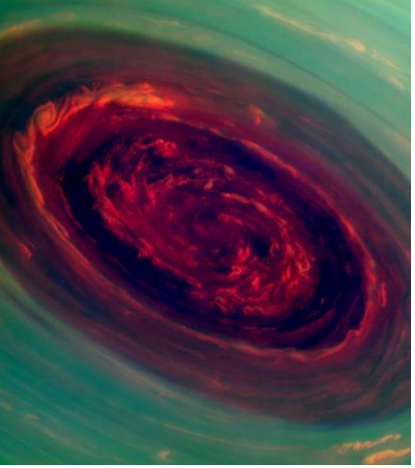

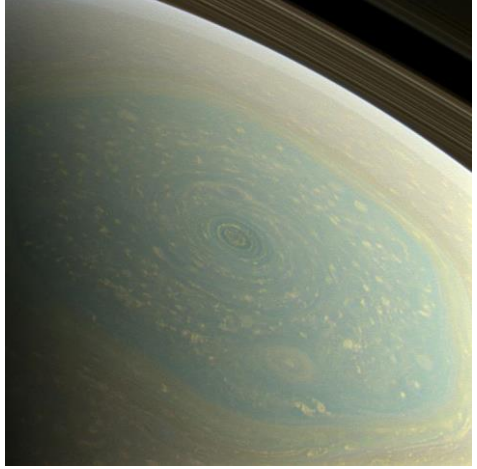
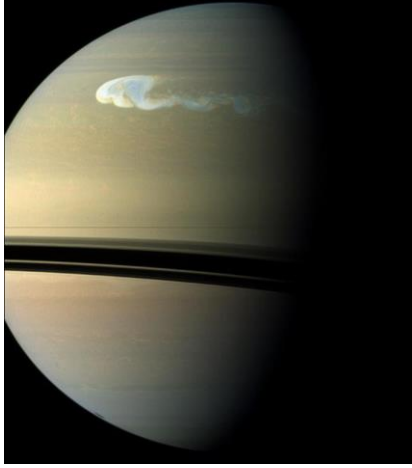

Science Planning & Sequence Team
CASSINI

SATURN TARGET WORKING TEAM

Rev 193 Segment Legacy Package

Segment Boundary: June 22, 2013– June 28, 2013
2013-173T13:28:00 – 2013-179T06:43:00 (SCET)

Integration Began 09/27/2012
Segment Delivered to S79 Sequence 12/12/2012
Lead Integrator was Shawn Brooks

Legacy Package Assembled by Keven Uchida

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Segment Overview and Final Products

Segment Summary

- This was an ~6 day long periapsis segment in the first inclined phase of the Solstice Mission. Saturn was observed over nearly the entire range of phase angles.
- There were five high priority science observations (PIEs) in this segment. ISS and UVIS had two each. ISS searched for plumes emanating from Mimas, then observed the plumes from Enceladus. UVIS performed low phase observations of Dione and Mimas. RSS observed a chord ring occultation, cutting across all but the D ring and innermost C ring.
- In addition to its PIE observations, ISS performed northern hemispheric observations, and an out-of-discipline Titan Monitoring observation.
- VIMS and UVIS shared the lead between hemispherical mapping and auroral observations. VIMS additionally observed the occultation of R Carinae by Saturn's atmosphere and performed an activity to better characterize its solar port response. CIRS lead only one activity in this segment – a compositional (COMPSIT) map toward Saturn's southern hemisphere, at high phase angles.
- On DOY 175, the Sun made a close approach to Saturn and was occulted by Saturn for ~4 hours. The observations at this time, however, were targeted such that CMT management (allowing ORS boresight to Sun angles of < 12 degrees) was NOT required.
- MAPS was requested to trim down to their "nominal" rates during this segment, and with that, there were no data volume issues of note.

