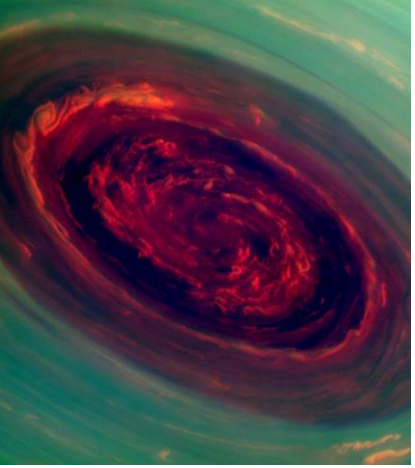
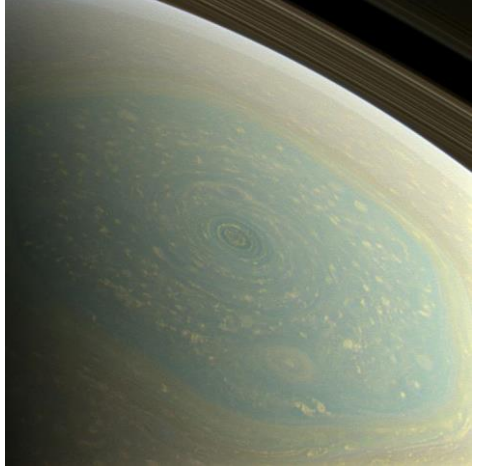
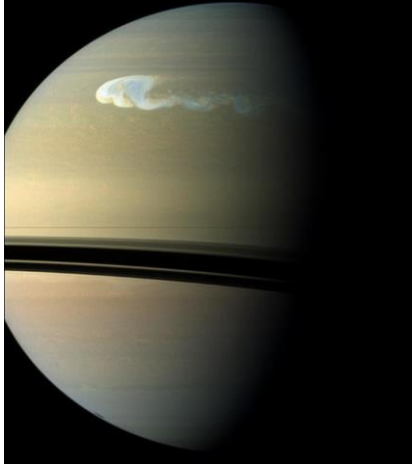


Science Planning & Sequence Team
CASSINI

SATURN TARGET WORKING TEAM

Rev 194-195 Segment Legacy Package

Segment Boundary: July 13, 2013 – July 19, 2013
2013-194T05:41:00 – 2013-200T21:10:00 (SCET)

Integration Began 09/17/2012
Segment Delivered to S79 Sequence 12/13/2012
Lead Integrator was Kathleen Kelleher

Legacy Package Assembled by Kathleen Kelleher

Table of Contents

Segment Overview and Final Products

Segment Summary

- Saturn 194-195 is a 5.5+ day apoapse segment in the first inclined phase (IN-1) of the Solstice Mission.
- The timeline was filled primarily with UVIS EUV/FUVs, a typical apoapse activity, and VIMS southern hemisphere regional mapping and a stellar ring occultation.
- Noteworthy out-of-discipline activities included Titan Cloud Monitoring Campaign observations and MAG calibration rolling.
- A single waypoint was chosen for the entire segment except during RSS's occultation. In this case the RBOT (reaction wheel) friendly attitude was incompatible with science and caused extended turn times.

