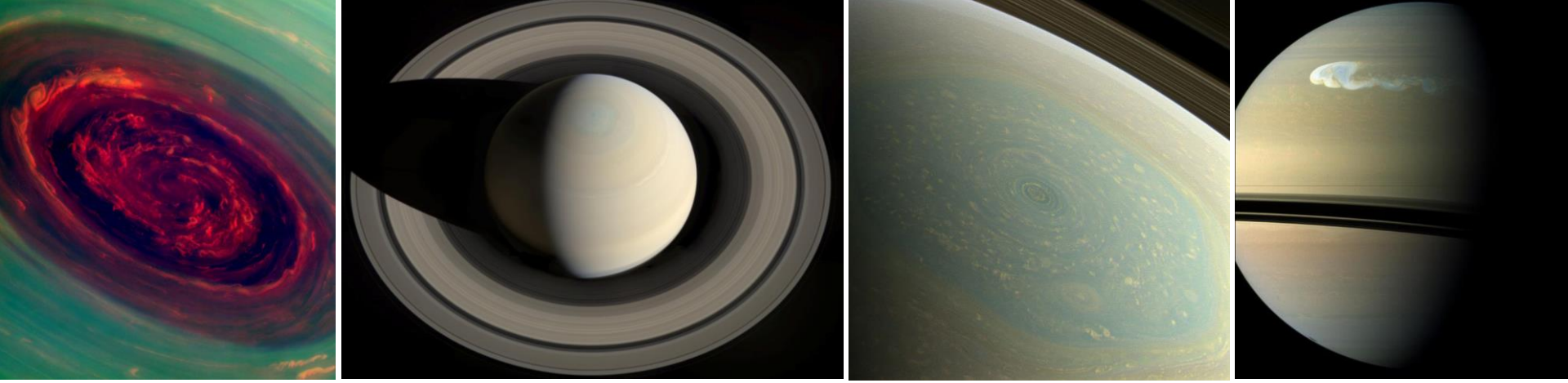


Science Planning & Sequence Team
CASSINI

SATURN TARGET WORKING TEAM

Rev 119_120 Segment Legacy Package

Segment Boundary: October 13, 2009 – November 1, 2009
2009-286T13:49 – 2009-305T12:35 (SCET)

Integration Began 05/12/2008
Segment Delivered to S54 Sequence 04/06/2009
Lead Integrator was Anna Marie Aguinaldo

Legacy Package Assembled by Kyle Cloutier

Table of Contents

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

Segment Overview and Final Products

Segment Summary

- Saturn 119_120 was a periapse segment in the Equinox extended mission which covered ~19 days, roughly an entire orbit. The spacecraft stayed relatively equatorial during this segment. Planning for the segment took place over multiple months. Rev 119 periapse was planned first, then the surrounding apoapse time was filled in later.
- Rev 119 Periapse was allocated to RADAR to create a global map of Saturn's equatorial region.
- Periapse was allocated to the Saturn TWT, but outside the 6 hours surrounding periapse, high-priority icy satellite observations were accommodated (unique low-phase opportunities).
- Out near apoapse, the timeline accommodated several icy satellite observations. Saturn observations included CIRS composition and mapping, and ISS lightning searches.
- Solar viewing constraints impacted science placement. CMT constraint management was required during the occulted period on DOY 286.
- Being a long segment with several icy satellite targets, the waypoint strategy was much more complicated than usual.

Final Sequenced SPASS (1 of 4)

	Request	Riders	Start (SCET)	Start (Epoch)	Duration	End	Primary	Secondary	Comments
	SATURN_119_120 Segment		2009-286T13:49:00		018T22:46:00	2009-305T12:35:00			
	SP_119SA_WAYPTTURN286_PRIME	M	2009-286T13:49:00		000T00:35:00	2009-286T14:24:00	ISS_NAC to Saturn (12.0,0.0,0.0 deg. offset)	NEG_X to NSP	
	NEW WAYPOINT		**2009-286T14:24:00**		**000T01:26:00**	**2009-286T15:50:00**	**ISS_NAC to Saturn (12.0,0.0,0.0 deg. offset)**	**NEG_X to NSP**	
	VIMS_119SA_NHEMDYN001_PRIME	I, M	2009-286T14:24:00		000T01:05:00	2009-286T15:29:00	VIMS_IR to Saturn (12.0,0.0,0.0 deg. offset)	NEG_X to NSP	VIMS cannot look at Saturn center until 2009-286T14:59
	SP_119RH_WAYPTTURN286_PRIME	M	2009-286T15:29:00		000T00:21:00	2009-286T15:50:00	ISS_NAC to Rhea	NEG_X to NSP	
	NEW WAYPOINT		**2009-286T15:50:00**		**000T07:24:00**	**2009-286T23:14:00**	**ISS_NAC to Rhea**	**NEG_X to NSP**	
SOST	CIRS_119RH_FP1SECLN003_PRIME	C, I, M, U, V	2009-286T15:50:00		000T04:10:00	2009-286T20:00:00	CIRS_FP1 to Rhea	NEG_X to North_Pole_Dir	
SOST	ISS_119EN_PLMHRHP001_PRIME	M, R, U, V	2009-286T20:00:00		000T02:25:00	2009-286T22:25:00	ISS_NAC to Enceladus	POS_X to NSP	S_N_ER_5A for first 15 minutes 20:00-20:15; S_N_ER_3 for remainder of observation 20:15-22:25 (Saturn_twt 080721)
SOST	VIMS_119RH_RHEA001_PRIME	C, I, M, R, U	2009-286T22:25:00		000T00:24:00	2009-286T22:49:00	ISS_NAC to Rhea	NEG_X to NSP	
SOST	SP_119SA_WAYPTTURN986_PRIME	M, R	2009-286T22:49:00		000T00:25:00	2009-286T23:14:00	NEG_Z to Saturn	NEG_X to NSP	
	NEW WAYPOINT		**2009-286T23:14:00**		**000T12:56:00**	**2009-287T12:10:00**	**NEG_Z to Saturn**	**NEG_X to NSP**	
	RADAR_119SA_GLOBALMAP001_PRIME	E, M	2009-286T23:14:00		000T12:16:00	2009-287T11:30:00	NEG_Z to Saturn	PIC	
	Periapse R = 3.195 Rs, lat ...		2009-287T05:10:30		000T00:00:01	2009-287T05:10:31			
	SP_119TE_WAYPTTURN287_PRIME	M	2009-287T11:30:00		000T00:40:00	2009-287T12:10:00	ISS_NAC to Tethys	NEG_X to NSP	
	NEW WAYPOINT		**2009-287T12:10:00**		**000T03:43:00**	**2009-287T15:53:00**	**ISS_NAC to Tethys**	**NEG_X to NSP**	
SOST	ISS_119TE_GEOLOG001_PRIME	C, M, U, V	2009-287T12:10:00		000T00:30:00	2009-287T12:40:00	ISS_NAC to Tethys	NEG_X to NSP	NAC to Tethys
SOST	ISS_119MI_LOWPHASE001_PRIME	C, M, U, V	2009-287T12:40:00		000T01:25:00	2009-287T14:05:00	ISS_NAC to Mimas	NEG_X to NSP	NAC to Mimas
SOST	ISS_119EN_LOWPHASE001_PRIME	C, M, U, V	2009-287T14:05:00		000T01:05:00	2009-287T15:10:00	ISS_NAC to Enceladus	NEG_X to NSP	NAC to Enceladus
SOST	ISS_119TE_LOWPHASE001_PRIME	C, M, U, V	2009-287T15:10:00		000T00:30:00	2009-287T15:40:00	ISS_NAC to Tethys	NEG_X to NSP	NAC to Tethys
SOST	SP_119SA_WAYPTTURN287_PRIME	M	2009-287T15:40:00		000T00:13:00	2009-287T15:53:00	ISS_NAC to Saturn	NEG_X to NSP	
	NEW WAYPOINT		**2009-287T15:53:00**		**002T12:06:00**	**2009-290T03:59:00**	**ISS_NAC to Saturn**	**NEG_X to NSP**	
	VIMS_119SA_NHEMDYN002_PRIME	I, M	2009-287T15:53:00		000T02:05:00	2009-287T17:58:00	ISS_NAC to Saturn	NEG_X to NSP	
	SP_119EA_DLTURN287_PRIME	M	2009-287T17:58:00		000T00:36:00	2009-287T18:34:00	XBAND to Earth	NEG_X to NEP	
	SP_119EA_C70METNON287_PRIME	C, E, M, R	2009-287T18:34:00		000T09:00:00	2009-288T03:34:00	XBAND to Earth	5_Hr_Rolling	NEG_X to NEP; CRPC; rolling required
	SP_119SA_WAYPTTURN288_PRIME	M	2009-288T03:34:00		000T00:40:00	2009-288T04:14:00	ISS_NAC to Saturn	NEG_X to NSP	
	VIMS_119SA_NHEMDYN003_PRIME	I, M	2009-288T04:14:00		000T13:41:00	2009-288T17:55:00	ISS_NAC to Saturn	NEG_X to NSP	
	SP_119EA_DLTURN288_PRIME	M	2009-288T17:55:00		000T00:39:00	2009-288T18:34:00	XBAND to Earth	NEG_X to NSP	
	SP_119EA_C70METOTP288_PRIME	E, M, N	2009-288T18:34:00		000T09:00:00	2009-289T03:34:00	XBAND to Earth	NEG_X to NSP	NEG_X to NSP; CAPS
	SP_119SA_WAYPTTURN289_PRIME	M	2009-289T03:34:00		000T00:40:00	2009-289T04:14:00	ISS_NAC to Saturn	NEG_X to NSP	
	UVIS_119SA_EUVFUV001_PRIME	M, V	2009-289T04:14:00		000T10:38:00	2009-289T14:52:00	UVIS_FUV to Saturn (-1.148,0.0,-2.752 deg. offset)	NEG_X to 38.0/84.0	
	ISS_119TI_M90R3CLD289_PRIME	C, M, U	2009-289T14:52:00		000T01:15:00	2009-289T16:07:00	ISS_NAC to Titan	NEG_X to 37.3/83.8	
	ISS_119TE_MUTUALEVE001_PRIME	M	2009-289T16:07:00		000T00:40:00	2009-289T16:47:00	ISS_NAC to Tethys	NEG_X to NSP	ISS_NAC to Tethys control of secondary axis not required
	VIMS_119SA_GLOBDYN001_PRIME	I, M	2009-289T16:47:00		000T00:52:00	2009-289T17:39:00	ISS_NAC to Saturn	NEG_X to NSP	
	SP_119EA_DLTURN289_PRIME	M	2009-289T17:39:00		000T00:40:00	2009-289T18:19:00	XBAND to Earth	NEG_X to NSP	
	SP_119EA_G70METNON289_PRIME	C, M, N	2009-289T18:19:00		000T03:45:00	2009-289T22:04:00	XBAND to Earth	Rolling	NEG_X to NSP
	SP_119EA_C34HEFOTB289_PRIME	C, M, N	2009-289T22:04:00		000T05:15:00	2009-290T03:19:00	XBAND to Earth	NEG_X to NSP	NEG_X to NSP
	SP_119EA_WAYPTTURN290_PRIME	M	2009-290T03:19:00		000T00:40:00	2009-290T03:59:00	ISS_NAC to Saturn	NEG_X to Sun	

Final Sequenced SPASS (2 of 4)

