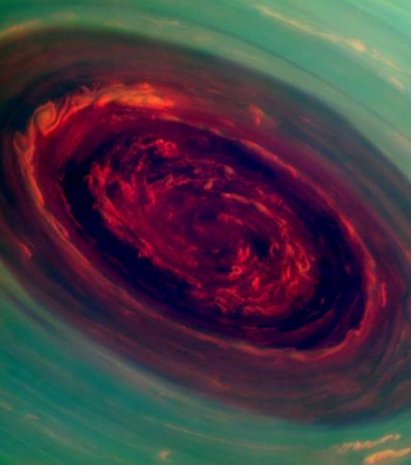

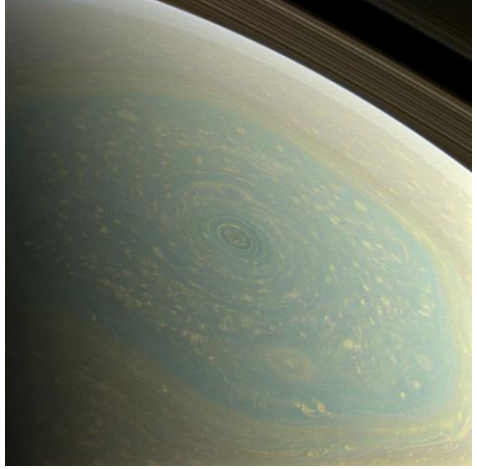
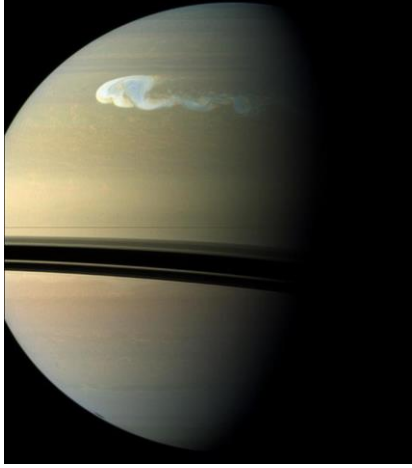

Science Planning & Sequence Team
CASSINI

SATURN TARGET WORKING TEAM

Rev 191_192 Segment Legacy Package

Segment Boundary: June 7, 2013 – June 15, 2013
2013-158T00:45:00 – 2013-166T13:59:00 (SCET)

Integration Began 08/13/2012
Segment Delivered to S79 Sequence 12/14/2012
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 fell in the first inclined phase (IN-1) of the Solstice Mission. It started just prior to Rev 192 apoapse, covered the inbound portion of the orbit and continued through periapse (10.24 Rs). It immediately follows Saturn TWT's Rev 191 segment, which fell on the other side of a sequence boundary.
- Solar geometry impacted the science that could be planned near periapse. Targets other than Saturn were chosen. With no Saturn targeting during the eclipse portion, no special commanding to relax CMT (S/C automated constraint avoidance) limits was required.
- This orbital arc was all inside of 20 Rs and therefore not subject to the usual Solstice Mission apoapse templates used by the Saturn discipline.
- Saturn focused science activities included VIMS and ISS led south and north polar studies, CIRS Compositional Sit & Stares, Aurora, and a UVIS Solar Occultation.
- Notable out-of-discipline activities included VIMS Ring/Stellar occultations, ISS observations of the small irregular moon Albiorix, and a Enceladus plume PIE (Pre-Integrated Event).
- Many of the suggested observations at the start of integration were included in the final timeline.
- Data volume negotiations were somewhat challenging.

Final Sequenced SPASS (1 of 2)

