8.6	135.1	168.9	102.6	0.0	881.5	4.9	250.0	0.0		
OBSERVATION_NOR	309 12:20	310 03:21	216.2	28.3	57.6	5.4	243.1	106.8	64.9	0.0	557.4	0.0	350.0	0.0	12.3	1642.0
SP_120EA_M70METOTB310_PRIME	310 03:21	310 12:21	129.6	17.0	43.2	3.2	0.0	64.0	38.9	0.0	334.0	4.9	0.0	0.0	0.0	634.9
DAILY TOTAL SCIENCE	309 12:20	310 12:21	345.8	45.3	100.8	8.6	243.1	170.8	103.8	0.0	891.4	4.9	350.0	0.0		
OBSERVATION_NOR	310 12:21	311 03:21	184.3	32.1	0.0	5.4	577.8	106.7	64.8	0.0	414.2	36.2	100.0	0.0	12.3	1533.7
SP_120EA_M34HEFNON311_PRIME	311 03:21	311 12:21	64.8	17.0	43.2	3.2	0.0	64.0	38.9	0.0	42.4	4.9	0.0	0.0	0.0	278.5
DAILY TOTAL SCIENCE	310 12:21	311 12:21	249.1	49.0	43.2	8.6	577.8	170.7	103.7	0.0	456.6	41.2	100.0	0.0		
OBSERVATION_NOR	311 12:21	312 03:21	108.0	28.3	0.0	5.4	247.1	106.7	64.8	0.0	70.7	151.4	50.0	0.0	12.3	844.7
SP_120EA_M70METNON312_PRIME	312 03:21	312 12:21	64.8	17.0	0.0	3.2	0.0	64.0	38.9	0.0	42.4	4.9	0.0	0.0	0.0	235.3
DAILY TOTAL SCIENCE	311 12:21	312 12:21	172.8	45.3	0.0	8.6	247.1	170.7	103.7	0.0	113.2	156.4	50.0	0.0		
OBSERVATION_NOR	312 12:21	313 10:36	160.2	42.0	0.0	8.0	623.1	158.3	96.1	0.0	104.9	233.0	100.0	0.0	18.2	1543.7
SP_120EA_G34HEFNON313_PRIME	313 10:36	313 19:36	64.8	17.0	0.0	3.2	0.0	64.0	38.9	0.0	42.4	4.9	0.0	0.0	0.0	235.3
DAILY TOTAL SCIENCE	312 12:21	313 19:36	225.0	59.0	0.0	11.3	623.1	222.3	135.0	0.0	147.4	237.9	100.0	0.0		
OBSERVATION_NOR	313 19:36	314 17:06	154.8	40.6	0.0	7.7	448.1	152.9	92.9	0.0	101.4	151.4	73.0	0.0	17.6	1240.4
SP_120EA_C70METNON314_PRIME	314 17:06	315 02:06	64.8	17.0	43.2	3.2	0.0	64.0	38.9	0.0	42.4	4.9	0.0	0.0	0.0	278.5
DAILY TOTAL SCIENCE	313 19:36	315 02:06	219.6	57.5	43.2	11.0	448.1	217.0	131.8	0.0	143.8	156.4	73.0	0.0		
OBSERVATION_NOR	315 02:06	316 03:06	180.0	47.2	18.0	19.1	738.4	177.8	108.0	0.0	117.9	275.9	33.0	0.0	20.4	1735.7
SP_121EA_M34BWGOTP316_PRIME	316 03:06	316 12:06	64.8	17.0	43.2	3.2	0.0	64.0	38.9	0.0	42.4	4.9	0.0	0.0	0.0	278.5
DAILY TOTAL SCIENCE	315 02:06	316 12:06	244.8	64.1	61.2	22.3	738.4	241.9	146.9	0.0	160.3	280.8	33.0	0.0		
OBSERVATION_NOR	316 12:06	317 10:21	160.2	42.0	0.0	8.0	766.1	158.3	96.1	0.0	104.9	205.8	200.0	0.0	18.2	1759.6
SP_121EA_G34BWGOTB317_PRIME	317 10:21	317 19:21	64.8	17.0	43.2	3.2	0.0	64.0	38.9	0.0	42.4	4.9	0.0	0.0	0.0	278.5
DAILY TOTAL SCIENCE	316 12:06	317 19:21	225.0	58.9	43.2	11.3	766.1	222.3	135.0	0.0	147.4	210.7	200.0	0.0		

