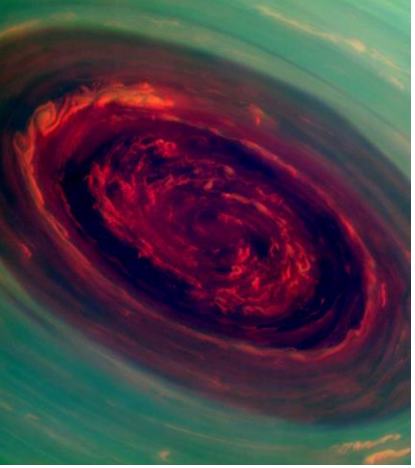

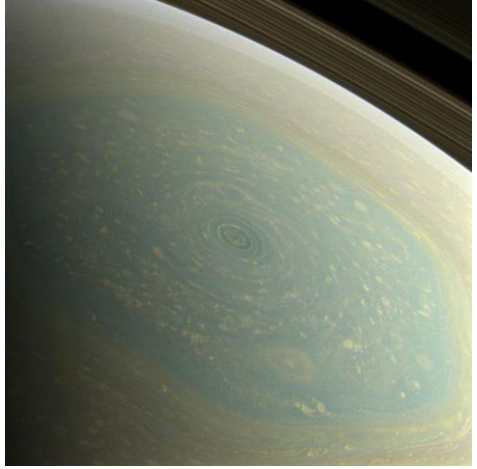
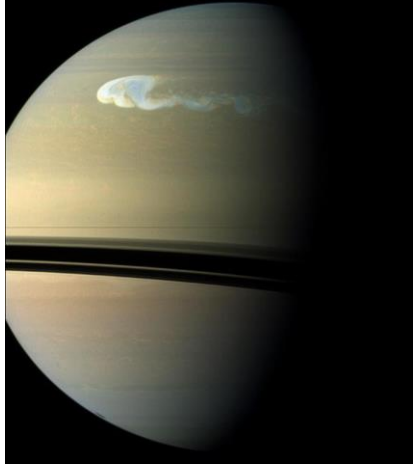

Science Planning & Sequence Team
CASSINI

SATURN TARGET WORKING TEAM

Rev 121_122 Segment Legacy Package

Segment Boundary: November 22, 2009 – December 11, 2009
2009-326T01:22:00 – 2009-345T10:10:00 (SCET)

Integration Began 06/30/2008
Segment Delivered to S55 Sequence 05/11/2009
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” (i.e, pseudo-cross-discipline) , were of a multiple discipline flavor.

- The Rev 121_122 segment was over 19 days long. It began outbound from Rev 121 periapse and continued through Rev 122 apoapse, ending the day after 122 periapse – covering nearly an entire orbit.

- Saturn science was the focus of Rev 122 periapse, where one of the few opportunities to conduct a deep atmosphere campaign, with VIMS and RADAR observing the same territory, was executed. A Radio Science Earth-atmosphere occultation was also observed.

- Observations of Enceladus plumes and CDA ring plane crossing were also given time near periapse.

- The time away from periapse contained similar Saturn science to the other orbits in this series, including ISS photopolarimetry and lightning searches, and CIRS Mid-IR mapping, but with a heavier focus on CIRS composition.

- Notable out-of-discipline apoapse activities included a plethora of observations of several icy satellites, mostly in the form of mutual event “photo-ops” but also including dedicated observations of Enceladus and Iapetus. The E and G rings were also covered by VIMS.

- The waypoint strategy and science activity placement at Rev 122 periapse was complicated by solar viewing geometry, requiring the use of Earth as the waypoint. Fortunately, the Radio Science occultations and RADAR observations kept the Sun away from the ORS boresights during the critical time and constraint management was not required.

- 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 3)

Request	Riders	Start (SCET)	Start (Epoch)	Duration	End (SCET)	Primary	Secondary	Comments
Sequence S55, length = 39 days		2009-317T19:21:00		039T04:05:00	2009-356T23:26:00			
SATURN_121_122 Segment		2009-326T01:22:00		019T08:48:00	2009-345T10:10:00			
NAV_121SK_OPNAV261_PRIME	M	2009-326T01:22:00		000T01:29:00	2009-326T02:51:00	ISS_NAC to Satellites	NEG_X to Sun	
NAV_121EA_WAYPTTURN261_PRIME	M	2009-326T02:51:00		000T00:01:00	2009-326T02:52:00	ISS_NAC to Saturn	NEG_X to Sun	
NEW WAYPOINT		**2009-326T02:52:00**		**001T00:00:00**	**2009-327T02:52:00**	**ISS_NAC to Saturn**	**NEG_X to Sun**	
VIMS_121SA_NHEMDYN001_PRIME	I, M	2009-326T02:52:00		000T09:35:00	2009-326T12:27:00	ISS_NAC to Saturn	NEG_X to Sun	
CAPS_121SA_DUSKPTG001_PRIME	M	2009-326T12:27:00		000T02:00:00	2009-326T14:27:00	POS_Y to COROT (0.0,0.0,40.0 deg. offset)	NEG_X to NSP	
ISS_121TI_M150R2HZ326_PRIME	C, M, U	2009-326T14:27:00	E121_M150R2HZ326+000T00:00:00	000T01:15:00	2009-326T15:42:00	ISS_NAC to Titan	NEG_X to Sun	
SP_121EA_DLTURN326_PRIME	M	2009-326T15:42:00		000T00:40:00	2009-326T16:22:00	XBAND to Earth	POS_X to NSP	
SP_121EA_C70METOTP326_PRIME	C, E, M, N	2009-326T16:22:00		000T09:00:00	2009-327T01:22:00	XBAND to Earth	POS_X to NSP	Pos_X to NSP; CAPS approved new initial secondary
NAV_121SK_OPNAV271_PRIME	M	2009-327T01:22:00		000T01:29:00	2009-327T02:51:00	ISS_NAC to Satellites	POS_X to NSP	
NAV_121SA_WAYPTTURN271_PRIME	M	2009-327T02:51:00		000T00:01:00	2009-327T02:52:00	ISS_NAC to Saturn	NEG_Z to Sun	
NEW WAYPOINT		**2009-327T02:52:00**		**009T22:26:00**	**2009-337T01:18:00**	**ISS_NAC to Saturn**	**NEG_Z to Sun**	
ISS_121SA_1X2WPXX009_PRIME	M	2009-327T02:52:00		000T01:00:00	2009-327T03:52:00	ISS_NAC to Saturn	NEG_Z to Sun	
ISS_121PA_MUTUALEVE001_PRIME	M	2009-327T03:52:00		000T00:53:00	2009-327T04:45:00	ISS_NAC to Pandora	NEG_Z to Sun	ISS_NAC to Pandora control of secondary axis not required
UVIS_121EN_ICYATM002_PRIME	I, M	2009-327T04:45:00		000T04:00:00	2009-327T08:45:00	UVIS_FUV to Enceladus	NEG_Z to NSP	See observation description. Duration of 4 hours allows for 30 min slew to and from Enceladus, and 3 integration sites.
ISS_121SA_NALGTNG008_PRIME	M, V	2009-327T08:45:00		000T04:15:00	2009-327T13:00:00	ISS_NAC to Saturn	NEG_Z to Sun	
CAPS_121SA_DUSKPTG002_PRIME	M	2009-327T13:00:00		000T02:00:00	2009-327T15:00:00	POS_Y to COROT (0.0,0.0,40.0 deg. offset)	NEG_Z to Sun	
ISS_121OT_SATELLORB004_PRIME	M	2009-327T15:00:00		000T00:27:00	2009-327T15:27:00	ISS_NAC to Rocks	NEG_Z to Sun	
SP_121EA_DLTURN327_PRIME	M	2009-327T15:27:00		000T00:40:00	2009-327T16:07:00	XBAND to Earth	POS_X to NSP	
SP_121EA_C34BWGOTB327_PRIME	M, N	2009-327T16:07:00		000T09:00:00	2009-328T01:07:00	XBAND to Earth	4_Hr_Rolling	POS_X to NSP
SP_121SA_WAYPTTURN328_PRIME	M	2009-328T01:07:00		000T00:40:00	2009-328T01:47:00	ISS_NAC to Saturn	NEG_Z to Sun	
ISS_121SA_NALGTNG009_PRIME	M	2009-328T01:47:00		000T05:54:00	2009-328T07:41:00	ISS_NAC to Saturn	NEG_Z to Sun	
ISS_121SA_1X2WPXX010_PRIME	M	2009-328T07:41:00		000T01:00:00	2009-328T08:41:00	ISS_NAC to Saturn	NEG_Z to Sun	
ISS_121EP_MUTUALEVE001_PRIME	M	2009-328T08:41:00		000T01:07:00	2009-328T09:48:00	ISS_NAC to Epimetheus	NEG_Z to Sun	ISS_NAC to Epimetheus control of secondary axis not required
ISS_121JA_MUTUALEVE002_PRIME	M	2009-328T09:48:00		000T00:43:00	2009-328T10:31:00	ISS_NAC to Janus	NEG_Z to Sun	ISS_NAC to Janus control of secondary axis not required
CAPS_121SA_MAGBNDPTG001_PRIME	M	2009-328T10:31:00		000T02:00:00	2009-328T12:31:00	POS_Y to COROT (0.0,0.0,40.0 deg. offset)	NEG_Z to Sun	
VIMS_121RI_EG80PHASE001_PRIME	I, M	2009-328T12:31:00		000T12:07:00	2009-329T00:38:00	VIMS_IR to Rings	NEG_Z to Sun	
ISS_121OT_SATELLORB008_PRIME	M	2009-329T00:38:00		000T00:30:00	2009-329T01:08:00	ISS_NAC to Rocks	NEG_Z to Sun	
NAV_121SK_OPNAVK001_PRIME	M	2009-329T01:08:00		000T00:59:00	2009-329T02:07:00	ISS_NAC to 276.832/3.095	NEG_X to Sun	
NAV_121EA_DLTURN291_PRIME	M	2009-329T02:07:00		000T00:01:00	2009-329T02:08:00	XBAND to Earth	POS_X to NSP	
SP_121EA_M34BWGNON329_PRIME	C, E, M	2009-329T02:08:00		000T09:00:00	2009-329T11:08:00	XBAND to Earth	3_Hr_Rolling	POS_X to NSP CAPS; ENGR PEM-A; 3-hr roll OK
SP_121SA_WAYPTTURN329_PRIME	M	2009-329T11:08:00		000T00:40:00	2009-329T11:48:00	ISS_NAC to Saturn	NEG_Z to Sun	
ISS_121SA_1X2WPXX011_PRIME	M	2009-329T11:48:00		000T01:00:00	2009-329T12:48:00	ISS_NAC to Saturn	NEG_Z to Sun	
UVIS_121EN_ICYATM003_PRIME	M	2009-329T12:48:00		000T04:00:00	2009-329T16:48:00	UVIS_FUV to Enceladus (0.0,-24.99,0.0 deg. offset)	NEG_Z to 33.3/83.0	See observation description. Duration of 4 hours allows for 30 min slew to and from Enceladus, and 3 integration sites.
CIRS_121SA_COMPSIT002_PRIME	M, V	2009-329T16:48:00		000T08:40:00	2009-330T01:28:00	CIRS_FP1 to Saturn	NEG_Z to Sun	
SP_121EA_DLTURN330_PRIME	M	2009-330T01:28:00		000T00:40:00	2009-330T02:08:00	XBAND to Earth	POS_X to NEP	
SP_121EA_M70METNON430_PRIME	C, M	2009-330T02:08:00		000T03:00:00	2009-330T05:08:00	XBAND to Earth	Rolling	
SP_121EA_M34BWGNON330_PRIME	C, M	2009-330T05:08:00		000T06:00:00	2009-330T11:08:00	XBAND to Earth	Rolling/SRU	POS_X to NEP
SP_121SA_WAYPTTURN330_PRIME	M	2009-330T11:08:00		000T00:40:00	2009-330T11:48:00	ISS_NAC to Saturn	NEG_Z to Sun	
ISS_121IA_IAPETUS330_PRIME	M, U	2009-330T11:48:00		000T01:48:00	2009-330T13:36:00	UVIS_FUV to Iapetus	NEG_X to 313.9/11.1	
ISS_121SA_1X2WPXX012_PRIME	M	2009-330T13:36:00		000T01:00:00	2009-330T14:36:00	ISS_NAC to Saturn	NEG_Z to Sun	
ISS_121OT_SATELLORB012_PRIME	M	2009-330T14:36:00		000T00:30:00	2009-330T15:06:00	ISS_NAC to Rocks	NEG_Z to Sun	
ISS_121RH_MUTUALEVE002_PRIME	M	2009-330T15:06:00		000T00:42:00	2009-330T15:48:00	ISS_NAC to Rhea	NEG_Z to Sun	ISS_NAC to Rhea control of secondary axis not required
ISS_121RH_PHOTOOP001_PRIME	M, U	2009-330T15:48:00		000T01:35:00	2009-330T17:23:00	ISS_NAC to Epimetheus	NEG_Z to Sun	ISS_NAC to Rhea control of secondary axis not required
ISS_121SA_NALGTNG010_PRIME	M, V	2009-330T17:23:00		000T02:16:00	2009-330T19:39:00	ISS_NAC to Saturn	NEG_Z to Sun	
ISS_121TI_MUTUALEVE003_PRIME	M	2009-330T19:39:00		000T00:59:00	2009-330T20:38:00	ISS_NAC to Titan	NEG_Z to Sun	ISS_NAC to Titan control of secondary axis not required
CIRS_121SA_COMPSIT003_PRIME	M, V	2009-330T20:38:00		000T08:00:00	2009-331T04:38:00	CIRS_FP1 to Saturn	NEG_Z to Sun	
ISS_121OT_SATELLORB015_PRIME	M	2009-331T04:38:00		000T00:30:00	2009-331T05:08:00	ISS_NAC to Rocks	NEG_Z to Sun	
ISS_121SA_1X2WPXX013_PRIME	M	2009-331T05:08:00		000T01:00:00	2009-331T06:08:00	ISS_NAC to Saturn	NEG_Z to Sun	
ISS_121SA_NALGTNG011_PRIME	M, V	2009-331T06:08:00		000T01:24:00	2009-331T07:32:00	ISS_NAC to Saturn	NEG_Z to Sun	
ISS_121TI_MUTUALEVE004_PRIME	M	2009-331T07:32:00		000T01:06:00	2009-331T08:38:00	ISS_NAC to Titan	NEG_Z to Sun	ISS_NAC to Titan control of secondary axis not required
NAV_121SK_OPNAVK003_PRIME	M	2009-331T08:38:00		000T00:59:00	2009-331T09:37:00	ISS_NAC to 274.885/3.341	POS_X to NEP	
NAV_121EA_DLTURN311_PRIME	M	2009-331T09:37:00		000T00:01:00	2009-331T09:38:00	XBAND to Earth	POS_X to NEP	