	Request	Riders	Start (SCET)	Start (Epoch)	Duration	End (SCET)	Primary	Secondary	Comments
	Sequence S79, length = 68 days		2013-158T00:45:00		068T09:06:00	2013-226T09:51:00			
	SATURN_191_192 Segment		2013-158T00:45:00		008T13:14:00	2013-166T13:59:00			
	SP_191EA_S79IVP158_PRIME		2013-158T00:45:00		000T00:06:00	2013-158T00:51:00	XBAND to Earth	NEG_Y to 294.0/42.0	S79 IVP Gap
	SP_191SA_WAYPTTURN158_PRIME		2013-158T00:51:00		000T00:40:00	2013-158T01:31:00	ISS_NAC to Saturn	NEG_Z to NSP	
Gap 1	**NEW WAYPOINT**		**2013-158T01:31:00**		**000T22:29:00**	**2013-159T00:00:00**	**ISS_NAC to Saturn**	**NEG_Z to NSP**	
Gap 1	VIMS_191SA_SREGMOVI001_PRIME	C, I, U	2013-158T01:31:00		000T21:49:00	2013-158T23:20:00	ISS_NAC to Saturn	NEG_Z to NSP	
	Apoapse Per = 12.0 d, inc ...		2013-158T06:29:06		000T00:00:01	2013-158T06:29:07			
	SP_192EA_DLTURN159_PRIME		2013-158T23:20:00		000T00:40:00	2013-159T00:00:00	XBAND to Earth	POS_X to 134.7/43.1	
	NEW WAYPOINT		**2013-159T00:00:00**		**000T15:10:00**	**2013-159T15:10:00**	**XBAND to Earth**	**POS_X to 134.7/43.1**	
	SP_192EA_YGAP159_PRIME		2013-159T00:00:00		000T01:30:00	2013-159T01:30:00	XBAND to Earth	POS_X to 134.7/43.1	
	SP_192EA_G70METNON159_PRIME		2013-159T01:30:00		000T04:00:00	2013-159T05:30:00	XBAND to Earth	3_Hr_Rolling	
	SP_192EA_C34BWGNON159_PRIME	C	2013-159T05:30:00		000T09:00:00	2013-159T14:30:00	XBAND to Earth	Rolling/SRU	MIMI. NEG_Y to Saturn (0,0,-9.5). SID suspend
	SP_192SA_WAYPTTURN159_PRIME		2013-159T14:30:00		000T00:40:00	2013-159T15:10:00	ISS_NAC to Saturn	NEG_Z to NSP	
Gap 2	**NEW WAYPOINT**		**2013-159T15:10:00**		**000T12:35:00**	**2013-160T03:45:00**	**ISS_NAC to Saturn**	**NEG_Z to NSP**	
Gap 2	VIMS_192SA_SPOLMOV001_PRIME	C	2013-159T15:10:00		000T11:55:00	2013-160T03:05:00	ISS_NAC to Saturn	NEG_Z to NSP	
	SP_192EA_DLTURN160_PRIME		2013-160T03:05:00		000T00:40:00	2013-160T03:45:00	XBAND to Earth	POS_X to 135.2/44.0	
	NEW WAYPOINT		**2013-160T03:45:00**		**000T11:10:00**	**2013-160T14:55:00**	**XBAND to Earth**	**POS_X to 135.2/44.0**	
	SP_192EA_YGAP160_PRIME		2013-160T03:45:00		000T01:30:00	2013-160T05:15:00	XBAND to Earth	POS_X to 135.2/44.0	
	SP_192EA_C34BWGNON160_PRIME	C, R	2013-160T05:15:00		000T09:00:00	2013-160T14:15:00	XBAND to Earth	Rolling/SRU	MIMI. NEG_Y to Saturn (0,0,-12). SID suspend
	SP_192SA_WAYPTTURN160_PRIME		2013-160T14:15:00		000T00:40:00	2013-160T14:55:00	ISS_NAC to Saturn	NEG_Z to 136.5/31.5	
Gap 3	**NEW WAYPOINT**		**2013-160T14:55:00**		**000T12:49:00**	**2013-161T03:44:00**	**ISS_NAC to Saturn**	**NEG_Z to 136.5/31.5**	
Gap 3	VIMS_192SA_AURSTARE001_PRIME	C, I, U	2013-160T14:55:00		000T06:05:00	2013-160T21:00:00	ISS_NAC to Saturn	NEG_Z to 136.5/31.5	
Gap 3	UVIS_192SA_AURSLEW001_PRIME	V	2013-160T21:00:00		000T06:04:00	2013-161T03:04:00	UVIS_FUV to Saturn	NEG_Z to 136.5/31.5	
	SP_192EA_DLTURN161_PRIME		2013-161T03:04:00		000T00:40:00	2013-161T03:44:00	XBAND to Earth	NEG_X to NSP	
	NEW WAYPOINT		**2013-161T03:44:00**		**000T11:10:00**	**2013-161T14:54:00**	**XBAND to Earth**	**NEG_X to NSP**	
	ENGR_192SC_KPTYBIAS161_PRIME		2013-161T03:44:00		000T01:30:00	2013-161T05:14:00	POS_Z to DELTA_H (0.0,0.0,-24.999 deg. offset)	NEG_X to Sun	
	SP_192EA_C34HEFNON161_PRIME	C, E	2013-161T05:14:00		000T08:15:00	2013-161T13:29:00	XBAND to Earth	3_Hr_Rolling	CAPS. NEG_X to NEP or NSP. SID suspend
	SP_192SA_WAYPTTURN161_PRIME		2013-161T14:14:00		000T00:40:00	2013-161T14:54:00	ISS_NAC to Saturn	NEG_Z to 136.5/31.5	
	NEW WAYPOINT		**2013-161T14:54:00**		**001T00:20:00**	**2013-162T15:14:00**	**ISS_NAC to Saturn**	**NEG_Z to 136.5/31.5**	
Gap 4	ISS_192TI_M120R2HZ164_PRIME	C, V	2013-161T14:54:00	E192_M120R2HZ164+000T00:00:00	000T01:30:00	2013-161T16:24:00	ISS_NAC to Titan	NEG_Z to 136.5/31.5	No Preference to secondary pointing
Gap 4	VIMS_192RI_RCASOCC001_PRIME	C	2013-161T16:24:00		000T02:36:00	2013-161T19:00:00	VIMS_IR to 359.603/51.389	NEG_X to Sun	
Gap 4	CIRS_192SA_COMPSIT001_PRIME	U, V	2013-161T19:00:00		000T19:34:00	2013-162T14:34:00	CIRS_FP3 to Saturn	NEG_Z to 136.5/31.5	
	SP_192EA_DLTURN162_PRIME		2013-162T14:34:00		000T00:35:00	2013-162T15:09:00	XBAND to Earth (0.0,0.0,-10.0 deg. offset)	NEG_X to NSP	
	SP_192EA_DLTURN462_PRIME		2013-162T15:09:00		000T00:05:00	2013-162T15:14:00	XBAND to Earth	NEG_X to NSP	
	NEW WAYPOINT		**2013-162T15:14:00**		**000T09:40:00**	**2013-163T00:54:00**	**XBAND to Earth**	**NEG_X to NSP**	
	SP_192EA_M34HEFOTP162_PRIME	C, E, N	2013-162T15:14:00		000T09:00:00	2013-163T00:14:00	XBAND to Earth	4_Hr_Rolling	CAPS. NEG_X to NEP or NSP. OTP
	SP_192SA_WAYPTTURN163_PRIME		2013-163T00:14:00		000T00:31:00	2013-163T00:45:00	UVIS_SOL_OFF to Sun (0.0,5.0,0.0 deg. offset)	POS_X to NSP	
	SP_192SA_WAYPTTURN463_PRIME		2013-163T00:45:00		000T00:09:00	2013-163T00:54:00	UVIS_SOL_OFF to Sun	POS_X to NSP	
	NEW WAYPOINT		**2013-163T00:54:00**		**000T07:41:00**	**2013-163T08:35:00**	**UVIS_SOL_OFF to Sun**	**POS_X to NSP**	
Gap 5a	ISS_192OT_ALBPOLA103_PRIME	U, V	2013-163T01:00:00		000T02:00:00	2013-163T03:00:00	UVIS_FUV to Rocks	NEG_Z to Earth	
Gap 5a	**SP_192NA_DEADTIME163_PRIME**		**2013-163T03:00:00**		**000T00:20:00**	**2013-163T03:20:00**	**UVIS_SOL_OFF to Sun**	**POS_X to NSP**	
Gap 5a	UVIS_192SU_USUNOCC001_PRIME	V	2013-163T03:20:00	GMB_E192_Saturn_Solar_Occ_Ing-000T01:35:49	000T02:15:00	2013-163T05:35:00	UVIS_SOL_OFF to Sun	POS_X to NSP	
Gap 5a	**SP_192NA_DEADTIME463_PRIME**		**2013-163T05:35:00**	**GMB_E192_Saturn_Solar_Occ_Ing+000T00:39:11**	**000T00:20:00**	**2013-163T05:55:00**	**UVIS_SOL_OFF to Sun**	**POS_X to NSP**	
Gap 5b	ISS_192EN_PLMHPMR001_PIE	C, U, V	2013-163T05:55:00		000T02:00:00	2013-163T07:55:00	ISS_NAC to Enceladus	POS_X to NSP	SOST PIE
Gap 5b	SP_192EA_DLTURN163_PRIME		2013-163T07:55:00		000T00:31:00	2013-163T08:26:00	XBAND to Earth (0.0,0.0,-5.0 deg. offset)	NEG_X to NSP	
Gap 5b	SP_192EA_DLTURN463_PRIME		2013-163T08:26:00		000T00:09:00	2013-163T08:35:00	XBAND to Earth	NEG_X to NSP	
Gap 5b	**NEW WAYPOINT**		**2013-163T08:35:00**		**000T16:19:00**	**2013-164T00:54:00**	**XBAND to Earth**	**NEG_X to NSP**	
Gap 5b	ISS_192OT_ALBPOLB103_PRIME	U	2013-163T08:35:00		000T06:39:00	2013-163T15:14:00	UVIS_FUV to Rocks	NEG_Z to Earth	

Final Sequenced SPASS (2 of 2)