Request	Riders	Start (SCET)	Start (Epoch)	Duration	End	Primary	Secondary	Comments
NEW WAYPOINT		2009-290T03:59:00		003T23:45:00	2009-294T03:44:00	ISS_NAC to Saturn	NEG_X to Sun	
ISS_119TI_M90R3CLD290_PRIME	C, M, U	2009-290T03:59:00	E119_M90R3CLD290+000T00:00:00	000T01:15:00	2009-290T05:14:00	ISS_NAC to Titan	NEG_X to 37.3/83.8	
ISS_119SA_1X2WPXX002_PRIME	M	2009-290T05:14:00		000T01:00:00	2009-290T06:14:00	ISS_NAC to Saturn	NEG_Z to 38.0/84.0	
CAPS_119SA_MAGBNDPTG001_PRIME	M	2009-290T06:14:00		000T02:00:00	2009-290T08:14:00	POS_Y to COROT (0.0,0.0,40.0 deg. offset)	NEG_X to NSP	
ISS_119TE_MUTUALEVE004_PRIME	M	2009-290T08:14:00		000T00:55:00	2009-290T09:09:00	ISS_NAC to Tethys	NEG_X to Sun	ISS_NAC to Tethys control of secondary axis not required
ISS_119SA_NALGTNG001_PRIME	M	2009-290T09:09:00		000T04:00:00	2009-290T13:09:00	ISS_NAC to Saturn	NEG_Z to 38.0/84.0	
ISS_119OT_SATELLORB007_PRIME	M	2009-290T13:09:00		000T00:30:00	2009-290T13:39:00	ISS_NAC to Rocks	NEG_X to Sun	
UVIS_119EN_ICYATM002_PRIME	M	2009-290T13:39:00		000T04:00:00	2009-290T17:39:00	UVIS_FUV to Enceladus	NEG_X to Sun	See observation description. Duration of 4 hours allows for 30 min slew to and from Enceladus, and 3 integration sites.
SP_119EA_DLTURN290_PRIME	M	2009-290T17:39:00		000T00:40:00	2009-290T18:19:00	XBAND to Earth	POS_X to NEP	
SP_119EA_C34BWGNON290_PRIME	C, M	2009-290T18:19:00		000T09:00:00	2009-291T03:19:00	XBAND to Earth	Rolling/SRU	POS_X to NEP
SP_119SA_WAYPTTURN291_PRIME	M	2009-291T03:19:00		000T00:40:00	2009-291T03:59:00	ISS_NAC to Saturn	NEG_X to Sun	
ISS_119SA_1X2WPXX003_PRIME	M	2009-291T03:59:00		000T01:00:00	2009-291T04:59:00	ISS_NAC to Saturn	NEG_Z to 38.0/84.0	
VIMS_119RI_EG80PHASE001_PRIME	M	2009-291T04:59:00		000T12:10:00	2009-291T17:09:00	VIMS_IR to Rings	NEG_X to Sun	
ISS_119OT_SATELLORB010_PRIME	M	2009-291T17:09:00		000T00:30:00	2009-291T17:39:00	ISS_NAC to Rocks	NEG_X to Sun	
SP_119EA_DLTURN291_PRIME	M	2009-291T17:39:00		000T00:40:00	2009-291T18:19:00	XBAND to Earth (0.0,0.0,-35.0 deg. offset)	NEG_X to NSP	
SP_119EA_C70METNON291_PRIME	E, M	2009-291T18:19:00		000T09:00:00	2009-292T03:19:00	XBAND to Earth (0.0,0.0,-35.0 deg. offset)	3_Hr_Rolling	NEG_X to NSP (0,0,-35); CAPS; RWA friction test; 3 hr roll ok
SP_119EA_WAYPTTURN292_PRIME	M	2009-292T03:19:00		000T00:40:00	2009-292T03:59:00	ISS_NAC to Saturn	NEG_X to Sun	
ISS_119SA_1X2WPXX004_PRIME	M	2009-292T03:59:00		000T01:00:00	2009-292T04:59:00	ISS_NAC to Saturn	NEG_Z to 38.1/84.0	
ISS_119OT_SATELLORB012_PRIME	M	2009-292T04:59:00		000T01:00:00	2009-292T05:59:00	ISS_NAC to Rocks	NEG_X to Sun	
CAPS_119SU_SWAURPTG010_PRIME	M	2009-292T05:59:00		000T02:52:00	2009-292T08:51:00	POS_Y to COROT (0.0,0.0,40.0 deg. offset)	NEG_X to NSP	
ISS_119MI_MUTUALEVE001_PRIME	M	2009-292T08:51:00		000T00:42:00	2009-292T09:33:00	ISS_NAC to Mimas	NEG_X to Sun	ISS_NAC to Mimas control of secondary axis not required
ISS_119SA_NALGTNG003_PRIME	M	2009-292T09:33:00		000T08:06:00	2009-292T17:39:00	ISS_NAC to Saturn	NEG_Z to 38.1/84.0	
SP_119EA_DLTURN292_PRIME	M	2009-292T17:39:00		000T00:40:00	2009-292T18:19:00	XBAND to Earth	POS_X to NEP	
SP_119EA_C34BWGNON292_PRIME	M, R	2009-292T18:19:00		000T08:00:00	2009-293T02:19:00	XBAND to Earth	Rolling/SRU	POS_X to NEP
SP_119EA_WAYPTTURN293_PRIME	M	2009-293T03:19:00		000T00:40:00	2009-293T03:59:00	ISS_NAC to Saturn	NEG_X to Sun	
ISS_119SA_1X2WPXX005_PRIME	M	2009-293T03:59:00		000T01:00:00	2009-293T04:59:00	ISS_NAC to Saturn	NEG_Z to 38.1/84.0	
ISS_119OT_SATELLORB014_PRIME	M	2009-293T04:59:00		000T00:30:00	2009-293T05:29:00	ISS_NAC to Rocks	NEG_X to Sun	
CIRS_119SA_COMPSIT004_PRIME	I, M, V	2009-293T05:29:00		000T11:55:00	2009-293T17:24:00	CIRS_FP1 to Saturn	NEG_X to Sun	waypoint secondary is NEG_X to Sun NEG_X to Sun = NEG_Z to NSP at this time, so original pointing is unchanged
SP_119EA_DLTURN293_PRIME	M	2009-293T17:24:00		000T00:40:00	2009-293T18:04:00	XBAND to Earth	POS_X to 93.57/-59.39	
SP_119EA_C34HEFOTP293_PRIME	C, E, M, N	2009-293T18:04:00		000T09:00:00	2009-294T03:04:00	XBAND to Earth	4_Hr_Rolling	POS_X to 93.57/-59.39; CAPS
SP_119EA_WAYPTTURN294_PRIME	M	2009-294T03:04:00		000T00:40:00	2009-294T03:44:00	ISS_NAC to Saturn	NEG_Z to NSP	
NEW WAYPOINT		2009-294T03:44:00		001T00:00:00	2009-295T03:44:00	ISS_NAC to Saturn	NEG_Z to NSP	
CIRS_119SA_MIRTMAP001_PRIME	I, M, V	2009-294T03:44:00		000T13:40:00	2009-294T17:24:00	CIRS_FP3 to Saturn	NEG_Z to NSP	
SP_119EA_DLTURN294_PRIME	M	2009-294T17:24:00		000T00:40:00	2009-294T18:04:00	XBAND to Earth	POS_X to 93.57/-59.39	
SP_119EA_C70METOTB294_PRIME	C, M, N	2009-294T18:04:00		000T09:00:00	2009-295T03:04:00	XBAND to Earth	4_Hr_Rolling	POS_X to 93.57/-59.39
SP_119EA_WAYPTTURN295_PRIME	M	2009-295T03:04:00		000T00:40:00	2009-295T03:44:00	ISS_NAC to Saturn	NEG_X to Sun	

Final Sequenced SPASS (3 of 4)

Request	Riders	Start (SCET)	Start (Epoch)	Duration	End	Primary	Secondary	Comments
NEW WAYPOINT		2009-295T03:44:00		010T09:06:00	2009-305T12:50:00	ISS_NAC to Saturn	NEG_X to Sun	
ISS_119SA_1X2WPXX007_PRIME	M	2009-295T03:44:00		000T01:00:00	2009-295T04:44:00	ISS_NAC to Saturn	NEG_Z to 37.6/83.9	
CAPS_119SU_SWAURPTG011_PRIME	M	2009-295T04:44:00		000T02:39:00	2009-295T07:23:00	POS_Y to COROT (0.0,0.0,40.0 deg. offset)	NEG_X to NSP	
ISS_119RH_MUTUALEVE001_PRIME	M	2009-295T07:23:00		000T00:44:00	2009-295T08:07:00	ISS_NAC to Rhea	NEG_X to Sun	ISS_NAC to Rhea control of secondary axis not required
ISS_119OT_OUTERSATS002_PRIME	M, U	2009-295T08:07:00		000T03:00:00	2009-295T11:07:00	UVIS_FUV to Rocks	NEG_X to Sun	
ISS_119RE_LRLEMP001_PRIME	M	2009-295T11:07:00		000T06:17:00	2009-295T17:24:00	ISS_NAC to Rings	PIC	
SP_119EA_DLTURN295_PRIME	M	2009-295T17:24:00		000T00:40:00	2009-295T18:04:00	XBAND to Earth	POS_X to NEP	
SP_119EA_C34BWGNON295_PRIME	M, R	2009-295T18:04:00		000T09:00:00	2009-296T03:04:00	XBAND to Earth	Rolling/SRU	POS_X to NEP
SP_119EA_WAYPTTURN296_PRIME	M	2009-296T03:04:00		000T00:40:00	2009-296T03:44:00	ISS_NAC to Saturn	NEG_X to Sun	
ISS_119RE_LRLEMP002_PRIME	M	2009-296T03:44:00		000T10:00:00	2009-296T13:44:00	ISS_NAC to Rings	PIC	
CIRS_119SA_COMPSIT005_PRIME	I, M, V	2009-296T13:44:00		000T12:20:00	2009-297T02:04:00	CIRS_FP1 to Saturn	NEG_X to Sun	waypoint secondary is NEG_X to Sun NEG_X to Sun is ~ 2 degrees tilt wrt to NEG_Z to NSP
Apoapse Per = 19.0 d, inc ...		2009-296T16:58:59		000T00:00:01	2009-296T16:59:00			
ISS_120SA_1X2WPXX008_PRIME	M	2009-297T02:04:00		000T01:00:00	2009-297T03:04:00	ISS_NAC to Saturn	NEG_Z to 37.6/83.9	
NAV_120SK_OPNAVK002_PRIME	M	2009-297T03:04:00		000T00:59:00	2009-297T04:03:00	ISS_NAC to 286.83/2.156	POS_X to NEP	
NAV_120EA_DLTURN971_PRIME	M	2009-297T04:03:00		000T00:01:00	2009-297T04:04:00	XBAND to Earth	POS_X to NEP	
SP_120EA_M70METNON297_PRIME	C, M	2009-297T04:04:00		000T09:00:00	2009-297T13:04:00	XBAND to Earth	Rolling/SRU	POS_X to NEP
SP_120EA_WAYPTTURN297_PRIME	M	2009-297T13:04:00		000T00:40:00	2009-297T13:44:00	ISS_NAC to Saturn	NEG_X to Sun	
ISS_120OT_OUTERSATS001_PRIME	M, U	2009-297T13:44:00		000T03:00:00	2009-297T16:44:00	UVIS_FUV to Rocks	NEG_X to Sun	
CAPS_120SU_SWAURPTG002_PRIME	M	2009-297T16:44:00		000T02:00:00	2009-297T18:44:00	POS_Y to COROT (0.0,0.0,40.0 deg. offset)	NEG_X to NSP	
ISS_120SA_NALGTNG001_PRIME	M, V	2009-297T18:44:00		000T07:40:00	2009-298T02:24:00	ISS_NAC to Saturn	NEG_Z to 37.6/83.9	
ISS_120SA_1X2WPXX010_PRIME	M	2009-298T02:24:00		000T01:00:00	2009-298T03:24:00	ISS_NAC to Saturn	NEG_Z to 37.5/83.9	
SP_120EA_DLTURN298_PRIME	M	2009-298T03:24:00		000T00:40:00	2009-298T04:04:00	XBAND to Earth	POS_X to NEP	
SP_120EA_M34BWGNON298_PRIME	M	2009-298T04:04:00		000T09:00:00	2009-298T13:04:00	XBAND to Earth	Rolling/SRU	POS_X to NEP
SP_120EA_WAYPTTURN298_PRIME	M	2009-298T13:04:00		000T00:40:00	2009-298T13:44:00	ISS_NAC to Saturn	NEG_X to Sun	
ISS_120SA_NALGTNG002_PRIME	M, V	2009-298T13:44:00		000T06:40:00	2009-298T20:24:00	ISS_NAC to Saturn	NEG_Z to 37.5/83.9	
CIRS_120OT_1STAROBS002_PRIME	M	2009-298T20:24:00		000T06:00:00	2009-299T02:24:00	CIRS_FP3 to Star	NEG_X to Sun	
ISS_120SA_1X2WPXX011_PRIME	M	2009-299T02:24:00		000T01:00:00	2009-299T03:24:00	ISS_NAC to Saturn	NEG_Z to 37.5/83.9	
SP_120EA_DLTURN299_PRIME	M	2009-299T03:24:00		000T00:40:00	2009-299T04:04:00	XBAND to Earth	POS_X to NEP	
SP_120EA_M34BWGNON299_PRIME	C, M	2009-299T04:04:00		000T09:00:00	2009-299T13:04:00	XBAND to Earth	Rolling/SRU	POS_X to NEP
SP_120EA_WAYPTTURN299_PRIME	M	2009-299T13:04:00		000T00:40:00	2009-299T13:44:00	ISS_NAC to Saturn	NEG_X to Sun	
ISS_120TI_M150R2HZ299_PRIME	C, M, U	2009-299T13:44:00	E120_M150R2HZ299+000T00:00:00	000T01:15:00	2009-299T14:59:00	ISS_NAC to Titan (0.0,-30.0,0.0 deg. offset)	NEG_X to 216.8/-83.6	
ISS_120SA_NALGTNG003_PRIME	M, V	2009-299T14:59:00		000T05:13:00	2009-299T20:12:00	ISS_NAC to Saturn	NEG_Z to 37.5/83.9	
ISS_120RH_MUTUALEVE001_PRIME	M	2009-299T20:12:00		000T00:41:00	2009-299T20:53:00	ISS_NAC to Rhea	NEG_X to Sun	ISS_NAC to Rhea control of secondary axis not required
CAPS_120SU_SWAURPTG003_PRIME	M	2009-299T20:53:00		000T04:41:00	2009-300T01:34:00	POS_Y to COROT (0.0,0.0,40.0 deg. offset)	NEG_X to NSP	
ISS_120EN_MUTUALEVE001_PRIME	M	2009-300T01:34:00		000T00:41:00	2009-300T02:15:00	ISS_NAC to Enceladus	NEG_X to Sun	ISS_NAC to Enceladus control of secondary axis not required
ISS_120SA_1X2WPXX012_PRIME	M	2009-300T02:15:00		000T01:00:00	2009-300T03:15:00	ISS_NAC to Saturn	NEG_Z to 37.5/83.9	
SP_120EA_DLTURN300_PRIME	M	2009-300T03:15:00		000T00:35:00	2009-300T03:50:00	XBAND to Earth	POS_X to NEP	
SP_120EA_M70METNON300_PRIME	C, E, M	2009-300T03:50:00		000T09:00:00	2009-300T12:50:00	XBAND to Earth	Rolling/SRU	POS_X to NEP

Final Sequenced SPASS (4 of 4)