Final Sequenced SPASS (2 of 3)

Request	Riders	Start (SCET)	Start (Epoch)	Duration	End (SCET)	Primary	Secondary	Comments
SP_121EA_G34B26NON331_PRIME	C, M	2009-331T09:38:00		000T06:00:00	2009-331T15:38:00	XBAND to Earth	5_Hr_Rolling	POS_X to NEP
SP_121EA_C70METNON331_PRIME	M	2009-331T15:38:00		000T03:00:00	2009-331T18:38:00	XBAND to Earth	POS_X to NEP	
SP_121SA_WAYPTTURN331_PRIME	M	2009-331T18:38:00		000T00:40:00	2009-331T19:18:00	ISS_NAC to Saturn	NEG_Z to Sun	
ISS_121TI_M90R2CLD331_PRIME	C, M, U	2009-331T19:18:00	E121_M90R2CLD331+000T00:00:00	000T01:15:00	2009-331T20:33:00	ISS_NAC to Titan (0.0,-9.0,0.0 deg. offset)	POS_Z to 214.4/-83.6	
CIRS_121SA_COMPSIT004_PRIME	M, V	2009-331T20:33:00		000T08:00:00	2009-332T04:33:00	CIRS_FP1 to Saturn	NEG_Z to Sun	
ISS_121SA_1X2WPXX014_PRIME	M	2009-332T04:33:00		000T01:00:00	2009-332T05:33:00	ISS_NAC to Saturn	NEG_Z to Sun	
ISS_121OT_SATELLORB016_PRIME	M	2009-332T05:33:00		000T00:30:00	2009-332T06:03:00	ISS_NAC to Rocks	NEG_Z to Sun	
ISS_121SA_NALGTNG012_PRIME	M, V	2009-332T06:03:00		000T07:37:00	2009-332T13:40:00	ISS_NAC to Saturn	NEG_Z to Sun	
ISS_121DI_MUTUALEVE002_PRIME	M	2009-332T13:40:00		000T00:43:00	2009-332T14:23:00	ISS_NAC to Dione	NEG_Z to Sun	ISS_NAC to Dione control of secondary axis not required
ISS_121SA_NALGTNG013_PRIME	M, V	2009-332T14:23:00		000T00:50:00	2009-332T15:13:00	ISS_NAC to Saturn	NEG_Z to Sun	
SP_121EA_DLTURN332_PRIME	M, R	2009-332T15:13:00		000T00:40:00	2009-332T15:53:00	XBAND to Earth	POS_X to NEP	
SP_121EA_C70METNON332_PRIME	C, M, R	2009-332T15:53:00		000T09:00:00	2009-333T00:53:00	XBAND to Earth	Rolling/SRU	POS_X to NEP
SP_121SA_WAYPTTURN333_PRIME	M	2009-333T00:53:00		000T00:40:00	2009-333T01:33:00	ISS_NAC to Saturn	NEG_Z to Sun	
ISS_121TI_M90R2CLD333_PRIME	C, M, U	2009-333T01:33:00	E121_M90R2CLD333+000T00:00:00	000T01:15:00	2009-333T02:48:00	ISS_NAC to Titan	POS_Z to 210.5/-83.1	
ISS_121IA_IAPETUS333_PRIME	M, U	2009-333T02:48:00		000T03:00:00	2009-333T05:48:00	UVIS_FUV to Iapetus	NEG_X to 294.8/42.1	
ISS_121SA_1X2WPXX015_PRIME	M	2009-333T05:48:00		000T01:00:00	2009-333T06:48:00	ISS_NAC to Saturn	NEG_Z to Sun	
ISS_121RE_LRLEMP001_PRIME	M, V	2009-333T06:48:00		000T18:25:00	2009-334T01:13:00	ISS_NAC to Rings	PIC	
SP_121EA_DLTURN334_PRIME	M	2009-334T01:13:00		000T00:40:00	2009-334T01:53:00	XBAND to Earth	POS_X to NEP	
SP_121EA_M70METNON334_PRIME	C, E, M	2009-334T01:53:00		000T09:00:00	2009-334T10:53:00	XBAND to Earth	5_Hr_Rolling	POS_X to NEP
SP_121SA_WAYPTTURN334_PRIME	M	2009-334T10:53:00		000T00:40:00	2009-334T11:33:00	ISS_NAC to Saturn	NEG_Z to Sun	
ISS_121TI_M90R3CLD334_PRIME	C, M, U	2009-334T11:33:00	E121_M90R3CLD334+000T00:00:00	000T01:15:00	2009-334T12:48:00	ISS_NAC to Titan	POS_X to 41.1/84.0	
ISS_121IA_IAPETUS334_PRIME	M, U	2009-334T12:48:00		000T01:30:00	2009-334T14:18:00	UVIS_FUV to Iapetus	NEG_X to 283.3/49.2	
ISS_121SA_1X2WPXX016_PRIME	M	2009-334T14:18:00		000T01:00:00	2009-334T15:18:00	ISS_NAC to Saturn	NEG_Z to Sun	
ISS_121SA_NALGTNG014_PRIME	M, V	2009-334T15:18:00		000T05:42:00	2009-334T21:00:00	ISS_NAC to Saturn	NEG_Z to Sun	
Apoapse Per = 19.0 d, inc ...		2009-334T17:36:50		000T00:00:01	2009-334T17:36:51			
ISS_122TI_ECLIPSE0001_PRIME	M, U	2009-334T21:00:00		000T04:00:00	2009-335T01:00:00	ISS_NAC to Titan	POS_X to 39.0/83.9	
CIRS_122SA_COMPSIT001_PRIME	M, V	2009-335T01:00:00		000T07:43:00	2009-335T08:43:00	CIRS_FP1 to Saturn	NEG_Z to Sun	
SP_122EA_DLTURN335_PRIME	M	2009-335T08:43:00		000T00:40:00	2009-335T09:23:00	XBAND to Earth	POS_X to NEP	
SP_122EA_G34BWGNON335_PRIME	C, M	2009-335T09:23:00		000T04:14:00	2009-335T13:37:00	XBAND to Earth	POS_X to NEP	POS_X to NEP
SP_122EA_G34BWGNON435_PRIME	C, E, M	2009-335T14:33:00		000T01:26:00	2009-335T15:59:00	XBAND to Earth	POS_X to NEP	POS_X to NEP
SP_122EA_G34BWGNON535_PRIME	C, E, M	2009-335T16:55:00		000T01:28:00	2009-335T18:23:00	XBAND to Earth	POS_X to NEP	POS_X to NEP
SP_122SA_WAYPTTURN335_PRIME	M	2009-335T18:23:00		000T00:40:00	2009-335T19:03:00	ISS_NAC to Saturn	NEG_Z to Sun	
ISS_122IA_IAPETUS335_PRIME	M, U	2009-335T19:03:00		000T02:15:00	2009-335T21:18:00	UVIS_FUV to Iapetus	NEG_X to 272.3/52.3	
ISS_122RH_MUTUALEVE003_PRIME	M	2009-335T21:18:00		000T00:52:00	2009-335T22:10:00	ISS_NAC to Rhea	NEG_Z to Sun	ISS_NAC to Rhea control of secondary axis not required
CIRS_122SA_COMPSIT003_PRIME	M, V	2009-335T22:10:00		000T15:48:00	2009-336T13:58:00	CIRS_FP1 to Saturn	NEG_Z to Sun	
ISS_122SA_1X2WPXX002_PRIME	M	2009-336T13:58:00		000T01:00:00	2009-336T14:58:00	ISS_NAC to Saturn	NEG_Z to Sun	
SP_122EA_DLTURN336_PRIME	M	2009-336T14:58:00		000T00:40:00	2009-336T15:38:00	XBAND to Earth	POS_X to NEP	
SP_122EA_C70METNON336_PRIME	C, M, R	2009-336T15:38:00		000T09:00:00	2009-337T00:38:00	XBAND to Earth	5_Hr_Rolling	POS_X to NEP
SP_122SA_WAYPTTURN337_PRIME	M	2009-337T00:38:00		000T00:40:00	2009-337T01:18:00	ISS_NAC to Saturn	NEG_Z to NSP	
NEW WAYPOINT		**2009-337T01:18:00**		**001T10:01:00**	**2009-338T11:19:00**	**ISS_NAC to Saturn**	**NEG_Z to NSP**	
CIRS_122SA_MIRMAP001_PRIME	M, V	2009-337T01:18:00		000T22:41:00	2009-337T23:59:00	CIRS_FP3 to Saturn	NEG_Z to NSP	
ISS_122SA_1X2WPXX003_PRIME	M	2009-337T23:59:00		000T01:00:00	2009-338T00:59:00	ISS_NAC to Saturn	NEG_X to Sun	
SP_122EA_DLTURN338_PRIME	M	2009-338T00:59:00		000T00:40:00	2009-338T01:39:00	XBAND to Earth	POS_X to 95.16/-64.09	
SP_122EA_M70METOTP338_PRIME	C, E, M, N	2009-338T01:39:00		000T09:00:00	2009-338T10:39:00	XBAND to Earth	4_Hr_Rolling	POS_X to 95.16/-64.09; CAPS
SP_122SA_WAYPTTURN338_PRIME	M	2009-338T10:39:00		000T00:40:00	2009-338T11:19:00	ISS_NAC to Saturn	NEG_Z to Sun	
NEW WAYPOINT		**2009-338T11:19:00**		**001T00:00:00**	**2009-339T11:19:00**	**ISS_NAC to Saturn**	**NEG_Z to Sun**	
ISS_122IA_IAPETUS338_PRIME	M, U	2009-338T11:19:00		000T01:30:00	2009-338T12:49:00	UVIS_FUV to Iapetus	POS_Z to 250.8/51.5	
ISS_122SA_1X2WPXX004_PRIME	M	2009-338T12:49:00		000T01:00:00	2009-338T13:49:00	ISS_NAC to Saturn	NEG_X to Sun	
CIRS_122SA_COMPSIT004_PRIME	M, V	2009-338T13:49:00		000T08:00:00	2009-338T21:49:00	CIRS_FP1 to Saturn	NEG_Z to Sun	
ISS_122SA_NALGTNG003_PRIME	M, V	2009-338T21:49:00		000T03:10:00	2009-339T00:59:00	ISS_NAC to Saturn	NEG_Z to Sun	
SP_122EA_DLTURN339_PRIME	M	2009-339T00:59:00		000T00:40:00	2009-339T01:39:00	XBAND to Earth	POS_X to 95.16/-64.09	
SP_122EA_M34BWGOTB339_PRIME	C, M, N	2009-339T01:39:00		000T09:00:00	2009-339T10:39:00	XBAND to Earth	4_Hr_Rolling	POS_X to 95.16/-64.09
SP_122SA_WAYPTTURN339_PRIME	M	2009-339T10:39:00		000T00:25:00	2009-339T11:04:00	ISS_NAC to Saturn	POS_X to 244.2/49.1	
SP_122SA_WAYPTTURN439_PRIME	M	2009-339T11:04:00		000T00:15:00	2009-339T11:19:00	ISS_NAC to Saturn	NEG_Z to NSP	
NEW WAYPOINT		**2009-339T11:19:00**		**001T07:30:00**	**2009-340T18:49:00**	**ISS_NAC to Saturn**	**NEG_Z to NSP**	
ISS_122IA_IAPETUS339_PRIME	M, U	2009-339T11:19:00		000T01:30:00	2009-339T12:49:00	UVIS_FUV to Iapetus	POS_X to 244.2/48.1	
CAPS_122SA_SURVEYPTG001_PRIME	M	2009-339T12:49:00		000T02:00:00	2009-339T14:49:00	POS_Y to COROT (0.0,0.0,40.0 deg. offset)	NEG_X to NSP	
ISS_122SA_1X2WPXX005_PRIME	M	2009-339T14:49:00		000T01:00:00	2009-339T15:49:00	ISS_NAC to Saturn	NEG_X to Sun	
CIRS_122SA_MIRMAP002_PRIME	M, V	2009-339T15:49:00		000T15:40:00	2009-340T07:29:00	CIRS_FP3 to Saturn	NEG_Z to NSP	
ISS_122SA_1X2WPXX006_PRIME	M	2009-340T07:29:00		000T01:00:00	2009-340T08:29:00	ISS_NAC to Saturn	NEG_X to Sun	
SP_122EA_DLTURN340_PRIME	M	2009-340T08:29:00		000T00:40:00	2009-340T09:09:00	XBAND to Earth	POS_X to NEP	
SP_122EA_G34BWGNON340_PRIME	C, M	2009-340T09:09:00		000T09:00:00	2009-340T18:09:00	XBAND to Earth	5_Hr_Rolling	POS_X to NEP

Final Sequenced SPASS (3 of 3)

