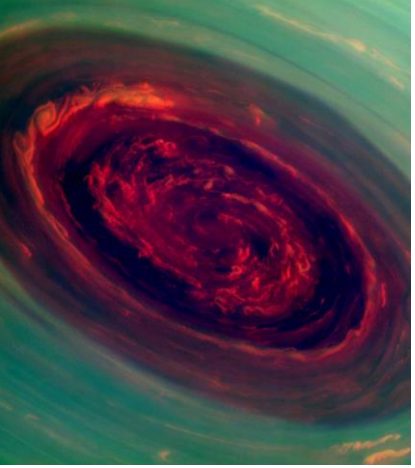

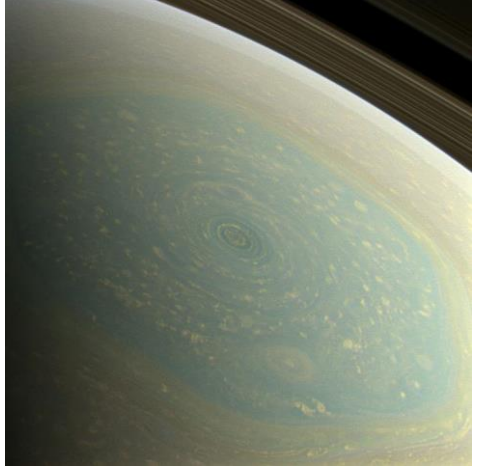
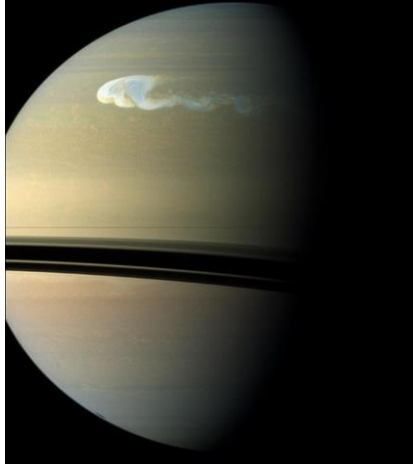

Science Planning & Sequence Team
CASSINI

SATURN TARGET WORKING TEAM

Rev 188 Segment Legacy Package

Segment Boundary: April 29, 2013 – May 5, 2013
2013-119T11:02:00 – 2013-125T10:32:00 (SCET)

Integration Began 05/14/2012
Segment Delivered to S78 Sequence 09/05/2012
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 was centered on Rev 188 periapse (6.24 Rs).

- Solar geometry impacted the science that could be planned in the hours prior to periapse. Targets other than Saturn were chosen when the Sun was not safely behind the planet. An ISS limb scan was performed during the eclipse portion, requiring special commanding to relax CMT (S/C automated constraint avoidance) limits (see page 8 & 17 for more details).

- Saturn focused science included VIMS and UVIS aurora, VIMS-led polar and regional mapping of both poles and hemispheres, CIRS mapping and composition, and ISS-led feature tracking.

- There were several high priority PIEs (Pre-Integrated Events) in this segment including both UVIS Solar and Stellar-Ring Occultations, an ISS-led Enceladus Plume, a VIMS Stellar-Ring occultation, and VIMS-led North Pole Dynamics.

- Suggested observations in integration were selected for most periods and waypoints were chosen for science compatibility, utilizing RBOT (reaction wheel) friendly attitudes when possible.

- With the addition of a Madrid 34-meter DSN station on DOY 124, just preceding the final downlink, data volume was manageable with the resources provided in the nominal DSN plan.