Request	Riders	Start (SCET)	Start (Epoch)	Duration	End	Primary	Secondary	Comments
SP_120EA_WAYPTTURN300_PRIME	M	2009-300T12:50:00		000T00:40:00	2009-300T13:30:00	ISS_NAC to Saturn	NEG_X to Sun	
CIRS_120OT_STRALTCAL001_PRIME	M	2009-300T13:30:00		000T05:40:00	2009-300T19:10:00	CIRS_FPB to Retargetable	NEG_X to Sun	
ISS_120TI_MUTUALEVE003_PRIME	M	2009-300T19:10:00		000T01:00:00	2009-300T20:10:00	ISS_NAC to Titan	NEG_X to Sun	ISS_NAC to Titan control of secondary axis not required
ISS_120SA_1X2WPXX013_PRIME	M	2009-300T20:10:00		000T01:00:00	2009-300T21:10:00	ISS_NAC to Saturn	NEG_Z to 37.5/83.9	
ISS_120SA_NALGTNG004_PRIME	M, V	2009-300T21:10:00		000T06:00:00	2009-301T03:10:00	ISS_NAC to Saturn	NEG_Z to 37.5/83.9	
SP_120EA_DLTURN301_PRIME	M	2009-301T03:10:00		000T00:40:00	2009-301T03:50:00	XBAND to Earth	POS_X to NEP	
SP_120EA_M70METNON301_PRIME	C, M	2009-301T03:50:00		000T09:00:00	2009-301T12:50:00	XBAND to Earth	Rolling/SRU	POS_X to NEP
SP_120EA_WAYPTTURN301_PRIME	M	2009-301T12:50:00		000T00:40:00	2009-301T13:30:00	ISS_NAC to Saturn	NEG_X to Sun	
CAPS_120SA_SURVEYPTG001_PRIME	M	2009-301T13:30:00		000T02:00:00	2009-301T15:30:00	POS_Y to COROT (0.0,0.0,40.0 deg. offset)	NEG_X to NSP	
ISS_120SA_NALGTNG005_PRIME	M, V	2009-301T15:30:00		000T06:55:00	2009-301T22:25:00	ISS_NAC to Saturn	NEG_Z to 37.5/83.9	
ISS_120SA_1X2WPXX014_PRIME	M	2009-301T22:25:00		000T01:00:00	2009-301T23:25:00	ISS_NAC to Saturn	NEG_Z to 37.5/83.9	
CIRS_120SA_COMPSIT001_PRIME	I, M, V	2009-301T23:25:00		000T10:00:00	2009-302T09:25:00	CIRS_FP1 to Saturn	NEG_X to Sun	waypoint secondary to NEG_X to Sun NEG_X to Sun ~ NEG_Z to NSP to within ~3 degrees
UVIS_120EN_ICYATM001_PRIME	M, R	2009-302T09:25:00		000T04:00:00	2009-302T13:25:00	UVIS_FUV to Enceladus	NEG_X to 44.1/10.2	See observation description. Duration of 4 hours allows for 30 min slew to and from Enceladus, and 3 integration sites.
CAPS_120SA_SURVEYPTG002_PRIME	M, R	2009-302T13:25:00		000T02:00:00	2009-302T15:25:00	POS_Y to COROT (0.0,0.0,40.0 deg. offset)	NEG_X to NSP	
RADAR_120TI_SEQUACAL001_PRIME	M	2009-302T15:25:00		000T01:30:00	2009-302T16:55:00	NEG_Z to Titan	PIC	
SP_120EA_DLTURN302_PRIME	M	2009-302T16:55:00		000T00:40:00	2009-302T17:35:00	XBAND to Earth	NEG_Y to 95.35/-74.47	
SP_120EA_C34BWGOTP302_PRIME	C, M, N	2009-302T17:35:00		000T09:00:00	2009-303T02:35:00	XBAND to Earth	4_Hr_Rolling	NEG_Y to 95.35/-74.47 (or POS_Y to NSP (0,0,-20)); CAPS
SP_120EA_WAYPTTURN303_PRIME	M	2009-303T02:35:00		000T00:40:00	2009-303T03:15:00	ISS_NAC to Saturn	NEG_X to Sun	
ISS_120TI_M90R2CLD303_PRIME	C, M, U	2009-303T03:15:00	E120_M90R2CLD303+000T00:00:00	000T01:15:00	2009-303T04:30:00	ISS_NAC to Titan	NEG_X to 212.7/-83.0	
ISS_120SA_1X2WPXX015_PRIME	M	2009-303T04:30:00		000T01:00:00	2009-303T05:30:00	ISS_NAC to Saturn	NEG_Z to 37.5/83.9	
VIMS_120RI_EG130PHAS001_PRIME	M	2009-303T05:30:00		000T11:25:00	2009-303T16:55:00	VIMS_IR to Rings	NEG_X to Sun	
SP_120EA_DLTURN303_PRIME		2009-303T16:55:00		000T00:40:00	2009-303T17:35:00	XBAND to Earth	NEG_Y to 95.35/-74.47	
SP_120EA_C70METNON303_PRIME	C, N	2009-303T17:35:00		000T01:45:00	2009-303T19:20:00	XBAND to Earth	Rolling	NEG_Y to 95.35/-74.47 (or POS_Y to NSP (0,0,-20)); CAPS
SP_120EA_C34HEFOTB303_PRIME	C, E, N	2009-303T19:20:00		000T07:15:00	2009-304T02:35:00	XBAND to Earth	3_Hr_Rolling	NEG_Y to 95.35/-74.47 (or POS_Y to NSP (0,0,-20)); CAPS
SP_120SA_WAYPTTURN304_PRIME		2009-304T02:35:00		000T00:40:00	2009-304T03:15:00	ISS_NAC to Saturn	NEG_X to Sun	
ISS_120TI_M90R2CLD304_PRIME	C, U	2009-304T03:15:00	E120_M90R2CLD304+000T00:00:00	000T01:15:00	2009-304T04:30:00	ISS_NAC to Titan	NEG_X to 44.7/84.3	
ISS_120SA_WALGTNG001_PRIME		2009-304T04:30:00		000T04:00:00	2009-304T08:30:00	ISS_NAC to Saturn	NEG_Z to 37.5/83.9	
ISS_120RE_HPLELR001_PRIME		2009-304T08:30:00		000T03:35:00	2009-304T12:05:00	ISS_NAC to Rings	PIC	
VIMS_120SA_GLOBDYN001_PRIME	I	2009-304T12:05:00		000T12:00:00	2009-305T00:05:00	ISS_NAC to Saturn	NEG_X to Sun	
CIRS_120SA_NADIROCC001_PRIME	M	2009-305T00:05:00		000T02:50:00	2009-305T02:55:00	CIRS_FP3 to Saturn	NEG_X to Sun	
SP_120EA_DLTURN305_PRIME	M	2009-305T02:55:00		000T00:40:00	2009-305T03:35:00	XBAND to Earth	POS_X to NEP	
SP_120EA_M70METNON305_PRIME	C, E, M, R	2009-305T03:35:00		000T09:00:00	2009-305T12:35:00	XBAND to Earth	POS_X to NEP	POS_X to NEP

Final Sequenced SMT and Data Volume (1 of 3)

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_119EA_C70METNON287_PRIME	287 18:34	288 03:34	329	2896	122	3348	3544	197	0	489	53	3890	2950	-940	578	5%	940
SP_119EA_C70METOTP288_PRIME	288 18:34	289 03:34	940	1321	63	2324	3544	1220	0	440	53	2818	2481	-338	578	5%	337
SP_119EA_G70METNON289_PRIME	289 18:19	289 22:04	337	1308	62	1708	3544	1837	0	143	22	1872	1168	-705	578	6%	705
SP_119EA_C34HEFOTB289_PRIME	289 22:04	290 03:19	705	0	0	705	3544	2840	0	240	31	975	390	-586	578	5%	585
SP_119EA_C34BWGNON290_PRIME	290 18:19	291 03:19	585	988	63	1637	3544	1907	0	355	53	2045	622	-1424	578	5%	1423
SP_119EA_C70METNON291_PRIME	291 18:19	292 03:19	1423	626	63	2113	3544	1432	0	277	53	2442	3020	577	578	5%	0
SP_119EA_C34BWGNON292_PRIME	292 18:19	293 02:19	0	1108	63	1171	3544	2373	0	263	47	1481	570	-911	0	0%	911
SP_119EA_C34HEFOTP293_PRIME	293 18:04	294 03:04	911	1206	67	2184	3544	1361	0	383	53	2620	558	-2062	218	1%	2062
SP_119EA_C70METOTB294_PRIME	294 18:04	295 03:04	2062	1202	63	3327	3544	218	0	383	53	3763	3037	-727	260	2%	726
SP_119EA_C34BWGNON295_PRIME	295 18:04	296 03:04	726	1097	63	1887	3544	1657	0	306	53	2246	630	-1616	260	2%	1616
SP_120EA_M70METNON297_PRIME	297 04:04	297 13:04	1616	1460	106	3181	3544	363	0	317	53	3551	3114	-438	260	2%	437
SP_120EA_M34BWGNON298_PRIME	298 04:04	298 13:04	437	1147	63	1648	3544	1896	0	230	53	1931	540	-1392	260	2%	1391
SP_120EA_M34BWGNON299_PRIME	299 04:04	299 13:04	1391	886	63	2341	3544	1203	0	317	53	2711	540	-2172	260	2%	2172
SP_120EA_M70METNON300_PRIME	300 03:50	300 12:50	2172	1050	62	3284	3544	260	0	372	53	3709	3114	-596	362	2%	595
SP_120EA_M70METNON301_PRIME	301 03:50	301 12:50	595	1506	63	2165	3544	1380	0	534	53	2752	3114	361	362	3%	0
SP_120EA_C34BWGOTP302_PRIME	302 17:35	303 02:35	0	1468	122	1590	3544	1954	0	247	53	1890	525	-1365	0	0%	1364
SP_120EA_C70METNON303_PRIME	303 17:35	303 19:20	1364	454	63	1881	3544	1663	0	35	10	1926	502	-1425	0	0%	1424
SP_120EA_C34HEFOTB303_PRIME	303 19:20	304 02:35	1424	0	0	1424	3544	2120	0	189	43	1656	554	-1103	0	0%	1102
SP_120EA_M70METNON305_PRIME	305 03:35	305 12:35	1102	1270	106	2477	3544	1067	0	654	53	3185	3031	-154	64	0%	154

Final Sequenced SMT and Data Volume (2 of 3)