Request	Riders	Start (SCET)	Start (Epoch)	Duration	End (SCET)	Primary	Secondary	Comments
ISS_192OT_ALBPOLB103_PRIME	U	2013-163T08:35:00		000T06:39:00	2013-163T15:14:00	UVIS_FUV to Rocks	NEG_Z to Earth	
SP_192EA_M70METOTB163_PRIME	C, N	2013-163T15:14:00		000T09:00:00	2013-164T00:14:00	XBAND to Earth	NEG_X to NSP	CAPS. same secondary as OTP pass. OTB. SID suspend
SP_192SA_WAYPTTURN164_PRIME		2013-164T00:14:00		000T00:40:00	2013-164T00:54:00	ISS_NAC to Saturn	POS_Z to 136.5/31.5	
NEW WAYPOINT		**2013-164T00:54:00**		**000T20:20:00**	**2013-164T21:14:00**	**ISS_NAC to Saturn**	**POS_Z to 136.5/31.5**	
CIRS_192SA_COMPSIT002_PRIME	U, V	2013-164T00:54:00		000T12:00:00	2013-164T12:54:00	CIRS_FPB to Saturn	POS_Z to 136.5/31.5	
Periapse R = 10.244 Rs, lat...		2013-164T05:58:22		000T00:00:01	2013-164T05:58:23			
VIMS_192SA_NPOLMOV001_PRIME	C, I	2013-164T12:54:00		000T06:46:00	2013-164T19:40:00	ISS_NAC to Saturn	POS_Z to 136.5/31.5	
VIMS_192SA_RCAROCC001_PRIME	C	2013-164T19:40:00		000T00:54:00	2013-164T20:34:00	VIMS_IR to 143.061/-62.789	POS_Z to 136.5/31.5	No Preference to secondary pointing
SP_192EA_DLTURN164_PRIME		2013-164T20:34:00		000T00:40:00	2013-164T21:14:00	XBAND to Earth	POS_X to NSP	
NEW WAYPOINT		**2013-164T21:14:00**		**000T11:10:00**	**2013-165T08:24:00**	**XBAND to Earth**	**POS_X to NSP**	
ENGR_192SC_KPTYBIAS164_PRIME		2013-164T21:14:00		000T01:30:00	2013-164T22:44:00	NEG_Z to DELTA_H (0.0,0.0,-45.0 deg. offset)	NEG_X to Sun	
SP_192EA_G34HEFNON164_PRIME	C	2013-164T22:44:00		000T09:00:00	2013-165T07:44:00	XBAND to Earth	Rolling/SRU	CAPS. POS_X to NEP or NSP. SID suspend
SP_192SA_WAYPTTURN165_PRIME		2013-165T07:44:00		000T00:40:00	2013-165T08:24:00	ISS_NAC to Saturn	POS_Z to 136.5/31.5	
NEW WAYPOINT		**2013-165T08:24:00**		**000T11:10:00**	**2013-165T19:34:00**	**ISS_NAC to Saturn**	**POS_Z to 136.5/31.5**	
ISS_192SA_NPOLVORT001_PRIME	C, U, V	2013-165T08:24:00		000T09:00:00	2013-165T17:24:00	ISS_NAC to Saturn	POS_Z to 136.5/31.5	
ISS_192TI_M30R2CLD165_PRIME	C, V	2013-165T17:24:00	E192_M30R2CLD165+000T00:00:00	000T01:30:00	2013-165T18:54:00	ISS_NAC to Titan	POS_Z to 136.5/31.5	No Preference to secondary pointing
SP_192EA_DLTURN166_PRIME		2013-165T18:54:00		000T00:40:00	2013-165T19:34:00	XBAND to Earth	POS_X to 307.3/-20.7	
NEW WAYPOINT		**2013-165T19:34:00**		**000T19:11:00**	**2013-166T14:45:00**	**XBAND to Earth**	**POS_X to 307.3/-20.7**	
ISS_192OT_ALBPOLC103_PRIME	U	2013-165T19:34:00		000T07:55:00	2013-166T03:29:00	UVIS_FUV to Rocks	NEG_Z to Earth	
ENGR_192SC_KPTYBIAS166_PRIME		2013-166T03:29:00		000T01:30:00	2013-166T04:59:00	NEG_Z to DELTA_H (0.0,0.0,9.998 deg. offset)	NEG_X to Sun	
SP_192EA_C70METNON166_PRIME	C	2013-166T04:59:00		000T09:00:00	2013-166T13:59:00	XBAND to Earth	Rolling	MIMI. NEG_Y to Saturn (0,0,-9.5).

Gap 6

Gap 7

Final Sequenced SMT and Data Volume (1 of 2)

DATA VOLUME SUMMARY --- TRANSFER FRAME OVERHEAD INCLUDED (80 BITS PER 8800-BIT FRAME)

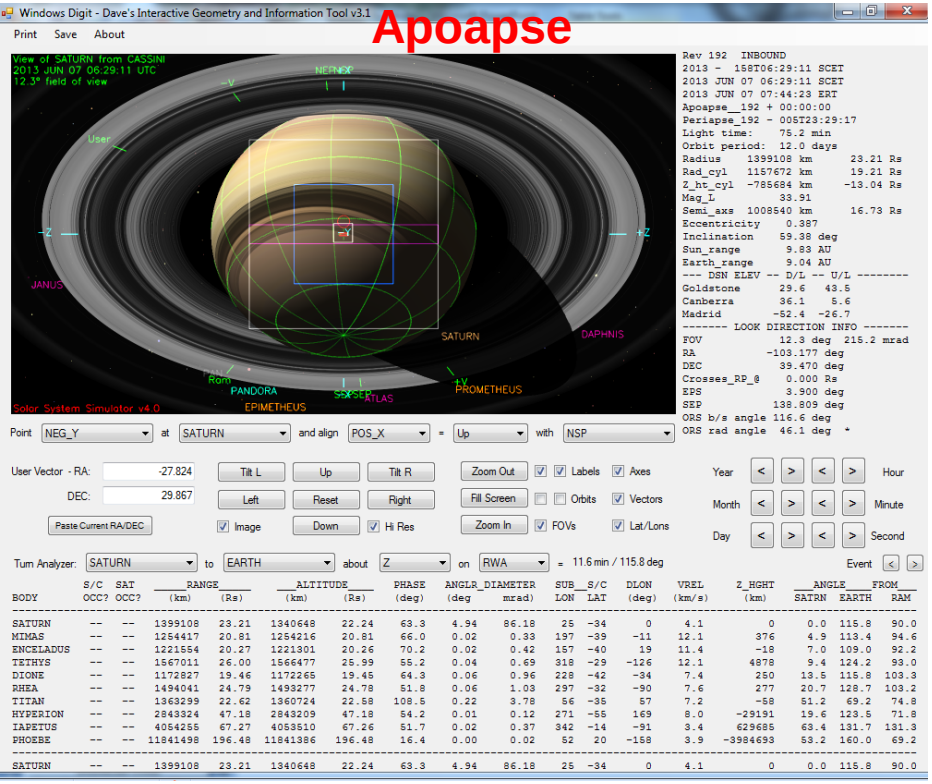
			OBSERVATION_PERIOD							DOWNLINK_PASS							
			P4						P5	RECORDED		PLAYBACK					
DOWNLINK PASS NAME	Start doy hh:mm	End doy hh:mm	START (Mb)	SCI (Mb)	HK+E (Mb)	TOTAL (Mb)	CPACTY (Mb)	MRGN (Mb)	OPNAV (Mb)	SCI (Mb)	ENGR (Mb)	TOTAL (Mb)	CPACTY (Mb)	MARGN (Mb)	NET_MARGN (Mb)	(%)	CAROVR (Mb)
SP_192EA_G70METNON159_PRIME	159 01:30	159 05:30	0	2280	105	2385	3322	937	0	58	24	2466	1719	-748	293	2%	748
SP_192EA_C34BWGNON159_PRIME	159 05:30	159 14:30	748	0	0	748	3322	2574	0	222	53	1023	896	-128	293	3%	128
SP_192EA_C34BWGNON160_PRIME	160 05:15	160 14:15	128	819	62	1009	3322	2313	0	222	53	1284	896	-389	293	2%	388
SP_192EA_C34HEFNON161_PRIME	161 05:14	161 13:29	388	648	63	1099	3322	2223	0	212	49	1360	844	-517	293	2%	516
SP_192EA_M34HEFOTP162_PRIME	162 15:14	163 00:14	516	1058	109	1683	3322	1639	0	232	53	1968	622	-1346	293	2%	1346
SP_192EA_M70METOTB163_PRIME	163 15:14	164 00:14	1346	1158	63	2567	3322	755	0	728	53	3348	3054	-294	293	2%	293
SP_192EA_G34HEFNON164_PRIME	164 22:44	165 07:44	293	1383	95	1772	3322	1551	0	331	53	2156	842	-1314	293	2%	1314
SP_192EA_C70METNON166_PRIME	166 04:59	166 13:59	1314	1626	90	3029	3322	293	0	332	53	3414	3720	306	434	3%	0