Final Sequenced SPASS

	Request	Riders	Start (SCET)	Start (Epoch)	Duration	End (SCET)	Primary	Secondary	Comments
	SATURN_193 Segment		2013-173T13:28:00		005T17:15:00	2013-179T06:43:00			
	SP_193SA_WAYPTTURN173_PRIME		2013-173T13:28:00		000T00:12:00	2013-173T13:40:00	XBAND to Earth (0.0,-20.0,0.0 deg. offset)	NEG_Y to 344.0/-62.0	
	SP_193SA_WAYPTTURN473_PRIME		2013-173T13:40:00		000T00:28:00	2013-173T14:08:00	ISS_NAC to Saturn	POS_X to 136.5/31.5	
	NEW WAYPOINT		**2013-173T14:08:00**		**000T12:50:00**	**2013-174T02:58:00**	**ISS_NAC to Saturn**	**POS_X to 136.5/31.5**	
Gap 1	ISS_193TI_M150R2HZ173_PRIME	C, V	2013-173T14:08:00	E193_M150R2HZ173+000T00:00:00	000T01:30:00	2013-173T15:38:00	ISS_NAC to Titan	NEG_X to Sun	
Gap 1	VIMS_193SA_AURSTARE001_PRIME	C, I, U	2013-173T15:38:00		000T05:20:00	2013-173T20:58:00	ISS_NAC to Saturn	POS_X to NSP	
Gap 1	UVIS_193SA_AURSLEW001_PRIME	C, V	2013-173T20:58:00		000T05:20:00	2013-174T02:18:00	UVIS_FUV to Saturn	POS_X to 136.5/31.5	
	SP_193EA_DLTURN174_PRIME		2013-174T02:18:00		000T00:40:00	2013-174T02:58:00	XBAND to Earth	NEG_X to NSP	
	NEW WAYPOINT		**2013-174T02:58:00**		**000T11:10:00**	**2013-174T14:08:00**	**XBAND to Earth**	**NEG_X to NSP**	
	ENGR_193SC_KPTYBIAS174_PRIME		2013-174T02:58:00		000T01:30:00	2013-174T04:28:00	POS_Z to DELTA_H (0.0,0.0,-65.0 deg. offset)	NEG_X to Sun	
Gap 2	SP_193EA_C34BWGNON174_PRIME	C, R	2013-174T04:28:00		000T09:00:00	2013-174T13:28:00	XBAND to Earth	5_Hr_Rolling	CAPS. NEG_X to NEP or NSP. CIRS heating
Gap 2	SP_193SA_WAYPTTURN174_PRIME		2013-174T13:28:00		000T00:21:00	2013-174T13:49:00	XBAND to 27.7/60.3	NEG_Y to 28.5/24.7	
Gap 2	SP_193SA_WAYPTTURN474_PRIME		2013-174T13:49:00		000T00:19:00	2013-174T14:08:00	ISS_NAC to Saturn	NEG_Z to NSP	
	NEW WAYPOINT		**2013-174T14:08:00**		**000T08:17:00**	**2013-174T22:25:00**	**ISS_NAC to Saturn**	**NEG_Z to NSP**	
Gap 3a	CIRS_193SA_COMPSIT001_PRIME	V	2013-174T14:08:00		000T05:52:00	2013-174T20:00:00	CIRS_FP1 to Saturn	NEG_Z to NSP	
Gap 3a	ISS_193MI_MIPLUME001_PIE	C, U, V	2013-174T20:00:00		000T02:00:00	2013-174T22:00:00	UVIS_FUV to Mimas	NEG_Z to NSP	Collaborative Rider(s): UVIS. No Preference to secondary pointing
Gap 3a	SP_193SU_WAYPTTURN674_PRIME		2013-174T22:00:00		000T00:10:00	2013-174T22:10:00	ISS_NAC to Saturn (0.0,0.0,30.0 deg. offset)	NEG_Z to NSP	
Gap 3a	SP_193SU_WAYPTTURN874_PRIME		2013-174T22:10:00		000T00:15:00	2013-174T22:25:00	VIMS_IR_SOL to Sun	NEG_Z to NSP	
	NEW WAYPOINT		**2013-174T22:25:00**		**000T05:42:00**	**2013-175T04:07:00**	**VIMS_IR_SOL to Sun**	**NEG_Z to NSP**	
Gap 3a	ISS_193SA_LIMBSCAN001_PRIME	V	2013-174T22:25:00		000T01:35:00	2013-175T00:00:00	ISS_NAC to Saturn	NEG_Z to NSP	
Gap 3a	VIMS_193SU_SOLARPORT001_PRIME	R, U	2013-175T00:00:00		000T03:26:00	2013-175T03:26:00	UVIS_SOLAR to Sun	NEG_Z to NSP	
Gap 3b	SP_193EA_WAYPTTURN175_PRIME	R	2013-175T03:27:00		000T00:29:00	2013-175T03:56:00	XBAND to Earth (0.0,-25.0,0.0 deg. offset)	NEG_X to NSP	
Gap 3b	SP_193EA_WAYPTTURN475_PRIME	R	2013-175T03:56:00		000T00:11:00	2013-175T04:07:00	XBAND to Earth	NEG_X to NSP	
	NEW WAYPOINT		**2013-175T04:07:00**		**000T21:31:00**	**2013-176T01:38:00**	**XBAND to Earth**	**NEG_X to NSP**	
Gap 3b	RSS_193RI_OCC001_PIE		2013-175T04:07:00		000T05:11:00	2013-175T09:18:00	XBAND to Earth	PIC	
Gap 3b	SP_193EA_C70METUNQ175_PRIME		2013-175T09:18:00		000T02:52:00	2013-175T12:10:00	XBAND to Earth	NEG_X to NSP	CAPS. POS_X to NEP or NSP. CIRS heating
Gap 3b	ISS_193EN_PLMHPMR001_PIE	C, M, U, V	2013-175T12:10:00		000T02:18:00	2013-175T14:28:00	ISS_NAC to Enceladus	NEG_X to NSP	SOST PIE
Gap 3b	SP_193EA_M34BWGNON175_PRIME	C, M, R	2013-175T14:28:00		000T09:00:00	2013-175T23:28:00	XBAND to Earth	5_Hr_Rolling	CAPS. NEG_X to NEP or NSP. CIRS heating
Gap 3b	ENGR_193SC_KPTYBIAS175_PRIME		2013-175T23:28:00		000T01:30:00	2013-176T00:58:00	NEG_Z to DELTA_H (0.0,0.0,90.0 deg. offset)	NEG_X to Sun	
Gap 3b	SP_193SA_WAYPTTURN176_PRIME		2013-176T00:58:00		000T00:40:00	2013-176T01:38:00	ISS_NAC to Saturn	POS_Z to NSP	
	NEW WAYPOINT		**2013-176T01:38:00**		**001T18:35:00**	**2013-177T20:13:00**	**ISS_NAC to Saturn**	**POS_Z to NSP**	
Gap 4	VIMS_193SA_NREGMAP001_PRIME	C	2013-176T01:38:00		000T11:00:00	2013-176T12:38:00	ISS_NAC to Saturn	POS_Z to NSP	
Gap 4	Periapse R = 10.246 Rs, lat...		2013-176T05:08:48		000T00:00:01	2013-176T05:08:49			
Gap 4	UVIS_193SA_AURSLEW002_PRIME	C	2013-176T12:38:00		000T06:20:00	2013-176T18:58:00	UVIS_FUV to Saturn	POS_Z to NSP	
Gap 4	VIMS_193SA_RCAROCC001_PRIME	E	2013-176T18:58:00		000T01:20:00	2013-176T20:18:00	VIMS_IR to 143.061/-62.789	POS_Z to NSP	No Preference to secondary pointing
Gap 4	VIMS_193SA_AURSTARE002_PRIME	C, I, U	2013-176T20:18:00		000T05:00:00	2013-177T01:18:00	ISS_NAC to Saturn	POS_Z to NSP	
Gap 4	VIMS_193SA_NPOLMOV001_PRIME	C, I, U	2013-177T01:18:00		000T16:45:00	2013-177T18:03:00	ISS_NAC to Saturn	POS_Z to NSP	
Gap 4	ISS_193TI_M90R2CLD177_PRIME	C, V	2013-177T18:03:00	E193_M90R2CLD177+000T00:00:00	000T01:30:00	2013-177T19:33:00	ISS_NAC to Titan	POS_Z to NSP	No Preference to secondary pointing
Gap 4	SP_193EA_DLTURN177_PRIME		2013-177T19:33:00		000T00:40:00	2013-177T20:13:00	XBAND to Earth	POS_X to NEP	
	NEW WAYPOINT		**2013-177T20:13:00**		**000T11:10:00**	**2013-178T07:23:00**	**XBAND to Earth**	**POS_X to NEP**	
	ENGR_193SC_KPTYBIAS177_PRIME		2013-177T20:13:00		000T01:30:00	2013-177T21:43:00	NEG_Z to DELTA_H (0.0,0.0,-4.999 deg. offset)	NEG_X to Sun	
	SP_193EA_G70METNON177_PRIME	C	2013-177T21:43:00		000T09:00:00	2013-178T06:43:00	XBAND to Earth	5_Hr_Rolling	CAPS. POS_X to NEP or NSP. CIRS heating
	SP_193SA_WAYPTTURN178_PRIME		2013-178T06:43:00		000T00:15:00	2013-178T06:58:00	XBAND to Earth	NEG_Y to Saturn	
	SP_193SA_WAYPTTURN478_PRIME		2013-178T06:58:00		000T00:25:00	2013-178T07:23:00	ISS_NAC to Saturn	NEG_X to 136.5/31.5	
	NEW WAYPOINT		**2013-178T07:23:00**		**000T12:50:00**	**2013-178T20:13:00**	**ISS_NAC to Saturn**	**NEG_X to 136.5/31.5**	
Gap 5	UVIS_193DI_LOPHASE001_PIE	C, I, V	2013-178T07:23:00		000T02:22:00	2013-178T09:45:00	UVIS_FUV to Dione	NEG_X to 136.5/31.5	
Gap 5	UVIS_193MI_LOPHASE001_PIE	C, I, V	2013-178T09:45:00		000T01:30:00	2013-178T11:15:00	UVIS_FUV to Mimas	NEG_X to 136.5/31.5	
Gap 5	ISS_193SA_NSTARE001_PRIME	V	2013-178T11:15:00		000T08:18:00	2013-178T19:33:00	ISS_NAC to Saturn	NEG_X to 136.5/31.5	No Preference to secondary pointing
Gap 5	SP_193EA_DLTURN178_PRIME		2013-178T19:33:00		000T00:28:00	2013-178T20:01:00	POS_X to 300.0/5.0	XBAND to Earth	
Gap 5	SP_193EA_DLTURN478_PRIME		2013-178T20:01:00		000T00:12:00	2013-178T20:13:00	XBAND to Earth	POS_X to NEP	
	NEW WAYPOINT		**2013-178T20:13:00**		**000T11:00:00**	**2013-179T07:13:00**	**XBAND to Earth**	**POS_X to NEP**	
	SP_193EA_YGAP178_PRIME		2013-178T20:13:00		000T01:30:00	2013-178T21:43:00	XBAND to Earth	POS_X to NEP	
	SP_193EA_M34BWGNON178_PRIME	C	2013-178T21:43:00		000T01:30:00	2013-178T23:13:00	XBAND to Earth	Rolling	CAPS. POS_X to NEP or NSP. CIRS heating
	SP_193EA_G34METUNQ178_PRIME	C	2013-178T23:13:00		000T07:30:00	2013-179T06:43:00	XBAND to Earth	Rolling	