Final Sequenced SPASS

Gap 1

Gap 2

Gap 3

Gap 4

Request	Riders	Start (SCET)	Start (Epoch)	Duration	End (SCET)	Primary	Secondary	Comments
Sequence 579, length = 68 days		2013-158T00:45:00		068T09:06:00	2013-226T09:51:00			
SATURN_194_195 Segment		2013-194T05:41:00		006T15:29:00	2013-200T21:10:00			
SP_194SA_WAYPTTURN194_PRIME		2013-194T05:41:00		000T00:40:00	2013-194T06:21:00	ISS_NAC to Saturn	NEG_X to Sun	
NEW WAYPOINT		**2013-194T06:21:00**		**000T14:19:00**	**2013-194T20:40:00**	**ISS_NAC to Saturn**	**NEG_X to Sun**	
UVIS_194SA_EUVFUV001_PRIME	I, V	2013-194T06:21:00		000T10:40:00	2013-194T17:01:00	UVIS_FUV to Saturn	NEG_X to Sun	
VIMS_194SA_SREGMAP001_PRIME	C, I	2013-194T17:01:00		000T02:59:00	2013-194T20:00:00	ISS_NAC to Saturn	NEG_Z to NSP	
SP_194EA_DLTURN194_PRIME		2013-194T20:00:00		000T00:40:00	2013-194T20:40:00	XBAND to Earth	NEG_X to NEP	
NEW WAYPOINT		**2013-194T20:40:00**		**000T09:40:00**	**2013-195T06:20:00**	**XBAND to Earth**	**NEG_X to NEP**	
SP_194EA_G34HEFOTP194_PRIME	C, E, N	2013-194T20:40:00		000T09:00:00	2013-195T05:40:00	XBAND to Earth	4_Hr_Rolling	NEG_X to NEP. OTP. SID suspend
SP_194SA_WAYPTTURN195_PRIME		2013-195T05:40:00		000T00:40:00	2013-195T06:20:00	ISS_NAC to Saturn	NEG_X to Sun	
NEW WAYPOINT		**2013-195T06:20:00**		**000T14:20:00**	**2013-195T20:40:00**	**ISS_NAC to Saturn**	**NEG_X to Sun**	
ISS_194TI_M90R2CLD195_PRIME	C, V	2013-195T06:20:00	E194_M90R2CLD195+000T00:00:00	000T01:30:00	2013-195T07:50:00	ISS_NAC to Titan	NEG_X to Sun	No Preference to secondary pointing
UVIS_194SA_EUVFUV002_PRIME	I, V	2013-195T07:50:00		000T10:40:00	2013-195T18:30:00	UVIS_FUV to Saturn	NEG_X to Sun	
VIMS_194SA_SREGMAP002_PRIME	C, I	2013-195T18:30:00		000T01:30:00	2013-195T20:00:00	ISS_NAC to Saturn	NEG_Z to NSP	
SP_194EA_DLTURN195_PRIME		2013-195T20:00:00		000T00:40:00	2013-195T20:40:00	XBAND to Earth	NEG_X to 281.479/62.659	
NEW WAYPOINT		**2013-195T20:40:00**		**000T09:40:00**	**2013-196T06:20:00**	**XBAND to Earth**	**NEG_X to 281.479/62.659**	
SP_194EA_G34HEFOTB195_PRIME	C, N	2013-195T20:40:00		000T09:00:00	2013-196T05:40:00	XBAND to Earth	4_Hr_Rolling	NEG_X to NEP. OTB. SID suspend. CIRS heating
SP_194SA_WAYPTTURN196_PRIME		2013-196T05:40:00		000T00:40:00	2013-196T06:20:00	ISS_NAC to Saturn	NEG_X to Sun	
NEW WAYPOINT		**2013-196T06:20:00**		**000T14:05:00**	**2013-196T20:25:00**	**ISS_NAC to Saturn**	**NEG_X to Sun**	
Apoapse Peri = 16.0 d, inc ..		2013-196T06:14:33		000T00:00:01	2013-196T06:14:34			
UVIS_195SA_EUVFUV003_PRIME	I, V	2013-196T06:20:00		000T08:40:00	2013-196T15:00:00	UVIS_FUV to Saturn	NEG_X to Sun	
VIMS_195RI_MUCEPOCC001_PRIME	C, U	2013-196T15:00:00		000T04:45:00	2013-196T19:45:00	VIMS_IR to 325.876/58.78	PIC	
SP_195EA_DLTURN196_PRIME		2013-196T19:45:00		000T00:40:00	2013-196T20:25:00	XBAND to Earth	NEG_X to 281.479/62.659	
NEW WAYPOINT		**2013-196T20:25:00**		**000T11:10:00**	**2013-197T07:35:00**	**XBAND to Earth**	**NEG_X to 281.479/62.659**	
SP_195EA_G34HEFNON196_PRIME	C	2013-196T20:25:00		000T09:00:00	2013-197T05:25:00	XBAND to Earth	Rolling/SRU	NEG_X to NEP. SID suspend. CIRS heating
SP_195EA_YGAP197_PRIME		2013-197T05:25:00		000T01:30:00	2013-197T06:55:00	XBAND to Earth	NEG_X to 281.479/62.659	
SP_195SA_WAYPTTURN197_PRIME		2013-197T06:55:00		000T00:40:00	2013-197T07:35:00	ISS_NAC to Saturn	NEG_X to Sun	
NEW WAYPOINT		**2013-197T07:35:00**		**000T11:20:00**	**2013-197T18:55:00**	**ISS_NAC to Saturn**	**NEG_X to Sun**	
UVIS_195SA_EUVFUV004_PRIME	I, V	2013-197T07:35:00		000T10:40:00	2013-197T18:15:00	UVIS_FUV to Saturn	NEG_X to Sun	
SP_195EA_DLTURN197_PRIME		2013-197T18:15:00		000T00:40:00	2013-197T18:55:00	XBAND to Earth	NEG_X to 281.479/62.659	
NEW WAYPOINT		**2013-197T18:55:00**		**000T11:10:00**	**2013-198T06:05:00**	**XBAND to Earth**	**NEG_X to 281.479/62.659**	
SP_195EA_YGAP397_PRIME		2013-197T18:55:00		000T01:30:00	2013-197T20:25:00	XBAND to Earth	NEG_X to 281.479/62.659	
SP_195EA_G70METNON197_PRIME	C, E	2013-197T23:25:00		000T06:00:00	2013-198T05:25:00	XBAND to Earth	5_Hr_Rolling	NEG_X to NEP. CIRS heating
SP_195SA_WAYPTTURN198_PRIME		2013-198T05:25:00		000T00:40:00	2013-198T06:05:00	ISS_NAC to Saturn	NEG_X to Sun	
NEW WAYPOINT		**2013-198T06:05:00**		**000T12:50:00**	**2013-198T18:55:00**	**ISS_NAC to Saturn**	**NEG_X to Sun**	
ISS_195TI_M90R2CLD198_PRIME	C, V	2013-198T06:05:00	E195_M90R2CLD198+000T00:00:00	000T01:30:00	2013-198T07:35:00	ISS_NAC to Titan	NEG_X to Sun	No Preference to secondary pointing
UVIS_195SA_EUVFUV005_PRIME	I, V	2013-198T07:35:00		000T10:40:00	2013-198T18:15:00	UVIS_FUV to Saturn	NEG_X to Sun	
SP_195EA_DLTURN198_PRIME		2013-198T18:15:00		000T00:40:00	2013-198T18:55:00	XBAND to Earth	NEG_X to 281.479/62.659	
NEW WAYPOINT		**2013-198T18:55:00**		**000T14:10:00**	**2013-199T09:05:00**	**XBAND to Earth**	**NEG_X to 281.479/62.659**	
SP_195EA_YGAP198_PRIME		2013-198T18:55:00		000T01:30:00	2013-198T20:25:00	XBAND to Earth	NEG_X to 281.479/62.659	
SP_195EA_G34B26NON198_PRIME	C, R	2013-198T20:25:00		000T09:00:00	2013-199T05:25:00	XBAND to Earth	Rolling	NEG_X to NEP. CIRS heating
SP_195EA_C70METNON199_PRIME		2013-199T05:25:00		000T03:00:00	2013-199T08:25:00	XBAND to Earth	3_Hr_Rolling	NEG_X to NEP. CIRS heating
SP_195SA_WAYPTTURN199_PRIME		2013-199T08:25:00		000T00:40:00	2013-199T09:05:00	ISS_NAC to Saturn	NEG_X to Sun	
NEW WAYPOINT		**2013-199T09:05:00**		**000T11:20:00**	**2013-199T20:25:00**	**ISS_NAC to Saturn**	**NEG_X to Sun**	
UVIS_195SA_EUVFUV006_PRIME	I, V	2013-199T09:05:00		000T10:40:00	2013-199T19:45:00	UVIS_FUV to Saturn	NEG_X to Sun	
SP_195EA_DLTURN199_PRIME		2013-199T19:45:00		000T00:40:00	2013-199T20:25:00	XBAND to Earth	NEG_X to NEP	
NEW WAYPOINT		**2013-199T20:25:00**		**001T09:45:00**	**2013-201T06:10:00**	**XBAND to Earth**	**NEG_X to NEP**	
SP_195EA_G34B26NON199_PRIME	C, N, U	2013-199T20:25:00		000T02:15:00	2013-199T22:40:00	XBAND to Earth	Rolling	NEG_X to NEP. OTP. CIRS heating
SP_195EA_G70METOTP199_PRIME	C, E, N, U	2013-199T22:40:00		000T06:45:00	2013-200T05:25:00	XBAND to Earth	2_Hr_Rolling	NEG_X to NEP. OTP. CIRS heating
MAG_195SU_CALROLL001_PRIME		2013-200T05:25:00		000T07:15:00	2013-200T12:40:00	NEG_X to Earth (0.0,0.0,-30.0 deg. offset)	Rolling	
SP_195EA_M34HEFOTB200_PRIME	C, N, U	2013-200T12:40:00		000T08:30:00	2013-200T21:10:00	XBAND to Earth	Rolling	NEG_X to NEP. OTB. CIRS heating

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 (%)	CAROVR (Mb)
SP_194EA_G34BWGNON193_PRIME	194 02:26	194 05:41	416	0	0	416	3322	2906	0	79	19	514	229	-286	-107	-1%	286
SP_194EA_G34HEFOTP194_PRIME	194 20:40	195 05:40	286	1127	63	1476	3322	1847	0	287	53	1816	662	-1154	-107	0%	1153
SP_194EA_G34HEFOTB195_PRIME	195 20:40	196 05:40	1153	1076	63	2293	3322	1029	0	287	53	2633	795	-1838	-107	0%	1838
SP_195EA_G34HEFNON196_PRIME	196 20:25	197 05:25	1838	933	62	2833	3322	489	0	287	53	3173	770	-2403	-107	0%	2403
SP_195EA_G70METNON197_PRIME	197 23:25	198 05:25	2403	952	76	3431	3322	-107	0	199	35	3556	2351	-1206	1255	14%	1205
SP_195EA_G34B26NON198_PRIME	198 20:25	199 05:25	1205	733	63	2001	3322	1321	0	209	53	2263	670	-1593	1729	16%	1593
SP_195EA_C70METNON199_PRIME	199 05:25	199 08:25	1593	0	0	1593	3322	1729	0	39	18	1649	1309	-341	2391	23%	340
SP_195EA_G34B26NON199_PRIME	199 20:25	199 22:40	340	539	51	931	3322	2391	0	37	13	981	151	-831	2492	25%	830
SP_195EA_G70METOTP199_PRIME	199 22:40	200 05:25	830	0	0	830	3322	2492	0	122	40	993	1886	893	3000	24%	0
SP 195EA M34HEFOTB200 PRIME	200 12:40	200 21:10	0	120	31	150	3322	3172	0	149	50	349	629	280	2107	16%	0