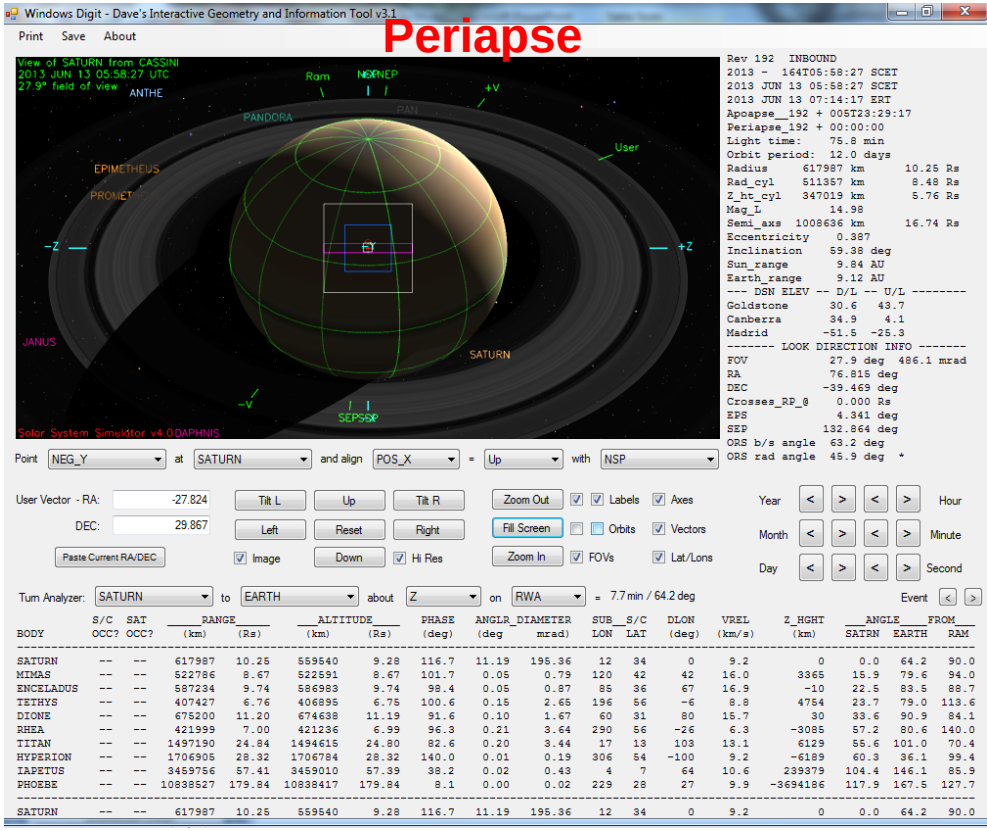
Final Sequenced SMT and Data Volume (2 of 2)

DATA VOLUME REPORT --- TRANSFER FRAME OVERHEAD NOT INCLUDED

Event	Start doy hh:mm	End doy hh:mm	CAPS (Mb)	CDA (Mb)	CIRS (Mb)	INMS (Mb)	ISS (Mb)	MAG (Mb)	MIMI (Mb)	RADAR (Mb)	RPWS (Mb)	UVIS (Mb)	VIMS (Mb)	PROBE (Mb)	ENGR (Mb)	TOTAL (Mb)
OBSERVATION_NOR	158 00:45	159 01:30	90.9	46.7	157.1	13.2	400.0	44.0	75.7	0.0	108.3	395.2	928.6	0.0	103.4	2363.2
SP_192EA_G70METNON159_PRIME	159 01:30	159 05:30	10.1	7.5	0.0	1.4	0.0	7.1	12.2	0.0	18.9	0.0	0.0	0.0	0.0	57.3
SP_192EA_C34BWGNON159_PRIME	159 05:30	159 14:30	22.7	17.0	86.4	3.2	0.0	16.0	27.5	0.0	42.4	4.9	0.0	0.0	0.0	220.2
DAILY TOTAL SCIENCE	158 00:45	159 14:30	123.7	71.2	243.5	17.9	400.0	67.1	115.5	0.0	169.6	400.2	928.6	0.0	103.4	
OBSERVATION_NOR	159 14:30	160 05:15	37.2	27.8	85.8	5.3	0.0	26.2	45.1	0.0	69.6	0.0	514.3	0.0	61.6	873.0
SP_192EA_C34BWGNON160_PRIME	160 05:15	160 14:15	22.7	17.0	86.4	3.2	0.0	16.0	27.5	0.0	42.4	4.9	0.0	0.0	0.0	220.2
DAILY TOTAL SCIENCE	159 14:30	160 14:15	59.9	44.8	172.2	8.6	0.0	42.2	72.7	0.0	112.0	4.9	514.3	0.0	61.6	
OBSERVATION_NOR	160 14:15	161 05:14	45.6	28.3	43.8	5.4	60.0	26.6	45.8	0.0	70.7	220.1	95.7	0.0	62.6	704.6
SP_192EA_C34HEFNON161_PRIME	161 05:14	161 13:29	29.7	15.6	78.3	3.0	0.0	14.7	25.2	0.0	38.9	4.5	0.0	0.0	0.0	209.9
DAILY TOTAL SCIENCE	160 14:15	161 13:29	75.3	43.8	122.1	8.4	60.0	41.3	71.1	0.0	109.6	224.6	95.7	0.0	62.6	
OBSERVATION_NOR	161 13:29	162 15:14	92.7	48.6	191.2	11.2	35.0	45.8	78.8	0.0	121.3	64.2	360.0	0.0	107.6	1156.4
SP_192EA_M34HEFOTP162_PRIME	162 15:14	163 00:14	32.4	17.0	86.4	3.2	0.0	16.0	27.5	0.0	42.1	4.9	0.0	0.0	0.0	229.6
DAILY TOTAL SCIENCE	161 13:29	163 00:14	125.1	65.6	277.6	14.4	35.0	61.8	106.3	0.0	163.4	69.2	360.0	0.0	107.6	
OBSERVATION_NOR	163 00:14	163 15:14	54.0	36.5	28.8	5.4	420.0	26.7	45.9	0.0	216.4	166.4	147.0	0.0	62.7	1209.8
SP_192EA_M70METOTB163_PRIME	163 15:14	164 00:14	32.4	48.4	86.4	3.2	0.0	16.0	27.5	0.0	502.6	4.9	0.0	0.0	0.0	721.5
DAILY TOTAL SCIENCE	163 00:14	164 00:14	86.4	84.9	115.2	8.6	420.0	42.7	73.4	0.0	719.0	171.3	147.0	0.0	62.7	
OBSERVATION_NOR	164 00:14	164 22:44	81.0	42.4	148.1	8.1	120.0	40.0	68.8	0.0	352.1	39.1	470.7	0.0	94.0	1464.4
SP_192EA_G34HEFNON164_PRIME	164 22:44	165 07:44	32.4	17.0	86.4	3.2	0.0	16.0	27.5	0.0	140.8	4.9	0.0	0.0	0.0	328.3
DAILY TOTAL SCIENCE	164 00:14	165 07:44	113.4	59.4	234.5	11.3	120.0	56.0	96.4	0.0	492.9	44.1	470.7	0.0	94.0	
OBSERVATION_NOR	165 07:44	166 04:59	76.5	40.1	86.4	7.7	390.5	37.8	65.0	0.0	332.7	184.5	390.0	0.0	88.8	1700.0
SP_192EA_C70METNON166_PRIME	166 04:59	166 13:59	32.4	17.0	86.4	3.2	0.0	16.0	27.5	0.0	141.1	4.9	0.0	0.0	0.0	328.7
DAILY TOTAL SCIENCE	165 07:44	166 13:59	108.9	57.1	172.8	10.9	390.5	53.8	92.6	0.0	473.8	189.5	390.0	0.0	88.8	