Final Sequenced SMT and Data Volume

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

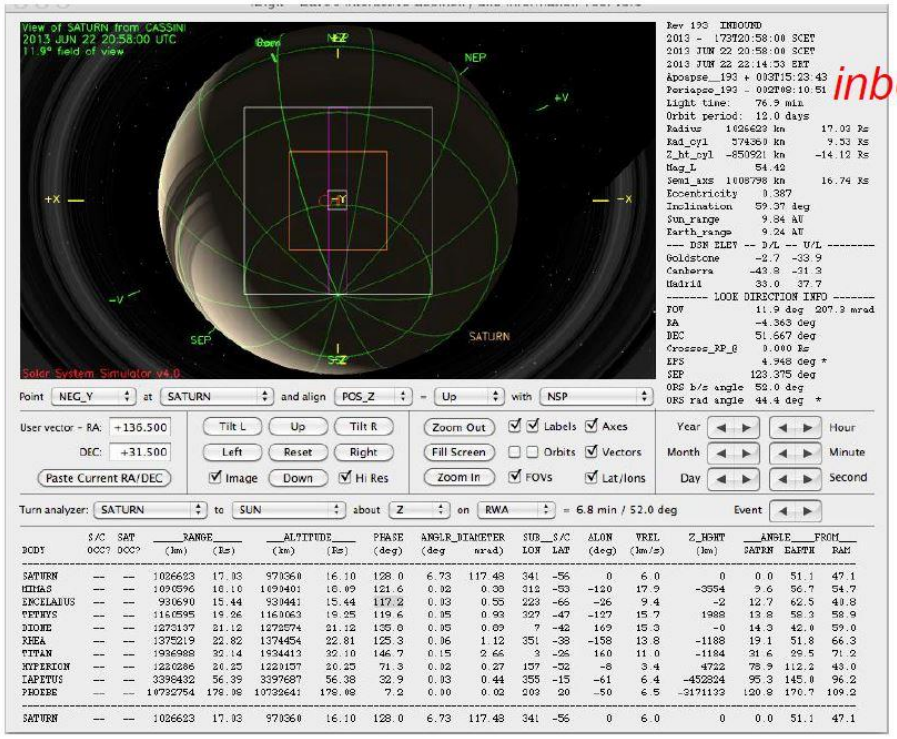
			OBSERVATION_PERIOD							DOWNLINK_PASS						
			P4						P5	RECORDED		PLAYBACK				
DOWNLINK PASS NAME	Start doy hh:mm	End doy hh:mm	START (Mb)	SCI (Mb)	HK+E (Mb)	TOTAL (Mb)	CPACTY (Mb)	MRGN (Mb)	OPNAV (Mb)	SCI (Mb)	ENGR (Mb)	TOTAL (Mb)	CPACTY (Mb)	MARGN (Mb)	NET_MARGN (Mb)	CAROVR (%)
SP_193EA_C34BWGNON174_PRIME	174 04:28	174 13:28	0	631	63	695	3322	2627	0	221	53	969	860	-109	-311	-2%
SP_193EA_C70METUNQ175_PRIME	175 09:18	175 12:10	109	1059	84	1252	3322	2070	0	41	17	1310	878	-432	-311	-2%
SP_193EA_M34BWGNON175_PRIME	175 14:28	175 23:28	432	346	10	787	3322	2535	0	222	53	1062	635	-427	-311	-1%
SP_193EA_G70METNON177_PRIME	177 21:43	178 06:43	427	3012	195	3635	3322	-311	0	232	53	3607	3319	-289	505	4%
SP_193EA_M34BWGNON178_PRIME	178 21:43	178 23:13	288	1198	63	1550	3322	1772	0	30	9	1588	76	-1513	650	6%