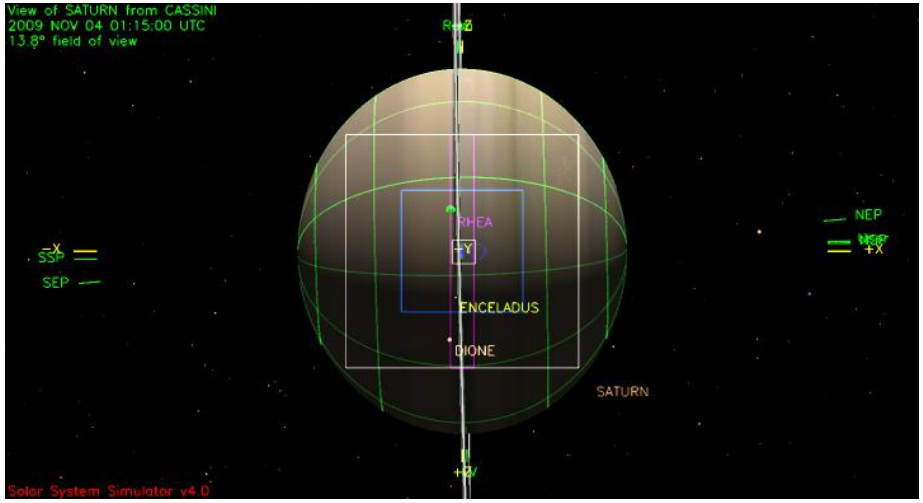
	CAPS (Mb)	CDA (Mb)	CIRS (Mb)	INMS (Mb)	ISS (Mb)	MAG (Mb)	MIMI (Mb)	RADAR (Mb)	RPWS (Mb)	UVIS (Mb)	VIMS (Mb)	PROBE (Mb)
TOTAL RECORDED (OPNAV data not included)	2369.8	469.3	610.8	109.0	3951.6	1755.4	1066.0	0.0	3832.4	1303.5	1156.0	0.0

Waypoint Selection

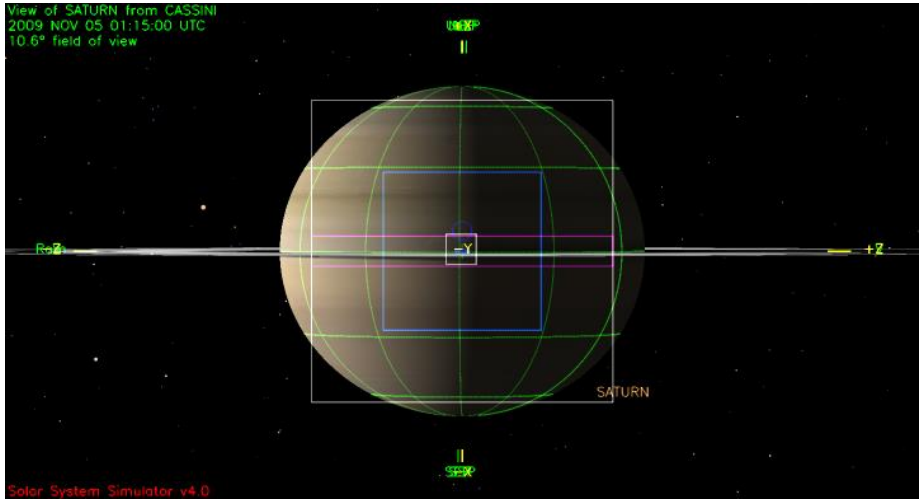
No Waypoint Selection Info Available.

Waypoints Chosen (1 of 2)

Waypoint 1 (2009-307T13:15:00 – 2009-308T13:15:00): ISS_NAC to Saturn; NEG_Z to Sun

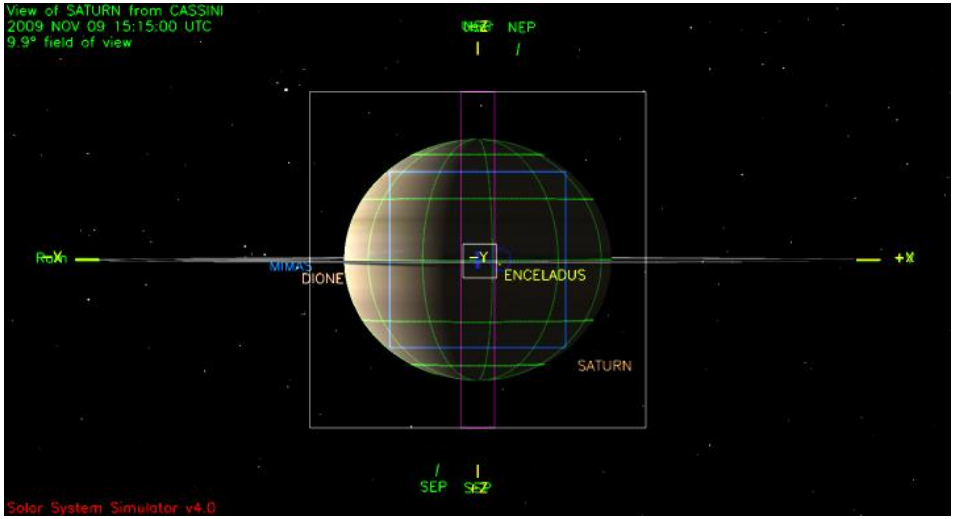


Waypoint 2 (2009-308T13:15:00 – 2009-309T13:00:00): ISS_NAC to Saturn; POS_X to NSP



Waypoints Chosen (2 of 2)

Waypoint 3 (2009-309T13:00:00 – 2009-317T19:21:00): ISS_NAC to Saturn; NEG_Z to NSP



Notes & Liens

Notes:

- Pointing:
  - Turns on DOYs 309 and 310 were designed as “2-part” turns to avoid 180 degree ambiguity.
- Data Volume:
  - No issues.
- DSN:
  - No passes in maintenance.
- Opmodes:
  - Nothing extraordinary.
- Special Activities:
  - None, but that does not mean that the activities that are there are expendable! ;)

Sequence Liens:

- None