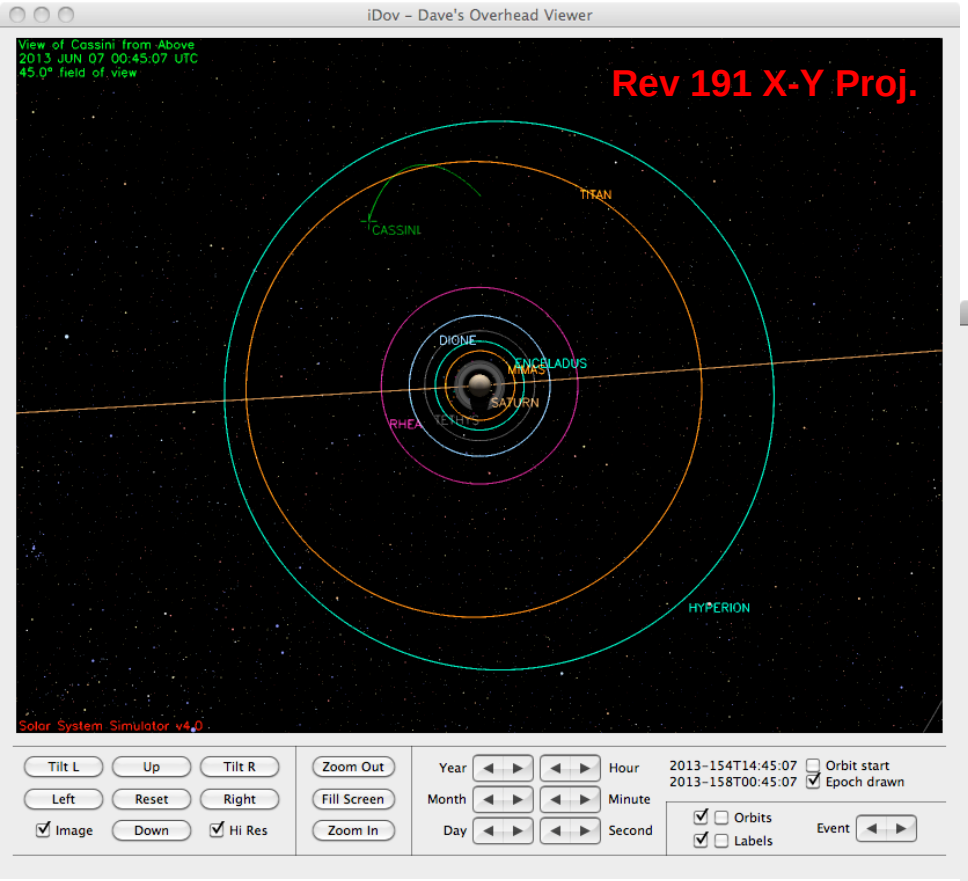
Segment Geometry (1 of 2)

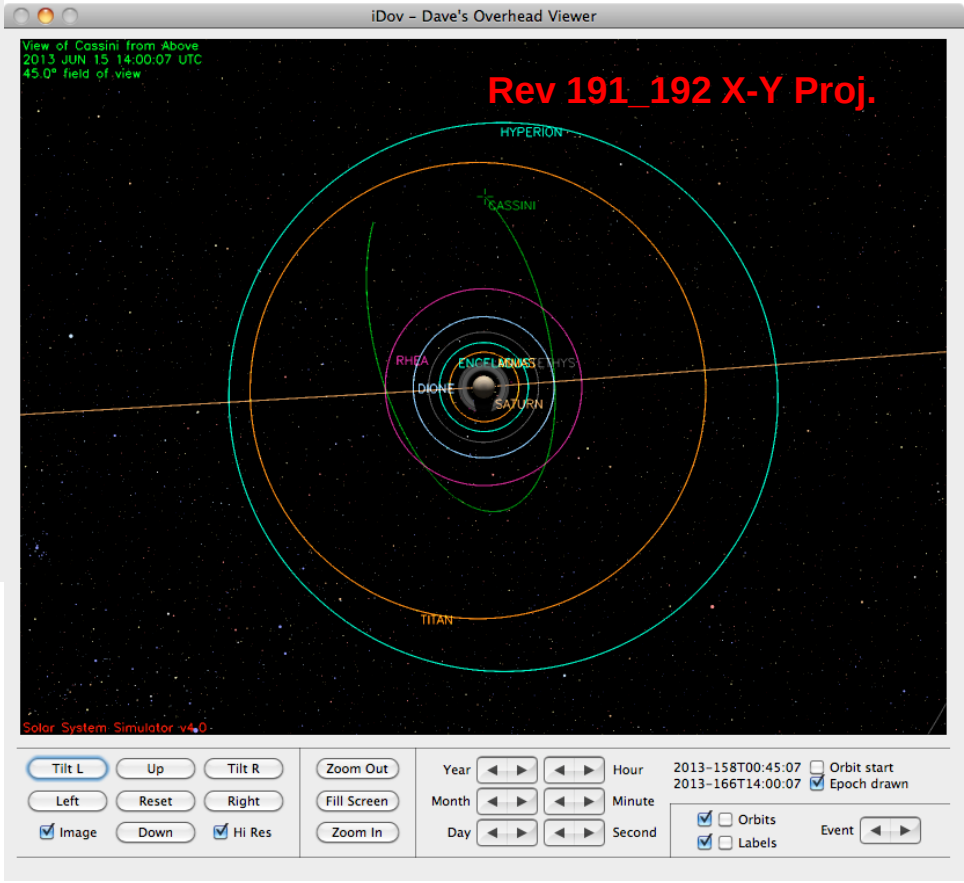




	Saturn Range	Phase Angle	Sub-S/C Lat.
Segment Start	23.2	59.9	-31
Apoapse	23.2	63.3	-34
Periapse	10.3	116.7	34
Segment End	17.0	1.9	21

Segment Geometry (2 of 2)

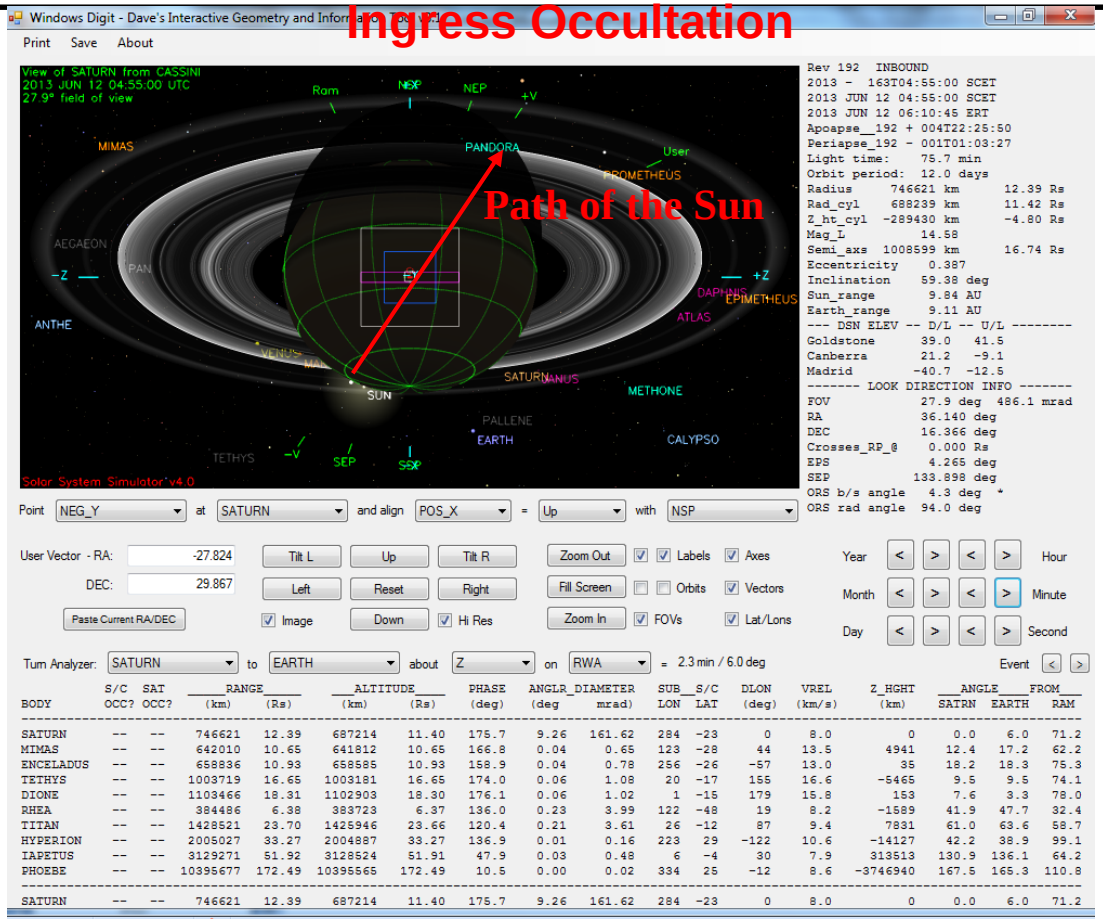




- Nearly entire orbit inside 20 Rs
- Apoapse @ 23 Rs in 191_192 segment
- CAKE templates did not apply here