DATA VOLUME REPORT --- TRANSFER FRAME OVERHEAD NOT INCLUDED

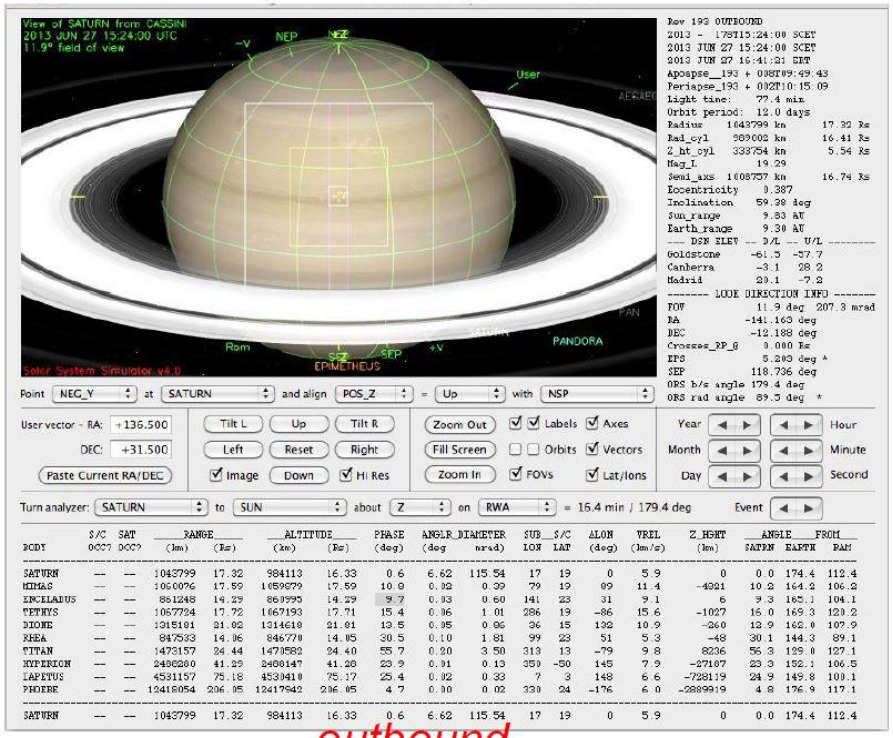
Event	Start doy hh:mm	End doy hh:mm	CAPS (Mb)	CDA (Mb)	CIRS (Mb)	INMS (Mb)	ISS (Mb)	MAG (Mb)	MIMI (Mb)	RADAR (Mb)	RPWS (Mb)	UVIS (Mb)	VIMS (Mb)	PROBE (Mb)	ENGR (Mb)	TOTAL (Mb)
OBSERVATION_NOR	173 13:28	174 04:28	37.8	28.3	98.4	5.4	85.0	26.7	45.9	0.0	67.5	144.9	85.7	0.0	62.7	688.3
SP_193EA_C34BWGNON174_PRIME	174 04:28	174 13:28	22.7	17.0	86.4	3.2	0.0	16.0	27.5	0.0	41.0	4.9	0.0	0.0	0.0	218.8
DAILY TOTAL SCIENCE	173 13:28	174 13:28	60.5	45.3	184.8	8.6	85.0	42.7	73.4	0.0	108.5	149.9	85.7	0.0	62.7	
OBSERVATION_NOR	174 13:28	175 09:18	50.0	37.4	71.0	7.1	329.3	35.3	60.7	0.0	92.8	31.0	335.0	0.0	82.9	1132.5
SP_193EA_C70METUNQ175_PRIME	175 09:18	175 12:10	7.2	5.4	0.0	1.0	0.0	5.1	8.8	0.0	13.4	0.0	0.0	0.0	0.0	40.9
DAILY TOTAL SCIENCE	174 13:28	175 12:10	57.2	42.8	71.0	8.2	329.3	40.4	69.5	0.0	106.2	31.0	335.0	0.0	82.9	
OBSERVATION_NOR	175 12:10	175 14:28	5.8	4.3	33.1	0.8	200.0	4.1	7.0	0.0	10.8	35.4	41.0	0.0	9.6	352.0
SP_193EA_M34BWGNON175_PRIME	175 14:28	175 23:28	22.7	17.0	86.4	3.2	0.0	16.0	27.5	0.0	42.1	4.9	0.0	0.0	0.0	219.9
DAILY TOTAL SCIENCE	175 12:10	175 23:28	28.5	21.3	119.5	4.1	200.0	20.1	34.6	0.0	52.9	40.4	41.0	0.0	9.6	
OBSERVATION_NOR	175 23:28	177 21:43	116.6	87.2	303.0	16.7	258.5	82.3	141.5	0.0	216.5	463.4	1299.3	0.0	193.3	3178.2
SP_193EA_G70METNON177_PRIME	177 21:43	178 06:43	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	175 23:28	178 06:43	149.0	104.2	389.4	19.9	258.5	98.3	169.1	0.0	258.8	468.4	1299.3	0.0	193.3	
OBSERVATION_NOR	178 06:43	178 21:43	82.6	28.3	55.7	5.4	346.0	26.7	45.9	0.0	70.7	59.5	466.5	0.0	62.7	1250.0
SP_193EA_M34BWGNON178_PRIME	178 21:43	178 23:13	5.4	2.8	5.4	0.5	0.0	2.7	4.6	0.0	7.1	0.8	0.0	0.0	0.0	29.3
SP_193EA_G34METUNQ178_PRIME	178 23:13	179 06:43	27.0	14.1	81.0	2.7	0.0	13.3	22.9	0.0	35.4	4.1	0.0	0.0	0.0	200.6
DAILY TOTAL SCIENCE	178 06:43	179 06:43	115.0	45.3	142.1	8.6	346.0	42.7	73.4	0.0	113.2	64.5	466.5	0.0	62.7	