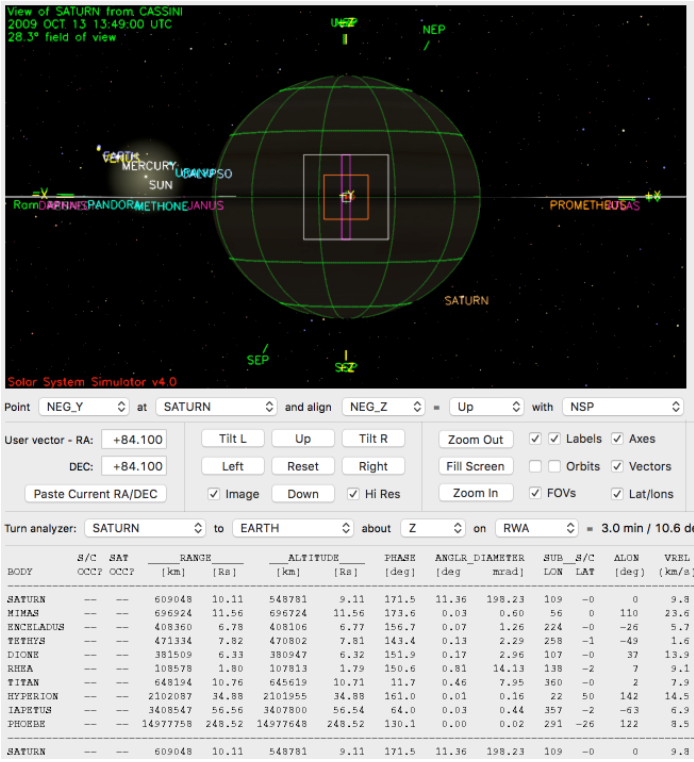
DATA VOLUME REPORT --- TRANSFER FRAME OVERHEAD NOT INCLUDED

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	286 13:49	287 18:34	414.0	246.4	63.9	20.4	705.5	204.5	124.2	132.5	359.3	214.2	377.0	0.0	120.2	2982.1
OBSERVATION_SI	286 13:49	287 18:34	0.0	0.0	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.0
SP_119EA_C70METNON287_PRIME	287 18:34	288 03:34	129.6	17.0	86.4	3.2	0.0	64.0	38.9	0.0	140.8	4.9	0.0	0.0	0.0	484.9
DAILY TOTAL SCIENCE	286 13:49	288 03:34	543.6	263.4	158.3	23.7	705.5	268.5	163.1	132.5	500.1	219.1	377.0	0.0	120.2	
OBSERVATION_NOR	288 03:34	288 18:34	216.0	28.3	0.0	5.4	121.6	106.7	64.8	0.0	291.5	0.0	475.0	0.0	62.7	1372.0
SP_119EA_C70METOTP288_PRIME	288 18:34	289 03:34	129.6	17.0	0.0	3.2	0.0	64.0	38.9	0.0	178.8	4.9	0.0	0.0	0.0	436.4
DAILY TOTAL SCIENCE	288 03:34	289 03:34	345.6	45.3	0.0	8.6	121.6	170.7	103.7	0.0	470.2	4.9	475.0	0.0	62.7	
OBSERVATION_NOR	289 03:34	289 18:19	212.4	27.8	18.0	15.4	110.2	102.1	63.7	0.0	299.3	197.2	250.0	0.0	61.6	1357.8
SP_119EA_G70METNON289_PRIME	289 18:19	289 22:04	54.0	7.1	29.7	1.4	0.0	13.3	16.2	0.0	17.7	2.1	0.0	0.0	0.0	141.4
SP_119EA_C34HEFOTB289_PRIME	289 22:04	290 03:19	100.1	9.9	56.7	1.9	0.0	18.7	22.7	0.0	24.8	2.9	0.0	0.0	0.0	237.6
DAILY TOTAL SCIENCE	289 03:34	290 03:19	366.5	44.8	104.4	18.6	110.2	134.2	102.6	0.0	341.8	202.1	250.0	0.0	61.6	
OBSERVATION_NOR	290 03:19	290 18:19	216.0	28.3	18.0	5.4	482.1	53.4	64.8	0.0	70.7	40.8	0.0	0.0	62.7	1042.1
SP_119EA_C34BWGNON290_PRIME	290 18:19	291 03:19	129.6	14.3	86.4	3.2	0.0	32.0	38.9	0.0	42.4	4.9	0.0	0.0	0.0	351.8
DAILY TOTAL SCIENCE	290 03:19	291 03:19	345.6	42.6	104.4	8.6	482.1	85.4	103.7	0.0	113.2	45.7	0.0	0.0	62.7	
OBSERVATION_NOR	291 03:19	291 18:19	216.0	16.2	0.0	5.4	135.1	53.4	64.8	0.0	70.7	0.0	58.8	0.0	62.7	683.0
SP_119EA_C70METNON291_PRIME	291 18:19	292 03:19	89.6	9.7	0.0	3.2	0.0	32.0	38.9	0.0	95.7	4.9	0.0	0.0	0.0	274.2
DAILY TOTAL SCIENCE	291 03:19	292 03:19	305.6	25.9	0.0	8.6	135.1	85.4	103.7	0.0	166.5	4.9	58.8	0.0	62.7	
OBSERVATION_NOR	292 03:19	292 18:19	64.3	16.2	0.0	5.4	606.7	53.4	64.8	0.0	286.7	0.0	0.0	0.0	62.7	1160.2
SP_119EA_C34BWGNON292_PRIME	292 18:19	293 02:19	28.8	8.6	0.0	2.9	0.0	28.5	34.6	0.0	152.9	4.4	0.0	0.0	0.0	260.7
DAILY TOTAL SCIENCE	292 03:19	293 02:19	93.1	24.8	0.0	8.3	606.7	81.8	99.4	0.0	439.7	4.4	0.0	0.0	62.7	
OBSERVATION_NOR	293 02:19	293 18:04	56.7	17.0	85.8	5.7	256.7	56.0	68.0	0.0	301.1	0.5	347.9	0.0	65.8	1261.2
SP_119EA_C34HEFOTP293_PRIME	293 18:04	294 03:04	32.4	9.7	86.4	3.2	0.0	32.0	38.9	0.0	172.0	4.9	0.0	0.0	0.0	379.6
DAILY TOTAL SCIENCE	293 02:19	294 03:04	89.1	26.7	172.2	8.9	256.7	88.0	106.9	0.0	473.1	5.5	347.9	0.0	65.8	
OBSERVATION_NOR	294 03:04	294 18:04	54.0	16.2	196.8	5.4	121.6	53.4	64.8	0.0	286.7	0.0	392.0	0.0	62.7	1253.6
SP_119EA_C70METOTB294_PRIME	294 18:04	295 03:04	32.4	9.7	86.4	3.2	0.0	32.0	38.9	0.0	172.0	4.9	0.0	0.0	0.0	379.6
DAILY TOTAL SCIENCE	294 03:04	295 03:04	86.4	25.9	283.2	8.6	121.6	85.4	103.7	0.0	458.8	4.9	392.0	0.0	62.7	

Final Sequenced SMT and Data Volume (3 of 3)

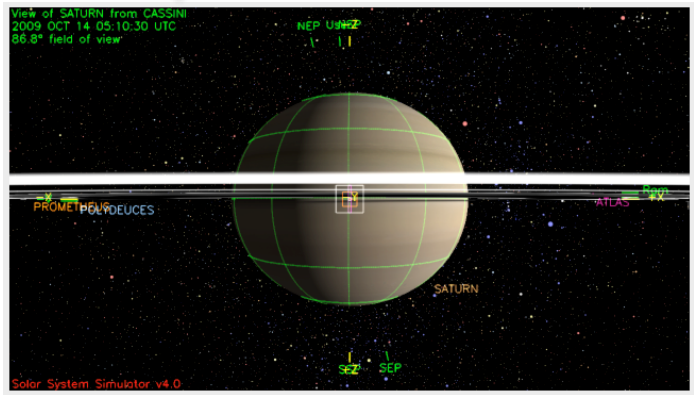
Event	Start doy hh:mm	End doy hh:mm	CAPS (Mb)	CDA (Mb)	CIRS (Mb)	INMS (Mb)	ISS (Mb)	MAG (Mb)	MIMI (Mb)	RADAR (Mb)	RPWS (Mb)	UVIS (Mb)	VIMS (Mb)	PROBE (Mb)	ENGR (Mb)	TOTAL (Mb)
OBSERVATION_NOR	295 03:04	295 18:04	63.5	16.2	0.0	5.4	543.1	53.4	64.8	0.0	286.7	54.3	0.0	0.0	62.7	1150.1
SP_119EA_C34BWGNON295_PRIME	295 18:04	296 03:04	32.4	9.7	0.0	13.3	0.0	32.0	38.9	0.0	172.0	4.9	0.0	0.0	0.0	303.3
DAILY TOTAL SCIENCE	295 03:04	296 03:04	95.9	25.9	0.0	18.7	543.1	85.4	103.7	0.0	458.8	59.3	0.0	0.0	62.7	
OBSERVATION_NOR	296 03:04	297 04:04	90.0	27.0	88.8	9.0	415.5	88.9	108.0	0.0	397.3	0.0	222.0	0.0	104.5	1551.0
SP_120EA_M70METNON297_PRIME	297 04:04	297 13:04	32.4	9.7	86.4	3.2	0.0	32.0	38.9	0.0	106.6	4.9	0.0	0.0	0.0	314.2
DAILY TOTAL SCIENCE	296 03:04	297 13:04	122.4	36.7	175.2	12.2	415.5	120.9	146.9	0.0	503.9	4.9	222.0	0.0	104.5	
OBSERVATION_NOR	297 13:04	298 04:04	61.2	16.2	0.0	5.4	579.1	53.4	64.8	0.0	177.7	54.3	125.0	0.0	62.7	1199.7
SP_120EA_M34BWGNON298_PRIME	298 04:04	298 13:04	32.4	9.7	0.0	3.2	0.0	32.0	38.9	0.0	106.6	4.9	0.0	0.0	0.0	227.8
DAILY TOTAL SCIENCE	297 13:04	298 13:04	93.6	25.9	0.0	8.6	579.1	85.4	103.7	0.0	284.3	59.3	125.0	0.0	62.7	
OBSERVATION_NOR	298 13:04	299 04:04	54.0	16.2	38.9	5.4	343.1	53.4	64.8	0.0	177.7	0.0	125.0	0.0	62.7	941.1
SP_120EA_M34BWGNON299_PRIME	299 04:04	299 13:04	32.4	9.7	86.4	3.2	0.0	32.0	38.9	0.0	106.6	4.9	0.0	0.0	0.0	314.2
DAILY TOTAL SCIENCE	298 13:04	299 13:04	86.4	25.9	125.3	8.6	343.1	85.4	103.7	0.0	284.3	4.9	125.0	0.0	62.7	
OBSERVATION_NOR	299 13:04	300 03:50	70.0	15.9	18.0	5.3	447.1	52.5	63.8	0.0	263.7	4.5	100.0	0.0	61.7	1102.6
SP_120EA_M70METNON300_PRIME	300 03:50	300 12:50	32.4	9.7	86.4	3.2	0.0	32.0	38.9	0.0	160.7	4.9	0.0	0.0	0.0	368.3
DAILY TOTAL SCIENCE	299 13:04	300 12:50	102.4	25.7	104.4	8.6	447.1	84.5	102.7	0.0	424.3	9.5	100.0	0.0	61.7	
OBSERVATION_NOR	300 12:50	301 03:50	54.0	16.2	36.7	5.4	433.1	53.4	64.8	0.0	728.8	0.0	100.0	0.0	62.7	1555.0
SP_120EA_M70METNON301_PRIME	301 03:50	301 12:50	32.4	9.7	86.4	3.2	0.0	32.0	38.9	0.0	321.7	4.9	0.0	0.0	0.0	529.3
DAILY TOTAL SCIENCE	300 12:50	301 12:50	86.4	25.9	123.1	8.6	433.1	85.4	103.7	0.0	1050.5	4.9	100.0	0.0	62.7	
OBSERVATION_NOR	301 12:50	302 17:35	146.7	45.2	72.0	10.4	443.3	102.3	124.2	12.3	94.6	29.0	375.0	0.0	120.2	1575.0
SP_120EA_C34BWGOTP302_PRIME	302 17:35	303 02:35	32.4	17.0	86.4	3.2	0.0	32.0	38.9	0.0	29.6	4.9	0.0	0.0	0.0	244.5
DAILY TOTAL SCIENCE	301 12:50	303 02:35	179.1	62.2	158.4	13.6	443.3	134.3	163.1	12.3	124.2	33.9	375.0	0.0	120.2	
OBSERVATION_NOR	303 02:35	303 17:35	54.0	28.3	18.0	5.4	138.1	40.6	54.9	0.0	49.4	2.0	58.8	0.0	62.7	512.1
SP_120EA_C70METNON303_PRIME	303 17:35	303 19:20	6.3	3.3	8.1	0.6	0.0	3.8	5.7	0.0	5.8	1.0	0.0	0.0	0.0	34.5
SP_120EA_C34HEFOTB303_PRIME	303 19:20	304 02:35	26.1	13.7	78.3	2.6	0.0	15.7	23.5	0.0	23.9	4.0	0.0	0.0	0.0	187.7
DAILY TOTAL SCIENCE	303 02:35	304 02:35	86.4	45.3	104.4	8.6	138.1	60.0	84.1	0.0	79.0	6.9	58.8	0.0	62.7	
OBSERVATION_NOR	304 02:35	305 03:35	143.6	54.9	58.8	9.0	498.6	57.0	81.0	0.0	82.3	2.0	271.0	0.0	104.5	1362.6
SP_120EA_M70METNON305_PRIME	305 03:35	305 12:35	129.6	135.8	86.4	3.2	0.0	32.0	29.2	0.0	227.3	4.9	0.0	0.0	0.0	648.4
DAILY TOTAL SCIENCE	304 02:35	305 12:35	273.2	190.7	145.2	12.2	498.6	89.0	110.2	0.0	309.5	6.9	271.0	0.0	104.5	

Segment Geometry (1 of 2)



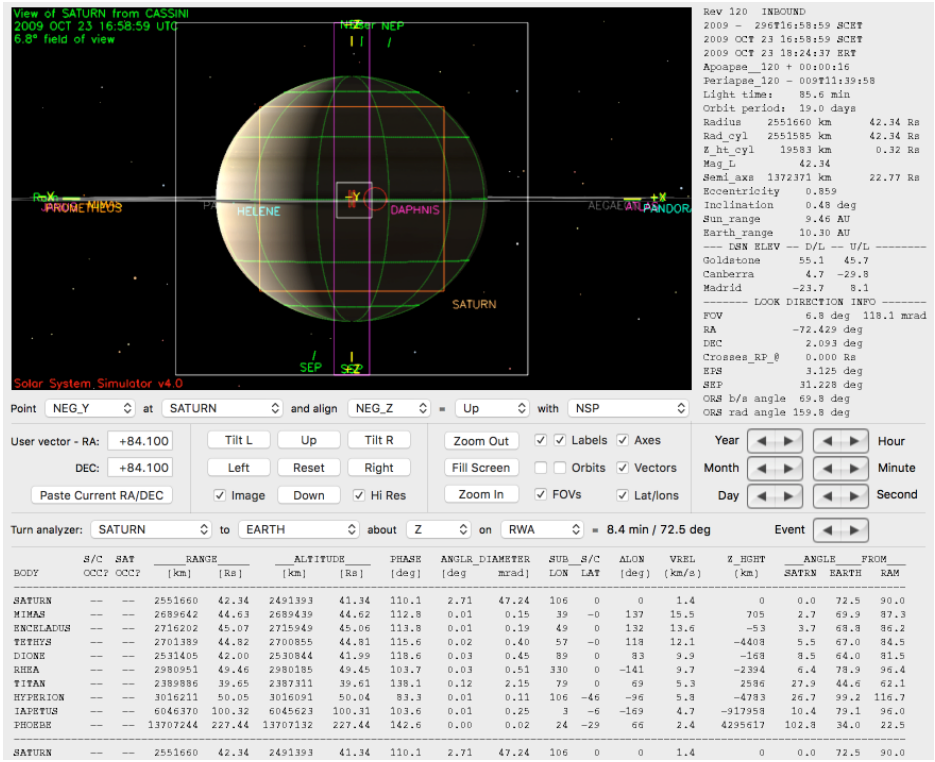
Segment Start: 2009-286T13:49

Periapse: 2009-287T05:10:30



	Saturn Range	Phase Angle	Sub-S/C Lat.
Segment Start	10.11 Rs	171.5 deg	0
Periapse	3.2 Rs	69.7 deg	0
Apoapse	42.34 Rs	110.1 deg	0
Segment End	10.43 Rs	169.8 deg	0