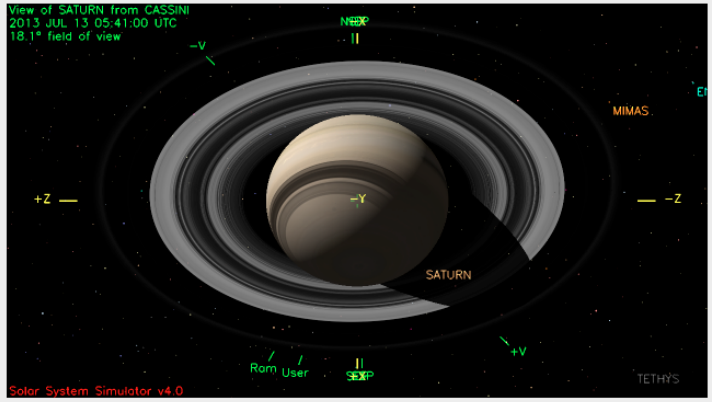
* NOTE: Negative SSR (P4) Margins did not result in data loss due to compression/under-utilization.

Final Sequenced SMT and Data Volume (2 of 2)

DATA VOLUME REPORT --- TRANSFER FRAME OVERHEAD NOT INCLUDED

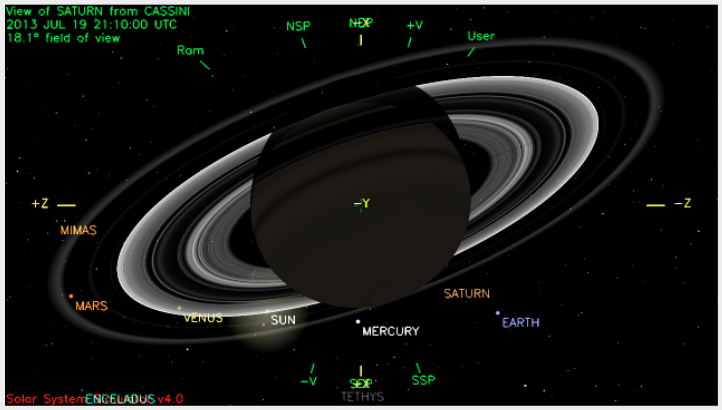
Event	Start doy hh:mm	End doy hh:mm	CAPS (Mb)	CDA (Mb)	CIRS (Mb)	INMS (Mb)	ISS (Mb)	MAG (Mb)	MIMI (Mb)	RADAR (Mb)	RPWS (Mb)	UVIS (Mb)	VIMS (Mb)	PROBE (Mb)	ENGR (Mb)	TOTAL (Mb)
OBSERVATION_NOR	194 05:41	194 20:40	37.8	28.3	98.3	5.4	140.0	26.6	45.8	0.0	178.0	193.2	363.0	0.0	62.6	1179.0
SP_194EA_G34HEFOTP194_PRIME	194 20:40	195 05:40	22.7	17.0	86.4	3.2	0.0	16.0	27.5	0.0	106.9	4.9	0.0	0.0	0.0	284.7
DAILY TOTAL SCIENCE	194 05:41	195 05:40	60.4	45.2	184.7	8.6	140.0	42.7	73.4	0.0	284.9	198.2	363.0	0.0	62.6	
OBSERVATION_NOR	195 05:40	195 20:40	37.8	28.3	109.2	5.4	133.5	26.7	45.9	0.0	178.2	193.2	308.0	0.0	62.7	1128.8
SP_194EA_G34HEFOTB195_PRIME	195 20:40	196 05:40	22.7	17.0	86.4	3.2	0.0	16.0	27.5	0.0	106.9	4.9	0.0	0.0	0.0	284.7
DAILY TOTAL SCIENCE	195 05:40	196 05:40	60.5	45.3	195.6	8.6	133.5	42.7	73.4	0.0	285.1	198.2	308.0	0.0	62.7	
OBSERVATION_NOR	196 05:40	196 20:25	37.2	27.8	100.0	15.4	50.0	26.2	45.1	0.0	175.2	174.2	273.0	0.0	61.6	985.8
SP_195EA_G34HEFNON196_PRIME	196 20:25	197 05:25	22.7	17.0	86.4	3.2	0.0	16.0	27.5	0.0	106.9	4.9	0.0	0.0	0.0	284.7
DAILY TOTAL SCIENCE	196 05:40	197 05:25	59.9	44.8	186.4	18.6	50.0	42.2	72.7	0.0	282.1	179.1	273.0	0.0	61.6	
OBSERVATION_NOR	197 05:25	197 23:25	45.4	34.0	98.4	6.5	50.0	32.0	55.1	0.0	213.8	194.9	213.0	0.0	75.2	1018.2
SP_195EA_G70METNON197_PRIME	197 23:25	198 05:25	15.1	11.3	64.8	2.2	0.0	10.7	18.4	0.0	71.3	3.3	0.0	0.0	0.0	197.0
DAILY TOTAL SCIENCE	197 05:25	198 05:25	60.5	45.3	163.2	8.6	50.0	42.7	73.4	0.0	285.1	198.2	213.0	0.0	75.2	
OBSERVATION_NOR	198 05:25	198 20:25	37.8	28.3	21.6	5.4	88.5	26.7	45.9	0.0	55.8	193.2	223.0	0.0	62.7	788.8
SP_195EA_G34B26NON198_PRIME	198 20:25	199 05:25	22.7	17.0	86.4	3.2	0.0	16.0	27.5	0.0	29.2	4.9	0.0	0.0	0.0	206.9
SP_195EA_C70METNON199_PRIME	199 05:25	199 08:25	7.6	5.7	0.0	1.1	0.0	5.3	9.2	0.0	9.7	0.0	0.0	0.0	0.0	38.5
DAILY TOTAL SCIENCE	198 05:25	199 08:25	68.0	50.9	108.0	9.7	88.5	48.0	82.6	0.0	94.7	198.2	223.0	0.0	62.7	
OBSERVATION_NOR	199 08:25	199 20:25	30.2	11.3	0.0	4.3	50.0	10.7	25.9	0.0	38.9	193.2	170.0	0.0	50.2	584.7
SP_195EA_G34B26NON199_PRIME	199 20:25	199 22:40	5.7	2.1	13.5	0.8	0.0	2.0	4.9	0.0	7.3	0.6	0.0	0.0	0.0	36.9
SP_195EA_G70METOTP199_PRIME	199 22:40	200 05:25	17.0	6.4	51.3	2.4	0.0	6.0	14.6	0.0	21.9	1.8	0.0	0.0	0.0	121.4
DAILY TOTAL SCIENCE	199 08:25	200 05:25	52.9	19.8	64.8	7.6	50.0	18.7	45.4	0.0	68.0	195.6	170.0	0.0	50.2	
OBSERVATION_NOR	200 05:25	200 12:40	18.3	6.8	0.0	2.6	0.0	51.6	15.7	0.0	23.5	0.0	0.0	0.0	30.3	148.7
SP_195EA_M34HEFOTB200_PRIME	200 12:40	200 21:10	21.4	8.0	59.4	3.1	0.0	7.6	18.4	0.0	27.5	2.3	0.0	0.0	0.0	147.6
DAILY TOTAL SCIENCE	200 05:25	200 21:10	39.7	14.9	59.4	5.7	0.0	59.1	34.0	0.0	51.0	2.3	0.0	0.0	30.3	