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

Segment Geometry



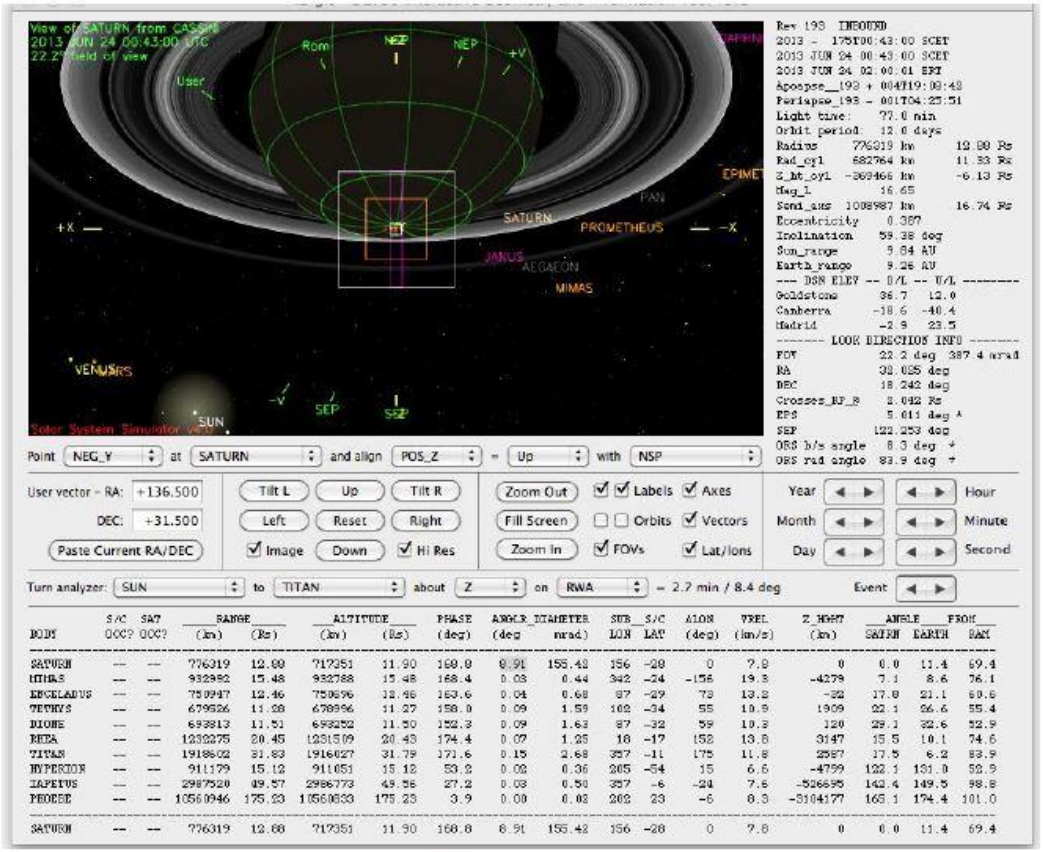
inbound



outbound

	Saturn Range	Phase Angle	Sub-S/C Lat.
Segment Start	18.0 R_{Sat}	120.1°	59°S
Periapse	10.3 R_{Sat}	117.0°	34°N
Segment End	19.2 R_{Sat}	15.4°	6°N

Solar Geometry – ORS Boresight Concerns



- Pointing to NEG_Y to Saturn (center) would lead to a CMT violation between 2013-174T22:41:00 and 2013-175T12:27:00.
- The Sun is occulted by Saturn starting at 2013-175T04:05:53 until 2013-175T08:06:15.
- CMT violations will be a problem through all but the first 41 minutes of Gap 3a and 3b.
- CMT will be an issue for the ISS plume PIE as well; Enceladus is within 15° of the Sun until 2013-175T12:46:00.
- Titan is within 15° of the Sun during Gap 3.

Saturn-Sun angle < 15° :	2013-174T22:41:00 – 175T12:27:00
Saturn-Sun angle < 12° :	2013-175T00:18:00 – 175T11:15:00
solar ingress/solar egress:	2013-175T04:05:53 – 175T08:06:15
RSS ingress/RSS egress:	2013-175T05:36:31 – 175T08:27:32

Daily Science Highlights

DOY 173 (22 June 2012): The Saturn_193 segment began with another observation in the longstanding Titan Monitoring Campaign, the purpose of which was to catch in changes in Titan's surprisingly dynamic weather. VIMS and then UVIS took turns pointing at Saturn's southern polar regions to study the planet's version of the aurora australis.

DOY 174 (23 June 2012): Following VIMS' and UVIS' auroral studies, the spacecraft pointed towards the Earth to downlink those data. This downlink pass also served the purpose of obtaining data for a Gravity Science Enhancement observation, intended to refine our knowledge of both Saturn's gravitational field and Cassini's location in orbit around Saturn. CIRS then turned back towards Saturn to acquire as many infrared spectra of Saturn's atmosphere to help determine its composition. This CIRS COMPSIT was followed by an ISS observation of Mimas which was intended to search for plumes of material emanating from that satellite. The day's science activities ended with an ISS observation of Saturn's limb at high phase angles.

DOY 175 (24 June 2012): VIMS acquired observations of the Sun to better characterize its solar port's response before the Earth passed behind Saturn's rings from Cassini's vantage point. RSS observed this chord ring occultation, which cut across all but the D ring and very innermost C ring. After the occultation had concluded, ISS trained its cameras on Enceladus so that all of the ORS instruments could acquire observations of Enceladus' intriguing jets and plumes. High phase angle observations such as this allow scientists to study the small particles which comprise Enceladus' dust plumes. The days' science activities finished up with a downlink that also served as the second half of the Gravity Science Enhancement observation begun the day before. And as Cassini passed through the ring plane, the CDA and RPWS sought to measure the enhanced particle flux that typically accompanies passage through Saturn's equatorial region.

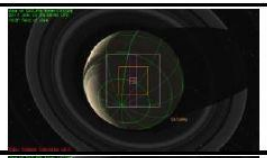
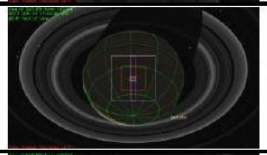
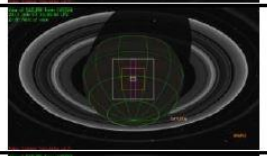
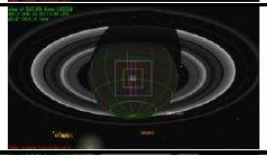
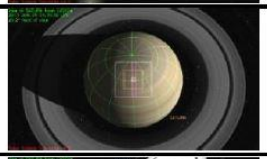
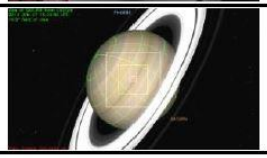
DOY 176 (25 June 2012): With the spacecraft having crossed Saturn's equator, VIMS now turned towards Saturn's northern hemisphere, mapping the planet's northern mid-latitudes in concert with CIRS. Then UVIS complemented its studies of Saturn's southern aurorae with observations of Saturn's northern auroral regions. VIMS rounded out the day's science with an observation of an occultation of the star *R Carinae* by Saturn's atmosphere and its own observation of Saturn's northern aurorae. Periapse occurs on this day.

DOY 177 (26 June 2012): The bulk of the day's activities consisted of a long movie of Saturn's northern polar regions, which was intended to elucidate the complex atmospheric dynamics at work there. This observation was led by VIMS. Subsequently, ISS pointed its cameras at Titan for another Titan Monitoring Campaign observation.

DOY 178 (27 June 2012): After relaying data acquired the previous day back to Earth, UVIS targeted first Dione and then Mimas to obtain low-phase observations of these satellites, with the other ORS instruments riding along. The Saturn_193 segment came to a close with ISS mapping out Saturn's northern hemisphere while the planet slowly receded into the distance as Cassini moved out towards apoapse.