Final Sequenced SPASS

Request	Riders	Start (SCET)	Start (Epoch)	Duration	End (SCET)	Primary	Secondary	Comments
Sequence S78, length = 72 days		2013-085T13:15:00		072T11:30:00	2013-158T00:45:00			
SATURN_188 Segment		2013-119T11:02:00		005T23:30:00	2013-125T10:32:00			
SP_188SA_WAYPTTURN119_PRIME		2013-119T11:02:00		000T00:40:00	2013-119T11:42:00	ISS_NAC to Saturn	NEG_Z to 137.2/29.3	
NEW WAYPOINT		**2013-119T11:42:00**		**000T14:20:00**	**2013-120T02:02:00**	**ISS_NAC to Saturn**	**NEG_Z to 137.2/29.3**	
VIMS_188SA_AURSTARE001_PRIME	C, I, U	2013-119T11:42:00		000T06:20:00	2013-119T18:02:00	ISS_NAC to Saturn	NEG_Z to 137.2/29.3	
UVIS_188SA_AURSLEW001_PRIME	C, V	2013-119T18:02:00		000T06:20:00	2013-120T00:22:00	UVIS_FUV to Saturn	NEG_Z to 137.2/29.3	
VIMS_188SA_SPOLEMAP001_PRIME	C	2013-120T00:22:00		000T01:00:00	2013-120T01:22:00	ISS_NAC to Saturn	NEG_Z to 137.2/29.3	
SP_188EA_DLTURN120_PRIME		2013-120T01:22:00		000T00:40:00	2013-120T02:02:00	XBAND to Earth	NEG_X to NEP	
NEW WAYPOINT		**2013-120T02:02:00**		**000T09:40:00**	**2013-120T11:42:00**	**XBAND to Earth**	**NEG_X to NEP**	
SP_188EA_G34BWGOTP120_PRIME	C, E, N	2013-120T02:02:00		000T09:00:00	2013-120T11:02:00	XBAND to Earth	4_Hr_Rolling	CAPS. NEG_X to NEP or NSP. OTP. SID suspend
SP_188SA_WAYPTTURN120_PRIME		2013-120T11:02:00		000T00:40:00	2013-120T11:42:00	ISS_NAC to Saturn	NEG_Z to 137.2/29.3	
NEW WAYPOINT		**2013-120T11:42:00**		**000T06:35:00**	**2013-120T18:17:00**	**ISS_NAC to Saturn**	**NEG_Z to 137.2/29.3**	
VIMS_188SA_SPOLEMOV001_PRIME	C	2013-120T11:42:00		000T05:55:00	2013-120T17:37:00	ISS_NAC to Saturn	NEG_Z to 137.2/29.3	
SP_188EA_DLTURN420_PRIME		2013-120T17:37:00		000T00:40:00	2013-120T18:17:00	XBAND to Earth	NEG_X to NEP	
NEW WAYPOINT		**2013-120T18:17:00**		**000T09:24:00**	**2013-121T03:41:00**	**XBAND to Earth**	**NEG_X to NEP**	
SP_188EA_M70METOTB120_PRIME	C, N	2013-120T18:17:00		000T09:00:00	2013-121T03:17:00	XBAND to Earth	4_Hr_Rolling	CAPS. same secondary as OTP pass. OTB. SID suspend
SP_188SA_WAYPTTURN121_PRIME		2013-121T03:17:00		000T00:24:00	2013-121T03:41:00	UVIS_SOL_OFF to Sun	NEG_X to NSP	
NEW WAYPOINT		**2013-121T03:41:00**		**000T07:44:00**	**2013-121T11:25:00**	**UVIS_SOL_OFF to Sun**	**NEG_X to NSP**	
VIMS_188SA_SREGMAP001_PRIME	C	2013-121T03:41:00		000T02:04:00	2013-121T05:45:00	ISS_NAC to Saturn	POS_X to NSP	
SP_188NA_DEADTIME121_PRIME		**2013-121T05:45:00**		**000T00:20:00**	**2013-121T06:05:00**	**UVIS_SOL_OFF to Sun**	**NEG_X to NSP**	
UVIS_188SU_USUNOCC001_PIE	V	2013-121T06:05:00	GMB_E188_Saturn_Solar_Occ_Ing-000T01:04:26	000T01:20:00	2013-121T07:25:00	UVIS_SOL_OFF to Sun	NEG_X to NSP	No Preference to secondary pointing
ISS_188SA_LIMBSCAN002_PRIME	V	2013-121T07:25:00	GMB_E188_Saturn_Solar_Occ_Ing+000T00:15:34	000T00:30:00	2013-121T07:55:00	ISS_NAC to Saturn	NEG_X to NSP	
SP_188NA_DEADTIME421_PRIME		**2013-121T07:55:00**	**GMB_E188_Saturn_Solar_Occ_Ing+000T00:45:34**	**000T00:20:00**	**2013-121T08:15:00**	**UVIS_SOL_OFF to Sun**	**NEG_X to NSP**	