Solar Geometry – ORS Boresight Concerns

Ingress Occultation



- Pointing to NEG_Y to Saturn (center) would lead to a CMT violation between ~2013-163T01:05:00 and ~2013-163T12:05:00.
- Minimum NEG_Y to Sun angle is ~0.81° at 2013-163T06:55:00.
- At this range, Saturn is less that 10 deg. across.
- Period of concern falls within observation period 5.

ORS to Sun < 15 deg.

162T23:25 — **163T13:15**

ORS to Sun < 12 deg.

163T01:05 — **163T12:05**

Sun in Occultation (Tour Atlas)

163T04:55:49 — **163T08:53:28**

Daily Science Highlights (1 of 2)

===== Jun 07 2013 =====
DOY 158:
MAPS teams continued their outer magnetospheric and dust survey campaign.
VIMS performed 2x2 mosaics of Saturn's south hemisphere for a movie, while other ORS teams rode along.
The spacecraft traversed apoapse at a range of 23.2 Rs.

===== Jun 08 2013 =====oDOY 159:
CAPS performed an Electron Spectrometer calibration.
VIMS observed Saturn's South Pole, taking 2*2 Mosaics to form a movie, while CIRS rode along.

===== Jun 09 2013 =====
DOY 160:
RSS performed an Operations Readiness Test to demonstrate DSN and RSSG preparedness to support the Rev193 Saturn rings occultation on 2013/175.
VIMS conducted Saturn south polar auroral mapping with ORS riders.
UVIS imaged Saturn's aurora with a series of rapid slews, while VIMS rode along.
MAPS continued their magnetospheric survey campaign.

===== Jun 10 2013 =====
DOY 161:
ISS led the ORS teams with a distant observation of Titan haze as part of the ongoing Titan Monitoring Campaign.
VIMS observed an R Cassiopeia stellar ring occultation of the F-ring and A-ring, with CIRS riding.
CIRS imaged Saturn's southern aurora by sitting and staring at one location to derive composition. UVIS and VIMS took ride-along data.

===== Jun 11 2013 =====
DOY 162:
CIRS wrapped up their compositional observation of Saturn.
MAPS teams took measurements as part of their inner magnetosphere survey.

Daily Science Highlights (2 of 2)

===== Jun 12 2013 =====
DOY 163:
UVIS observed an ingress solar occultation by Saturn with VIMS riding along.
ISS looked at Enceladus' plumes while the other ORS teams rode along.
ISS and UVIS observed Saturn's irregular moon Albiorix to determine the siderial period, the pole-axis orientation, and a shape model for this object. With a diameter of approx. 30-40 km, prograde orbiting Albiorix is the second or third-largest of the 38 known irregular moons of Saturn.
MAPS instruments took measurements as the spacecraft passed through the ring plane.
RPWS examined Saturn aurora and kilometric radiation in the auroral magnetosphere (e.g. the acceleration region) and SKR source regions.

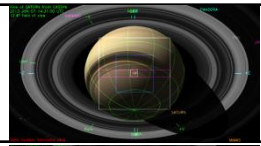
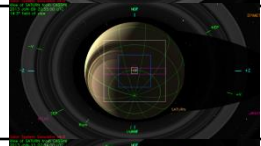
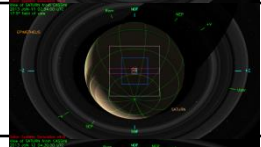
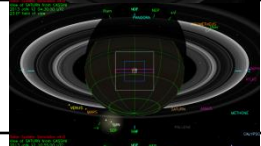
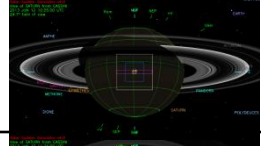
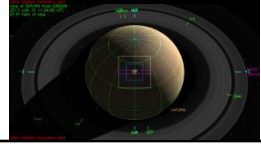
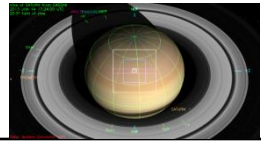
===== Jun 13 2013 =====
DOY 164:
CIRS conducted a sit and stare observation of Saturn's northern aurora to derive composition, while UVIS and VIMS rode along.
The spacecraft traveled through periapse at a range of 10.2 Rs.
With CIRS and ISS riders, VIMS recorded a Saturn North Pole movie with 2x2 Mosaics centered at the North Pole.
VIMS observed the star R Carinae as it is occulted by Saturn with a CIRS rider.

===== Jun 14 2013 =====
DOY 165:
ISS investigated Saturn's North Pole for tracking of the possible north polar vortex. The other ORS teams rode along.
ISS led an ORS distant Titan cloud observation as part of the ongoing Titan Monitoring Campaign.
ISS took another look at Albiorix, an irregular moon of Saturn, while UVIS rode along to measure the satellite's albedo in ultraviolet light.

===== Jun 15 2013 =====
DOY 166:
ISS finished an observation of the irregular moon Albiorix.
MAPS teams continued their outer magnetospheric survey.

Segment Integration Planning

Timeline Gaps and Suggested Observations

Gap	Start	End	Duration	Phase angle (range)	Rs range	Sub-S/C Lat.	Snapshot (mid-gap)
1	2013-158T01:31:00 *VIMS Storm Alley Movie*	2013-158T23:20:00	000T21:49:00	60.3 to 76.0	23.2 to 22.9	-32 to -44	
2	2013-159T15:10:00 *VIMS & UVIS Aurora*	2013-160T03:05:00	000T11:55:00	83.4 to 91.4	22.4 to 21.6	-49 to -53	
3	2013-160T14:55:00 *VIMS Polar Dynamics Movie*	2013-161T03:04:00	000T12:09:00	100.0 to 109.8	20.6 to 19.4	-57 to -59	
4	2013-161T14:54:00 *CIRS Mapping*	2013-162T14:34:00	000T23:40:00	120.8 to 149.9	18.0 to 14.6	-58 to -43	
5a	2013-163T03:00:00 *UVIS Ingress Solar Occultation*	2013-163T05:55:00	000T02:55:00	171.8 to 177.7	12.7 to 12.3	-26 to -21	
5b	2013-163T07:55:00 *ISS Limb Hazes and VIMS Ring Occultation*	2013-163T14:34:00	000T06:39:00	177.6 to 161.5	12.0 to 11.2	-17 to -3	
6	2013-164T02:24:00 *CIRS 12 hrs, VIMS North Pole Movie 6 hrs*	2013-164T20:34:00	000T18:10:00	127.7 to 74.1	10.3 to 11.1	25 to 59	
7	2013-165T08:24:00 *12hr ISS North Pole Movie, 6hr VIMS Regional Map*	2013-166T02:49:00	000T18:25:00	46.4 to 15.6	12.6 to 15.4	53 to 32	

Initial SMT and Data Volume (1 of 2)