Request	Riders	Start (SCET)	Start (Epoch)	Duration	End (SCET)	Primary	Secondary	Comments
SP_122SA_WAYPTTURN340_PRIME	M	2009-340T18:09:00		000T00:40:00	2009-340T18:49:00	ISS_NAC to Saturn	NEG_Z to Sun	
NEW WAYPOINT		**2009-340T18:49:00**		**001T06:35:00**	**2009-342T01:24:00**	**ISS_NAC to Saturn**	**NEG_Z to Sun**	
ISS_122SA_1X2WPXX007_PRIME	M	2009-340T18:49:00		000T01:00:00	2009-340T19:49:00	ISS_NAC to Saturn	NEG_X to Sun	
VIMS_122RI_EG130PHAS001_PRIME	I, M	2009-340T19:49:00		000T12:00:00	2009-341T07:49:00	VIMS_IR to Rings	NEG_Z to Sun	
ISS_122SA_NALGTNG005_PRIME	M, V	2009-341T07:49:00		000T04:55:00	2009-341T12:44:00	ISS_NAC to Saturn	NEG_Z to Sun	
CAPS_122SA_SURVEYPTG003_PRIME		2009-341T12:44:00		000T02:00:00	2009-341T14:44:00	POS_Y to COROT (0.0,0.0,40.0 deg. offset)	NEG_X to NSP	
SP_122EA_DLTURN341_PRIME		2009-341T14:44:00		000T00:40:00	2009-341T15:24:00	XBAND to Earth	POS_X to NEP	
SP_122EA_C70METNON341_PRIME	C	2009-341T15:24:00		000T09:00:00	2009-342T00:24:00	XBAND to Earth	POS_X to NEP	
NAV_122SK_OPNAV421_PRIME		2009-342T00:24:00		000T00:59:00	2009-342T01:23:00	ISS_NAC to Satellites	NEG_X to NSP	
NAV_122EA_WAYPTTURN421_PRIME		2009-342T01:23:00		000T00:01:00	2009-342T01:24:00	ISS_NAC to Saturn	NEG_X to NSP	
NEW WAYPOINT		**2009-342T01:24:00**		**001T08:40:00**	**2009-343T10:04:00**	**ISS_NAC to Saturn**	**NEG_X to NSP**	
ISS_122SA_1X2WPXX008_PRIME		2009-342T01:24:00		000T01:00:00	2009-342T02:24:00	ISS_NAC to Saturn	NEG_X to Sun	
VIMS_122SA_GLOBDYN001_PRIME	I	2009-342T02:24:00		000T12:20:00	2009-342T14:44:00	ISS_NAC to Saturn	NEG_X to NSP	
SP_122EA_DLTURN342_PRIME	I	2009-342T14:44:00		000T00:40:00	2009-342T15:24:00	XBAND to Earth	POS_X to NEP	
SP_122EA_C70METOTP342_PRIME	C, E, N	2009-342T15:24:00		000T09:35:00	2009-343T00:59:00	XBAND to Earth	POS_X to NEP	
SP_122EA_M34HEFOTB343_PRIME	C, E, M, N	2009-343T00:59:00		000T08:25:00	2009-343T09:24:00	XBAND to Earth	POS_X to NEP	
SP_122EA_WAYPTTURN343_PRIME	M	2009-343T09:24:00		000T00:40:00	2009-343T10:04:00	XBAND to Earth	POS_X to NEP	
NEW WAYPOINT		**2009-343T10:04:00**		**002T00:46:00**	**2009-345T10:50:00**	**XBAND to Earth**	**POS_X to NEP**	
CIRS_122SA_NADIROCC001_PRIME	M	2009-343T10:04:00		000T03:00:00	2009-343T13:04:00	CIRS_FP3 to Saturn	NEG_Z to NSP	
CDA_122DR_RPX0180003_PRIME	M	2009-343T13:04:00		000T02:26:00	2009-343T15:30:00	NEG_X to 12.0/-30.2	NEG_Z to 284.9/4.9	
ISS_122EN_PLMHRMP001_PRIME	M, R	2009-343T15:30:00		000T01:54:00	2009-343T17:24:00	ISS_NAC to Enceladus	NEG_X to NSP	
SP_122EA_DEADTIME343_PRIME	**M, R**	**2009-343T17:24:00**		**000T00:20:00**	**2009-343T17:44:00**	**XBAND to Earth**	**POS_X to NEP**	
RSS_122SA_OCC001_PRIME	M	2009-343T17:44:45	LMB_E122_SATURN_RSS_OCC_1_ING-000T00:47:17	000T04:36:15	2009-343T22:21:00	XBAND to Earth	POS_X to NEP	
SP_122EA_DEADTIME443_PRIME	**M**	**2009-343T22:21:00**		**000T00:20:00**	**2009-343T22:41:00**	**XBAND to Earth**	**POS_X to NEP**	
RADAR_122SA_GLOBALMAP002_PRIME	M	2009-343T22:41:00		000T14:32:00	2009-344T13:13:00	NEG_Z to Saturn	PIC	incorporated warmup within this time to accomodate RSS pwr issues
Periapse R = 3.196 Rs, lat ...		2009-344T06:04:09		000T00:00:01	2009-344T06:04:10			
VIMS_122SA_GLOBDYN002_PRIME	I, M	2009-344T13:13:00		000T11:57:00	2009-345T01:10:00	ISS_NAC to Saturn	POS_X to NSP	
SP_122EA_M70METNON345_PRIME	C, E, M	2009-345T01:10:00		000T09:00:00	2009-345T10:10:00	XBAND to Earth	Rolling/SRU	POS_X to NEP; CRPC; rolling required

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)	NET_MARGN (%)	CAROVR (Mb)
SP_121EA_C70METOTP326_PRIME	326 16:22	327 01:22	291	1830	63	2184	3539	1355	0	478	53	2715	2676	-39	-37	0%	39
SP_121EA_C34BWGOTB327_PRIME	327 16:07	328 01:07	39	1302	62	1403	3539	2136	0	233	53	1689	673	-1017	-37	0%	1016
SP_121EA_M34BWGNON329_PRIME	329 02:08	329 11:08	1016	1327	106	2449	3539	1089	0	239	53	2741	642	-2100	-37	0%	2100
SP_121EA_M70METNON430_PRIME	330 02:08	330 05:08	2100	749	63	2913	3539	626	0	76	18	3006	1007	-2000	-37	0%	1999
SP_121EA_M34BWGNON330_PRIME	330 05:08	330 11:08	1999	0	0	1999	3539	1539	0	174	35	2208	447	-1762	-37	0%	1761
SP_121EA_G34B26NON331_PRIME	331 09:38	331 15:38	1761	1504	95	3361	3539	178	0	152	35	3548	515	-3034	-37	0%	3033
SP_121EA_C70METNON331_PRIME	331 15:38	331 18:38	3033	0	0	3033	3539	505	0	54	18	3105	992	-2114	-37	0%	2114
SP_121EA_C70METNON332_PRIME	332 15:53	333 00:53	2114	1373	90	3576	3539	-37	0	390	53	3982	3210	-772	312	2%	772
SP_121EA_M70METNON334_PRIME	334 01:53	334 10:53	772	1897	106	2775	3539	764	0	455	53	3283	3370	86	312	3%	0
SP_122EA_G34BWGNON335_PRIME	335 09:23	335 13:37	0	1714	95	1809	3539	1729	0	163	25	1998	314	-1684	384	3%	1683
SP_122EA_G34BWGNON435_PRIME	335 14:33	335 15:59	1683	38	4	1725	3539	1813	0	59	8	1793	100	-1694	384	3%	1693
SP_122EA_G34BWGNON535_PRIME	335 16:55	335 18:23	1693	38	4	1735	3539	1803	0	60	9	1804	84	-1721	384	3%	1720
SP_122EA_C70METNON336_PRIME	336 15:38	337 00:38	1720	1345	90	3155	3539	384	0	316	53	3523	3267	-257	792	4%	256
SP_122EA_M70METOTP338_PRIME	338 01:39	338 10:39	256	1767	106	2129	3539	1409	0	391	53	2573	2798	224	792	4%	0
SP_122EA_M34BWGOTB339_PRIME	339 01:39	339 10:39	0	1060	63	1123	3539	2415	0	260	53	1436	660	-777	567	3%	776
SP_122EA_G34BWGNON340_PRIME	340 09:09	340 18:09	776	1317	95	2189	3539	1350	0	216	53	2458	681	-1777	567	3%	1777
SP_122EA_C70METNON341_PRIME	341 15:24	342 00:24	1777	1076	90	2942	3539	596	0	194	53	3189	3417	228	567	3%	0
SP_122EA_C70METOTP342_PRIME	342 15:24	343 00:59	0	2244	63	2307	3539	1231	0	304	57	2668	2816	147	339	2%	0
SP_122EA_M34HEFOTB343_PRIME	343 00:59	343 09:24	0	0	0	0	3539	3539	0	499	50	549	736	186	194	1%	0
SP_122EA_M70METNON345_PRIME	345 01:10	345 10:10	0	2766	169	2935	3539	604	0	439	53	3427	3431	4	8	0%	0

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

Final Sequenced SMT and Data Volume (2 of 3)

DATA VOLUME REPORT --- TRANSFER FRAME OVERHEAD NOT INCLUDED

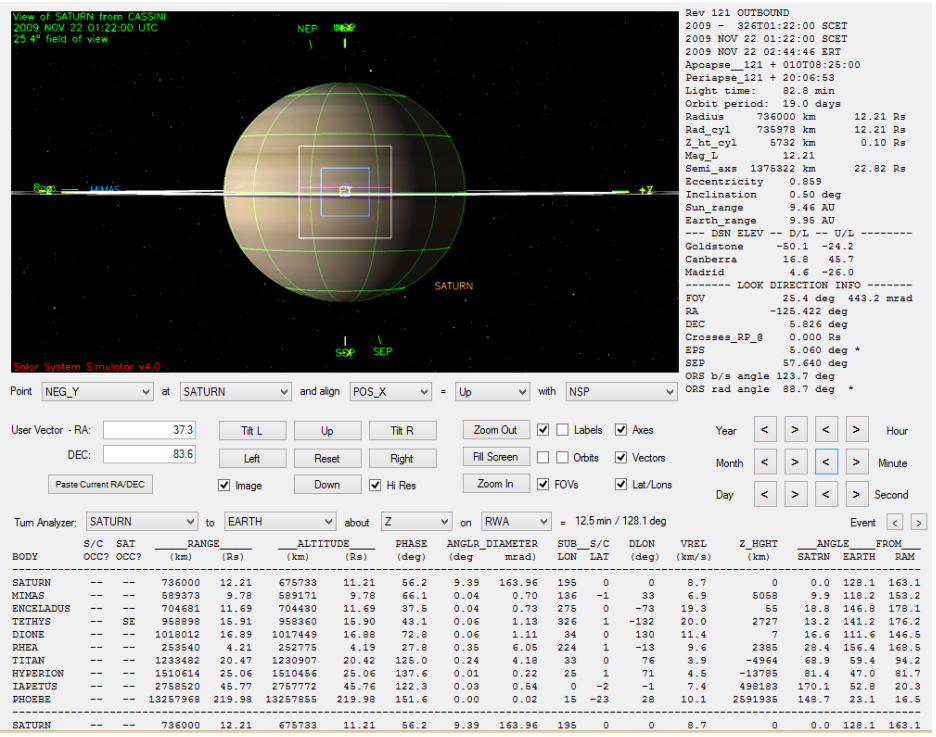
Event	Start doy hh:mm	End doy hh:mm	CAPS (Mb)	CDA (Mb)	CIRS (Mb)	INMS (Mb)	ISS (Mb)	MAG (Mb)	MIMI (Mb)	RADAR (Mb)	RPWS (Mb)	UVIS (Mb)	VIMS (Mb)	PROBE (Mb)	ENGR (Mb)	TOTAL (Mb)
OBSERVATION_NOR	326 01:22	326 16:22	216.0	136.6	18.0	5.4	473.4	53.4	64.8	0.0	391.0	4.5	450.0	0.0	62.7	1875.7
SP_121EA_C70METOTP326_PRIME	326 16:22	327 01:22	129.6	17.0	43.2	3.2	0.0	32.0	38.9	0.0	204.5	4.9	0.0	0.0	0.0	473.4
DAILY TOTAL SCIENCE	326 01:22	327 01:22	345.6	153.5	61.2	8.6	473.4	85.4	103.7	0.0	595.5	9.5	450.0	0.0	62.7	
OBSERVATION_NOR	327 01:22	327 16:07	212.4	27.8	0.0	5.3	439.1	52.5	63.7	0.0	335.2	54.3	100.0	0.0	61.6	1351.9
SP_121EA_C34BWGOTB327_PRIME	327 16:07	328 01:07	75.0	17.0	0.0	3.2	0.0	32.0	30.7	0.0	68.0	4.9	0.0	0.0	0.0	230.8
DAILY TOTAL SCIENCE	327 01:22	328 01:07	287.4	44.8	0.0	8.6	439.1	84.5	94.4	0.0	403.1	59.3	100.0	0.0	61.6	
OBSERVATION_NOR	328 01:07	329 02:08	180.1	47.2	0.0	9.0	685.9	89.0	81.1	0.0	118.0	0.0	105.0	0.0	104.6	1419.7
SP_121EA_M34BWGNON329_PRIME	329 02:08	329 11:08	64.8	17.0	43.2	3.2	0.0	32.0	29.2	0.0	42.4	4.9	0.0	0.0	0.0	236.8
DAILY TOTAL SCIENCE	328 01:07	329 11:08	244.9	64.2	43.2	12.2	685.9	121.0	110.2	0.0	160.4	4.9	105.0	0.0	104.6	
OBSERVATION_NOR	329 11:08	330 02:08	98.3	28.3	62.4	5.4	103.1	53.4	48.6	0.0	70.7	72.5	200.0	0.0	62.7	805.3
SP_121EA_M70METNON430_PRIME	330 02:08	330 05:08	10.8	5.7	21.6	1.1	0.0	10.7	9.7	0.0	14.1	1.6	0.0	0.0	0.0	75.3
SP_121EA_M34BWGNON330_PRIME	330 05:08	330 11:08	21.6	11.3	64.8	2.2	0.0	21.3	19.4	0.0	28.3	3.3	0.0	0.0	0.0	172.2
DAILY TOTAL SCIENCE	329 11:08	330 11:08	130.7	45.3	148.8	8.6	103.1	85.4	77.8	0.0	113.2	77.4	200.0	0.0	62.7	
OBSERVATION_NOR	330 11:08	331 09:38	81.0	42.4	57.6	8.1	668.9	80.0	72.9	0.0	106.1	61.3	312.0	0.0	94.0	1584.4
SP_121EA_G34B26NON331_PRIME	331 09:38	331 15:38	21.6	11.3	43.2	2.2	0.0	21.3	19.4	0.0	28.3	3.3	0.0	0.0	0.0	150.6
SP_121EA_C70METNON331_PRIME	331 15:38	331 18:38	10.8	5.7	0.0	1.1	0.0	10.7	9.7	0.0	14.1	1.6	0.0	0.0	0.0	53.7
DAILY TOTAL SCIENCE	330 11:08	331 18:38	113.4	59.4	100.8	11.3	668.9	112.0	102.1	0.0	148.6	66.2	312.0	0.0	94.0	
OBSERVATION_NOR	331 18:38	332 15:53	76.5	40.1	75.6	7.7	536.1	75.6	68.8	0.0	100.2	4.5	375.0	0.0	88.8	1448.9
SP_121EA_C70METNON332_PRIME	332 15:53	333 00:53	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	331 18:38	333 00:53	108.9	57.1	162.0	10.9	536.1	107.6	107.7	0.0	272.3	9.5	375.0	0.0	88.8	
OBSERVATION_NOR	333 00:53	334 01:53	180.0	47.2	18.0	29.1	516.1	177.8	108.0	0.0	603.0	50.7	150.0	0.0	104.5	1984.4
SP_121EA_M70METNON334_PRIME	334 01:53	334 10:53	64.8	17.0	86.4	3.2	0.0	64.0	38.9	0.0	172.0	4.9	0.0	0.0	0.0	451.3
DAILY TOTAL SCIENCE	333 00:53	334 10:53	244.8	64.1	104.4	32.4	516.1	241.9	146.9	0.0	775.0	55.7	150.0	0.0	104.5	
OBSERVATION_NOR	334 10:53	335 09:23	111.6	42.4	73.6	8.1	493.7	80.0	97.2	0.0	375.9	46.2	370.0	0.0	94.0	1792.7
SP_122EA_G34BWGNON335_PRIME	335 09:23	335 13:37	15.2	8.0	34.9	1.5	0.0	15.1	18.3	0.0	66.4	2.3	0.0	0.0	0.0	161.7
DAILY TOTAL SCIENCE	334 10:53	335 13:37	126.8	50.4	108.5	9.6	493.7	95.1	115.5	0.0	442.3	48.5	370.0	0.0	94.0	
OBSERVATION_NOR	335 13:37	335 14:33	3.4	1.8	10.1	0.3	0.0	3.3	4.0	0.0	14.6	0.5	0.0	0.0	3.9	41.9
SP_122EA_G34BWGNON435_PRIME	335 14:33	335 15:59	5.2	2.7	15.5	0.5	0.0	5.1	6.2	0.0	22.5	0.8	0.0	0.0	0.0	58.4
DAILY TOTAL SCIENCE	335 13:37	335 15:59	8.5	4.5	25.6	0.9	0.0	8.4	10.2	0.0	37.1	1.3	0.0	0.0	3.9	
OBSERVATION_NOR	335 15:59	335 16:55	3.4	1.8	10.1	0.3	0.0	3.3	4.0	0.0	14.6	0.5	0.0	0.0	3.9	41.9
SP_122EA_G34BWGNON535_PRIME	335 16:55	335 18:23	5.3	2.8	15.8	0.5	0.0	5.2	6.3	0.0	23.0	0.8	0.0	0.0	0.0	59.8
DAILY TOTAL SCIENCE	335 15:59	335 18:23	8.6	4.5	25.9	0.9	0.0	8.5	10.4	0.0	37.6	1.3	0.0	0.0	3.9	