UVIS_188ST_URLAMTAU001_PIE	C	2013-121T08:15:00		000T01:45:00	2013-121T10:00:00	UVIS_HSP to 60.17/12.49	NEG_X to NSP	
CIRS_188SA_REGMAP001_PRIME	I, V	2013-121T10:00:00		000T00:55:00	2013-121T10:55:00	CIRS_FPB to Saturn	NEG_X to NSP	stare at 75S or 80S maintain > 15 degrees from sun
SP_188SA_WAYPTTURN421_PRIME	M	2013-121T10:55:00		000T00:25:00	2013-121T11:20:00	ISS_NAC to Saturn (0.0,0.0,5.0 deg. offset)	POS_Z to NSP	Part 1 of 2-part turn
SP_188SA_WAYPTTURN521_PRIME	M	2013-121T11:20:00		000T00:05:00	2013-121T11:25:00	ISS_NAC to Saturn	POS_Z to NSP	Part 2 of 2-part turn
NEW WAYPOINT		**2013-121T11:25:00**		**001T05:07:00**	**2013-122T16:32:00**	**ISS_NAC to Saturn**	**POS_Z to NSP**	
ISS_188EN_PLMMPMR001_PIE	C, M, U, V	2013-121T11:25:00		000T02:55:00	2013-121T14:20:00	ISS_NAC to Enceladus	NEG_X to 358.302/19.759	SOST PIE
CIRS_188SA_COMPSIT001_PRIME	V	2013-121T14:20:00		000T04:10:00	2013-121T18:30:00	CIRS_FP3 to Saturn	POS_Z to NSP	37N Northern storm offset left to CML+60
Periapse R = 6.244 Rs, lat ...		2013-121T15:59:18		000T00:00:01	2013-121T15:59:19			
VIMS_188RI_RDOROCC001_PIE	C	2013-121T18:30:00		000T04:46:00	2013-121T23:16:00	VIMS_IR to 69.19/-62.078	POS_Z to NSP	
VIMS_188SA_NPOLEDYN001_PIE	C, I	2013-121T23:16:00		000T16:36:00	2013-122T15:52:00	ISS_NAC to Saturn	POS_Z to NSP	PIE
SP_188EA_DLTURN122_PRIME		2013-122T15:52:00		000T00:40:00	2013-122T16:32:00	XBAND to Earth	POS_X to NEP	
NEW WAYPOINT		**2013-122T16:32:00**		**000T11:10:00**	**2013-123T03:42:00**	**XBAND to Earth**	**POS_X to NEP**	
ENGR_188SC_KPTYBIAS122_PRIME		2013-122T16:32:00		000T01:30:00	2013-122T18:02:00	NEG_Z to DELTA_H	NEG_X to Sun	
SP_188EA_M70METNON122_PRIME	C	2013-122T18:12:00		000T08:50:00	2013-123T03:02:00	XBAND to Earth	Rolling	CAPS. POS_X to NEP or NSP.
SP_188SA_WAYPTTURN123_PRIME		2013-123T03:02:00		000T00:40:00	2013-123T03:42:00	ISS_NAC to Saturn	POS_X to 137.1/29.3	
NEW WAYPOINT		**2013-123T03:42:00**		**001T12:50:00**	**2013-124T16:32:00**	**ISS_NAC to Saturn**	**POS_X to 137.1/29.3**	
VIMS_188SA_NREGMAP001_PRIME	I	2013-123T03:42:00		000T12:00:00	2013-123T15:42:00	ISS_NAC to Saturn	POS_X to 137.1/29.3	
ISS_188SA_FEATRAK001_PRIME	V	2013-123T15:42:00		000T12:00:00	2013-124T03:42:00	ISS_NAC to Saturn	POS_X to 137.1/29.3	
CIRS_188SA_COMPSIT002_PRIME	U	2013-124T03:42:00		000T12:10:00	2013-124T15:52:00	CIRS_FP3 to Saturn	NEG_Z to NSP	
SP_188SA_DLTURN124_PRIME		2013-124T15:52:00		000T00:40:00	2013-124T16:32:00	XBAND to Earth	POS_X to 139.0/45.8	
NEW WAYPOINT		**2013-124T16:32:00**		**000T18:30:00**	**2013-125T11:02:00**	**XBAND to Earth**	**POS_X to 139.0/45.8**	
SP_188EA_YGAP124_PRIME		2013-124T16:32:00		000T01:30:00	2013-124T18:02:00	XBAND to Earth	POS_X to 139.0/45.8	
SP_188EA_M34BWGNON124_PRIME	R	2013-124T18:02:00		000T07:30:00	2013-125T01:32:00	XBAND to Earth	Rolling	
SP_188EA_G70METNON125_PRIME	C	2013-125T01:32:00		000T09:00:00	2013-125T10:32:00	XBAND to Earth	Rolling	MIMI. NEG_Y to Saturn (0,0,-9.5).