Segment Geometry




```
Rev 194 OUTBOUND
2013 -  194T05:41:00 SCET
2013 JUL 13 05:41:00 SCET
2013 JUL 13 07:00:23 ERT
Apoapse__194 + 012T01:02:04
Periapse_194 + 006T01:32:29
Light time:     79.4 min
Orbit period:   16.0 days
Radius      1456271 km       24.16 Rs
Rad_cyl     1135457 km       18.84 Rs
Z_ht_cyl    -911846 km       -15.13 Rs
Mag_L            39.75
Semi_axs    1222511 km       20.28 Rs
Eccentricity     0.241
Inclination     56.73 deg
Sun_range        9.84 AU
Earth_range      9.55 AU
--- DSN ELEV -- D/L -- U/L --------
Goldstone       12.4   37.5
Canberra        54.7   24.3
Madrid         -60.4  -43.3
------- LOOK DIRECTION INFO -------
FOV              18.1 deg  315.5 mrad
RA             -94.183 deg
DEC             43.475 deg
Crosses_RP_@     0.000 Rs
EPS              5.759 deg *
SEP            103.799 deg
ORS b/s angle  109.3 deg
ORS rad angle  131.9 deg
```

194 Outbound




```
Rev 195  INBOUND
2013 -  200T21:10:00 SCET
2013 JUL 19 21:10:00 SCET
2013 JUL 19 22:30:23 ERT
Apoapse__195 + 004T14:55:27
Periapse_195 - 003T08:30:19
Light time:     80.4 min
Orbit period:   15.9 days
Radius      1219521 km       20.23 Rs
Rad_cyl     1138604 km       18.89 Rs
Z_ht_cyl    -436820 km       -7.25 Rs
Mag_L            23.21
Semi_axs    1221873 km       20.27 Rs
Eccentricity     0.241
Inclination     56.73 deg
Sun_range        9.85 AU
Earth_range      9.66 AU
--- DSN ELEV -- D/L -- U/L --------
Goldstone       20.5  -10.5
Canberra       -35.3  -42.9
Madrid          16.1   36.2
------- LOOK DIRECTION INFO -------
FOV              18.1 deg  315.5 mrad
RA              35.746 deg
DEC             14.550 deg
Crosses_RP_@     0.000 Rs
EPS              5.869 deg *
SEP             97.576 deg
ORS b/s angle    3.6 deg  *
ORS rad angle   87.3 deg  *
```

Point NEG_Y at SATURN and align NEG_X = Up with NEP

User vector - RA: -88.648 DEC: +24.836 Paste Current RA/DEC

Tilt L | Up | Tilt R | Left | Reset | Right | Image | Down | Hi Res

Zoom Out | Fill Screen | Zoom In | Labels | Orbits | FOVs | Axes | Vectors | Lat/lons

Year / Month / Day / Hour / Minute / Second / Event

Turn analyzer: SATURN to EARTH about Z on RWA = 11.0 min / 107.7 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	ALON (deg)	VREL (km/s)	Z_HGHT (km)	ANGLE_FROM SATRN	ANGLE_FROM EARTH	ANGLE_FROM RAM
SATURN	--	--	1456271	24.16	1398257	23.20	70.7	4.74	82.79	18	-39	0	4.6	0	0.0	107.7	100.3
IO	--	--	2051M	34.03K	2051M	34.03K	33.4	0.00	0.00	71	4	26	29.1	834515894	112.6	22.4	115.7
EUROPA	--	--	2052M	34.04K	2052M	34.04K	33.3	0.00	0.00	5	4	26	32.1	834697668	112.6	22.4	115.7
GANYMEDE	--	--	2051M	34.04K	2051M	34.04K	33.4	0.00	0.00	62	4	26	25.7	834804341	112.6	22.4	115.7
CALLISTO	--	--	2052M	34.05K	2052M	34.05K	33.4	0.00	0.00	60	4	26	23.5	835101694	112.6	22.5	115.7
MIMAS	--	--	1402572	23.27	1402377	23.27	68.0	0.02	0.30	254	-42	-62	12.3	4925	7.0	111.0	105.7
ENCELADUS	--	--	1390166	23.07	1389916	23.06	66.9	0.02	0.37	259	-41	-63	10.6	-27	9.2	112.3	107.1
TETHYS	--	--	1645636	27.31	1645101	27.30	62.5	0.04	0.66	326	-33	-137	13.4	5589	8.4	116.0	99.8
DIONE	--	--	1438337	23.87	1437776	23.86	62.6	0.04	0.78	276	-39	-77	8.8	84	15.0	117.0	109.4
RHEA	--	--	1398106	23.20	1397344	23.19	61.7	0.06	1.10	279	-41	-68	7.0	1003	21.2	118.7	114.7
TITAN	--	--	1093325	18.14	1090750	18.10	84.3	0.27	4.71	290	-57	-28	3.5	8339	56.2	99.4	154.9
HYPERION	--	--	1891316	31.38	1891203	31.38	50.2	0.01	0.17	153	-72	-80	5.0	11184	47.7	132.9	124.1

Point NEG_Y at SATURN and align NEG_X = Up with NEP

User vector - RA: -88.648 DEC: +24.836 Paste Current RA/DEC

Tilt L | Up | Tilt R | Left | Reset | Right | Image | Down | Hi Res

Zoom Out | Fill Screen | Zoom In | Labels | Orbits | FOVs | Axes | Vectors | Lat/lons

Year / Month / Day / Hour / Minute / Second / Event

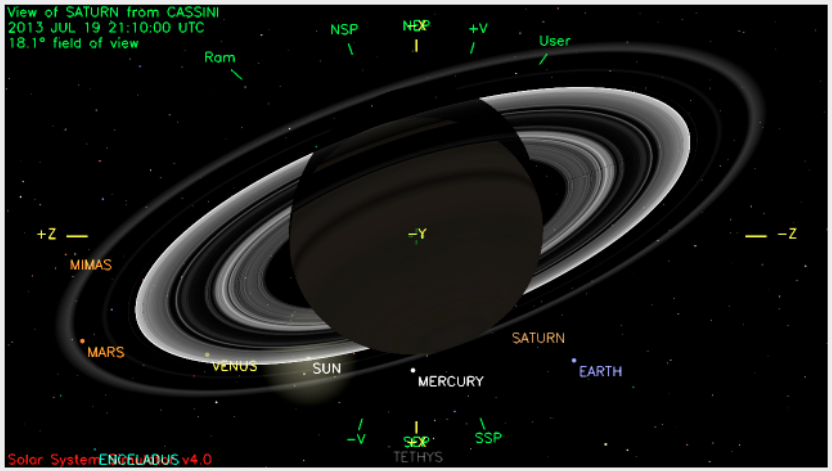
Turn analyzer: SATURN to EARTH about Z on RWA = 2.0 min / 4.4 deg