Final Sequenced SMT and Data Volume (3 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	335 18:23	336 15:38	76.5	40.1	113.8	7.7	203.1	75.6	91.8	0.0	333.3	40.8	350.0	0.0	88.8	1421.3
SP_122EA_C70METNON336_PRIME	336 15:38	337 00:38	32.4	17.0	43.2	3.2	0.0	32.0	38.9	0.0	141.1	4.9	0.0	0.0	0.0	312.8
DAILY TOTAL SCIENCE	335 18:23	337 00:38	108.9	57.1	157.0	10.9	203.1	107.6	130.7	0.0	474.4	45.7	350.0	0.0	88.8	
OBSERVATION_NOR	337 00:38	338 01:39	90.1	47.2	326.6	9.0	103.1	94.8	108.1	0.0	392.3	0.0	580.0	0.0	104.6	1855.8
SP_122EA_M70METOTP338_PRIME	338 01:39	338 10:39	32.4	17.0	86.4	3.2	0.0	64.0	38.9	0.0	140.6	4.9	0.0	0.0	0.0	387.5
DAILY TOTAL SCIENCE	337 00:38	338 10:39	122.5	64.2	413.0	12.2	103.1	158.9	147.0	0.0	532.9	4.9	580.0	0.0	104.6	
OBSERVATION_NOR	338 10:39	339 01:39	54.0	28.3	115.2	5.4	263.1	106.7	64.8	0.0	70.7	27.2	315.0	0.0	62.7	1113.1
SP_122EA_M34BWGOTB339_PRIME	339 01:39	339 10:39	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	338 10:39	339 10:39	86.4	45.3	201.6	8.6	263.1	138.7	103.7	0.0	113.2	32.1	315.0	0.0	62.7	
OBSERVATION_NOR	339 10:39	340 09:09	102.6	42.4	225.6	8.1	246.1	80.0	97.2	0.0	106.1	27.2	370.0	0.0	94.0	1399.4
SP_122EA_G34BWGNON340_PRIME	340 09:09	340 18:09	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	339 10:39	340 18:09	135.0	59.4	268.8	11.3	246.1	112.0	136.1	0.0	148.6	32.1	370.0	0.0	94.0	
OBSERVATION_NOR	340 18:09	341 15:24	98.1	40.1	0.0	7.7	463.1	70.8	88.1	0.0	100.2	0.0	198.0	0.0	88.8	1154.8
SP_122EA_C70METNON341_PRIME	341 15:24	342 00:24	32.4	17.0	43.2	3.2	0.0	19.4	29.2	0.0	42.4	4.9	0.0	0.0	0.0	191.8
DAILY TOTAL SCIENCE	340 18:09	342 00:24	130.5	57.1	43.2	10.9	463.1	90.2	117.2	0.0	142.7	4.9	198.0	0.0	88.8	
OBSERVATION_NOR	342 00:24	342 15:24	422.6	28.3	0.0	35.6	374.3	106.7	48.6	0.0	632.3	0.0	575.0	0.0	62.7	2286.1
SP_122EA_C70METOTP342_PRIME	342 15:24	343 00:59	34.5	27.5	86.4	3.5	0.0	68.2	31.0	0.0	45.2	5.3	0.0	0.0	0.0	301.6
SP_122EA_M34HEFOTB343_PRIME	343 00:59	343 09:24	53.8	127.0	40.7	3.0	0.0	27.3	34.3	0.0	204.1	4.6	0.0	0.0	0.0	494.9
DAILY TOTAL SCIENCE	342 00:24	343 09:24	511.0	182.9	127.1	42.1	374.3	202.2	114.0	0.0	881.6	9.9	575.0	0.0	62.7	
OBSERVATION_NOR	343 09:24	345 01:10	392.3	399.4	43.2	24.4	238.8	141.4	128.8	190.9	681.3	0.0	500.0	0.0	166.2	2906.8
SP_122EA_M70METNON345_PRIME	345 01:10	345 10:10	72.4	135.8	86.4	3.2	0.0	32.0	29.2	0.0	70.8	4.9	0.0	0.0	0.0	434.7
DAILY TOTAL SCIENCE	343 09:24	345 10:10	464.6	535.2	129.6	27.6	238.8	173.5	158.0	190.9	752.1	4.9	500.0	0.0	166.2	

Segment Geometry (1 of 2)

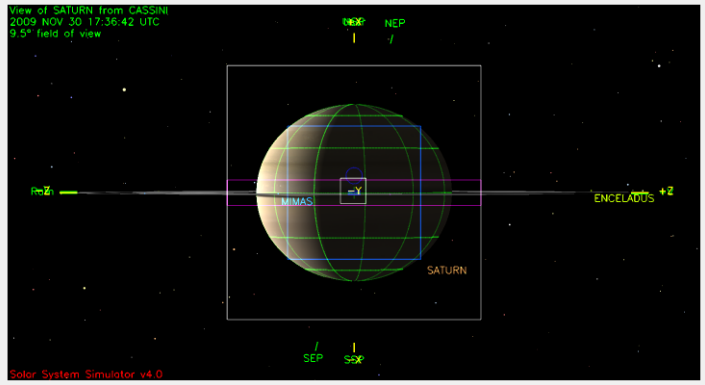



```
Rev 121 OUTBOUND
2009 -  326T01:22:00 SCET
2009 NOV 22 01:22:00 SCET
2009 NOV 22 02:44:46 ERT
Apoapse__121 + 010T08:25:00
Periapse_121 + 20:06:53
Light time:    82.8 min
Orbit period:  19.0 days
Radius      736000 km      12.21 Rs
Rad_cyl     735978 km      12.21 Rs
Z_ht_cyl      5732 km       0.10 Rs
Mag_L           12.21
Semi_axs   1375322 km      22.82 Rs
Eccentricity    0.859
Inclination     0.50 deg
Sun_range       9.46 AU
Earth_range     9.95 AU
--- DSN ELEV -- D/L -- U/L --------
Goldstone     -50.1  -24.2
Canberra       16.8   45.7
Madrid          4.6  -26.0
------- LOOK DIRECTION INFO -------
FOV            25.4 deg  443.2 mrad
RA           -125.422 deg
DEC             5.826 deg
Crosses_RP_@    0.000 Rs
EPS             5.060 deg *
SEP            57.640 deg
ORS b/s angle 123.7 deg
ORS rad angle  88.7 deg  *
```

BODY	S/C OCC?	SAT OCC?	RANGE (km)	RANGE (Rs)	ALTITUDE (km)	ALTITUDE (Rs)	PHASE (deg)	ANGLR_DIAMETER (deg)	ANGLR_DIAMETER (mrad)	SUB_S/C LON	SUB_S/C LAT	DLON (deg)	VREL (km/s)	Z_HGHT (km)	ANGLE FROM SATRN	ANGLE FROM EARTH	ANGLE FROM RAM
SATURN	--	--	736000	12.21	675733	11.21	56.2	9.39	163.96	195	0	0	8.7	0	0.0	128.1	163.1
MIMAS	--	--	589373	9.78	589171	9.78	66.1	0.04	0.70	136	-1	33	6.9	5058	9.9	118.2	153.2
ENCELADUS	--	--	704681	11.69	704430	11.69	37.5	0.04	0.73	275	0	-73	19.3	55	18.8	146.8	178.1
TETHYS	--	SE	958898	15.91	958360	15.90	43.1	0.06	1.13	326	1	-132	20.0	2727	13.2	141.2	176.2
DIONE	--	--	1018012	16.89	1017449	16.88	72.8	0.06	1.11	34	0	130	11.4	7	16.6	111.6	146.5
RHEA	--	--	253540	4.21	252775	4.19	27.8	0.35	6.05	224	1	-13	9.6	2385	28.4	156.4	168.5
TITAN	--	--	1233482	20.47	1230907	20.42	125.0	0.24	4.18	33	0	76	3.9	-4964	68.9	59.4	94.2
HYPERION	--	--	1510614	25.06	1510456	25.06	137.6	0.01	0.22	25	1	71	4.5	-13785	81.4	47.0	81.7
IAPETUS	--	--	2758520	45.77	2757772	45.76	122.3	0.03	0.54	0	-2	-1	7.4	498183	170.1	52.8	20.3
PHOEBE	--	--	13257968	219.98	13257855	219.98	151.6	0.00	0.02	15	-23	28	10.1	2591935	148.7	23.1	16.5
SATURN	--	--	736000	12.21	675733	11.21	56.2	9.39	163.96	195	0	0	8.7	0	0.0	128.1	163.1

Seg Start (Left)

Apoapse(below)

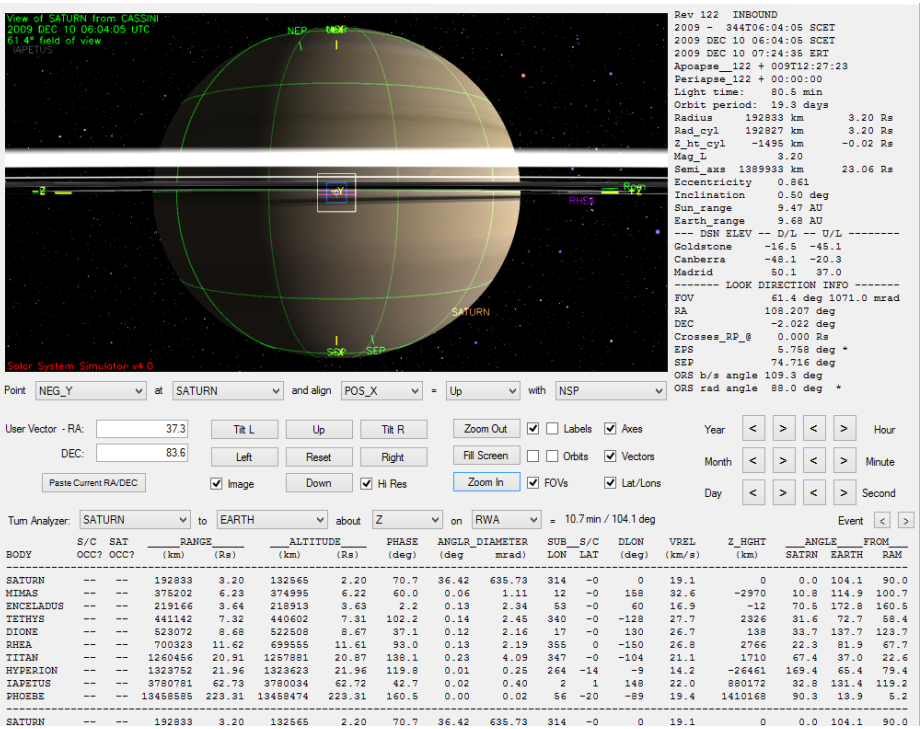



```
Rev 122  INBOUND
2009 -  334T17:36:42 SCET
2009 NOV 30 17:36:42 SCET
2009 NOV 30 18:58:28 ERT
Apoapse__122 + 00:00:00
Periapse_122 - 009T12:27:23
Light time:    81.8 min
Orbit period:  19.0 days
Radius     2556782 km      42.42 Rs
Rad_cyl    2556705 km      42.42 Rs
Z_ht_cyl     19879 km       0.33 Rs
Mag_L           42.43
Semi_axs   1375116 km      22.82 Rs
Eccentricity    0.859
Inclination     0.50 deg
Sun_range       9.47 AU
Earth_range     9.83 AU
--- DSN ELEV -- D/L -- U/L --------
Goldstone      29.2   53.3
Canberra       37.9    6.7
Madrid        -47.0  -25.7
------- LOOK DIRECTION INFO -------
FOV             9.5 deg  166.6 mrad
RA           -71.934 deg
DEC             2.036 deg
Crosses_RP_@    0.000 Rs
EPS             5.449 deg *
SEP            65.792 deg
ORS b/s angle  70.5 deg
ORS rad angle  88.1 deg  *
```

BODY	S/C OCC?	SAT OCC?	RANGE (km)	RANGE (Rs)	ALTITUDE (km)	ALTITUDE (Rs)	PHASE (deg)	ANGLR_DIAMETER (deg	ANGLR_DIAMETER mrad)	SUB_S/C LON	SUB_S/C LAT	DLON (deg)	VREL (km/s)	Z_HGHT (km)	ANGLE FROM SATRN	ANGLE FROM EARTH	ANGLE FROM RAM
SATURN	--	--	2556782	42.42	2496515	41.42	109.4	2.70	47.15	336	0	0	1.4	0	0.0	75.3	90.0
MIMAS	--	--	2373454	39.38	2373247	39.38	110.5	0.01	0.17	166	0	13	12.7	854	1.0	74.3	89.0
ENCELADUS	--	--	2742060	45.50	2741805	45.49	106.2	0.01	0.19	326	0	-139	13.7	-26	3.3	78.6	93.3
TETHYS	--	--	2455217	40.74	2454685	40.73	115.8	0.03	0.44	107	-0	67	10.9	716	6.3	69.0	83.7
DIONE	--	--	2772110	46.00	2771548	45.99	116.1	0.02	0.41	52	0	121	10.9	-150	6.7	68.7	83.3
RHEA	--	--	2416558	40.10	2415796	40.08	121.2	0.04	0.63	102	0	69	8.1	1008	11.7	63.6	78.3
TITAN	--	--	2342806	38.87	2340231	38.83	80.2	0.13	2.20	274	0	-66	5.0	3471	29.3	104.5	119.3
HYPERION	--	--	1201334	19.93	1201200	19.93	95.4	0.02	0.27	312	-36	-12	3.9	24539	14.1	89.3	104.1
IAPETUS	--	--	1389783	23.06	1389043	23.05	107.9	0.06	1.08	23	-28	12	1.9	908962	125.4	66.8	59.4
PHOEBE	--	--	13752140	228.18	13752027	228.18	165.5	0.00	0.02	194	-23	86	2.1	2037607	83.3	8.9	11.0
SATURN	--	--	2556782	42.42	2496515	41.42	109.4	2.70	47.15	336	0	0	1.4	0	0.0	75.3	90.0