Segment Integration Planning

Timeline Gaps and Suggested Observations

Gap	Start	End	Duration	Phase angle	Range (R_{Saturn})	SSC latitude	Snapshot (mid-gap)
1	2013-173T15:38:00	174T02:18:00	000T10:40:00	122.3° – 134.2°	17.8 – 16.3	58°S – 53°S	
	Suggested Observation: UVIS, VIMS Aurora						
2	2013-174T14:08:00	174T20:00:00	000T05:52:00	151.6° – 160.1°	14.5 – 13.6	43°S – 35°S	
	Suggested Observation: UVIS, VIMS Aurora						
3a	2013-174T22:00:00	175T00:18:00	000T02:18:00	163.7° – 168.0°	13.3 – 12.9	33°S – 29°S	
	Suggested Observation: ISS Limb Scan						
3b	2013-175T00:18:00	175T03:26:00	000T3:08:00	168.0° – 175.7°	12.9 – 12.4	29°S – 23°S	
	Suggested Observation: VIMS Solar Port						
4	2013-176T03:08:00	177T19:33:00	001T16:25:00	123.0° – 25.1°	10.3 – 14.4	29°N – 39°N	
	Suggested Observation: VIMS Mid-lat map, UVIS/VIMS aurora, VIMS Occ, VIMS Polar Map, ISS imaging						
6	2013-178T11:15:00	178T19:33:00	000T08:18:00	4.1° – 4.9°	16.7 – 17.9	23°N – 15°N	
	Suggested Observation: ISS imaging						

Gap 5 begins at 2013-178T09:00:00 and is 45 minutes in duration.

Initial SMT and Data Volume (1 of 2)

Beginning of Integration:

SMT Report with MAPS @ Nominal Rates

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_193EA_C34BWGNON174_PRIME	174 04:28	174 13:28	0	329	63	393	3322	2930	0	232	53	678	860	182	2778	31%	0
SP_193EA_C70METNON175_PRIME	175 09:58	175 12:10	0	510	87	597	3322	2725	0	34	13	644	897	253	2595	32%	0
SP_193EA_M34BWGNON175_PRIME	175 14:28	175 23:28	0	339	10	349	3322	2973	0	232	53	634	635	1	2342	32%	0
SP_193EA_G70METNON177_PRIME	177 21:43	178 06:43	0	786	195	981	3322	2341	0	232	53	1267	3319	2052	4411	66%	0
SP_193EA_G70METNON178_PRIME	178 21:43	179 06:43	0	640	63	704	3322	2618	0	232	53	989	3347	2358	2358	70%	0

- 400 Mb (DL-limited) available for Gaps 1-3; data volume for ISS SOST PIEs and TMC separate and accounted for
- 2.3 Gb (SSR-limited) available for Gap 4

Initial SMT and Data Volume (2 of 2)

Beginning of Integration:

SMT Report – Team Summary **MAPS @ 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	173 13:28	174 04:28	82.6	28.3	21.6	5.4	35.0	26.7	45.9	0.0	70.7	0.0	10.0	0.0	62.7	388.9
SP_193EA_C34BWGNON174_PRIME	174 04:28	174 13:28	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	173 13:28	174 13:28	115.0	45.3	108.0	8.6	35.0	42.7	73.4	0.0	113.2	4.9	10.0	0.0	62.7	
OBSERVATION_NOR	174 13:28	175 09:58	73.8	38.7	28.8	7.4	120.0	36.5	62.7	0.0	96.7	0.0	41.0	0.0	85.7	591.2
SP_193EA_C70METNON175_PRIME	175 09:58	175 12:10	7.9	4.2	0.0	0.8	0.0	3.9	6.7	0.0	10.4	0.0	0.0	0.0	0.0	33.9
DAILY TOTAL SCIENCE	174 13:28	175 12:10	81.7	42.8	28.8	8.2	120.0	40.4	69.5	0.0	107.1	0.0	41.0	0.0	85.7	
OBSERVATION_NOR	175 12:10	175 14:28	8.3	4.3	28.8	0.8	200.0	4.1	7.0	0.0	10.8	30.8	41.0	0.0	9.6	345.6
SP_193EA_M34BWGNON175_PRIME	175 14:28	175 23:28	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	175 12:10	175 23:28	40.7	21.3	115.2	4.1	200.0	20.1	34.6	0.0	53.3	35.7	41.0	0.0	9.6	
OBSERVATION_NOR	175 23:28	177 21:43	166.5	87.2	21.6	16.7	35.0	82.3	141.5	0.0	218.1	0.0	10.0	0.0	193.3	972.2
SP_193EA_G70METNON177_PRIME	177 21:43	178 06:43	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	175 23:28	178 06:43	198.9	104.2	108.0	19.9	35.0	98.3	169.1	0.0	260.6	4.9	10.0	0.0	193.3	
OBSERVATION_NOR	178 06:43	178 21:43	54.0	28.3	43.2	5.4	250.0	26.7	45.9	0.0	70.7	46.2	64.0	0.0	62.7	697.1
SP_193EA_G70METNON178_PRIME	178 21:43	179 06:43	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	178 06:43	179 06:43	86.4	45.3	129.6	8.6	250.0	42.7	73.4	0.0	113.2	51.1	64.0	0.0	62.7	

Waypoint Selection (1 of 2)

NEG_Y to Saturn; NSP secondaries

Gap	Start	End	Duration	POS_X	NEG_X	POS_Z	NEG_Z
1	2013-173T15:38:00	174T02:18:00	000T10:40:00	YES	NO	NO	YES
2	2013-174T14:08:00	174T20:00:00	000T05:52:00	YES	NO	NO	YES
3a	2013-174T22:00:00	175T00:18:00	000T02:18:00	NO ORS to Sun <15 deg.	NO ORS to Sun <15 deg.	NO ORS to Sun <15 deg.	NO ORS to Sun <15 deg.
3b	2013-175T00:18:00	175T03:26:00	000T3:08:00	NO ORS to Sun <12 deg.	NO ORS to Sun <12 deg.	NO ORS to Sun <12 deg.	NO ORS to Sun <12 deg.
4	2013-176T03:08:00	177T19:33:00	001T16:25:00	OK AFTER 176T22:00:00	OK BEFORE 176T22:30:00	YES	NO
6	2013-178T11:15:00	178T19:33:00	000T08:18:00	OK BEFORE 178T16:00:00	OK AFTER 178T13:50:00	OK BEFORE 178T16:15:00	OK AFTER 178T12:50:00

Waypoint Selection (2 of 2)