Segment Geometry (2 of 2)

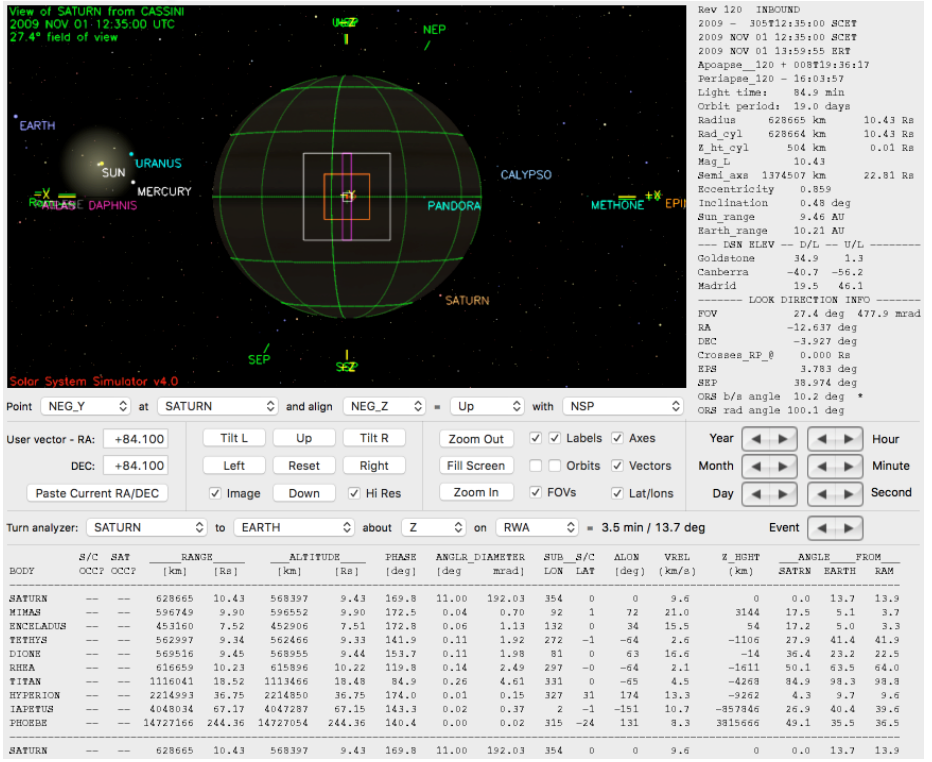


BODY	S/C OCC?	SAT OCC?	RANGE [km]	RANGE [Rs]	ALTITUDE [km]	ALTITUDE [Rs]	PHASE [deg]	ANGLR_DIAMETER [deg]	ANGLR_DIAMETER mrad]	SUB_S/C LON	SUB_S/C LAT	ALON [deg]	VREL (km/s)	Z_HGHT (km)	ANGLE_FROM SATRN	ANGLE_FROM EARTH	ANGLE_FROM RAM
SATURN	--	--	2551660	42.34	2491393	41.34	110.1	2.71	47.24	106	0	0	1.4	0	0.0	72.5	90.0
MIMAS	--	--	2689642	44.63	2689439	44.62	112.8	0.01	0.15	39	-0	137	15.5	705	2.7	69.9	87.3
ENCELADUS	--	--	2716202	45.07	2715949	45.06	113.8	0.01	0.19	49	0	132	13.6	-53	3.7	68.8	86.2
TETHYS	--	--	2701389	44.82	2700855	44.81	115.6	0.02	0.40	57	-0	118	12.1	-4408	5.5	67.0	84.5
DIONE	--	--	2531405	42.00	2530844	41.99	118.6	0.03	0.45	89	0	83	9.9	-168	8.5	64.0	81.5
RHEA	--	--	2980951	49.46	2980185	49.45	103.7	0.03	0.51	330	0	-141	9.7	-2394	6.4	78.9	96.4
TITAN	--	--	2389886	39.65	2387311	39.61	138.1	0.12	2.15	79	0	69	5.3	2586	27.9	44.6	62.1
HYPERION	--	--	3016211	50.05	3016091	50.04	83.3	0.01	0.11	106	-46	-96	5.8	-4783	26.7	99.2	116.7
IAPETUS	--	--	6046370	100.32	6045623	100.31	103.6	0.01	0.25	3	-6	-169	4.7	-917958	10.4	79.1	96.0
PHOEBE	--	--	13707244	227.44	13707132	227.44	142.6	0.00	0.02	24	-29	66	2.4	4295617	102.8	34.0	22.5
SATURN	--	--	2551660	42.34	2491393	41.34	110.1	2.71	47.24	106	0	0	1.4	0	0.0	72.5	90.0

	Saturn Range	Phase Angle	Sub-S/C Lat.
Segment Start	10.11 Rs	171.5 deg	0
Periapse	3.2 Rs	69.7 deg	0
Apoapse	42.34 Rs	110.1 deg	0
Segment End	10.43 Rs	169.8 deg	0

Apoapse: 2009-296T16:58:59

Segment End: 2009-305T12:35



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	ALON [deg]	VREL (km/s)	Z_HGHT (km)	ANGLE_FROM SATRN	ANGLE_FROM EARTH	ANGLE_FROM RAM
SATURN	--	--	628665	10.43	568397	9.43	169.8	11.00	192.03	354	0	0	9.6	0	0.0	13.7	13.9
MIMAS	--	--	596749	9.90	596552	9.90	172.5	0.04	0.70	92	1	72	21.0	3144	17.5	5.1	3.7
ENCELADUS	--	--	453160	7.52	452906	7.51	172.8	0.06	1.13	132	0	34	15.5	54	17.2	5.0	3.3
TETHYS	--	--	562997	9.34	562466	9.33	141.9	0.11	1.92	272	-1	-64	2.6	-1106	27.9	41.4	41.9
DIONE	--	--	569516	9.45	568955	9.44	153.7	0.11	1.98	81	0	63	16.6	-14	36.4	23.2	22.5
RHEA	--	--	616659	10.23	615896	10.22	119.8	0.14	2.49	297	-0	-64	2.1	-1611	50.1	63.5	64.0
TITAN	--	--	1116041	18.52	1113466	18.48	84.9	0.26	4.61	331	0	-65	4.5	-4268	84.9	98.3	98.8
HYPERION	--	--	2214933	36.75	2214850	36.75	174.0	0.01	0.15	327	31	174	13.3	-9262	4.3	9.7	9.6
IAPETUS	--	--	4048034	67.17	4047287	67.15	143.3	0.02	0.37	2	-1	-151	10.7	-857846	26.9	40.4	39.6
PHOEBE	--	--	14727166	244.36	14727054	244.36	140.4	0.00	0.02	315	-24	131	8.3	3815666	49.1	35.5	36.5
SATURN	--	--	628665	10.43	568397	9.43	169.8	11.00	192.03	354	0	0	9.6	0	0.0	13.7	13.9

Solar Geometry – ORS Boresight Concerns

ORS Boresight Solar Constraints on Science Pointing Noted:

ORS to Sun violation from 2009-286T13:49:00 to 2009-286T21:14:00

- in occultation from 2009-286T14:59:00 to 2009-286T19:34:00

See slide 31 for CMT management performed

Daily Science Highlights (1 of 3)

Science Highlights provided by Christen Gerhart

DOY 286 – October 13
VIMS created a regional mosaic of Saturn's northern hemisphere for 1h05m. CIRS observed a Rhea solar eclipse, at the time, this was the best case in the tour for CIRS FP1 spatial resolution. ISS observed plumes on Enceladus at high phase for 2h25m. VIMS observed and imaged Rhea for 24m.

DOY 287 – October 14
Periapse occurred on this day. RADAR created a global map of Saturn's equatorial region for 12h16m. ISS observed Mimas, Enceladus, and Tethys at low phase using the NAC for 1h25m, 1h05m, and 30m respectively. VIMS created a regional mosaic of Saturn's northern hemisphere for 2h05m. The main engine cover was opened during the downlink.

DOY 288 – October 15
VIMS created a regional dynamics mosaic of Saturn's northern hemisphere for 13h41m. Orbit Trim Maneuver (OTM) 218 was performed during the downlink. This was a "clean-up" maneuver after the Titan Fly-By from 11 -13 October (day 284 - 286; T62).

DOY 289 – October 16
UVIS executed several slow extreme and far ultraviolet scans across Saturn's visible hemisphere to form spectral images for 10h38m. ISS, CIRS and UVIS performed another observation in the Titan monitoring campaign (phase 62.2 and range 2.4 Mkm). ISS observed the transit of Tethys across Titan for 40m. VIMS created a global dynamics mosaic for 52m.

DOY 290 – October 17
ISS, CIRS and UVIS performed another observation in the Titan monitoring campaign (phase 78.3 and range 2.8 Mkm). ISS performed Saturn photopolarimetry with the WAC for 1h. CAPS performed a MAPS Survey for 2h. ISS observed the transit of Tethys across Titan for 55m. ISS performed a lightning search on Saturn using the NAC for 4h. ISS performed another observation in their Satellite Orbit Campaign. UVIS mapped volatiles in the immediate neighborhood of Enceladus for 4h, to test connection of volatile changes to plume eruptions.

DOY 291 – October 18
ISS performed Saturn photopolarimetry with the WAC for 1h. VIMS observed the E and G Rings for 12h10m. ISS performed another observation in their Satellite Orbit Campaign. The Attitude and Articulation Control Subsystem (AACS) performed a friction test on the reaction wheels during the downlink.

DOY 292 – October 19
ISS performed Saturn photopolarimetry with the WAC for 1h. ISS performed another observation in their Satellite Orbit Campaign. CAPS led the pointing for the MAPS team Solar Wind-Aurora Campaign observations. ISS observed the transit of Mimas across Rhea for 42m. ISS performed a lightning search on Saturn using the NAC for 8h6m.

Daily Science Highlights (2 of 3)

DOY 293 – October 20
ISS performed Saturn photopolarimetry with the WAC for 1h. ISS performed another observation in their Satellite Orbit Campaign. CIRS measured oxygen compounds in the stratosphere of Saturn for 11h55m. Orbit Trim Maneuver (OTM) 219 was performed during the downlink. This was a targeting maneuver for Enceladus Fly-By from 1- 3 November (day 305 - 307; E7).

DOY 294 – October 21
CIRS mapped Saturn's northern hemisphere to determine upper troposphere and tropopause temperature for 13h40m.

DOY 295 – October 22
ISS performed Saturn photopolarimetry with the WAC for 1h. CAPS performed another observation in their Solar Wind-Aurora Campaign. ISS observed the transit of Rhea across Dione for 44m. ISS observed Saturn's outer moon Bestla for 3h. ISS performed a post equinox, edge-on observation of Saturn's E Ring for 10h.

DOY 296 – October 23
ISS performed a post equinox, edge-on observation of Saturn's E Ring for 10h. CIRS mapped Saturn's northern hemisphere to determine upper troposphere and tropopause temperature for 12h20m. ISS performed Saturn photopolarimetry with the WAC for 1h. Apoapse occured on this day.

DOY 297 – October 24
ISS observed Saturn's outer moon Bestla for 3h. CAPS performed another observation in their Solar Wind-Aurora Campaign. ISS performed a lightning search on Saturn using the NAC for 7h40m.

DOY 298 – October 25
ISS performed Saturn photopolarimetry with the WAC for 1h. ISS also performed a lightning search on Saturn using the NAC for 6h40m. CIRS performed a mid-infrared spectroscopic observation of 1 of 3 stars: CW Leonis, Eta Carinae, Alpha Orionis.

DOY 299 – October 26
ISS performed Saturn photopolarimetry with the WAC for 1h. ISS, CIRS and UVIS performed another observation in the Titan monitoring campaign (phase 131 and range 1.2 Mkm). ISS performed a lightning search on Saturn using the NAC for 5h13m. ISS observed the transit of Rhea across Tethys for 41m. CAPS performed another observation in their Solar Wind-Aurora Campaign.

DOY 300 – October 27
ISS observed the transit of Enceladus across Tethys for 41m. ISS performed Saturn photopolarimetry with the WAC for 1h. ISS observed the transit of Titan across Rhea for 1h. ISS performed Saturn photopolarimetry with the WAC for 1h. ISS performed a lightning search on Saturn using the NAC for 6h. CIRS also performed a stray light calibration. Sunlight falling on the CIRS telescope can be potentially scattered into the instrument by mirror imperfections. To quantify the effects of ring particle impacts on the mirror performance, CIRS would monitor the scattered IR solar radiation relative to the offset angle from the sun.

Daily Science Highlights (3 of 3)

DOY 301 – October 28
CAPS performed a MAPS Survey for 2h. ISS performed a lightning search on Saturn using the NAC for 6h55m. ISS performed Saturn photopolarimetry with the WAC for 1h. CIRS measured oxygen compounds in the stratosphere of Saturn for 11h55m.

DOY 302 – October 29
UVIS mapped volatiles in the immediate neighborhood of Enceladus for 4h, to test connection of volatile changes to plume eruptions. CAPS performed a MAPS Survey for 2h. RADAR obtained distant Titan radiometer science and calibration data. Orbit Trim Maneuver (OTM) 220 was performed during the downlink. This was an approach maneuver for the Enceladus Fly-By from 1 - 3 November (day 305 - 307:E7).