	Saturn Range	Phase Angle	Sub-S/C Lat.
Segment Start	12.21	56.2	0
Apoapse	42.42	109.4	0
Periapse	3.20	70.7	0
Segment End	15.38	64.9	0

Segment Geometry (2 of 2)

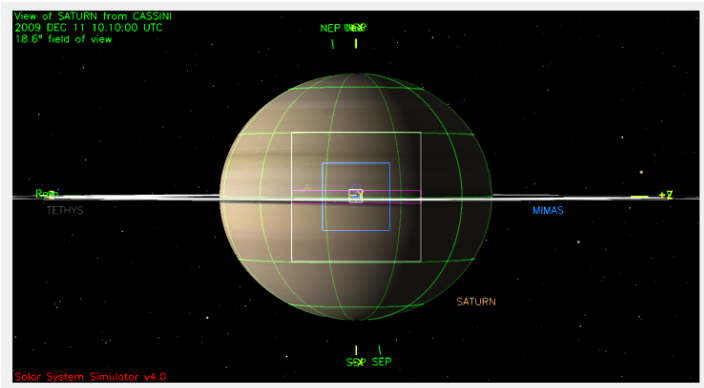



```
Rev 122  INBOUND
2009 -  344T06:04:05 SCET
2009 DEC 10 06:04:05 SCET
2009 DEC 10 07:24:35 ERT
Apoapse__122 + 009T12:27:23
Periapse_122 + 00:00:00
Light time:    80.5 min
Orbit period:  19.3 days
Radius      192833 km       3.20 Rs
Rad_cyl     192827 km       3.20 Rs
Z_ht_cyl     -1495 km      -0.02 Rs
Mag_L            3.20
Semi_axs   1389933 km      23.06 Rs
Eccentricity    0.861
Inclination     0.50 deg
Sun_range       9.47 AU
Earth_range     9.68 AU
--- DSN ELEV -- D/L -- U/L --------
Goldstone     -16.5  -45.1
Canberra      -48.1  -20.3
Madrid         50.1   37.0
------- LOOK DIRECTION INFO -------
FOV            61.4 deg 1071.0 mrad
RA            108.207 deg
DEC            -2.022 deg
Crosses_RP_@    0.000 Rs
EPS             5.758 deg *
SEP            74.716 deg
ORS b/s angle 109.3 deg
ORS rad angle  88.0 deg  *
```

BODY	S/C OCC?	SAT OCC?	RANGE (km)	RANGE (Rs)	ALTITUDE (km)	ALTITUDE (Rs)	PHASE (deg)	ANGLR_DIAMETER (deg	ANGLR_DIAMETER mrad)	SUB_S/C LON	SUB_S/C LAT	DLON (deg)	VREL (km/s)	Z_HGHT (km)	ANGLE_FROM SATRN	ANGLE_FROM EARTH	ANGLE_FROM RAM
SATURN	--	--	192833	3.20	132565	2.20	70.7	36.42	635.73	314	-0	0	19.1	0	0.0	104.1	90.0
MIMAS	--	--	375202	6.23	374995	6.22	60.0	0.06	1.11	12	-0	158	32.6	-2970	10.8	114.9	100.7
ENCELADUS	--	--	219166	3.64	218913	3.63	2.2	0.13	2.34	53	-0	60	16.9	-12	70.5	172.8	160.5
TETHYS	--	--	441142	7.32	440602	7.31	102.2	0.14	2.45	340	-0	-128	27.7	2326	31.6	72.7	58.4
DIONE	--	--	523072	8.68	522508	8.67	37.1	0.12	2.16	17	-0	130	26.7	138	33.7	137.7	123.7
RHEA	--	--	700323	11.62	699555	11.61	93.0	0.13	2.19	355	0	-150	26.8	2766	22.3	81.9	67.7
TITAN	--	--	1260456	20.91	1257881	20.87	138.1	0.23	4.09	347	-0	-104	21.1	1710	67.4	37.0	22.6
HYPERION	--	--	1323752	21.96	1323623	21.96	119.8	0.01	0.25	264	-14	-9	14.2	-26461	169.4	65.4	79.4
IAPETUS	--	--	3780781	62.73	3780034	62.72	42.7	0.02	0.40	2	1	148	22.0	880172	32.8	131.4	119.2
PHOEBE	--	--	13458585	223.31	13458474	223.31	160.5	0.00	0.02	56	-20	-89	19.4	1410168	90.3	13.9	5.2
SATURN	--	--	192833	3.20	132565	2.20	70.7	36.42	635.73	314	-0	0	19.1	0	0.0	104.1	90.0

Periapse (Left)

Seg End (below)