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)
SP_192EA_G70METNON159_PRIME	159 01:30	159 05:30	0	391	105	495	3322	2827	0	58	24	577	1719	**1141**	4464	36%	0
SP_192EA_C34BWGNON159_PRIME	159 05:30	159 14:30	0	0	0	0	3322	3322	0	222	53	275	896	**620**	3411	31%	0
SP_192EA_C34BWGNON160_PRIME	160 05:15	160 14:15	0	213	62	275	3322	3047	0	222	53	551	896	**344**	2791	28%	0
SP_192EA_C34BWGNON161_PRIME	161 05:14	161 14:14	0	224	63	288	3322	3034	0	232	53	573	890	**316**	2446	27%	0
SP_192EA_M34BWGOTP162_PRIME	162 15:14	163 00:14	0	390	106	496	3322	2826	0	232	53	781	535	-246	2129	26%	246
SP_192EA_M70METOTB163_PRIME	163 15:14	164 00:14	246	883	63	1193	3322	2129	0	728	53	1974	3054	**1080**	3446	45%	0
SP_192EA_G34HEFNON164_PRIME	164 22:44	165 07:44	0	665	95	760	3322	2562	0	331	53	1145	842	-303	2365	52%	302
SP_192EA_C70METNON166_PRIME	166 04:59	166 13:59	302	565	90	957	3322	**2365**	0	332	53	1342	3720	2378	2379	64%	0

Initial SMT and Data Volume (2 of 2)

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	158 00:45	159 01:30	90.9	46.7	0.0	13.2	0.0	44.0	75.7	0.0	116.7	0.0	0.0	0.0	103.4	490.8
SP_192EA_G70METNON159_PRIME	159 01:30	159 05:30	10.1	7.5	0.0	1.4	0.0	7.1	12.2	0.0	18.9	0.0	0.0	0.0	0.0	57.3
SP_192EA_C34BWGNON159_PRIME	159 05:30	159 14:30	22.7	17.0	86.4	3.2	0.0	16.0	27.5	0.0	42.4	4.9	0.0	0.0	0.0	220.2
DAILY TOTAL SCIENCE	158 00:45	159 14:30	123.7	71.2	86.4	17.9	0.0	67.1	115.5	0.0	178.0	4.9	0.0	0.0	103.4	
OBSERVATION_NOR	159 14:30	160 05:15	37.2	27.8	0.0	5.3	0.0	26.2	45.1	0.0	69.6	0.0	0.0	0.0	61.6	272.9
SP_192EA_C34BWGNON160_PRIME	160 05:15	160 14:15	22.7	17.0	86.4	3.2	0.0	16.0	27.5	0.0	42.4	4.9	0.0	0.0	0.0	220.2
DAILY TOTAL SCIENCE	159 14:30	160 14:15	59.9	44.8	86.4	8.6	0.0	42.2	72.7	0.0	112.0	4.9	0.0	0.0	61.6	
OBSERVATION_NOR	160 14:15	161 05:14	45.6	28.3	0.0	5.4	0.0	26.6	45.8	0.0	70.7	0.0	0.0	0.0	62.6	285.0
SP_192EA_C34BWGNON161_PRIME	161 05:14	161 14:14	32.4	17.0	86.4	3.2	0.0	16.0	27.5	0.0	42.4	4.9	0.0	0.0	0.0	229.9
DAILY TOTAL SCIENCE	160 14:15	161 14:14	78.0	45.2	86.4	8.6	0.0	42.7	73.4	0.0	113.1	4.9	0.0	0.0	62.6	
OBSERVATION_NOR	161 14:14	162 15:14	90.0	47.2	0.0	10.9	0.0	44.5	76.5	0.0	117.8	0.0	0.0	0.0	104.5	491.3
SP_192EA_M34BWGOTP162_PRIME	162 15:14	163 00:14	32.4	17.0	86.4	3.2	0.0	16.0	27.5	0.0	42.1	4.9	0.0	0.0	0.0	229.6
DAILY TOTAL SCIENCE	161 14:14	163 00:14	122.4	64.1	86.4	14.2	0.0	60.5	104.0	0.0	159.9	4.9	0.0	0.0	104.5	
OBSERVATION_NOR	163 00:14	163 15:14	54.0	36.5	57.6	5.4	320.0	26.7	45.9	0.0	216.4	30.8	82.0	0.0	62.7	938.0
SP_192EA_M70METOTB163_PRIME	163 15:14	164 00:14	32.4	48.4	86.4	3.2	0.0	16.0	27.5	0.0	502.6	4.9	0.0	0.0	0.0	721.5
DAILY TOTAL SCIENCE	163 00:14	164 00:14	86.4	84.9	144.0	8.6	320.0	42.7	73.4	0.0	719.0	35.7	82.0	0.0	62.7	
OBSERVATION_NOR	164 00:14	164 22:44	81.0	42.4	21.6	8.1	35.0	40.0	68.8	0.0	352.1	0.0	10.0	0.0	94.0	753.1
SP_192EA_G34HEFNON164_PRIME	164 22:44	165 07:44	32.4	17.0	86.4	3.2	0.0	16.0	27.5	0.0	140.8	4.9	0.0	0.0	0.0	328.3
DAILY TOTAL SCIENCE	164 00:14	165 07:44	113.4	59.4	108.0	11.3	35.0	56.0	96.4	0.0	492.9	4.9	10.0	0.0	94.0	
OBSERVATION_NOR	165 07:44	166 04:59	76.5	40.1	0.0	7.7	0.0	37.8	65.0	0.0	332.7	0.0	0.0	0.0	88.8	648.5
SP_192EA_C70METNON166_PRIME	166 04:59	166 13:59	32.4	17.0	86.4	3.2	0.0	16.0	27.5	0.0	141.1	4.9	0.0	0.0	0.0	328.7
DAILY TOTAL SCIENCE	165 07:44	166 13:59	108.9	57.1	86.4	10.9	0.0	53.8	92.6	0.0	473.8	4.9	0.0	0.0	88.8	

	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)	692.6	426.8	684.0	80.1	355.0	365.0	628.0	0.0	2248.8	65.4	92.0	0.0

Waypoint Selection

RBOT - Friendly

OBSERVATION PERIOD	START	END	POS_X	NEG_X	POS_Z	NEG_Z
SP_191NA_OBSERV158_NA	2013-158T00:45:00	2013-159T05:30:00	136.5/ 31.5	136.5/ 31.5	------	136.5/ 31.5
SP_192NA_OBSERV159_NA	2013-159T14:30:00	2013-160T05:15:00	136.5/ 31.5	136.5/ 31.5	------	136.5/ 31.5
SP_192NA_OBSERV160_NA	2013-160T14:15:00	2013-161T05:14:00	136.5/ 31.5	136.5/ 31.5	------	136.5/ 31.5
SP_192NA_OBSERV161_NA	2013-161T14:14:00	2013-162T15:14:00	136.5/ 31.5	136.5/ 31.5	------	136.5/ 31.5
SP_192NA_OBSERV163_NA	2013-163T00:14:00	2013-163T15:14:00	------	------	------	------
SP_192NA_OBSERV164_NA	2013-164T00:14:00	2013-164T22:44:00	136.5/ 31.5	136.5/ 31.5	136.5/ 31.5	------
SP_192NA_OBSERV165_NA	2013-165T07:44:00	2013-166T04:59:00	136.5/ 31.5	136.5/ 31.5	136.5/ 31.5	------

NEG_Y to Saturn Waypoints (Safe NSP Secondaries)