DOY 303 302 – October 30
ISS, CIRS and UVIS performed another observation in the Titan monitoring campaign (phase 85.9 and range 1.3 Mkm). ISS performed Saturn photopolarimetry with the WAC for 1h. VIMS observed the E and G Rings for 11h25m.

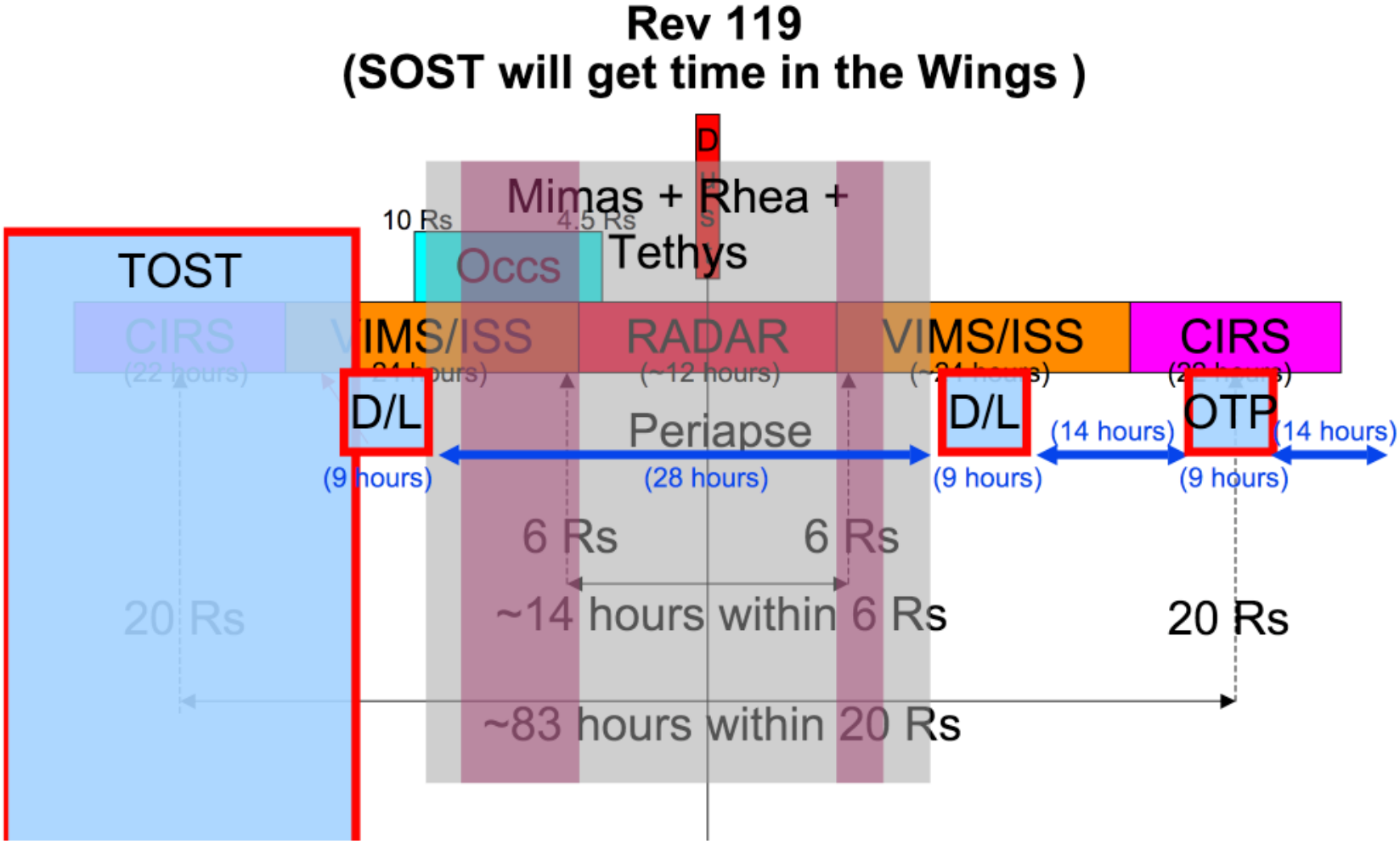
DOY 304 – October 31
ISS, CIRS and UVIS performed another observation in the Titan monitoring campaign (phase 86 and range 1.3 Mkm). CAPS performed a MAPS Survey for 2h. ISS performed a lightning search on Saturn using the NAC for 6h55m. ISS observed Saturn's E Ring in high phase for 3h35m. VIMS created a global dynamics mosaic for 12h.

DOY 305 – November 1
CIRS measured helium abundance at the location of a future RSS Saturn occultation. Over the downlink, Radio Science performed gravity science to better determine Enceladus' mass.

Segment Integration Planning

Timeline Gaps and Suggested Observations (1 of 2)

Observation Consideration (Periapse)



Timeline Gaps and Suggested Observations (2 of 2)

Observation Consideration

- CDA requesting a secondary axis during RADAR observation
  - RADAR is in Radiometry mode. Is secondary important as RADAR does their raster scan?
- ISS Mutual Events (e-mail from ISS via Bob West)
  - It looks like you guys have some really nice photo ops in there. (PHOTOOPs and MUTEVEs). I'd really like to get at least one of the Enceladus-Titan mutual events, preferably 119EN_MUTEVETI001 over the earlier one. (Rings are in the frame, yous see.) Those photo ops are also pretty high quality, so if you could get us at least half of those, that would be great. (Also, I believe that most of these can be used for orbit-determination, so the do double duty.) Priority on the full-color ones.
  - The RNGMNSHADs are also nice and if you can schedule them it would be really helpful, but I think that they're lower priority as photo-ops if we have to choose.
  - Joe Spitale says that the LOINCSTR is nice and would definitely help to have it, but it's not vital at this point.
  - I'll let Colin and/or Anne speak for the plume observations.
- UVIS EUV/FUV vs. CIRS COMPSIT
  - EUVFUV scan across disk of Saturn to form spectral images
    - EUVFUVs present in CIMS for Rev 119 outbound, 121 outbound, 126 outbound, and 131 inbound
    - What about Rev 120 inbound, Rev 120 outbound, and Rev 121 inbound? Seems like there could be many more opportunities.
  - COMPSITs are designed to map oxygen compounds versus latitude.
    - Numerous opportunities flagged in CIMS.
    - CIRS specifically asked for data in the wings of the SWG equatorial campaigns (centered near 20 Rs) and at very distant apoapses (>40 Rs).

Initial SMT and Data Volume (1 of 3)

Beginning of Integration:

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)
P_119EA_C70METNON287_PRIME	287 18:34	288 03:34	0	3091	122	3214	3522	308	0	602	53	3868	2950	-919	-2130	-14% 918
P_119EA_C70METOTP288_PRIME	288 18:34	289 03:34	918	1957	63	2939	3522	583	0	528	53	3519	2481	-1039	-2130	-17% 1039
P_119EA_C34HEFOTB289_PRIME	289 18:19	290 03:19	1039	1497	62	2598	3522	923	0	691	53	3342	663	-2679	-2130	-16% 2679
P_119EA_C34BWGNON290_PRIME	290 18:19	291 03:19	2679	1569	63	4311	3522	-789	0	684	53	4259	622	-3638	-2130	-17% 3522
P_119EA_C70METNON291_PRIME	291 18:19	292 03:19	3522	1183	63	4767	3522	-1245	0	666	53	4240	3020	-1221	-2130	-17% 1220
P_119EA_C34BWGNON292_PRIME	292 18:19	293 03:19	1220	1523	63	2806	3522	715	0	639	53	3498	620	-2878	-2130	-17% 2878
P_119EA_C34BWGOTP293_PRIME	293 18:04	294 03:04	2878	2145	62	5086	3522	-1563	0	639	53	4213	511	-3703	-2130	-17% 3522
P_119EA_C70METOTB294_PRIME	294 18:04	295 03:04	3522	2067	63	5652	3522	-2130	0	639	53	4213	3037	-1177	-2618	-21% 1176
P_119EA_C34BWGNON295_PRIME	295 18:04	296 03:04	1176	1513	63	2753	3522	768	0	649	53	3455	630	-2825	-2618	-21% 2825
P_120EA_M70METNON297_PRIME	297 04:04	297 13:04	2825	2464	106	5394	3522	-1872	11	697	53	4283	3114	-1170	-2618	-17% 1169
P_120EA_M34BWGNON298_PRIME	298 04:04	298 13:04	1169	1951	63	3183	3522	338	0	697	53	3934	540	-3394	-2618	-22% 3394
P_120EA_M34BWGNON299_PRIME	299 04:04	299 13:04	3394	1651	63	5108	3522	-1586	0	697	53	4272	540	-3733	-2618	-23% 3522
P_120EA_M70METNON300_PRIME	300 03:50	300 12:50	3522	1694	62	5278	3522	-1755	0	697	53	4272	3114	-1159	-2618	-25% 1158
P_120EA_M34BWGNON301_PRIME	301 03:50	301 12:50	1158	1831	63	3052	3522	469	0	665	53	3770	540	-3231	-2618	-36% 3231
P_120EA_C34BWGOTP302_PRIME	302 17:35	303 02:35	3231	2788	122	6141	3522	-2618	0	586	53	4161	525	-3636	-753	-10% 3522
P_120EA_C70METOTB303_PRIME	303 17:35	304 02:35	3522	691	63	4275	3522	-753	0	237	53	3812	3058	-754	0	0% 753
P_120EA_M70METNON305_PRIME	305 03:35	305 12:35	753	2051	106	2910	3522	611	0	830	53	3794	3031	-763	0	0% 763

1st box: periapse period
2nd box: apoapse/pseudo XD period
3rd box: 120 inbound

16. 3 Gb needed to be cut to prevent SSR overfill and carryover into the following SOST E7 flyby segment
38.4% data cut of all science data requested

Initial SMT and Data Volume (2 of 3)

Beginning of Integration:

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	286 13:49	287 18:34	414.0	246.4	116.2	20.4	747.3	204.5	124.2	132.5	359.3	214.2	377.0	0.0	23.5	2979.5
OBSERVATION_SI	286 13:49	287 18:34	0.0	0.0	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.0
SP_119EA_C70METNON287_PRIME	287 18:34	288 03:34	129.6	17.0	86.4	3.2	0.0	64.0	38.9	0.0	140.8	4.9	0.0	0.0	0.0	484.9
DAILY TOTAL SCIENCE	286 13:49	288 03:34	543.6	263.4	210.6	23.7	747.3	268.5	163.1	132.5	500.1	219.1	377.0	0.0		
OBSERVATION_NOR	288 03:34	288 18:34	216.0	28.3	0.0	5.4	543.4	106.7	64.8	0.0	291.5	0.0	475.0	0.0	12.3	1743.3
SP_119EA_C70METOTP288_PRIME	288 18:34	289 03:34	129.6	17.0	86.4	3.2	0.0	64.0	38.9	0.0	178.8	4.9	0.0	0.0	0.0	522.8
DAILY TOTAL SCIENCE	288 03:34	289 03:34	345.6	45.3	86.4	8.6	543.4	170.7	103.7	0.0	470.2	4.9	475.0	0.0		
OBSERVATION_NOR	289 03:34	289 18:19	212.4	27.8	18.0	15.4	146.4	102.1	63.7	0.0	299.3	197.2	250.0	0.0	12.1	1344.3
SP_119EA_C34HEFOTB289_PRIME	289 18:19	290 03:19	154.1	17.0	86.4	3.2	0.0	32.0	38.9	0.0	42.4	4.9	0.0	0.0	0.0	379.0
DAILY TOTAL SCIENCE	289 03:34	290 03:19	366.5	44.8	104.4	18.6	146.4	134.2	102.6	0.0	341.8	202.1	250.0	0.0		
OBSERVATION_NOR	290 03:19	290 18:19	216.0	28.3	18.0	5.4	623.3	53.4	64.8	0.0	70.7	77.0	0.0	0.0	12.3	1169.1
SP_119EA_C34BWGNON290_PRIME	290 18:19	291 03:19	129.6	17.0	86.4	3.2	0.0	32.0	38.9	0.0	42.4	4.9	0.0	0.0	0.0	354.5
DAILY TOTAL SCIENCE	290 03:19	291 03:19	345.6	45.3	104.4	8.6	623.3	85.4	103.7	0.0	113.2	81.9	0.0	0.0		
OBSERVATION_NOR	291 03:19	291 18:19	216.0	28.3	0.0	5.4	135.1	53.4	64.8	0.0	70.7	0.0	58.8	0.0	12.3	644.7
SP_119EA_C70METNON291_PRIME	291 18:19	292 03:19	89.6	17.0	86.4	3.2	0.0	32.0	38.9	0.0	95.7	4.9	0.0	0.0	0.0	367.8
DAILY TOTAL SCIENCE	291 03:19	292 03:19	305.6	45.3	86.4	8.6	135.1	85.4	103.7	0.0	166.5	4.9	58.8	0.0		
OBSERVATION_NOR	292 03:19	292 18:19	64.3	28.3	0.0	5.4	606.7	53.4	64.8	0.0	286.7	0.0	0.0	0.0	12.3	1121.8
SP_119EA_C34BWGNON292_PRIME	292 18:19	293 03:19	32.4	17.0	86.4	3.2	0.0	32.0	38.9	0.0	172.0	4.9	0.0	0.0	0.0	386.9
DAILY TOTAL SCIENCE	292 03:19	293 03:19	96.7	45.3	86.4	8.6	606.7	85.4	103.7	0.0	458.8	4.9	0.0	0.0		
OBSERVATION_NOR	293 03:19	293 18:04	53.1	27.8	171.6	5.3	629.1	52.5	63.7	0.0	282.0	0.0	337.8	0.0	12.1	1634.9
SP_119EA_C34BWGOTP293_PRIME	293 18:04	294 03:04	32.4	17.0	86.4	3.2	0.0	32.0	38.9	0.0	172.0	4.9	0.0	0.0	0.0	386.9
DAILY TOTAL SCIENCE	293 03:19	294 03:04	85.5	44.8	258.0	8.6	629.1	84.5	102.6	0.0	454.0	4.9	337.8	0.0		
OBSERVATION_NOR	294 03:04	294 18:04	54.0	28.3	196.8	5.4	494.0	53.4	64.8	0.0	286.7	0.0	285.5	0.0	12.3	1481.1
SP_119EA_C70METOTB294_PRIME	294 18:04	295 03:04	32.4	17.0	86.4	3.2	0.0	32.0	38.9	0.0	172.0	4.9	0.0	0.0	0.0	386.9
DAILY TOTAL SCIENCE	294 03:04	295 03:04	86.4	45.3	283.2	8.6	494.0	85.4	103.7	0.0	458.8	4.9	285.5	0.0		
OBSERVATION_NOR	295 03:04	295 18:04	63.5	28.3	0.0	5.4	543.1	53.4	64.8	0.0	286.7	54.3	0.0	0.0	12.3	1111.8
SP_119EA_C34BWGNON295_PRIME	295 18:04	296 03:04	32.4	17.0	86.4	13.3	0.0	32.0	38.9	0.0	172.0	4.9	0.0	0.0	0.0	397.0
DAILY TOTAL SCIENCE	295 03:04	296 03:04	95.9	45.3	86.4	18.7	543.1	85.4	103.7	0.0	458.8	59.3	0.0	0.0		