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Rev 122 OUTBOUND
2009 -  345T10:10:00 SCET
2009 DEC 11 10:10:00 SCET
2009 DEC 11 11:30:20 ERT
Apoapse__122 + 010T16:33:18
Periapse_122 + 001T04:05:55
Light time:    80.3 min
Orbit period:  19.1 days
Radius      926683 km      15.38 Rs
Rad_cyl     926651 km      15.38 Rs
Z_ht_cyl     7730 km        0.13 Rs
Mag_L           15.38
Semi_axs   1375764 km      22.83 Rs
Eccentricity    0.860
Inclination     0.50 deg
Sun_range       9.47 AU
Earth_range     9.66 AU
--- DSN ELEV -- D/L -- U/L --------
Goldstone      33.2    1.5
Canberra      -40.6   -55.1
Madrid         19.6   44.5
------- LOOK DIRECTION INFO -------
FOV            18.6 deg  324.7 mrad
RA           -116.179 deg
DEC             5.464 deg
Crosses_RP_@    0.000 Rs
EPS             5.790 deg *
SEP            75.871 deg
ORS b/s angle 115.1 deg
ORS rad angle  88.3 deg  *
```

BODY	S/C OCC?	SAT OCC?	RANGE (km)	RANGE (Rs)	ALTITUDE (km)	ALTITUDE (Rs)	PHASE (deg)	ANGLR_DIAMETER (deg	ANGLR_DIAMETER mrad)	SUB_S/C LON	SUB_S/C LAT	DLON (deg)	VREL (km/s)	Z_HGHT (km)	ANGLE_FROM SATRN	ANGLE_FROM EARTH	ANGLE_FROM RAM
SATURN	--	--	926683	15.38	866416	14.38	64.9	7.46	130.16	48	0	0	7.4	0	0.0	120.2	158.7
MIMAS	--	--	1093049	18.14	1092843	18.13	60.1	0.02	0.38	339	-0	-151	21.0	-4339	4.7	124.9	163.4
ENCELADUS	--	SE	1040551	17.27	1040297	17.26	52.6	0.03	0.49	308	0	-112	19.9	35	12.2	132.3	170.9
TETHYS	--	--	1177664	19.54	1177126	19.53	79.3	0.05	0.92	28	1	144	13.2	-5208	8.5	111.7	150.2
DIONE	--	--	1119461	18.57	1118899	18.57	83.1	0.06	1.01	51	0	111	8.3	-78	18.3	102.0	140.4
RHEA	--	--	1194622	19.82	1193858	19.81	39.9	0.07	1.28	315	0	-107	15.7	1671	24.9	145.0	176.3
TITAN	--	--	299450	4.97	296875	4.93	133.5	0.99	17.20	9	0	4	5.8	5004	161.5	41.6	3.0
HYPERION	--	--	2032382	33.72	2032225	33.72	111.2	0.01	0.16	353	-22	108	6.0	-23312	46.4	74.0	112.3
IAPETUS	--	--	3612655	59.94	3611907	59.93	23.7	0.02	0.41	346	-2	-82	9.9	841426	83.6	150.6	117.1
PHOEBE	--	--	12825483	212.81	12825373	212.81	164.9	0.00	0.02	71	-20	47	8.9	1331857	129.3	9.4	29.6
SATURN	--	--	926683	15.38	866416	14.38	64.9	7.46	130.16	48	0	0	7.4	0	0.0	120.2	158.7

Solar Geometry – ORS Boresight Concerns

- ISS_NAC to Saturn is not safe for the majority of the inbound portion of the periapse period.
  - Solar Occultation occurs from to 343T16:18:54.09 to 343T20:41:16.27.
  - Secondaries, such as NEG_X to Sun, NEG_Z to Sun, -/+ X to NSP all became safe around 343T22:15. This is toward the end of the RSS outbound occultation.
  - NEG_Y to Saturn is not safe here because of violations to ORS-to-Sun Boresight flight rules.
    - The operational limit of 15° from Sun angle is reached at 343T11:40, and does not come back up above that limit until 343T22:15.
    - The health and safety limit of 12° from Sun angle is reached at 343T13:25, and does not come back up above that limit until 343T21:40.

Daily Science Highlights (1 of 2)

DOY 326: The first day of the Saturn 121_122 segment began with the spacecraft taking images for optical navigation. VIMS spent some time looking at Saturn's north hemispheric dynamics and CAPS got some "prime time" during the dusk magnetosphere MAPS campaign. The ORS teams also took a look at Titan as part of their ongoing cloud monitoring campaign.

DOY 327: ISS took WAC images of Saturn for photopolarimetry and spent some time looking for lightning. ISS continued to watch the transit of Pandora across Epimetheus for orbit determination purposes. UVIS looked at Enceladus to map volatiles in the system in the immediate neighborhood in order to test the connection of volatile changes to plume eruptions. CAPS got some "prime time" during the dusk magnetosphere MAPS campaign and ISS looked at small satellites as part of their ongoing satellite orbit campaign.

DOY 328: ISS took WAC images of Saturn for photopolarimetry and spent some time looking for lightning. Additionally, ISS observed the transits of Epimetheus across Rhea and then Janus across Rhea for orbit determination purposes. The MAPS teams returned to their magnetospheric boundaries campaign with CAPS getting prime pointing coverage. However, the bulk of the day was spent looking at the rings by VIMS and ISS as they performed an E/G Ring phase observation.

DOY 329: ISS looked at small satellites as part of their ongoing satellite orbit campaign and some images were taken for optical navigation. ISS took WAC images of Saturn for photopolarimetry. UVIS looked at Enceladus to map volatiles in the system in the immediate neighborhood in order to test the connection of volatile changes to plume eruptions. CIRS spent the largest proportion of the day, measuring oxygen compounds (H2O, CO2) in Saturn's stratosphere as a function of latitude. Meanwhile, the MAPS teams continued their magnetospheric boundaries campaign.

DOY 330: ISS observations comprised most of this day. Images were taken of Iapetus, Saturn WAC photopolarimetry, Rhea, small satellites as part of the ongoing satellite orbit campaign, Saturn lightning searches, and transits of Rhea across Tethys and then Titan across Tethys for orbit determination purposes. The MAPS teams performed their magnetospheric boundaries and solar wind-aurora campaigns. CIRS began an observation that measured oxygen compounds (H2O, CO2) in Saturn's stratosphere as a function of latitude that carried into the next day.

DOY 331: ISS imaged small satellites as part of the ongoing satellite orbit campaign, followed by Saturn WAC photopolarimetry and lightning searches. Additionally, the transit of Titan across Mimas was observed and images were taken for the purpose of optical navigation. The ORS teams conducted a Titan cloud monitoring observation and CIRS again performed an observation that measured oxygen compounds (H2O, CO2) in Saturn's stratosphere. The MAPS teams continued their magnetospheric boundaries and solar wind-aurora campaigns.

DOY 332: ISS occupied the whole day looking for lightning on Saturn, taking WAC photopolarimetry images, looking at small satellites as part of the ongoing satellite orbit campaign, and observing the transit of Dione across Tethys for orbit determination purposes. The MAPS teams continued their magnetospheric boundaries and solar wind-aurora campaigns.

DOY 333: The ORS instruments looked at Titan as part of their cloud monitoring campaign. ISS spent the rest of the day looking at Iapetus, taking Saturn WAC photopolarimetry images, and conducting a low resolution, low elevation, high-phase observation of the E-ring. The MAPS teams continued their magnetospheric boundaries and solar wind-aurora campaigns.

Daily Science Highlights (2 of 2)

DOY 334:As Cassini flew through apoapse, the ORS instruments looked at Titan as part of their cloud monitoring campaign. ISS spent the rest of the day looking at Iapetus, taking Saturn WAC photopolarimetry images, and looking for lightning on Saturn. Additionally, ISS performed long exposures to search for aurorae and lightning on Titan in eclipse. The MAPS teams continued their solar wind-aurora campaign.

DOY 335: ISS observed Iapetus again and watched the transit of Rhea across Enceladus for orbit determination purposes. The MAPS teams continued their solar wind-aurora campaign.

DOY 336: CIRS spent the bulk of the day conducting an observation that measured oxygen compounds (H2O, CO2) in Saturn's stratosphere as a function of latitude. ISS also took more WAC photopolarimetry images and the MAPS teams continued their solar wind-aurora campaign.

DOY 337: Other than a small ISS WAC Saturn photopolarimetry observation, this whole day was dedicated to CIRS Mid-IR mapping of Saturn to determine upper troposphere and tropopause temperature with spatial resolution of about two degrees of latitude and longitude. Meanwhile, the MAPS teams continued their solar wind-aurora campaign.

DOY 338: In addition to more CIRS Saturn measurements to examine oxygen compounds in the stratosphere, ISS was snapping pictures of Iapetus, performing more WAC photopolarimetry, and searching for lightning on Saturn. Meanwhile, the MAPS teams continued their solar wind-aurora campaign.

DOY 339: ISS took more Saturn WAC photopolarimetry and images of Iapetus. The search for Saturn lightning also continued. CAPS got some "prime time" during the MAPS magnetospheric boundaries campaign. However, most of the day was spent by a CIRS Mid-IR mapping observation of Saturn.

DOY 340: ISS continued to perform WAC photopolarimetry and VIMS, with ISS, perform another E/G Ring phase observation. The MAPS teams continued their magnetospheric boundaries campaign.

DOY 341: ISS looked for lightning on Saturn and CAPS got some "prime time" during the MAPS magnetospheric boundaries campaign.

DOY 342: Images were taken for optical navigation and ISS took more WAC photopolarimetry images. VIMS spent most of the day looking at Saturn global dynamics, with ISS, as the spacecraft drew closer to the planet.

DOY 343: Inbound to periapse, things got very busy on the spacecraft. CIRS measured helium abundance at the RSS egress occultation point. CDA took advantage of some rare "prime time" in the timeline to observe the ring plane crossing. ISS conducted an Enceladus plume observation during a time when it is not safe to point the camera at Saturn due to the unique position of the Sun, relative to Cassini. RSS then performed a radio occultation of Saturn's ionosphere and atmosphere, to measure vertical profiles of electron density in the ionosphere, and of density, pressure, and temperature in the neutral atmosphere. X, S, and Ka bands were used. Meanwhile, the MAPS teams were conducting their satellites and rings interactions campaign to observe the interaction between the magnetospheric hot ion and electron distributions, rings, and icy satellites.