Gap 1 Gap 2 Gap 3a Gap 3b Gap 3c Gap 3d Gap 3e/f Gap 4

Final Sequenced SMT and Data Volume

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

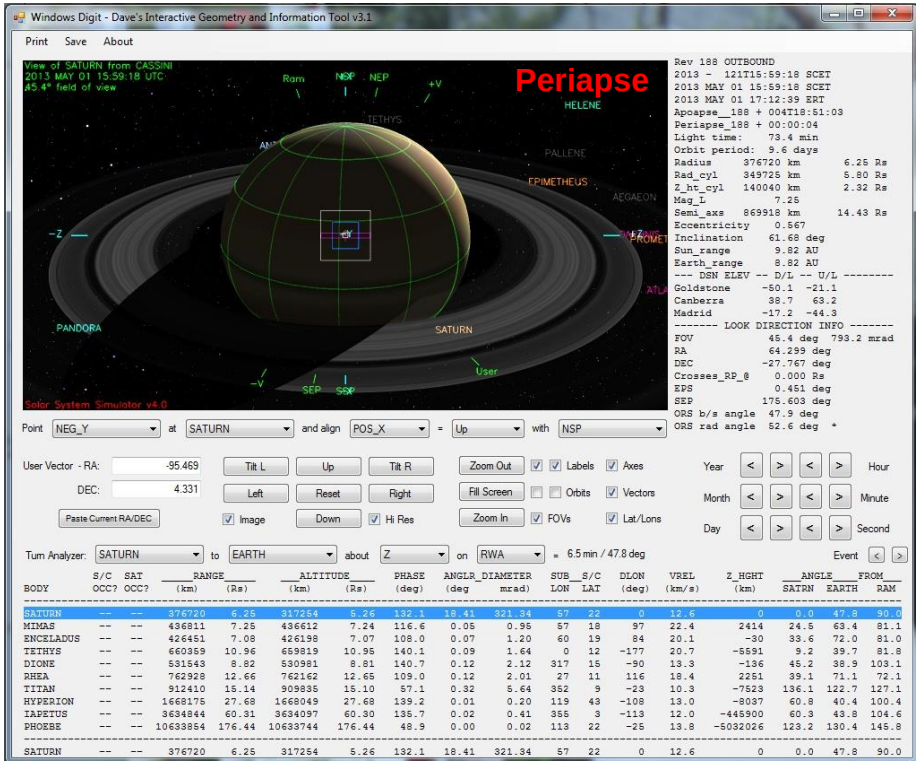
			OBSERVATION_PERIOD							DOWNLINK_PASS						
			P4						P5	RECORDED		PLAYBACK				
DOWNLINK PASS NAME	Start doy hh:mm	End doy hh:mm	START (Mb)	SCI (Mb)	HK+E (Mb)	TOTAL (Mb)	CPACTY (Mb)	MRGN (Mb)	OPNAV (Mb)	SCI (Mb)	ENGR (Mb)	TOTAL (Mb)	CPACTY (Mb)	MARGN (Mb)	NET_MARGN (Mb)	CAROVR (%)	(Mb)
SP_188EA_G34BWGOTP120_PRIME	120 02:02	120 11:02	264	1310	63	1637	3322	1686	0	359	53	2049	654	-1395	773	5%	1395
SP_188EA_M70METOTB120_PRIME	120 18:17	121 03:17	1395	611	31	2036	3322	1286	0	331	53	2421	3197	775	773	4%	0
SP_188EA_M70METNON122_PRIME	122 18:12	123 03:02	0	3160	164	3325	3322	-1	0	327	52	3701	3083	-618	6	0%	618
SP_188EA_M34BWGNON124_PRIME	124 18:02	125 01:32	618	2534	165	3316	3322	6	0	200	44	3560	635	-2925	397	2%	2925
SP_188EA_G70METNON125_PRIME	125 01:32	125 10:32	2925	0	0	2925	3322	397	0	332	53	3310	3767	457	849	4%	0