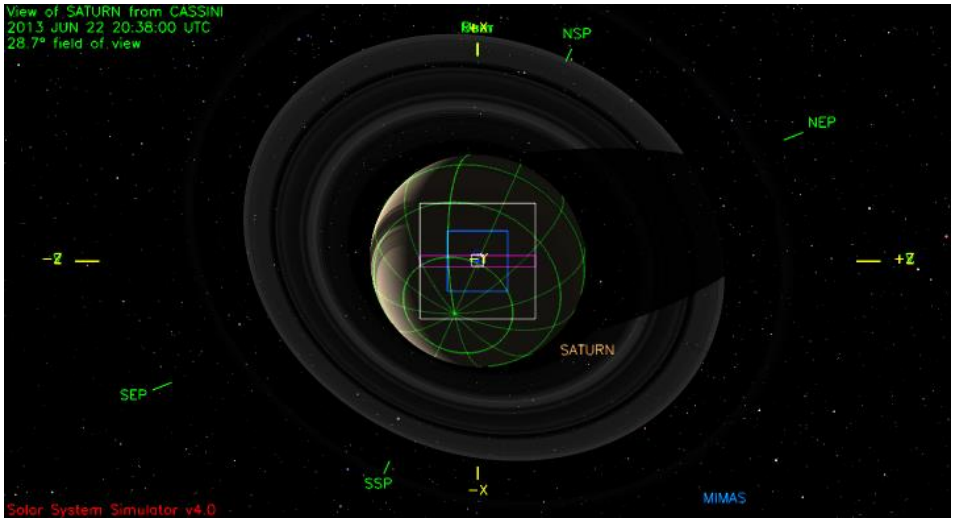
RBOT - Friendly

OBSERVATION PERIOD	START	END	POS_X	NEG_X	POS_Z	NEG_Z
SP_193NA_OBSERV173_NA	2013-173T13:28:00	2013-174T04:28:00	136.5/ 31.5	136.5/ 31.5	-----	136.5/ 31.5
SP_193NA_OBSERV174_NA	2013-174T13:28:00	2013-175T14:28:00	-----	-----	-----	-----
SP_193NA_OBSERV175_NA	2013-175T23:28:00	2013-177T21:43:00	136.5/ 31.5	136.5/ 31.5	136.5/ 31.5	-----
SP_193NA_OBSERV178_NA	2013-178T06:43:00	2013-178T21:43:00	136.4/ 31.5	136.4/ 31.5	-----	-----

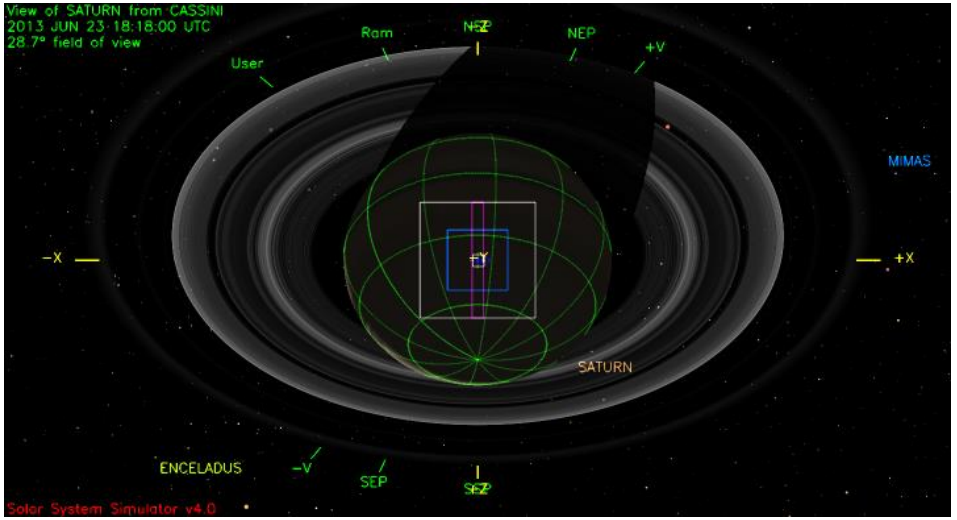
- NEG_Y to Saturn not safe during the second observation period referenced above.
  - ORS-to-SUN angle is <15° from 2013-174T22:41:00 – 175T12:27:00
  - ORS-to-SUN angle is <12° from 2013-175T00:18:00 – 175T11:15:00

Waypoints Chosen (1 of 3)

Waypoint 1 (2013–173T14:08:00 – 174T02:58:00): NEG_Y to Saturn, POS_X to 136.5/31.5

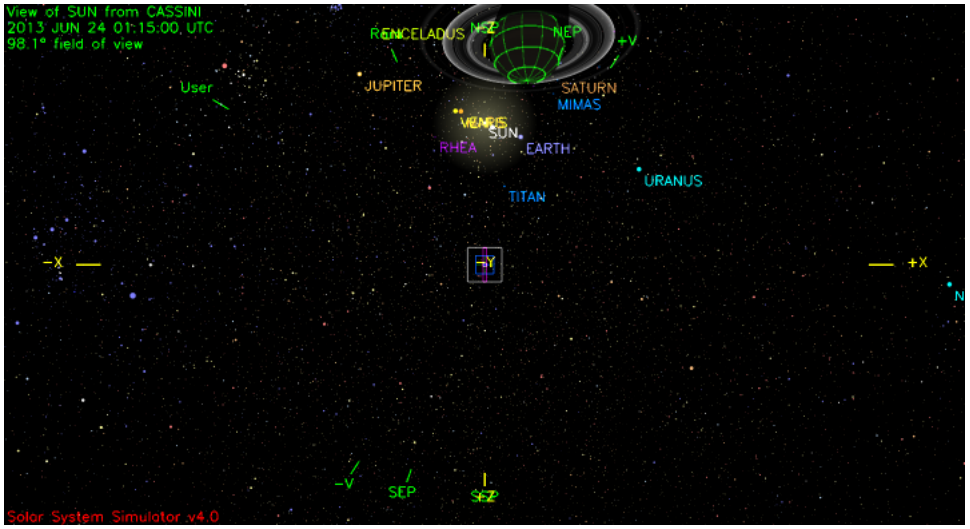


Waypoint 2 (2013–174T14:08:00 – 174T22:25:00): NEG_Y to Saturn, NEG_Z to NSP

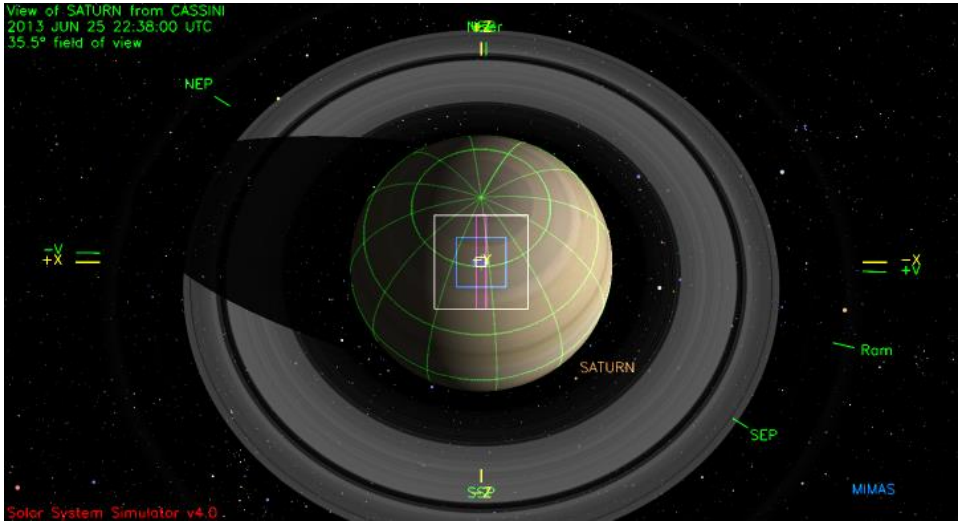


Waypoints Chosen (2 of 3)