DOY 344: At periapse, RADAR took over and spent time mapping Saturn's equatorial region at close range in collaboration with VIMS, who took over afterwards to look at global dynamics. These observations, along with the RSS occultation, were very high priority science for the Saturn Working Group. Meanwhile, the MAPS teams were conducting their satellites and rings interactions campaign to observe the interaction between the magnetospheric hot ion and electron distributions, rings, and icy satellites.

Segment Integration Planning

Timeline Gaps and Suggested Observations (1 of 3)

Saturn_121 Outbound

Request	Riders	Start (SCET)	Start (Epoch)	Duration	End (SCET)	Primary	Secondary	Comments
Sequence S55, length = 39 days		2009-317T19:21:00		039T04:05:00	2009-356T23:26:00			
SATURN_121_122 Segment		2009-326T01:22:00		019T08:48:00	2009-345T10:10:00			
SP_121SA_WAYPTTURN326_PRIME		2009-326T01:22:00		000T00:40:00	2009-326T02:02:00	ISS_NAC to Saturn	TBD	
VIMS_121SA_NHEMDYN001_PRIME		2009-326T02:02:00		000T15:00:00	2009-326T14:02:00	ISS_NAC to Saturn	NEG_X to NSP	
Gap				000T01:05:00				
ISS_121TI_M150R2HZ326_PRIME		2009-326T13:52:00	E121_M150R2HZ326+000T00:00	000T01:15:00	2009-326T15:07:00	ISS_NAC to Titan	NEG_X to Sun	
NAV_121SK_OPNAV261_PRIME		2009-326T15:07:00		000T01:14:00	2009-326T16:21:00	ISS_NAC to Satellites	POS_Z to NSP	
NAV_121EA_DLTURN261_PRIME		2009-326T16:21:00		000T00:01:00	2009-326T16:22:00	XBAND to Earth	POS_X to NSP	
SP_121EA_C34HEFOTP326_PRIME		2009-326T16:22:00		000T09:00:00	2009-327T01:22:00	XBAND to Earth	4_Hr_Rolling	NEG_X to NSP; CAPS

Rev 121-122 Statistics

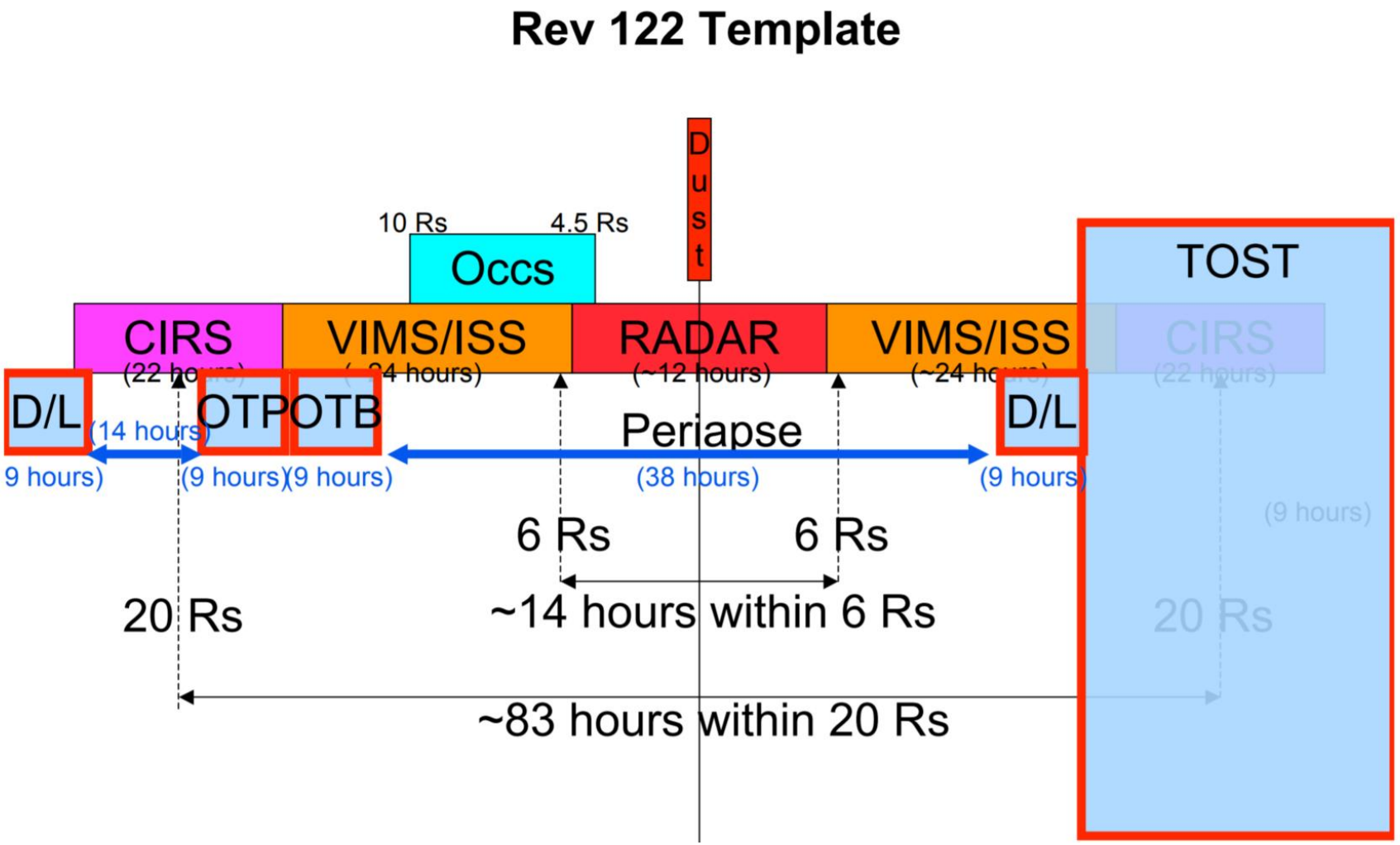
- Hybrid ORS Saturn Observing & UVIS System Scan Flavor

Saturn Rev 121_122 (pseudo-xd portion) Strawman Statistics

2009-327T01:22:00 --> 2009-342T00:24:00

	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											
SU_DUSKPTG	1	000T02:00:00		000T02:00:00	1	000T02:00:00		000T02:00:00	100%	100.00%	
SA_MAGBNDPTG	2	000T02:00:00		000T04:00:00	1	000T02:00:00		000T02:00:00	50%	50.00%	
SU_SWAURPTG	1	009T12:15:00		009T12:15:00	0				0%	0.00%	Tried to work mutiple 2 hr blocks of this into other pxd segments.
SA_SURVEYPTG	3	000T02:00:00		000T06:00:00	2	000T02:00:00		000T02:00:00	67%	33.33%	
CIRS											
SA_COMPSIT	3	000T10:00:00	000T21:10:00	001T17:10:00	3	000T08:50:00	000T15:48:00	001T16:18:00	100%	97.89%	
SA_MIRMAP	2	000T22:00:00		001T20:00:00	1	000T22:41:00		000T22:41:00	50%	51.55%	
ISS											
MUTUALEVE	22	000T00:40:00	000T01:55:00	000T19:11:00	8	000T00:42:00	000T01:07:00	000T07:05:00	36%	36.92%	Conflicts with each other and downlinks.
IA_IAPETUS	10	000T01:30:00		000T15:00:00	4	000T01:30:00	000T01:48:00	000T06:18:00	40%	42.00%	
OT_OUTERSATS	2	000T03:00:00		000T06:00:00	2	000T01:07:00	000T03:00:00	000T04:07:00	100%	68.61%	
OT_SATELLORB	14	000T00:30:00		000T07:00:00	5	000T00:30:00		000T02:30:00	36%	35.71%	
RE_LRLEMP	1	001T01:00:00		001T01:00:00	1	000T19:25:00		000T19:25:00	100%	77.67%	
RH_PHOTOOP	1	000T01:35:00		000T01:35:00	1	000T01:35:00		000T01:35:00	100%	100.00%	
TE_PHOTOOP	1	000T01:25:00		000T01:25:00	0				0%	0.00%	Conflict with downlink.
SA_1X2WPXX	15	000T01:00:00		000T15:00:00	14	000T01:00:00		000T14:00:00	93%	93.33%	
SA_NALGTNG	8	000T14:45:00	001T01:01:00	006T23:16:00	9	000T00:50:00	000T07:37:00	001T12:03:00	113%	21.55%	
TI_CLD_MONTIOR	4	000T01:15:00		000T05:00:00	4	000T01:15:00		000T05:00:00	100%	100.00%	
TI_ECLIPSE	1	000T04:00:00		000T04:00:00	1	000T04:00:00		000T04:00:00	100%	100.00%	
UVIS											
EN_ICYATM	2	000T04:00:00		000T08:00:00	2	000T03:50:00	000T04:00:00	000T07:50:00	100%	97.92%	
SA_MOS121APO	10	000T08:00:00		003T08:00:00	4	000T08:00:00		001T08:00:00	40%	40.00%	
VIMS											
RI_EG80PHASE	1	000T18:00:00		000T18:00:00	1	000T12:07:00		000T12:07:00	100%	67.31%	
RI_EG130PHAS	1	000T12:00:00		000T12:00:00	1	000T12:00:00		000T12:00:00	100%	100.00%	

Timeline Gaps and Suggested Observations (2 of 3)



Timeline Gaps and Suggested Observations (3 of 3)

Saturn_121_122 Periapse Strawman

	Request	Riders	Start (SCET)	Start (Epoch)	Duration	End (SCET)	Primary	Secondary	Comments
	Sequence S55, length = 39 days		2009-317T19:21:00		039T04:05:00	2009-356T23:26:00			
	SATURN_121_122 Segment		2009-326T01:22:00		019T08:48:00	2009-345T10:10:00			
	NAV_122SK_OPNAV421_PRIME	I	2009-342T14:09:00		000T01:14:00	2009-342T15:23:00	ISS_NAC to Satellites	POS_Z to NSP	
	NAV_122EA_DLTURN421_PRIME	I	2009-342T15:23:00		000T00:01:00	2009-342T15:24:00	XBAND to Earth	POS_X to NSP	
	SP_122EA_C34BWGOTP342_PRIME	C, N	2009-342T15:24:00		000T09:30:00	2009-343T00:54:00	XBAND to Earth	4_Hr_Rolling	POS_X to 95.29/-64.06; CAPS
	SP_122EA_M34BWGOTB343_PRIME	C, E, M, N	2009-343T00:54:00		000T09:30:00	2009-343T10:24:00	XBAND to Earth	POS_X to 95.29/-64.06	
	SP_122SA_WAYPTTURN343_PRIME		2009-343T10:24:00		000T00:40:00	2009-343T11:04:00	ISS_NAC to Saturn		
CIRS NADIROCC?	VIMS_122SA_GLOBDYN001_PRIME	I, M, R, U, V	2009-343T11:04:00		000T05:40:00	2009-343T16:44:00	ISS_NAC to Saturn	NEG_X to NSP	
	SP_122EA_WAYPTTURN443_PRIME		2009-343T16:44:00		000T00:40:00	2009-343T17:24:00	XBAND to Earth	NEG_Y to 49.06/57.77	
	NEW WAYPOINT		**2009-343T17:24:00**		**000T06:06:00**	**2009-343T23:30:00**	**XBAND to Earth**	**NEG_Y to 49.06/57.77**	
End time epoch-relative	**SP_122EA_DEADTIME343_PRIME**		**2009-343T17:24:00**		**000T00:20:00**	**2009-343T17:44:00**	**XBAND to Earth**	**NEG_Y to 49.06/57.77**	
	RSS_122SA_OCCIN001_PRIME	I, M	2009-343T17:44:54	LMB_E122_SATURN_RSS_OCC_1_ING-????	000T01:33:01	2009-343T19:17:55	XBAND to Earth	NEG_Y to 49.06/57.77	
Enough time for obs. w/turns?	VIMS_122SA_GLOBDYN???_PRIME		2009-343T19:18:00	LMB_E122_SATURN_RSS_OCC_1_ING-????	000T01:47:00	2009-343T21:05:00	ISS_NAC to Saturn		
OPMODE issue with RADAR Warm-up during RSS Occ?	RSS_122SA_OCCOUT001_PRIME	I, M, R, U, V	2009-343T21:05:55	LMB_E122_SATURN_RSS_OCC_1_ING-????	000T01:23:35	2009-343T22:29:30	XBAND to Earth	NEG_Y to 49.06/57.77	
	SP_122EA_DEADTIME443_PRIME		**2009-343T22:30:00**	**LMB_E122_SATURN_RSS_OCC_1_ING-????**	**000T00:20:00**	**2009-343T22:50:00**	**XBAND to Earth**	**NEG_Y to 49.06/57.77**	
Or NEG_Z to Saturn?	SP_122SA_WAYPTTURN543_PRIME		2009-343T22:50:00		000T00:40:00	2009-343T23:30:00	ISS_NAC to Saturn		
	NEW WAYPOINT		**2009-343T23:30:00**		**001T10:40:00**	**2009-345T10:10:00**	**ISS_NAC to Saturn**		
	RADAR_122SA_GLOBALMAP002_PRIME	I, M, U, V	2009-343T23:30:00		000T13:43:00	2009-344T13:13:00	NEG_Z to Saturn	PIC	
	Periapse R = 3.196 Rs, lat ...		2009-344T06:04:10		000T00:00:01	2009-344T06:04:11			
	VIMS_122SA_GLOBDYN002_PRIME	I, M, V	2009-344T13:13:00		000T11:17:00	2009-345T00:30:00	ISS_NAC to Saturn	NEG_X to NSP	
	SP_122EA_DLTURN345_PRIME		2009-345T00:30:00		000T00:40:00	2009-345T01:10:00	XBAND to Earth	NEG_X to NEP	
	SP_122EA_M70METNON345_PRIME	C, E, M	2009-345T01:10:00		000T09:00:00	2009-345T10:10:00	XBAND to Earth	Rolling	NEG_X to NEP; CRPC; rolling required

- Open Issues
  - Can the OTP and OTB on DOYs 342&343 be separated.
    - Move OTP over Goldstone to free up 8 hours closer to the planet?
  - Can the CIRS NADIROCC be moved earlier?
    - E.g. into a gap between the OTP and OTB?
    - Prior to OTP?
  - Can we dispense with Satellite, Ring, and CDA Ring Plane Crossing activities?
  - RADAR Warmup conflict with RSS.
    - Can RSS live without the egress?
    - Can RADAR accept a 40 minute warmup (starting after egress)?
  - Waypoint assessment will be ready for the next meeting
  - Thoughts on activities on DOY 342?

Initial SMT and Data Volume (1 of 3)

Integration (Following Timeline Completion):

First look at the whole segment, Periapse 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)	NET_MARGN (%)	CAROVR (Mb)
SP_121EA_C70METOTP326_PRIME	326 16:22	327 01:22	0	2267	63	2330	3496	1166	0	510	53	2893	2676	-217	-1906	-18%	217
SP_121EA_C34BWGOTB327_PRIME	327 16:07	328 01:07	217	1482	62	1761	3496	1734	0	466	53	2281	673	-1609	-1906	-17%	1608
SP_121EA_M34BWGNON329_PRIME	329 02:08	329 11:08	1608	2337	106	4051	3496	-555	11	510	53	4070	642	-3429	-1906	-14%	3428
SP_121EA_M34BWGNON330_PRIME	330 02:08	330 11:08	3428	1277	63	4768	3496	-1272	0	393	53	3942	642	-3301	-1906	-14%	3300
SP_121EA_G34HEFNON331_PRIME	331 09:38	331 18:38	3300	2007	95	5402	3496	-1906	11	350	53	3909	844	-3066	-1657	-12%	3066
SP_121EA_C70METNON332_PRIME	332 15:53	333 00:53	3066	1999	90	5154	3496	-1657	0	393	53	3942	3210	-732	-1433	-10%	732
SP_121EA_M34BWGNON334_PRIME	334 01:53	334 10:53	732	1443	106	2280	3496	1215	0	350	53	2683	650	-2033	-1433	-10%	2033
SP_122EA_G34HEFNON335_PRIME	335 09:23	335 18:23	2033	1926	95	4054	3496	-557	0	393	53	3942	855	-3087	-1433	-10%	3086
SP_122EA_C70METNON336_PRIME	336 15:38	337 00:38	3086	1691	90	4867	3496	-1371	0	350	53	3898	3267	-632	-1433	-8%	631
SP_122EA_M70METOTP338_PRIME	338 01:39	338 10:39	631	1957	106	2694	3496	802	0	393	53	3140	2798	-342	-1433	-11%	342
SP_122EA_M34BWGOTB339_PRIME	339 01:39	339 10:39	342	1295	63	1700	3496	1796	0	393	53	2146	660	-1487	-1433	-15%	1486
SP_122EA_G34BWGNON340_PRIME	340 09:09	340 18:09	1486	1901	95	3482	3496	13	0	412	53	3947	681	-3266	-1433	-16%	3266