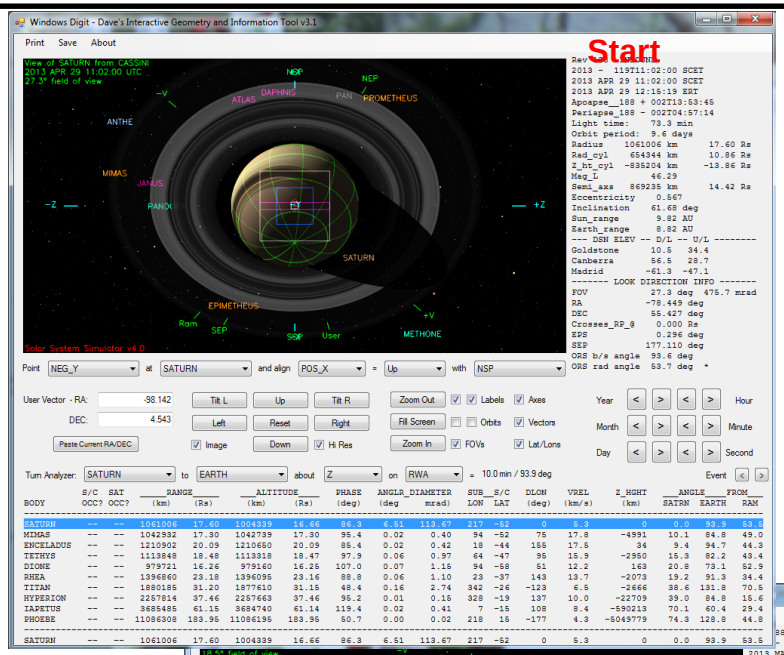
DATA VOLUME REPORT --- TRANSFER FRAME OVERHEAD NOT INCLUDED

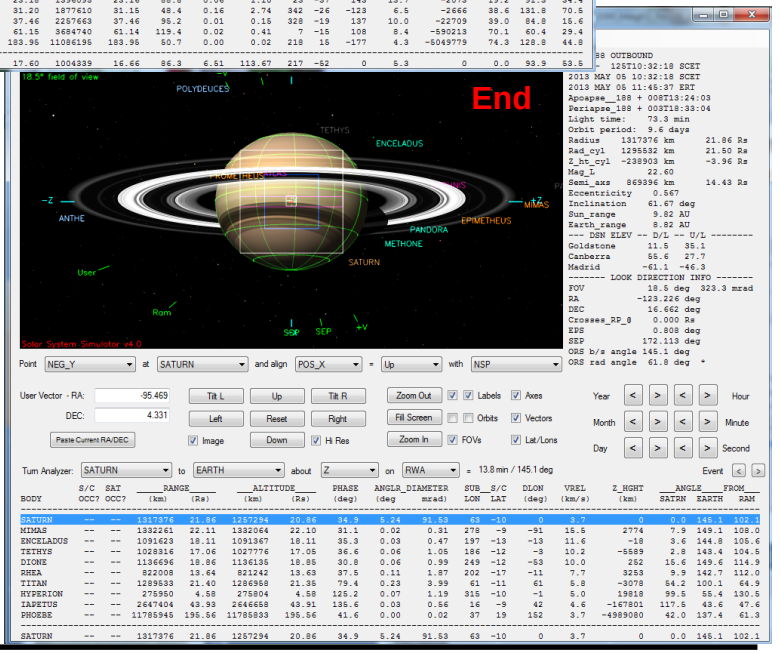
Event	Start doy hh:mm	End doy hh:mm	CAPS (Mb)	CDA (Mb)	CIRS (Mb)	INMS (Mb)	ISS (Mb)	MAG (Mb)	MIMI (Mb)	RADAR (Mb)	RPWS (Mb)	UVIS (Mb)	VIMS (Mb)	PROBE (Mb)	ENGR (Mb)	TOTAL (Mb)
OBSERVATION_NOR	119 11:02	120 02:02	54.0	28.3	98.4	5.4	120.0	53.4	64.8	0.0	235.2	438.3	200.0	0.0	62.7	1360.4
SP_188EA_G34BWGOTP120_PRIME	120 02:02	120 11:02	32.4	17.0	86.4	3.2	0.0	32.0	38.9	0.0	140.8	4.9	0.0	0.0	0.0	355.7
DAILY TOTAL SCIENCE	119 11:02	120 11:02	86.4	45.3	184.8	8.6	120.0	85.4	103.7	0.0	376.0	443.2	200.0	0.0	62.7	
OBSERVATION_NOR	120 11:02	120 18:17	26.1	13.7	42.6	2.6	0.0	25.8	31.3	0.0	113.4	0.0	350.0	0.0	30.3	635.8
SP_188EA_M70METOTB120_PRIME	120 18:17	121 03:17	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	120 11:02	121 03:17	58.5	30.7	129.0	5.9	0.0	41.8	58.9	0.0	254.3	4.9	350.0	0.0	30.3	