Waypoint 3 (2013–174T22:25:00 – 175T04:07:00): VIMS_IR_SOL to Sun, NEG_Z to NSP

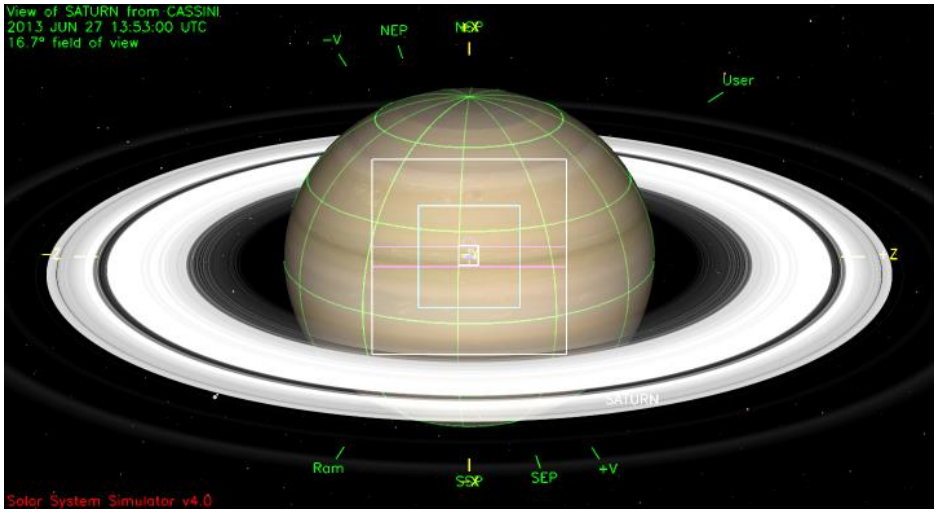


Waypoint 4 (2013–176T01:38:00 – 177T20:13:00): NEG_Y to Saturn, POS_Z to NSP



Waypoints Chosen (3 of 3)

Waypoint 5 (2013–178T07:23:00 – 178T20:13:00): NEG_Y to Saturn, POS_X to 136.5/31.5



Notes (1/2)

- Pointing:
  - The YGAP associated with the DOY 175 DSS-54 pass follows the downlink.
  - ISS_193SA_LIMBSCAN001_PRIME and ISS_193EN_PLMHPMR001_PIE may require NEG_Y-to-Sun waivers, depending on their implementation. (12° < NEG_Y-to-Sun angle < 15°). ISS_193SA_LIMBSCAN001_PRIME will not require a waiver if ISS targets the dawn limb, and not the dusk limb, of Saturn.
  - There were no safe RBOT-friendly waypoint secondaries for the second and third observations periods of this segment (2013-174T14:08:00 – 2013-174T22:25:00; 2013-174T22:25:00 – 2013-175T04:07:00). A non-RBOT-friendly waypoint secondary was used for the fourth observation period (2013-176T01:38:00 – 2013-177T20:13:00) to accommodate science.

- Data Volume:

  P4 is overfilled by 0.5010139 Mb. Possible data loss might occur during observation period. Check data volume recording over P4 and P4's size.

  - SMT warns of a -0.5 Mb SSR margin on DOY 177. The Saturn TWT accepts possible data loss. (Not only do we suspect that SMT isn't this accurate, we also note that CAPS data *is* included in this estimate and that compression has not been taken into account.)

- DSN:
  - DSS-14 could not cover the full 9 hours of the DOY 178/179 downlink due to a maintenance conflict; the pass was split in twain. DSS-25 supports the first 1.5 hours of this pass. Sufficient data volume margin exists if the DSS-25 pass is lost.
  - There is one Level 3 request in this segment.

    Rev 193 Saturn Rings Occultation Experiment:
    Level 3 request from 2013-175/0130 to 2013-175/1100
    Stations: DSS-14, DSS-43, DSS-34
  - `ap_downlink report check` warning dispositions:

    Warning: 70m usage for sequence exceeds project commitment of <= 35%; is at 50%
  - To be addressed pending S79 DSN negotiations. (There is ample data volume margin should we lose some 70-meter coverage during this segment.)

    Warning: number of sequence upload passes is 0; should be 5 or more

Notes (2/2)

- DSN (cont'd):
  - This segment is not at the end of a sequence; SEQ passes are not required here.
  - The following changes were made to the original DSN plan:
    - one 2-hour, 12-minute DSS-43 pass added on DOY 175 (2013-175T09:18:00 – 2013-175T12:10:00)
    - DSS-63 pass on DOY 175 downgraded to a 34-meter station
    - 07:30:00 of the DSS-25 pass on DOY 178/179 was replaced with DSS-14 coverage

- Resource checker:

2013-175T02:41:00	ENGR_193SC_RSS2RWAF175_PPS	From OpMode of DFPW_normal in Request ENGR_193SC_URSS3RWAS175_PPS does not match To Opmode of RSS2RWAP-FULL in Request ENGR_193SC_RSS2RWAF175_PPS

  - The RSS2RWAF to RSS3RWAS transition must be done using a unique opmode, as this transition is not currently supported as a normal transition.

2013-175T00:00:00	VIMS_193SU_SOLARPORT001_PRIME	Gap in Prime SPASS requests between VIMS_193SU_SOLARPORT001_PRIME and SP_193EA_WAYPTTURN175_PRIME. Gap of 000T00:01:00 is greater than or equal to 60 seconds.

  - This gap is intentional. It allows for the transition to RSS3RWAS opmode in support of the RSS occultation.

- Opmodes:
  - An RWA-slow opmode – RSS3RWAS – will be implemented to support the DOY 175 RSS ring occultation. As a consequence, SP_193EA_WAYPTTURN175_PRIME and SP_193EA_WAYPTTURN175_PRIME must utilize slow turn rates.
  - The utilization of the RSS3RWAS opmode will preclude CDA articulation between 2013-175T03:26:00 and 2013-175T09:18:33.

- Special Activities:
  - none

Liens

- List any Liens to be worked in SIP, *ie*
  - none