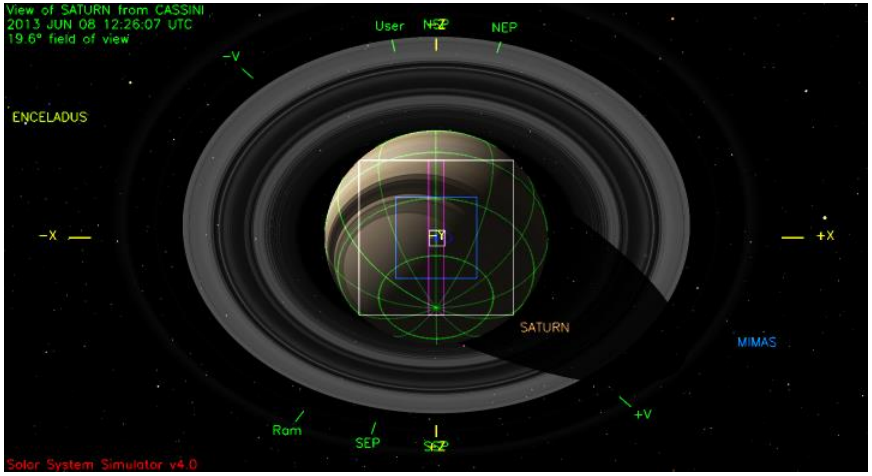
Gap	Start	End	Duration	POS_X	NEG_X	POS_Z	NEG_Z
1	2013-158T01:31:00	2013-158T23:20:00	000T21:49:00	NO	YES	NO	YES
2	2013-159T15:10:00	2013-160T03:05:00	000T11:55:00	NO	YES	NO	YES
3	2013-160T14:55:00	2013-161T03:04:00	000T12:09:00	NO	YES	NO	YES
4	2013-161T14:54:00	2013-162T14:34:00	000T23:40:00	YES	NO	NO	YES
5a	2013-163T03:00:00	2013-163T05:55:00	000T02:55:00	NO	NO	NO	NO
5b	2013-163T07:55:00	2013-163T14:34:00	000T06:39:00	NO	13:15 - END	13:15 - END	NO
6	2013-164T02:24:00	2013-164T20:34:00	000T18:10:00	NO	YES	YES	NO
7	2013-165T08:24:00	2013-166T02:49:00	000T18:25:00	YES	NO	YES	NO

*** NEG_Y to Saturn not safe from 2013-162T23:25to 163T13:15 (ORS to Sun < 15 deg.).**
- Minimum ORS to Sun angle is appx. 0.81 deg.

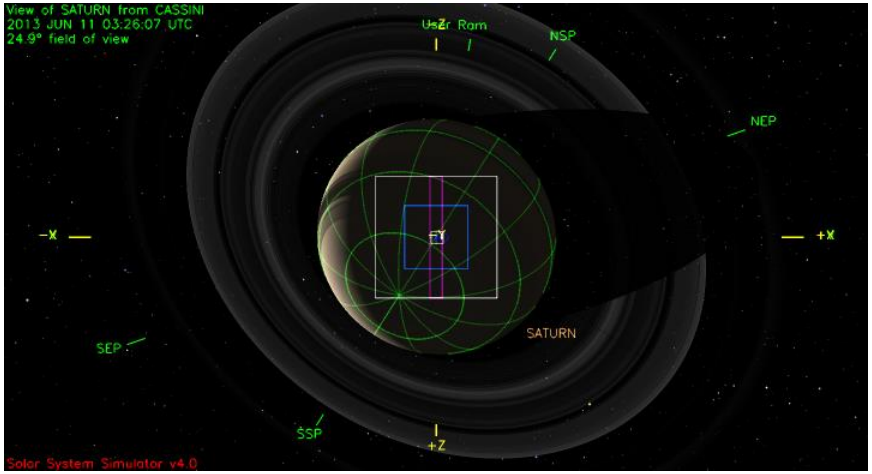
- UVIS_SOL_OFF to Sun; +/-X or +/-Z to NSP are all safe for the 5th period.

Waypoints Chosen (1 of 2)

Waypoint 1 (2013-158T01:31:00 – 2013-160T14:55:00): ISS_NAC to Saturn; NEG_Z to NSP

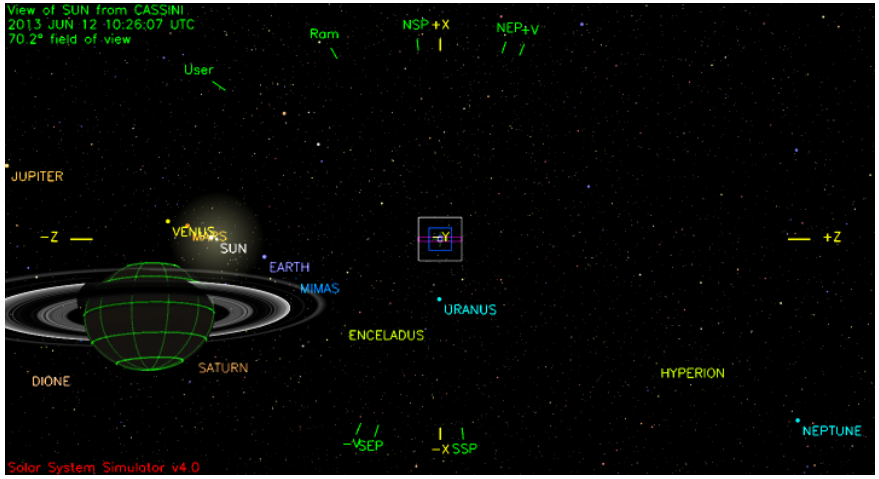


Waypoint 2 (2013-160T14:55:00 – 2013-163T00:54:00): ISS_NAC to Saturn, NEG_Z to 136.5/31.5

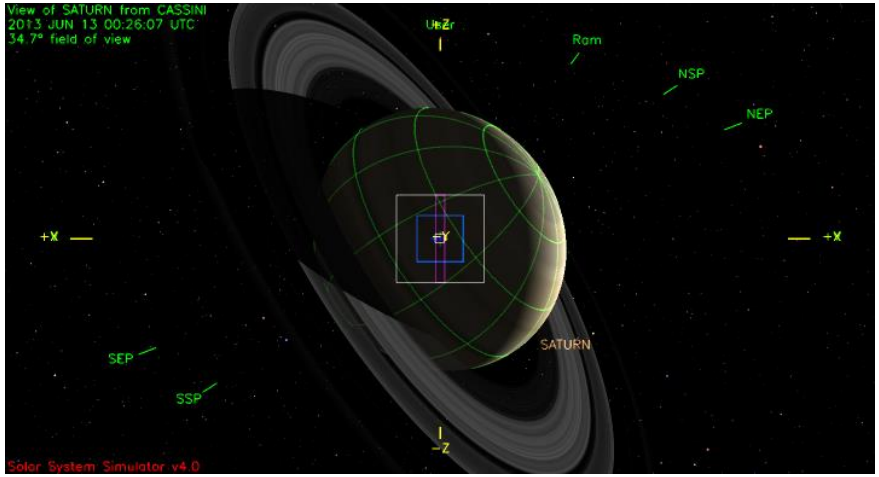


Waypoints Chosen (2 of 2)

Waypoint 3 (2013-163T00:54:00 – 2013-164T00:54:00): UVIS_SOL_OFF to Sun; POS_X to NSP



Waypoint 4 (2013-164T00:54:00 – 2013-165T19:34:00): ISS_NAC to Saturn, POS_Z to 136.5/31.5



Notes & Liens

- Pointing:
  - RBOT-friendly RA/Decs used where provided except for first two observation periods. For these periods, science goals could not be fully met by RBOT-friendly RA/Dec. To avoid unnecessary slewing, the science-preferred secondary was chosen as the waypoint.
- Data Volume:
  - Segment was too data volume intensive to clear SSR every 4 days. SSR cleared at end of week long segment.
- DSN:
  - ap_downlink report check warnings: SP_192EA_C34BWGNON159_PRIME is not a handover pass.
  - 4 hr DSS-14 added on DOY 159 immediately preceding nominally planned downlink.
  - DOY 164 downgraded to a HEF; DOY 166 upgraded to 70M.
- Resource checker:
  - All gaps are intentional.
- Opmodes:
  - Nothing unique.
- Hydrazine:
  - N/A
- Special Activities:
  - None.

Sequence Liens (should all be SPLAT items):

- None