SP_122EA_C34HEFNON341_PRIME	341 15:24	342 00:24	3266	1574	90	4930	3496	-1433	0	194	53	3742	791	-2952	-803	-9%	2951
SP_122EA_C70METOTP342_PRIME	342 15:24	343 00:59	2951	1285	63	4300	3496	-803	0	210	57	3762	2816	-947	-454	-6%	947
SP_122EA_M34HEFOTB343_PRIME	343 00:59	343 09:24	947	0	0	947	3496	2549	0	570	50	1567	736	-832	-454	-10%	831
SP_122EA_M70METNON345_PRIME	345 01:10	345 10:10	831	2951	169	3951	3496	-454	0	448	53	3997	3431	-566	0	0%	565

Cuts made so far:
RPWS – 7.6 Gbits
CIRS – 600 Mbits
MIMI - 738 Mbits (All 3 segments Combined)

3.5 Gbits had previously been cut from the final observation period & downlink during early periapse integration.

Initial SMT and Data Volume (2 of 3)

Integration (Following Timeline Completion):

First look at the whole segment, Periapse 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	326 01:22	326 16:22	316.8	156.4	18.0	5.4	731.8	106.7	64.8	0.0	391.0	5.2	450.0	0.0	12.3	2258.2
SP_121EA_C70METOTP326_PRIME	326 16:22	327 01:22	129.6	17.0	43.2	3.2	0.0	64.0	38.9	0.0	204.5	4.9	0.0	0.0	0.0	505.4
DAILY TOTAL SCIENCE	326 01:22	327 01:22	446.4	173.4	61.2	8.6	731.8	170.7	103.7	0.0	595.5	10.1	450.0	0.0		
OBSERVATION_NOR	327 01:22	327 16:07	212.4	27.8	0.0	5.3	522.1	104.9	63.7	0.0	335.2	72.5	125.0	0.0	12.1	1480.9
SP_121EA_C34BWGOTB327_PRIME	327 16:07	328 01:07	129.6	17.0	0.0	3.2	0.0	64.0	38.9	0.0	204.5	4.9	0.0	0.0	0.0	462.2
DAILY TOTAL SCIENCE	327 01:22	328 01:07	342.0	44.8	0.0	8.6	522.1	168.9	102.6	0.0	539.7	77.4	125.0	0.0		
OBSERVATION_NOR	328 01:07	329 02:08	360.2	47.2	0.0	9.0	765.1	178.0	108.1	0.0	568.5	0.0	280.0	0.0	20.4	2336.4
OBSERVATION_OPN	328 01:07	329 02:08	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_121EA_M34BWGNON329_PRIME	329 02:08	329 11:08	129.6	17.0	43.2	3.2	0.0	64.0	38.9	0.0	204.5	4.9	0.0	0.0	0.0	505.4
DAILY TOTAL SCIENCE	328 01:07	329 11:08	489.8	64.2	43.2	12.2	765.1	242.0	147.0	0.0	773.0	4.9	280.0	0.0		
OBSERVATION_NOR	329 11:08	330 02:08	196.7	28.3	124.8	5.4	103.1	106.7	64.8	0.0	312.8	72.5	250.0	0.0	12.3	1277.3
SP_121EA_M34BWGNON330_PRIME	330 02:08	330 11:08	64.8	17.0	86.4	3.2	0.0	64.0	38.9	0.0	110.5	4.9	0.0	0.0	0.0	389.7
DAILY TOTAL SCIENCE	329 11:08	330 11:08	261.5	45.3	211.2	8.6	103.1	170.7	103.7	0.0	423.3	77.4	250.0	0.0		
OBSERVATION_NOR	330 11:08	331 09:38	162.0	42.4	115.2	8.1	704.1	160.1	97.2	0.0	276.2	61.3	362.0	0.0	18.4	2007.0
OBSERVATION_OPN	330 11:08	331 09:38	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_121EA_G34HEFNON331_PRIME	331 09:38	331 18:38	64.8	17.0	43.2	3.2	0.0	64.0	38.9	0.0	110.5	4.9	0.0	0.0	0.0	346.5
DAILY TOTAL SCIENCE	330 11:08	331 18:38	226.8	59.4	158.4	11.3	704.1	224.1	136.1	0.0	386.7	66.2	362.0	0.0		
OBSERVATION_NOR	331 18:38	332 15:53	153.0	40.1	133.2	7.7	638.1	151.2	91.8	0.0	260.9	4.5	500.0	0.0	17.4	1997.7
SP_121EA_C70METNON332_PRIME	332 15:53	333 00:53	64.8	17.0	86.4	3.2	0.0	64.0	38.9	0.0	110.5	4.9	0.0	0.0	0.0	389.7
DAILY TOTAL SCIENCE	331 18:38	333 00:53	217.8	57.1	219.6	10.9	638.1	215.2	130.7	0.0	371.3	9.5	500.0	0.0		
OBSERVATION_NOR	333 00:53	334 01:53	180.0	47.2	18.0	19.1	418.1	177.8	108.0	0.0	306.9	4.5	150.0	0.0	20.4	1450.0
SP_121EA_M34BWGNON334_PRIME	334 01:53	334 10:53	64.8	17.0	43.2	3.2	0.0	64.0	38.9	0.0	110.5	4.9	0.0	0.0	0.0	346.5
DAILY TOTAL SCIENCE	333 00:53	334 10:53	244.8	64.1	61.2	22.3	418.1	241.9	146.9	0.0	417.4	9.5	150.0	0.0		
OBSERVATION_NOR	334 10:53	335 09:23	192.6	42.4	129.1	8.1	561.7	160.1	97.2	0.0	276.2	46.2	395.0	0.0	18.4	1927.0
SP_122EA_G34HEFNON335_PRIME	335 09:23	335 18:23	64.8	17.0	86.4	3.2	0.0	64.0	38.9	0.0	110.5	4.9	0.0	0.0	0.0	389.7
DAILY TOTAL SCIENCE	334 10:53	335 18:23	257.4	59.4	215.5	11.3	561.7	224.1	136.1	0.0	386.7	51.1	395.0	0.0		
OBSERVATION_NOR	335 18:23	336 15:38	153.0	40.1	227.5	7.7	203.1	151.2	91.8	0.0	260.9	40.8	500.0	0.0	17.4	1693.3
SP_122EA_C70METNON336_PRIME	336 15:38	337 00:38	64.8	17.0	43.2	3.2	0.0	64.0	38.9	0.0	110.5	4.9	0.0	0.0	0.0	346.5
DAILY TOTAL SCIENCE	335 18:23	337 00:38	217.8	57.1	270.7	10.9	203.1	215.2	130.7	0.0	371.3	45.7	500.0	0.0		
OBSERVATION_NOR	337 00:38	338 01:39	180.1	47.2	326.6	9.0	103.1	178.0	108.1	0.0	307.1	0.0	680.0	0.0	20.4	1959.6
SP_122EA_M70METOTP338_PRIME	338 01:39	338 10:39	64.8	17.0	86.4	3.2	0.0	64.0	38.9	0.0	110.5	4.9	0.0	0.0	0.0	389.7
DAILY TOTAL SCIENCE	337 00:38	338 10:39	244.9	64.2	413.0	12.2	103.1	242.0	147.0	0.0	417.6	4.9	680.0	0.0		

Initial SMT and Data Volume (3 of 3)

Integration (Following Timeline Completion):

First look at the whole segment, Periapse was worked earlier.

OBSERVATION_NOR	338 10:39	339 01:39	108.0	28.3	115.2	5.4	303.1	106.7	64.8	0.0	184.1	27.2	340.0	0.0	12.3	1295.0
SP_122EA_M34BWGOTB339_PRIME	339 01:39	339 10:39	64.8	17.0	86.4	3.2	0.0	64.0	38.9	0.0	110.5	4.9	0.0	0.0	0.0	389.7
DAILY TOTAL SCIENCE	338 10:39	339 10:39	172.8	45.3	201.6	8.6	303.1	170.7	103.7	0.0	294.6	32.1	340.0	0.0		
OBSERVATION_NOR	339 10:39	340 09:09	106.4	42.4	225.6	8.1	246.1	160.1	97.2	0.0	500.3	27.2	470.0	0.0	18.4	1901.8
SP_122EA_G34BWGNON340_PRIME	340 09:09	340 18:09	32.4	17.0	43.2	3.2	0.0	64.0	38.9	0.0	204.5	4.9	0.0	0.0	0.0	408.2
DAILY TOTAL SCIENCE	339 10:39	340 18:09	138.8	59.4	268.8	11.3	246.1	224.1	136.1	0.0	704.8	32.1	470.0	0.0		
OBSERVATION_NOR	340 18:09	341 15:24	98.1	40.1	0.0	7.7	523.1	134.1	88.1	0.0	420.8	0.0	248.0	0.0	17.4	1577.2
SP_122EA_C34HEFNON341_PRIME	341 15:24	342 00:24	32.4	17.0	43.2	3.2	0.0	19.4	29.2	0.0	42.4	4.9	0.0	0.0	0.0	191.8
DAILY TOTAL SCIENCE	340 18:09	342 00:24	130.5	57.1	43.2	10.9	523.1	153.5	117.2	0.0	463.2	4.9	248.0	0.0		
OBSERVATION_NOR	342 00:24	342 15:24	54.0	28.3	0.0	15.5	374.3	32.4	48.6	0.0	70.7	0.0	650.0	0.0	12.3	1286.0
SP_122EA_C70METOTP342_PRIME	342 15:24	343 00:59	34.5	27.5	40.7	3.5	0.0	20.7	31.0	0.0	45.2	5.3	0.0	0.0	0.0	208.4
SP_122EA_M34HEFOTB343_PRIME	343 00:59	343 09:24	100.9	127.0	40.7	3.0	0.0	50.5	34.3	0.0	204.1	4.6	0.0	0.0	0.0	565.2
DAILY TOTAL SCIENCE	342 00:24	343 09:24	189.4	182.9	81.3	21.9	374.3	103.6	114.0	0.0	320.0	9.9	650.0	0.0		
OBSERVATION_NOR	343 09:24	345 01:10	442.6	399.4	43.2	24.4	278.8	141.4	171.8	190.9	681.3	0.0	550.0	0.0	32.5	2956.3
SP_122EA_M70METNON345_PRIME	345 01:10	345 10:10	72.4	135.8	86.4	3.2	0.0	32.0	38.5	0.0	70.8	4.9	0.0	0.0	0.0	444.0
DAILY TOTAL SCIENCE	343 09:24	345 10:10	514.9	535.2	129.6	27.6	278.8	173.5	210.3	190.9	752.1	4.9	550.0	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)	4095.6	1568.7	2378.6	197.5	6475.3	2940.2	1965.5	190.9	7217.2	440.8	5950.0	0.0

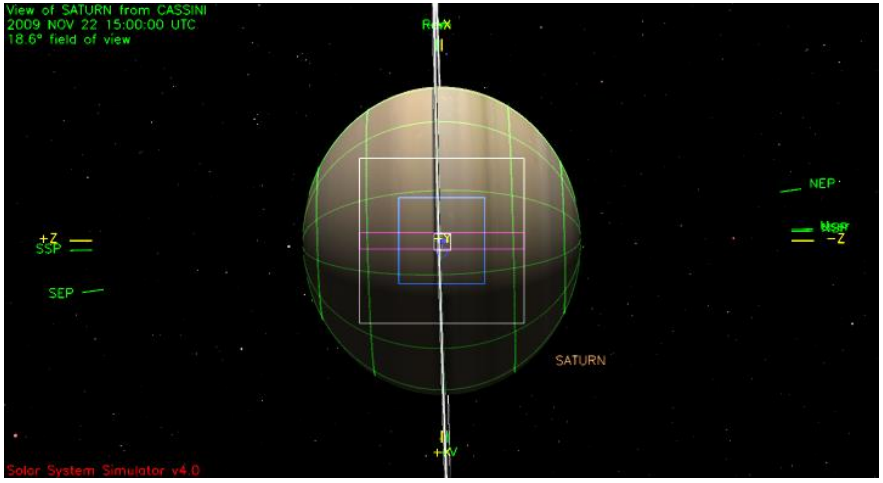
Waypoint Selection

Rev 122 Periapse

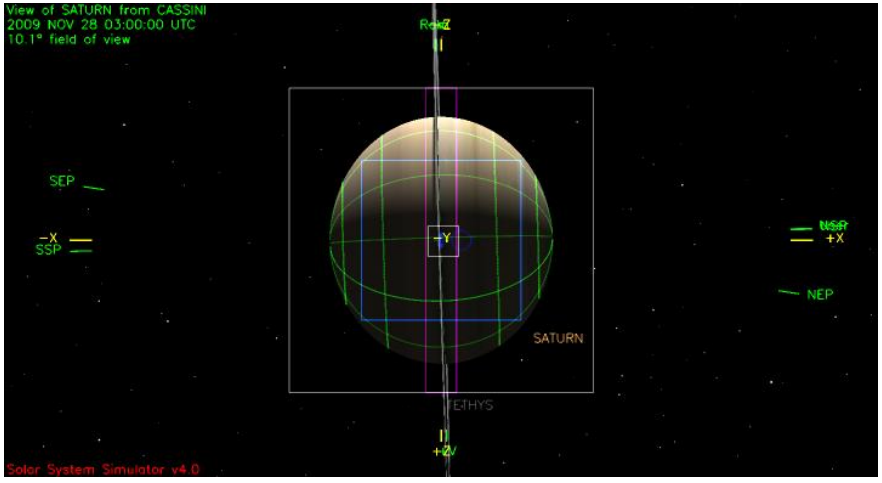
- ISS_NAC to Saturn is not safe for the majority of the inbound portion of the periapse period.
  - Solar Occultation occurs from to 343T16:18:54.09 to 343T20:41:16.27.
  - Secondaries, such as NEG_X to Sun, NEG_Z to Sun, -/+ X to NSP all became safe around 343T22:15. This is toward the end of the RSS outbound occultation.
  - NEG_Y to Saturn is not safe here because of violations to ORS-to-Sun Boresight flight rules.
    - The operational limit of 15º from Sun angle is reached at 343T11:40, and does not come back up above that limit until 343T22:15.
    - The health and safety limit of 12º from Sun angle is reached at 343T13:25, and does not come back up above that limit until 343T21:40.
  - This will impact VIMS_122SA_GLOBDYN001_PRIME and VIMS_122SA_GLOBDYN002_PRIME
- XBAND to Earth will be used at the waypoint during the occultation.
  - The secondary of NEG_Y to 49.06/57.77 is used by RSS in CIMS.
    - Is this secondary needed by anyone?
    - Any requests for the secondary at this time?
- XBAND to Earth will be used at the waypoint during the periapse period.
  - The secondary of POS_X to NEP is safe for the entire period.
    - Is this secondary acceptable to anyone?
    - Any requests for the secondary at this time?
      - CAPS requested a secondary of NEG_Y to NSP (0,0,30)
        - This waypoint is not safe with CIRS and VIMS heating in double digits!

Waypoints Chosen

Waypoint 1 (2009-326T02:52:00 – 2009-327T02:52:00): ISS_NAC to Saturn; NEG_X to Sun

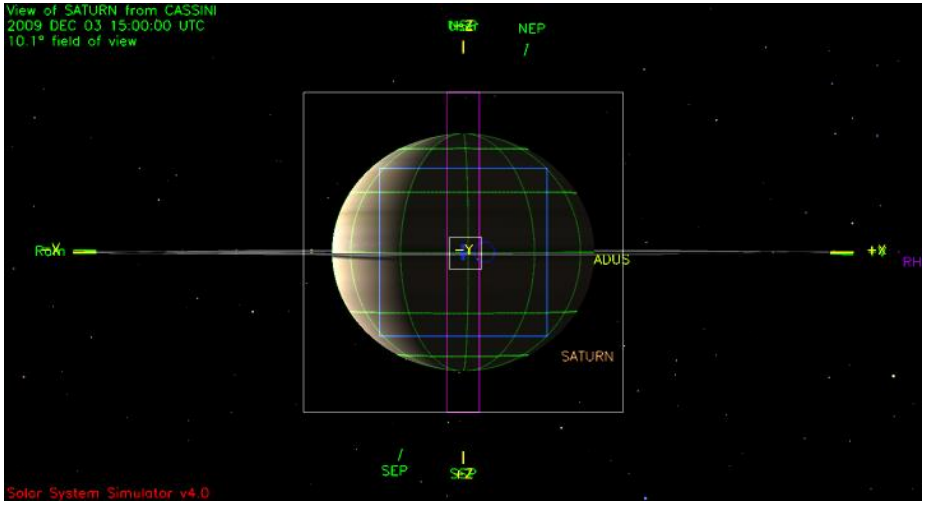


Waypoint 2 (2009-327T02:52:00 – 2009-337T01:18:00): ISS_NAC to Saturn; NEG_Z to Sun

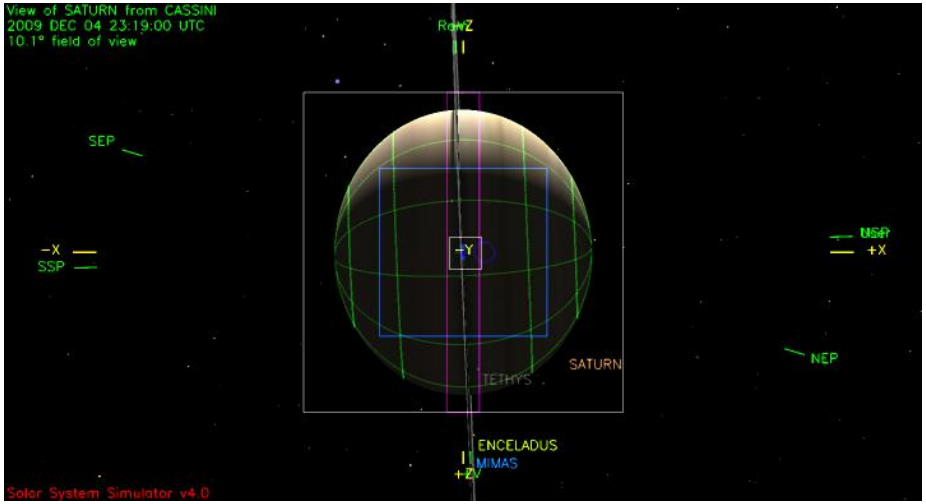


Waypoints Chosen

Waypoint 3 (2009-337T01:18:00 – 2009-338T11:19:00): ISS_NAC to Saturn; NEG_Z to NSP

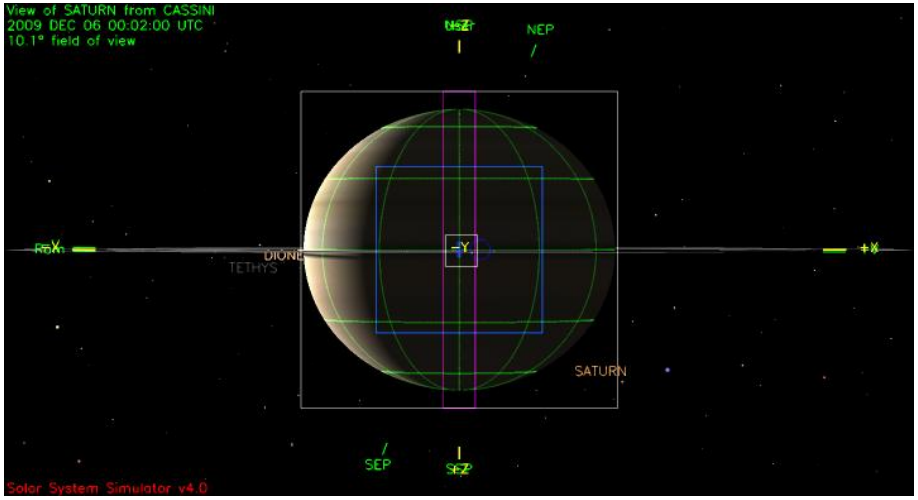


Waypoint 4 (2009-338T11:19:00 – 2009-339T11:19:00): ISS_NAC to Saturn; NEG_Z to Sun

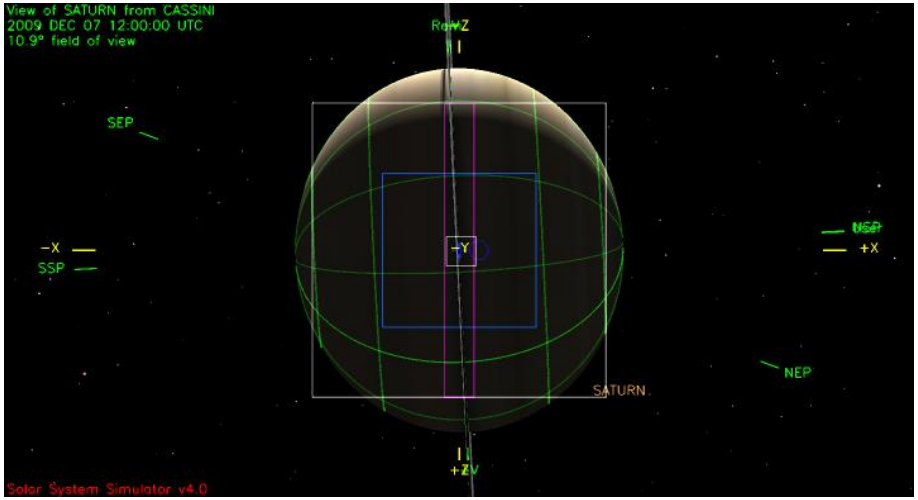


Waypoints Chosen

Waypoint 5 (2009-339T11:19:00 – 2009-340T18:49:00): ISS_NAC to Saturn; NEG_Z to NSP

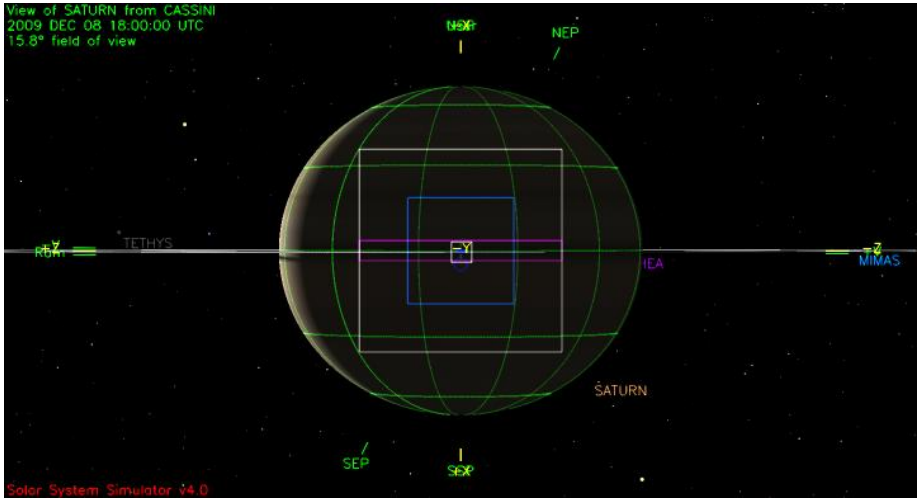


Waypoint 6 (2009-340T18:49:00 – 2009-342T01:24:00): ISS_NAC to Saturn; NEG_Z to Sun

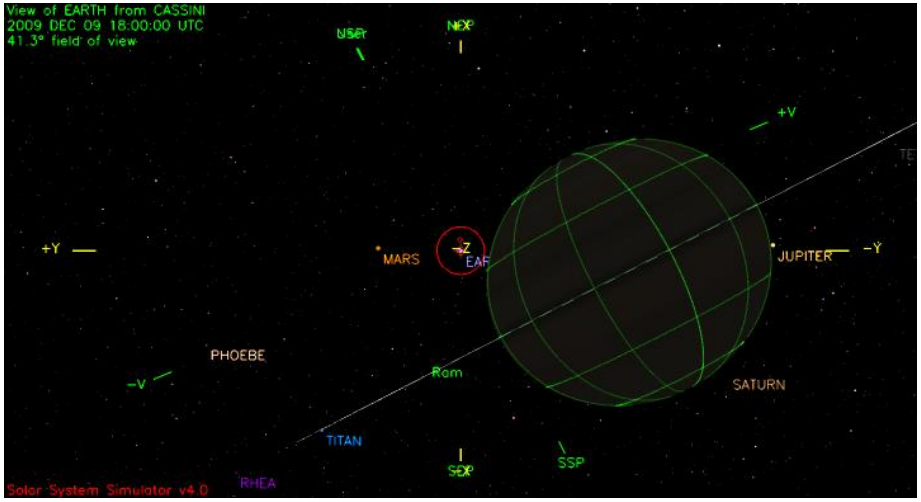


Waypoints Chosen

Waypoint 7 (2009-342T01:24:00 – 2009-343T10:04:00): ISS_NAC to Saturn; NEG_X to NSP



Waypoint 8 (2009-343T10:04:00 – 2009-345T10:50:00): XBAND to Earth; POS_X to NEP



Notes & Liens

Notes:

- Pointing:
  - Turns on DOY 327, 328 and 329 were designed as “2-part” turns to avoid 180 degree ambiguity.
  - RWD Turn on DOY 342 as the second part of a 2-part turn to avoid CMT violations.
- Data Volume:
  - No issues.
- DSN:
  - No passes in maintenance.
- Opmodes:
  - RSS Occ on DOY 343: S-band warm-up for full 2 hours, Ka-band on at start of ‘deadtime’.
    - **PLEASE CONTACT TWT LEADS IF CHANGES ARE ATTEMPTED!**
  - RADAR on DOY 343: Warm-up inside of the request’s SPASS ‘Prime’ time.
- Special Activities:
  - RSS occ on DOY 343; High priority Saturn Periapse segment DOYs 343-345.

Sequence Liens:

- None