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	ALON (deg)	VREL (km/s)	Z_HGHT (km)	ANGLE_FROM SATRN	ANGLE_FROM EARTH	ANGLE_FROM RAM
SATURN	--	--	1219521	20.23	1159983	19.25	176.4	5.67	98.88	232	-21	0	5.6	0	0.0	4.4	74.9
IO	--	--	2051M	34.03K	2051M	34.03K	33.6	0.00	0.00	342	4	159	38.9	835890678	19.3	22.6	62.8
EUROPA	--	--	2051M	34.03K	2051M	34.03K	33.6	0.00	0.00	318	4	159	32.5	835866009	19.2	22.6	62.8
GANYMEDE	--	--	2051M	34.04K	2051M	34.04K	33.6	0.00	0.00	36	4	159	33.2	836254665	19.3	22.6	62.8
CALLISTO	--	--	2049M	33.99K	2049M	33.99K	33.6	0.00	0.00	203	4	159	15.3	834783789	19.2	22.6	62.8
MIMAS	--	--	1129030	18.73	1128832	18.73	174.2	0.02	0.37	120	-23	53	13.5	4094	7.7	11.4	69.5
ENCELADUS	--	--	1361890	22.60	1361637	22.59	174.9	0.02	0.38	51	-19	125	15.2	-39	8.5	10.7	73.0
TETHYS	--	--	1492719	24.77	1492180	24.76	177.4	0.04	0.72	9	-18	169	15.2	-5578	4.7	4.5	77.6
DIONE	--	--	1315987	21.84	1315426	21.83	160.3	0.05	0.86	295	-19	-97	12.1	-181	16.6	14.5	83.9
RHEA	--	--	1432983	23.78	1432219	23.76	155.9	0.06	1.07	309	-17	-104	11.0	-1554	21.0	18.6	87.1
TITAN	--	--	896744	14.88	894169	14.84	108.0	0.33	5.74	296	-29	-39	6.1	-6830	68.4	67.8	89.0
HYPERION	--	--	1354835	22.48	1354701	22.48	99.9	0.01	0.24	70	-10	-53	6.1	-29604	76.5	75.2	100.3

195 Inbound

	Saturn Range	Phase Angle	Sub-S/C Lat.
Segment Start	24.1 R_{Sat}	70.7°	39° S
Segment End	20.2 R_{Sat}	176.4°	21° S

Solar Geometry – ORS Boresight Concerns




```
Rev 195  INBOUND
2013 -  200T21:10:00 SCET
2013 JUL 19 21:10:00 SCET
2013 JUL 19 22:30:23 ERT
Apoapse__195 + 004T14:55:27
Periapse_195 - 003T08:30:19
Light time:    80.4 min
Orbit period:  15.9 days
Radius     1219521 km      20.23 Rs
Rad_cyl    1138604 km      18.89 Rs
Z_ht_cyl   -436820 km      -7.25 Rs
Mag_L          23.21
Semi_axs   1221873 km      20.27 Rs
Eccentricity    0.241
Inclination    56.73 deg
Sun_range       9.85 AU
Earth_range     9.66 AU
--- DSN ELEV -- D/L -- U/L --------
Goldstone      20.5  -10.5
Canberra      -35.3  -42.9
Madrid         16.1   36.2
------- LOOK DIRECTION INFO -------
FOV            18.1 deg  315.5 mrad
RA             35.746 deg
DEC            14.550 deg
Crosses_RP_@    0.000 Rs
EPS             5.869 deg *
SEP            97.576 deg
ORS b/s angle   3.6 deg  *
ORS rad angle  87.3 deg  *
```

Point NEG_Y at SATURN and align NEG_X = Up with NEP

User vector – RA: -88.648 DEC: +24.836 Paste Current RA/DEC

Tilt L | Up | Tilt R | Left | Reset | Right | Image | Down | Hi Res

Zoom Out | Fill Screen | Zoom In

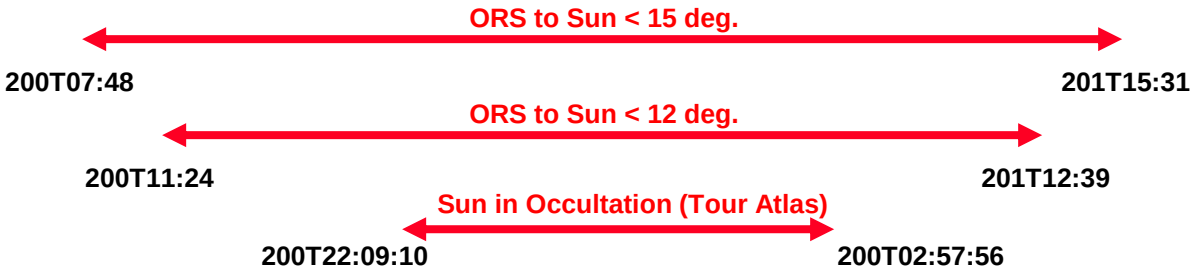
Labels | Orbits | FOVs | Axes | Vectors | Lat/lons

Year | Month | Day | Hour | Minute | Second

Turn analyzer: SATURN to EARTH about Z on RWA = 2.0 min / 4.4 deg Event

BODY	S/C OCC?	SAT OCC?	RANGE (km)	RANGE (Rs)	ALTITUDE (km)	ALTITUDE (Rs)	PHASE (deg)	ANGLR_DIAMETER (deg	mrad)	SUB_S/C LON	SUB_S/C LAT	ALON (deg)	VREL (km/s)	Z_HGHT (km)	ANGLE FROM SATRN	ANGLE FROM EARTH	ANGLE FROM RAM
SATURN	--	--	1219521	20.23	1159983	19.25	176.4	5.67	98.88	232	-21	0	5.6	0	0.0	4.4	74.9
IO	--	--	2051M	34.03K	2051M	34.03K	33.6	0.00	0.00	342	4	159	38.9	835890678	19.3	22.6	62.8
EUROPA	--	--	2051M	34.03K	2051M	34.03K	33.6	0.00	0.00	318	4	159	32.5	835866009	19.2	22.6	62.8
GANYMEDE	--	--	2051M	34.04K	2051M	34.04K	33.6	0.00	0.00	36	4	159	33.2	836254665	19.3	22.6	62.8
CALLISTO	--	--	2049M	33.99K	2049M	33.99K	33.6	0.00	0.00	203	4	159	15.3	834783789	19.2	22.6	62.8
MIMAS	--	--	1129030	18.73	1128832	18.73	174.2	0.02	0.37	120	-23	53	13.5	4094	7.7	11.4	69.5
ENCELADUS	--	--	1361890	22.60	1361637	22.59	174.9	0.02	0.38	51	-19	125	15.2	-39	8.5	10.7	73.0
TETHYS	--	--	1492719	24.77	1492180	24.76	177.4	0.04	0.72	9	-18	169	15.2	-5578	4.7	4.5	77.6
DIONE	--	--	1315987	21.84	1315426	21.83	160.3	0.05	0.86	295	-19	-97	12.1	-181	16.6	14.5	83.9
RHEA	--	--	1432983	23.78	1432219	23.76	155.9	0.06	1.07	309	-17	-104	11.0	-1554	21.0	18.6	87.1
TITAN	--	--	896744	14.88	894169	14.84	108.0	0.33	5.74	296	-29	-39	6.1	-6830	68.4	67.8	89.0
HYPERION	--	--	1354835	22.48	1354701	22.48	99.9	0.01	0.24	70	-10	-53	6.1	-29604	76.5	75.2	100.3

- Pointing to NEG_Y to Saturn (center) would lead to a CMT violation between ~2013-200T11:24:00 and ~2013-201T12:39:00.
- Minimum NEG_Y to Sun angle is ~1.5° at 2013-201T00:52:00.
- This period is during the last observation period, where a MAG CALROLL is proposed. XBAND to Earth pointing during this time will avoid the violations.