Initial SMT and Data Volume (3 of 3)

Beginning of Integration:

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	296 03:04	297 04:04	90.0	47.2	177.6	9.0	701.1	88.9	108.0	0.0	477.9	0.0	270.0	0.0	20.4	1990.1
OBSERVATION_OPN	296 03:04	297 04:04	0.0	0.0	0.0	0.0	10.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.8
SP_120EA_M70METNON297_PRIME	297 04:04	297 13:04	32.4	17.0	86.4	3.2	0.0	32.0	38.9	0.0	172.0	4.9	0.0	0.0	0.0	386.9
DAILY TOTAL SCIENCE	296 03:04	297 13:04	122.4	64.1	264.0	12.2	701.1	120.9	146.9	0.0	649.9	4.9	270.0	0.0		
OBSERVATION_NOR	297 13:04	298 04:04	61.2	28.3	0.0	5.4	579.1	53.4	64.8	0.0	286.7	54.3	150.0	0.0	12.3	1295.4
SP_120EA_M34BWGNON298_PRIME	298 04:04	298 13:04	32.4	17.0	86.4	3.2	0.0	32.0	38.9	0.0	172.0	4.9	0.0	0.0	0.0	386.9
DAILY TOTAL SCIENCE	297 13:04	298 13:04	93.6	45.3	86.4	8.6	579.1	85.4	103.7	0.0	458.8	59.3	150.0	0.0		
OBSERVATION_NOR	298 13:04	299 04:04	54.0	28.3	43.2	5.4	343.1	53.4	64.8	0.0	286.7	0.0	125.0	0.0	12.3	1016.1
SP_120EA_M34BWGNON299_PRIME	299 04:04	299 13:04	32.4	17.0	86.4	3.2	0.0	32.0	38.9	0.0	172.0	4.9	0.0	0.0	0.0	386.9
DAILY TOTAL SCIENCE	298 13:04	299 13:04	86.4	45.3	129.6	8.6	343.1	85.4	103.7	0.0	458.8	4.9	125.0	0.0		
OBSERVATION_NOR	299 13:04	300 03:50	70.0	27.9	18.0	5.3	447.1	52.5	63.8	0.0	282.3	4.5	125.0	0.0	12.1	1108.4
SP_120EA_M70METNON300_PRIME	300 03:50	300 12:50	32.4	17.0	86.4	3.2	0.0	32.0	38.9	0.0	172.0	4.9	0.0	0.0	0.0	386.9
DAILY TOTAL SCIENCE	299 13:04	300 12:50	102.4	44.8	104.4	8.6	447.1	84.5	102.7	0.0	454.3	9.5	125.0	0.0		
OBSERVATION_NOR	300 12:50	301 03:50	54.0	28.3	81.6	5.4	433.1	53.4	64.8	0.0	286.7	0.0	150.0	0.0	12.3	1169.5
SP_120EA_M34BWGNON301_PRIME	301 03:50	301 12:50	32.4	17.0	86.4	3.2	0.0	32.0	38.9	0.0	134.1	4.9	0.0	0.0	0.0	349.0
DAILY TOTAL SCIENCE	300 12:50	301 12:50	86.4	45.3	168.0	8.6	433.1	85.4	103.7	0.0	420.9	4.9	150.0	0.0		
OBSERVATION_NOR	301 12:50	302 17:35	146.7	54.2	144.0	10.4	682.7	102.3	124.2	12.3	135.6	72.5	350.0	0.0	23.5	1858.2
SP_120EA_C34BWGOTP302_PRIME	302 17:35	303 02:35	32.4	17.0	86.4	3.2	0.0	32.0	38.9	0.0	42.4	4.9	0.0	0.0	0.0	257.3
DAILY TOTAL SCIENCE	301 12:50	303 02:35	179.1	71.2	230.4	13.6	682.7	134.3	163.1	12.3	178.0	77.4	350.0	0.0		
OBSERVATION_NOR	303 02:35	303 17:35	54.0	28.3	18.0	5.4	138.1	40.6	54.9	0.0	70.7	4.5	58.8	0.0	12.3	485.6
SP_120EA_C34BWGOTB303_PRIME	303 17:35	304 02:35	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	303 02:35	304 02:35	86.4	45.3	104.4	8.6	138.1	60.0	84.1	0.0	113.2	9.5	58.8	0.0		
OBSERVATION_NOR	304 02:35	305 03:35	143.6	109.9	58.8	9.0	795.0	64.6	74.1	0.0	171.6	4.5	271.0	0.0	20.4	1722.5
SP_120EA_M70METNON305_PRIME	305 03:35	305 12:35	129.6	135.8	86.4	3.2	0.0	64.0	0.0	0.0	268.9	4.9	0.0	0.0	0.0	692.9
DAILY TOTAL SCIENCE	304 02:35	305 12:35	273.2	245.7	145.2	12.2	795.0	128.6	74.1	0.0	440.5	9.5	271.0	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)	3301.4	1231.6	2538.6	193.9	8587.2	1869.2	1872.2	144.8	6596.5	767.0	3283.9	0.0

Waypoint Selection (1 of 4)

Periapse period waypoint options (Saturn-centric)

- NEG_Y to Saturn
  - Note: ORS to Sun violation from 2009-286T13:49:00 to 2009-286T21:14:00
    - Occurs during the first SOST Block
    - In occultation from 2009-286T14:59:00 to 2009286T19:34:00
  - POS_X to NSP
    - Solar heating throughout (88.8 degrees < POS_X to Sun < 90 degrees)
    - Possible Saturn/Ring heating from 2009-287T03:44:00 to 2009-287T06:44:00 (<3.4 Rs, ΔT≈3.1 K)
  - NEG_X to NSP
    - No solar heating
    - Possible Saturn/Ring heating from 2009-287T03:44:00 to 2009-287T06:44:00 (<3.4 Rs, ΔT≈3.1 K)
  - POS_Z to NSP
    - No Solar heating from 2009-286T17:19:00 to 2009-287T09:34:00
    - Possible Saturn/Ring heating from 2009-287T03:44:00 to 2009-287T06:44:00 (<3.4 Rs, ΔT≈3.1 K)
  - NEG_Z to NSP
    - No Solar heating outside of 2009-286T17:19:00 to 2009-287T09:34:00
    - Possible Saturn/Ring heating from 2009-287T03:44:00 to 2009-287T06:44:00 (<3.4 Rs, ΔT≈3.1 K)
    - Tethys in SRUs from 2009-287T08:54:00 to 2009-287T10:24:00
  - NEG_X to Sun
    - No solar heating
    - Possible Saturn/Ring heating from 2009-287T03:44:00 to 2009-287T06:44:00 (<3.4 Rs, ΔT≈3.1 K)
    - Tethys in SRUs from 2009-287T09:49:00 to 2009-287T10:24:00
    - Possible RWA Rate CMT violations at 2009-287T08:49:00 (Spacecraft flip as Sun is crossing the ring plane?)

Waypoint Selection (2 of 4)

Periapse period waypoint impacts on turns

- Turn to NEG_Y to Rhea (from Saturn) at 2009-286T15:50:00
  - With NEG_X to NSP results in a ~16 minute turn (includes 2 minutes of margin)
  - With NEG_Z to NSP results in a ~10 minute turn (includes 2 minutes of margin)
  - With NEG_X to Sun results in a ~41 minute turn (includes 2 minutes of margin)
    - Sun is between Rhea and Saturn Center
  - Very Fortunate that the Sun is in occultation
- Turn from NEG_Y to Saturn (from Dione) at 2009-286T22:49:00
  - With NEG_X to NSP results in a ~28 minute turn (includes 2 minutes of margin)
    - Saturn/Ring thermal heating.
  - With NEG_Z to NSP not calculated due to SRU and Solar heating.
  - With POS_Z to NSP results in a ~16 minute turn (includes 2 minutes of margin)
    - Minor Saturn/Ring heating
  - With NEG_X to Sun results in a ~16 minute turn (includes 2 minutes of margin)
- Turn to NEG_Y to Tethys (from Saturn) at 2009-28711:30:00
  - With NEG_X to NSP results in a 28 minute turn (includes 2 minutes of margin)
  - With NEG_Z to NSP results in NEG_X to Sun violations at turn end (Tethys)
  - With POS_X to NSP results in NEG_X to Sun violation at turn start (Saturn)
  - With NEG_X to Sun results in a ~42 minute turn (includes 2 minutes of margin)
    - Sun is between Rhea and Saturn Center
- Turn to NEG_Y to Saturn (from Tethys) at 2009-287T15:40:00
  - With NEG_X to NSP results in a ~13 minute turn (includes 2 minutes of margin)
  - With NEG_Z to NSP results in a ~9 minute turn (includes 2 minutes of margin)
  - With NEG_X to Sun results in a ~11 minute turn (includes 2 minutes of margin)
- Turns from satellite to satellite & safe Waypoint attitudes not determined at this time
  - SOST homework

Waypoint Selection (3 of 4)

Apoapse period waypoint options (Saturn-centric)

2009-290T03:19:00 --> 2009-304T02:35:00

Primary Pointing	Seconday Pointing	Notes
NEG_Y_to_Saturn	NEG_X_to_Sun	
NEG_Y_to_Saturn	NEG_X_to_NSP	
NEG_Y_to_Saturn	POS_X_to_NSP	
NEG_Y_to_Saturn	NEG_Z_to_NSP	
NEG_Y_to_Saturn	POS_X_to_38.0/84.0	"RBOT friendly" waypoint
NEG_Y_to_Saturn	NEG_X_to_38.0/84.0	"RBOT friendly" waypoint
NEG_Y_to_Saturn	NEG_Z_to_38.0/84.0	"RBOT friendly" waypoint

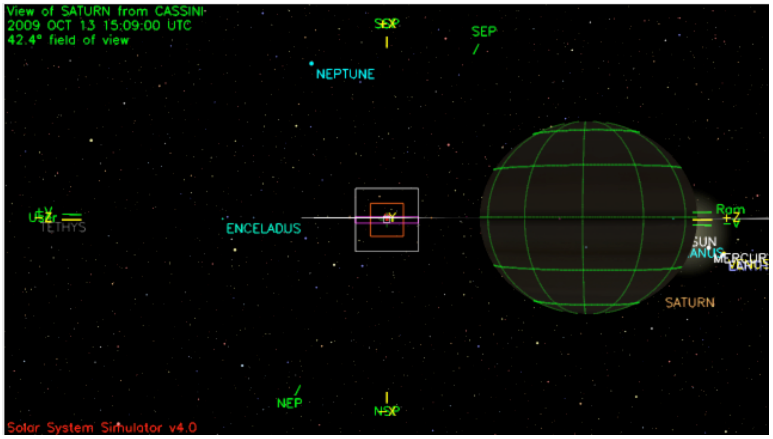
Waypoint Selection (4 of 4)

Inbound rev 120 waypoint options (Saturn-centric)
(DOY 304-305)