Daily Science Highlights

DOY 194 (13 July 2013): The Saturn_194_195 segment focused on performing a series of long UVIS EUVFUVs slow scans across Saturn's illuminated hemisphere to form spectral images. ISS rode along to take one polarimetry photo during each scan using the WAC, and VIMS and CIRS also rode along. After the first UVIS scan, VIMS did some mosaics to form a Saturn South Regional Map.

DOY 195 (14 July 2013): After an OTM and downlink, ISS added to their Titan Monitoring Campaign. Then UVIS did another EUVFUV with ISS, CIRS and VIMS riding, and VIMS did another mosaic on the southern hemisphere for mapping.

DOY 196 (15 July 2013): Another downlink and the bulk of the day was spent in a shortened UVIS EUVFUV (with ISS, VIMS and CIRS riding) in order to give VIMS as much time as possible on a ring occultation of MuCep star before turning back to Earth for the downlink.

DOY 197 (16 February 2013): Another UVIS EUVFUV for the campaign, again with ISS, CIRS and VIMS.

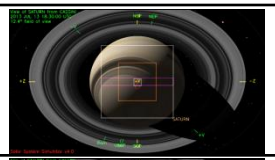
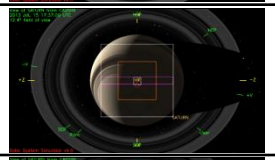
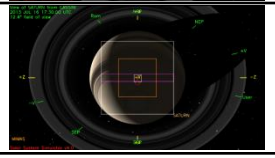
DOY 198 (17 February 2013): A second Titan Cloud Monitor observation for ISS, followed by a fifth UVIS EUVFUV and then turn to downlink. Only VIMS and ISS rode along on this one, due to data volume constraints.

DOY 199 (18 February 2013): The sixth and final UVIS EUVFUV for this segment occurred, again with just ISS and VIMS riding along, to occupy the day before turning to downlink.

DOY 200 (19 February 2013): MAG executed a Calibration Roll during Earth pointed time between downlinks to finish off the segment.

Segment Integration Planning

Timeline Gaps and Suggested Observations

Gap	Start	End	Duration	Phase angle	Range (R_{Saturn})	SSC latitude	Snapshot (mid-gap - no TCMs)
1	2013-194T17:01:00	194T20:00:00	000T02:59:00	77.8° – 79.7°	24.6	44° S – 45° S	
2	2013-195T18:30:00	195T20:00:00	000T01:30:00	94.1°	25.1	53° S	
3	2013-196T17:00:00	196T18:15:00	000T01:15:00	106.6° – 107.3°	25.1	56° S	
4	2013-197T16:45:00	197T18:15:00	000T01:30:00	120.9° – 121.9°	24.6	56° S – 55° S	

Suggested observations were not made by the integration leads at segment kickoff.

Initial SMT and Data Volume (1 of 3)

As is currently in CIMS, after upgrading DOY 197 and adding 3 hours DOY 199 of 70m:

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_194EA_G34BWGOTP194_PRIME	194 20:40	195 05:40	0	340	63	403	3322	2919	0	222	53	679	546	-133	2732	36%	132
SP_194EA_G34BWGOTB195_PRIME	195 20:40	196 05:40	132	298	63	493	3322	2829	0	222	53	768	652	-117	2732	38%	116
SP_195EA_G34BWGNON196_PRIME	196 20:25	197 05:25	116	412	62	591	3322	2732	0	222	53	866	646	-220	2751	43%	220
SP_195EA_G70METNON197_PRIME	197 20:25	198 05:25	220	288	63	571	3322	2751	0	260	53	884	3298	2413	3336	57%	0
SP_195EA_G34B26NON198_PRIME	198 20:25	199 05:25	0	277	51	327	3322	2995	0	222	53	603	670	67	922	37%	0
SP_195EA_C70METNON199_PRIME	199 05:25	199 08:25	0	0	63	63	3322	3259	0	246	18	327	680	353	854	46%	0
SP_195EA_G34BWGOTP199_PRIME	199 20:25	200 05:25	0	0	0	0	3322	3322	0	222	53	275	528	252	501	43%	0
SP_195EA_M34HEFOTB200_PRIME	200 12:40	200 21:10	0	105	31	135	3322	3187	0	209	50	395	643	248	249	39%	0

What is expected, after adding UVIS requests with riders and assuming MAPS go to minimum:

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 (%)	CAROVR (Mb)
SP_194EA_G34BWGOTP194_PRIME	194 20:40	195 05:40	0	623	63	686	3322	2636	0	183	53	922	546	-376	1625	20%	376
SP_194EA_G34BWGOTB195_PRIME	195 20:40	196 05:40	376	704	63	1143	3322	2179	0	183	53	1380	652	-728	1625	21%	727
SP_195EA_G34BWGNON196_PRIME	196 20:25	197 05:25	727	631	62	1420	3322	1902	0	183	53	1657	646	-1011	1625	23%	1011
SP_195EA_G70METNON197_PRIME	197 20:25	198 05:25	1011	623	63	1697	3322	1625	0	183	53	1933	3298	1364	2279	35%	0
SP_195EA_G34B26NON198_PRIME	198 20:25	199 05:25	0	687	63	750	3322	2572	0	183	53	986	670	-316	914	29%	316
SP_195EA_C70METNON199_PRIME	199 05:25	199 08:25	316	0	0	316	3322	3006	0	32	18	366	1280	914	914	37%	0
SP_195EA_G34BWGOTP199_PRIME	199 20:25	200 05:25	0	592	51	643	3322	2679	0	183	53	879	528	-351	0	0%	351
SP_195EA_M34HEFOTB200_PRIME	200 12:40	200 21:10	351	127	31	509	3322	2813	0	172	50	731	643	-88	0	0%	88

Initial SMT and Data Volume (2 of 3)

As is in CIMS currently, prior to deleted observations being hidden, MAPS at nominal rates:

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	194 05:41	194 20:40	37.8	28.3	28.8	5.4	73.5	26.6	45.8	0.0	70.7	0.0	20.0	0.0	62.6	399.5
SP_194EA_G34BWGOTP194_PRIME	194 20:40	195 05:40	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	194 05:41	195 05:40	60.4	45.2	115.2	8.6	73.5	42.7	73.4	0.0	113.1	4.9	20.0	0.0	62.6	
OBSERVATION_NOR	195 05:40	195 20:40	37.8	28.3	21.6	5.4	38.5	26.7	45.9	0.0	70.7	0.0	20.0	0.0	62.7	357.6
SP_194EA_G34BWGOTB195_PRIME	195 20:40	196 05:40	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	195 05:40	196 05:40	60.5	45.3	108.0	8.6	38.5	42.7	73.4	0.0	113.2	4.9	20.0	0.0	62.7	
OBSERVATION_NOR	196 05:40	196 20:25	37.2	27.8	21.6	15.4	38.5	26.2	45.1	0.0	69.6	0.0	126.7	0.0	61.6	469.8
SP_195EA_G34BWGNON196_PRIME	196 20:25	197 05:25	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	196 05:40	197 05:25	59.9	44.8	108.0	18.6	38.5	42.2	72.7	0.0	112.0	4.9	126.7	0.0	61.6	
OBSERVATION_NOR	197 05:25	197 20:25	37.8	28.3	21.6	5.4	38.5	26.7	45.9	0.0	70.7	0.0	10.0	0.0	62.7	347.6
SP_195EA_G70METNON197_PRIME	197 20:25	198 05:25	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	197 05:25	198 05:25	60.5	45.3	108.0	8.6	38.5	42.7	73.4	0.0	113.2	4.9	10.0	0.0	62.7	
OBSERVATION_NOR	198 05:25	198 20:25	37.8	28.3	21.6	5.4	38.5	69.4	45.9	0.0	70.7	0.0	144.5	0.0	62.7	524.8
SP_195EA_G34B26NON198_PRIME	198 20:25	199 05:25	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	198 05:25	199 05:25	60.5	45.3	108.0	8.6	38.5	85.4	73.4	0.0	113.2	4.9	144.5	0.0	62.7	
OBSERVATION_NOR	199 05:25	199 20:25	37.8	28.3	28.8	5.4	73.5	26.7	45.9	0.0	70.7	0.0	10.0	0.0	62.7	389.8
SP_195EA_G34BWGOTP199_PRIME	199 20:25	200 05:25	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	199 05:25	200 05:25	60.5	45.3	115.2	8.6	73.5	42.7	73.4	0.0	113.2	4.9	10.0	0.0	62.7	
OBSERVATION_NOR	200 05:25	200 12:40	18.3	13.7	0.0	2.6	0.0	12.9	22.2	0.0	34.2	0.0	0.0	0.0	30.3	134.1
SP_195EA_M70METOTB200_PRIME	200 12:40	200 21:10	21.4	16.0	81.0	3.1	0.0	15.1	26.0	0.0	40.1	4.7	0.0	0.0	0.0	207.4
DAILY TOTAL SCIENCE	200 05:25	200 21:10	39.7	29.7	81.0	5.7	0.0	28.0	48.2	0.0	74.3	4.7	0.0	0.0	30.3	

	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)	401.9	300.8	743.4	67.5	301.0	326.3	488.0	0.0	752.1	34.3	331.2	0.0

Initial SMT and Data Volume (3 of 3)

What is expected prior to gaps being filled and assuming MAPS at minimal rates:

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	194 05:41	194 20:40	37.8	14.1	0.0	5.4	50.8	13.3	35.1	0.0	48.5	193.2	219.0	0.0	62.6	679.9
SP_194EA_G34BWGOTP194_PRIME	194 20:40	195 05:40	22.7	8.5	86.4	3.2	0.0	8.0	21.1	0.0	29.2	2.5	0.0	0.0	0.0	181.5
DAILY TOTAL SCIENCE	194 05:41	195 05:40	60.4	22.6	86.4	8.6	50.8	21.3	56.1	0.0	77.7	195.7	219.0	0.0	62.6	
OBSERVATION_NOR	195 05:40	195 20:40	37.8	14.1	21.6	5.4	89.3	13.3	35.1	0.0	48.6	193.2	239.0	0.0	62.7	760.2
SP_194EA_G34BWGOTB195_PRIME	195 20:40	196 05:40	22.7	8.5	86.4	3.2	0.0	8.0	21.1	0.0	29.2	2.5	0.0	0.0	0.0	181.5
DAILY TOTAL SCIENCE	195 05:40	196 05:40	60.5	22.6	108.0	8.6	89.3	21.3	56.2	0.0	77.8	195.7	239.0	0.0	62.7	
OBSERVATION_NOR	196 05:40	196 20:25	37.2	13.9	0.0	15.4	50.8	13.1	34.5	0.0	47.8	193.2	219.0	0.0	61.6	686.6
SP_195EA_G34BWGNON196_PRIME	196 20:25	197 05:25	22.7	8.5	86.4	3.2	0.0	8.0	21.1	0.0	29.2	2.5	0.0	0.0	0.0	181.5
DAILY TOTAL SCIENCE	196 05:40	197 05:25	59.9	22.4	86.4	18.6	50.8	21.1	55.6	0.0	76.9	195.7	219.0	0.0	61.6	
OBSERVATION_NOR	197 05:25	197 20:25	37.8	14.1	0.0	5.4	50.8	13.3	35.1	0.0	48.6	193.2	219.0	0.0	62.7	680.1
SP_195EA_G70METNON197_PRIME	197 20:25	198 05:25	22.7	8.5	86.4	3.2	0.0	8.0	21.1	0.0	29.2	2.5	0.0	0.0	0.0	181.5
DAILY TOTAL SCIENCE	197 05:25	198 05:25	60.5	22.6	86.4	8.6	50.8	21.3	56.2	0.0	77.8	195.7	219.0	0.0	62.7	
OBSERVATION_NOR	198 05:25	198 20:25	37.8	14.1	21.6	5.4	89.3	6.2	35.1	0.0	48.6	193.2	229.0	0.0	62.7	743.1
SP_195EA_G34B26NON198_PRIME	198 20:25	199 05:25	22.7	8.5	86.4	3.2	0.0	8.0	21.1	0.0	29.2	2.5	0.0	0.0	0.0	181.5
SP_195EA_C70METNON199_PRIME	199 05:25	199 08:25	7.6	2.8	0.0	1.1	0.0	2.7	7.0	0.0	9.7	0.8	0.0	0.0	0.0	31.7
DAILY TOTAL SCIENCE	198 05:25	199 08:25	68.0	25.5	108.0	9.7	89.3	16.9	63.2	0.0	87.5	196.5	229.0	0.0	62.7	
OBSERVATION_NOR	199 08:25	199 20:25	30.2	11.3	0.0	4.3	50.8	10.7	28.1	0.0	38.9	193.2	219.0	0.0	50.2	636.7
SP_195EA_G34BWGOTP199_PRIME	199 20:25	200 05:25	22.7	8.5	86.4	3.2	0.0	8.0	21.1	0.0	29.2	2.5	0.0	0.0	0.0	181.5
DAILY TOTAL SCIENCE	199 08:25	200 05:25	52.9	19.8	86.4	7.6	50.8	18.7	49.1	0.0	68.0	195.7	219.0	0.0	50.2	
OBSERVATION_NOR	200 05:25	200 12:40	18.3	6.8	0.0	2.6	0.0	58.0	17.0	0.0	23.5	0.0	0.0	0.0	30.3	156.5
SP_195EA_M34HEFOTB200_PRIME	200 12:40	200 21:10	21.4	8.0	81.0	3.1	0.0	7.6	19.9	0.0	27.5	2.3	0.0	0.0	0.0	170.8
DAILY TOTAL SCIENCE	200 05:25	200 21:10	39.7	14.9	81.0	5.7	0.0	65.6	36.9	0.0	51.0	2.3	0.0	0.0	30.3	

	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)	401.9	150.4	642.6	67.5	382.0	186.3	373.2	0.0	516.7	1177.3	1343.9	0.0

Waypoint Selection

RBOT – Friendly as per CTV:

OBS_NAME	START	END	POS_X_2_NSP	POS_X_2_NEP	NEG_X_2_NSP	NEG_X_2_NEP	POS_Z_2_NSP	POS_Z_2_NEP	NEG_Z_2_NSP	NEG_Z_2_NEP	NEG_X_2_SUN	NEG_Z_2_EARTH
SP_194NA_OBSERV194_NA	2013-194T05:41:00	2013-194T20:40:00	**BAD**	**BAD**	OK	OK	**BAD**	**BAD**	OK	OK	OK	**BAD**
SP_194NA_OBSERV195_NA	2013-195T05:40:00	2013-195T20:40:00	**BAD**	**BAD**	OK	**BAD**	**BAD**	**BAD**	OK	OK	OK	**BAD**
SP_194NA_OBSERV196_NA	2013-196T05:40:00	2013-196T20:25:00	**BAD**	OK	OK	**BAD**	**BAD**	**BAD**	OK	OK	OK	**BAD**
SP_195NA_OBSERV197_NA	2013-197T05:25:00	2013-197T20:25:00	OK	OK	**BAD**	**BAD**	**BAD**	**BAD**	OK	OK	OK	**BAD**
SP_195NA_OBSERV198_NA	2013-198T05:25:00	2013-198T20:25:00	OK	OK	**BAD**	**BAD**	**BAD**	**BAD**	OK	OK	OK	**BAD**
SP_195NA_OBSERV199_NA	2013-199T05:25:00	2013-199T20:25:00	OK	OK	**BAD**	**BAD**	**BAD**	**BAD**	OK	OK	OK	**BAD**
SP_195NA_OBSERV200_NA	2013-200T05:25:00	2013-200T12:40:00	**BAD**	**BAD**	**BAD**	**BAD**	**BAD**	**BAD**	**BAD**	**BAD**	**BAD**	**BAD**

- UVIS prefers NEG_X to Sun (potentially open to RBOT issues) or NEG_Z to NSP.
- **Saturn pointing during last observation period is not safe due to ORS to Sun issues.**
- Problem of the last observation period (including turns to/from waypoint) would be solved by moving MAG calroll into the last observation period and staying Earth pointed.

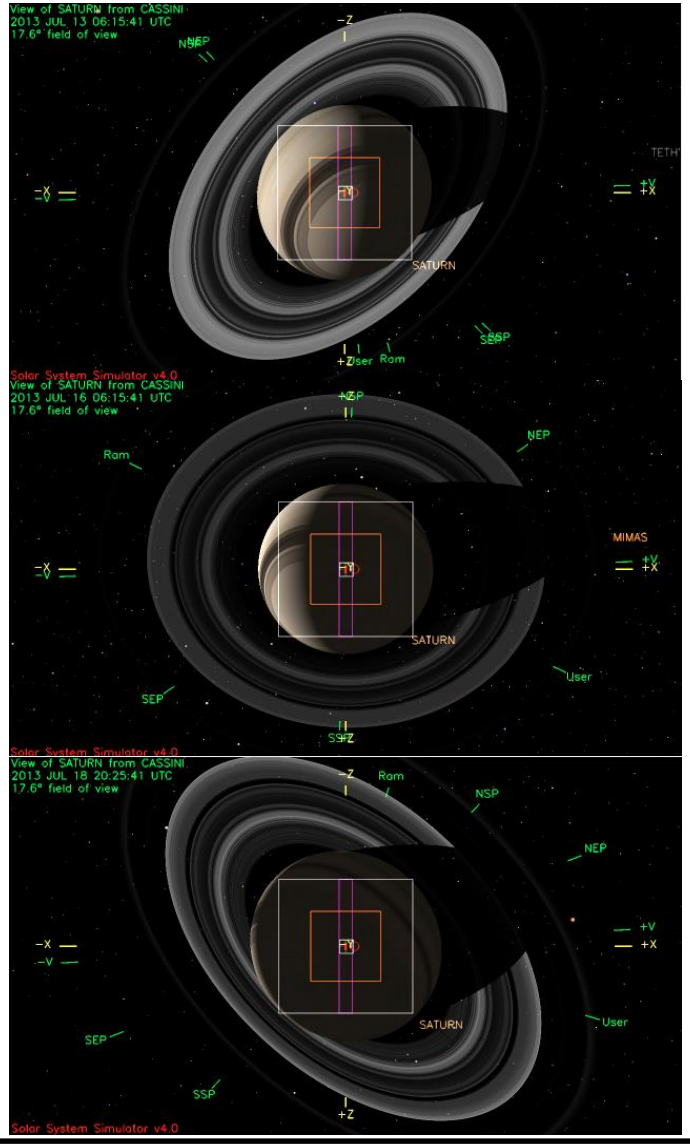
IN-1 RBOT WAYPOINTS

PRIMARY AXIS IS **NEG_Y to SATURN**

OBSERVATION PERIOD	START	END	POS_X	NEG_X	POS_Z	NEG_Z
SP_194NA_OBSERV194_NA	2013-194T05:41:00	2013-194T20:40:00	135.9/ 34.1	135.9/ 34.1	------	135.9/ 34.1
SP_194NA_OBSERV195_NA	2013-195T05:40:00	2013-195T20:40:00	135.9/ 34.1	135.9/ 34.1	------	135.9/ 34.1
SP_194NA_OBSERV196_NA	2013-196T05:40:00	2013-196T20:25:00	135.9/ 34.1	135.9/ 34.1	------	135.9/ 34.1
SP_195NA_OBSERV197_NA	2013-197T05:25:00	2013-197T20:25:00	135.9/ 34.1	135.9/ 34.1	------	135.9/ 34.1
SP_195NA_OBSERV198_NA	2013-198T05:25:00	2013-198T20:25:00	135.9/ 34.1	135.9/ 34.1	------	135.9/ 34.1
SP_195NA_OBSERV199_NA	2013-199T05:25:00	2013-199T20:25:00	135.9/ 34.1	135.9/ 34.1	------	135.9/ 34.1
SP_195NA_OBSERV200_NA	2013-200T05:25:00	2013-200T12:40:00	------	------	------	------

Waypoints Chosen

ISS_NAC to Sun; NEG_X to SUN for most of the segment



Beginning of segment

Middle of segment

End of observation time

Notes & Liens (1 of 2)

- Pointing:
  - Any SP turns that will violate turn margin policy and/or require hand edit to spturn script output
    - None
  - RBOT: exceptions to guidelines, waypoints
    - No RBOT-friendly waypoint secondary was identified or used between 2013-200T05:25:00 and 2013-200T12:40:00. This problem was solved by the MAG calroll keeping us earth pointed during this time.
    - Majority instrument wanted NEG_X to Sun secondary, knowing the RBOT implications. This was okayed by Kari. However, entire segment is outside 20Rs, so it should not affect RBOT.
- DSN:

  DSS-63 is in long-term maintenance through DOY 213.
  DSS-14 and DSS-15 are in weekly maintenance on DOY 199.
  DSS-14 is in weekly maintenance on DOY 196.
  DSS-43 is in weekly maintenance on DOY 200.

  The downlink on DOY 198 has been split between DSS-26 (9-hours) and DSS-43 (3-hours) for SSR clearing purposes.
  - `ap_downlink` has no errors, but complains about:

    ```
    Warning: SP_195EA_M34HEFOTB200_PRIME is an OTM pass and should be at least 9 hours in duration
    Warning: number of sequence upload passes is 0; should be 5 or more
    ```

    --both of which can be ignored. The former is an agreement between NAV and MP to shorten to 8.5 hours to address a NAV lien from 2011. As to the latter warning, this segment is in the middle of the sequence. The sequence uploads are contained in the other segments.

- RSS Activities:
  - RSS has a DSN Monopulse Calibration on DOY 198. Required DSS-26 support for X and Ka-band is the same as downlink station.

Notes & Liens (2 of 2)

- Data Volume:
  - No SMT warnings
- Hydrazine:
  - N/A
- Special Activities:
  - None
- Liens:
  - No liens, SPAM items, SPLAT items or Resource Checker items.