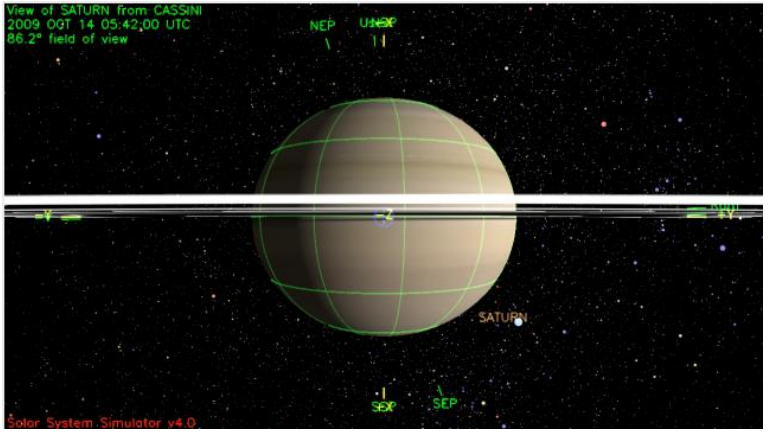
Request	Start (SCET)	Potential secondaries for ISS_NAC to Saturn waypoint						
Sequence S54, length = 40 days	2009-278T04:03:00							
SATURN_119_120 Segment	2009-286T13:49:00							
SP_120EA_DLTURN303_PRIME	2009-303T16:55:00							
SP_120EA_C34BWGOTB303_PRIME	2009-303T17:35:00	posx2nep	negx2nsp	posx2nep	negx2sun	negz2nsp	negz2nep	negz2earth
SP_120SA_WAYPTTURN303_PRIME	2009-304T02:35:00	OK	OK	OK	OK	OK	OK	OK
ISS_120TI_M90R2CLD304_PRIME	2009-304T03:15:00	OK	OK	OK	OK	OK	OK	OK
ISS_120RE_HPLELR001_PRIME	2009-304T04:30:00	OK	OK	OK	OK	OK	OK	OK
ISS_120SA_WALGTNG001_PRIME	2009-304T08:05:00	OK	OK	OK	OK	OK	OK	OK
VIMS_120SA_GLOBDYN001_PRIME	2009-304T12:05:00	OK	OK	OK	OK	OK	OK	OK
CIRS_120SA_NADIROCC001_PRIME	2009-305T00:05:00	OK	OK	OK	OK	OK	OK	OK
NAV_120SK_OPNAV051_PRIME	2009-305T02:05:00	OK	OK	OK	OK	OK	OK	OK
NAV_120EA_DLTURN051_PRIME	2009-305T03:34:00	OK	OK	OK	OK	OK	OK	OK
SP_120EA_M70METNON305_PRIME	2009-305T03:35:00	OK till 09:45	OK till 09:45	OK till 09:45	OK till 09:45	OK till 09:45	OK till 09:45	OK till 09:45

Waypoints Chosen (1 of 2)

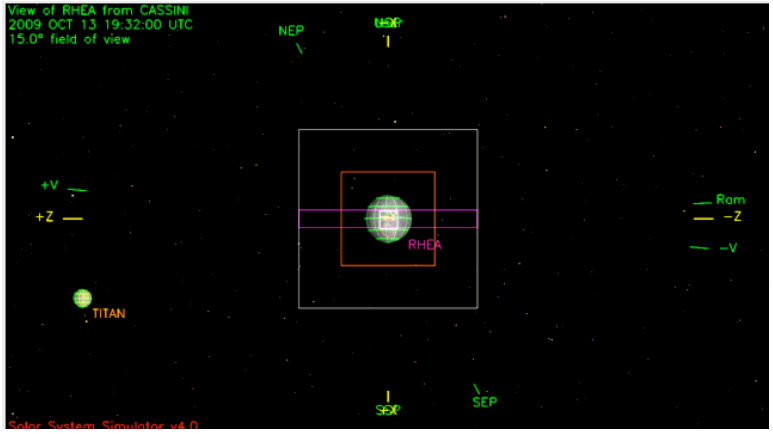
Waypoint 1 (2009-286T14:24 – 286T15:50):
NAC to Saturn (12,0,0 deg offset), NEG_X to NSP



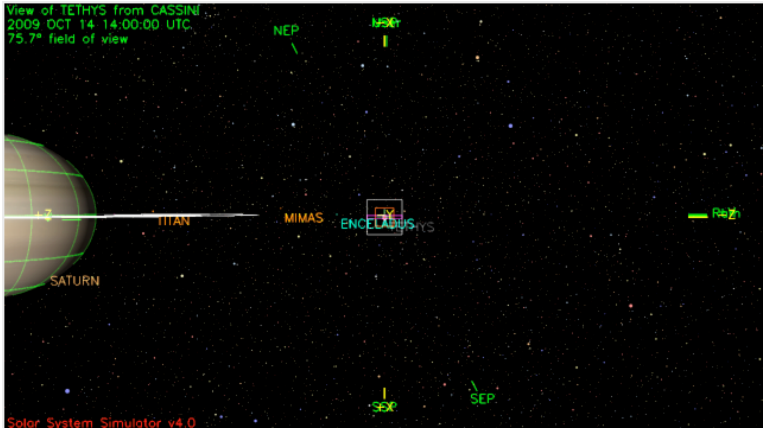
Waypoint 3 (2009-286T23:14 – 287T12:10):
NEG_Z to Saturn, NEG_X to NSP



Waypoint 2 (2009-286T15:50 – 286T23:14):
NAC to Rhea, NEG_X to NSP

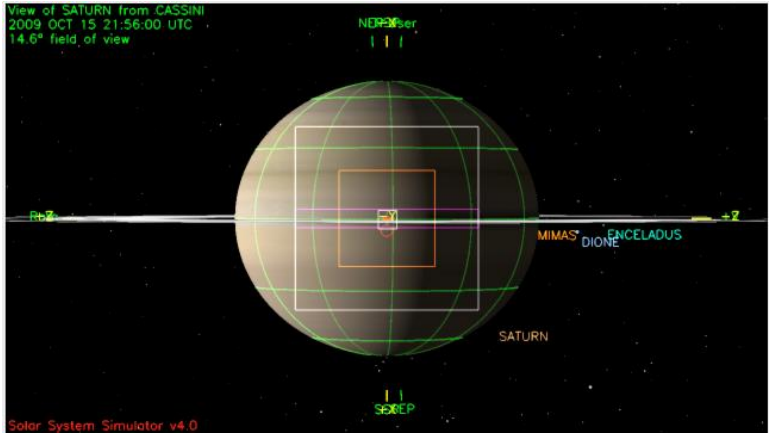


Waypoint 4 (2009-287T12:10 – 287T15:53):
NAC to Tethys, NEG_X to NSP

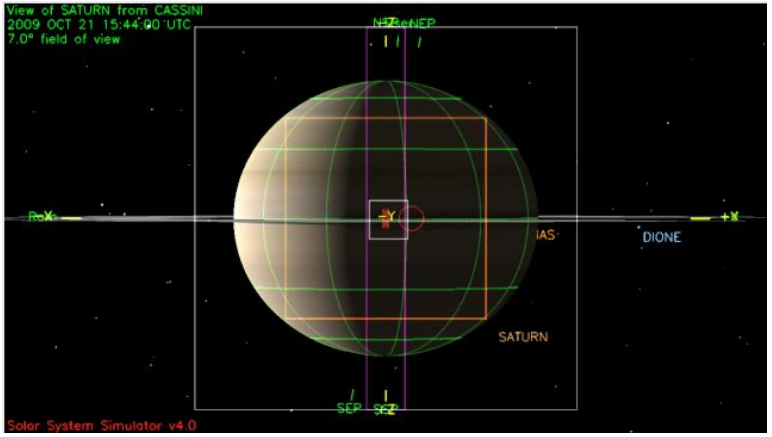


Waypoints Chosen (2 of 2)

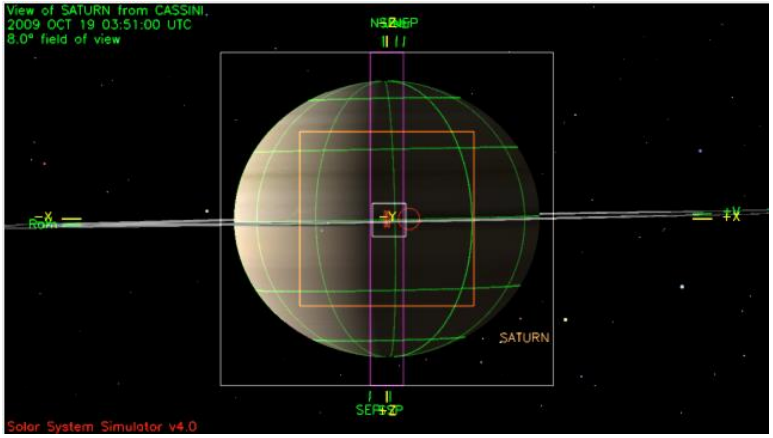
Waypoint 5 (2009-287T15:53 – 290T03:59):
NAC to Saturn, NEG_X to NSP



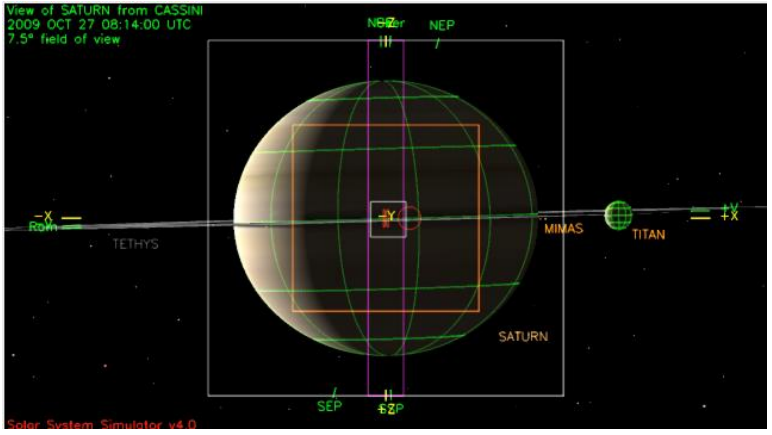
Waypoint 7 (2009-294T03:44 – 295T03:44):
NAC to Saturn, NEG_Z to NSP



Waypoint 6 (2009-290T03:59 – 294T03:44):
NAC to Saturn, NEG_X to Sun



Waypoint 8 (2009-295T03:44 – 305T12:50):
NAC to Saturn, NEG_X to Sun



Notes & Liens

Notes:

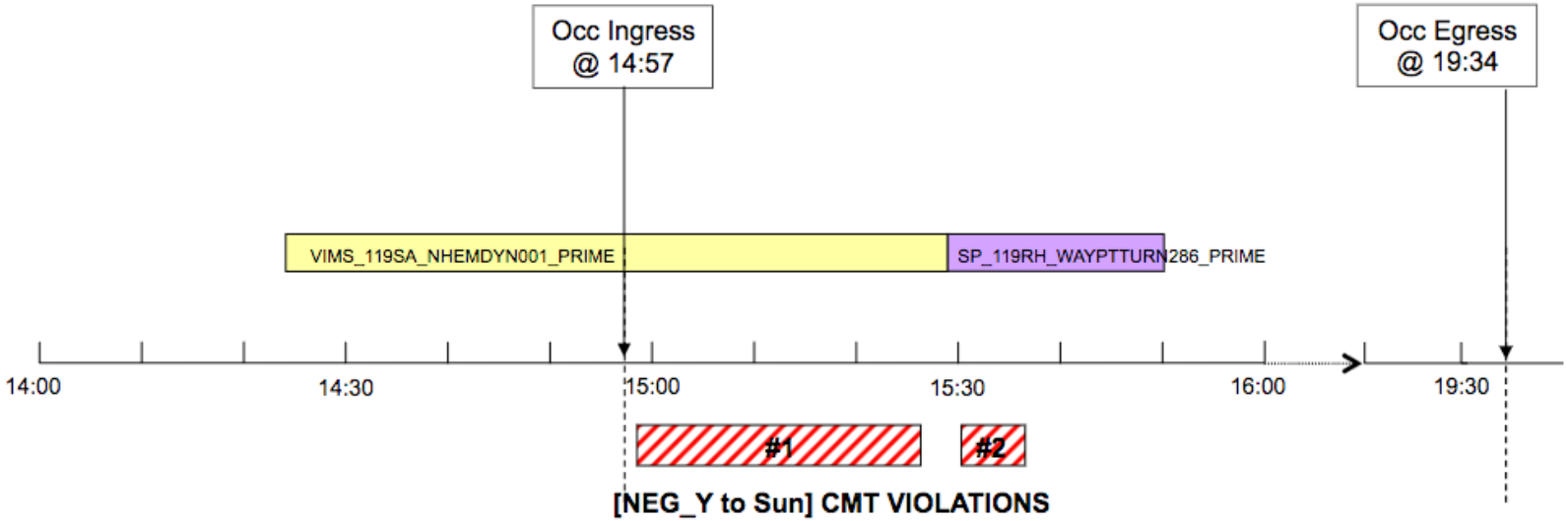
- Pointing:
  - No RBOT friendly secondaries were chosen.
- Data Volume:
  - None
- DSN:
  - None
- Opmodes:
  - None
- Special Activities:
  - None

Sequence Liens:

- None

CMT Management: -Y to Sun violation

CMT management was performed on DOY 285-286 during VIMS_119SA_NHEMDYN001_PRIME



From waiver:
According to the Tour Atlas, the Sun-Saturn occultation begins at 2009-286T14:57:50 and ends at 2009-286T19:34:30, a duration of ~277 minutes. NAV estimates that the occultation could start as late as 15:06:10. The VIMS activity VIMS_119SA_NHEMDYN001_PRIME begins at 2009-286T14:24:00 and ends at 2009-286T15:29:00.

The spacecraft remains at the waypoint until 2009-286T15:03:32.000, when it begins its turn to Saturn.
The [NEG_Y to Sun] CMT padded constraint warning is issued by KPT at 2009-286T15:05:20.000, [NEG_Y to Sun] angle is ~14.9424 degrees. The actual CMT violation, as reported by KPT, occurs at 2009- 286T15:06:05, [NEG_Y to Sun] angle 12.1925 degrees.

We are requesting CMT management during the observation from **2009-286T15:03:00 to 2009-286T15:47:00**.