OBSERVATION_NOR	121 03:17	122 18:12	140.1	100.7	220.5	30.5	479.9	69.2	119.1	0.0	391.6	135.8	1444.0	0.0	162.6	3294.0
SP_188EA_M70METNON122_PRIME	122 18:12	123 03:02	31.8	16.7	86.4	3.2	0.0	15.7	27.0	0.0	138.2	4.8	0.0	0.0	0.0	323.8
DAILY TOTAL SCIENCE	121 03:17	123 03:02	171.9	117.4	306.9	33.7	479.9	84.9	146.1	0.0	529.8	140.6	1444.0	0.0	162.6	
OBSERVATION_NOR	123 03:02	124 18:02	140.4	73.6	87.6	14.0	665.0	69.4	119.3	0.0	611.5	39.7	690.0	0.0	163.0	2673.5
SP_188EA_M34BWGNON124_PRIME	124 18:02	125 01:32	27.0	14.1	0.0	2.7	0.0	13.3	23.0	0.0	117.6	0.0	0.0	0.0	0.0	197.8
SP_188EA_G70METNON125_PRIME	125 01:32	125 10:32	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	123 03:02	125 10:32	199.8	104.7	174.0	20.0	665.0	98.7	169.8	0.0	870.3	44.6	690.0	0.0	163.0	

*Negative SSR Margins did not result in a loss of science data due to under-utilization/compression.

Segment Geometry

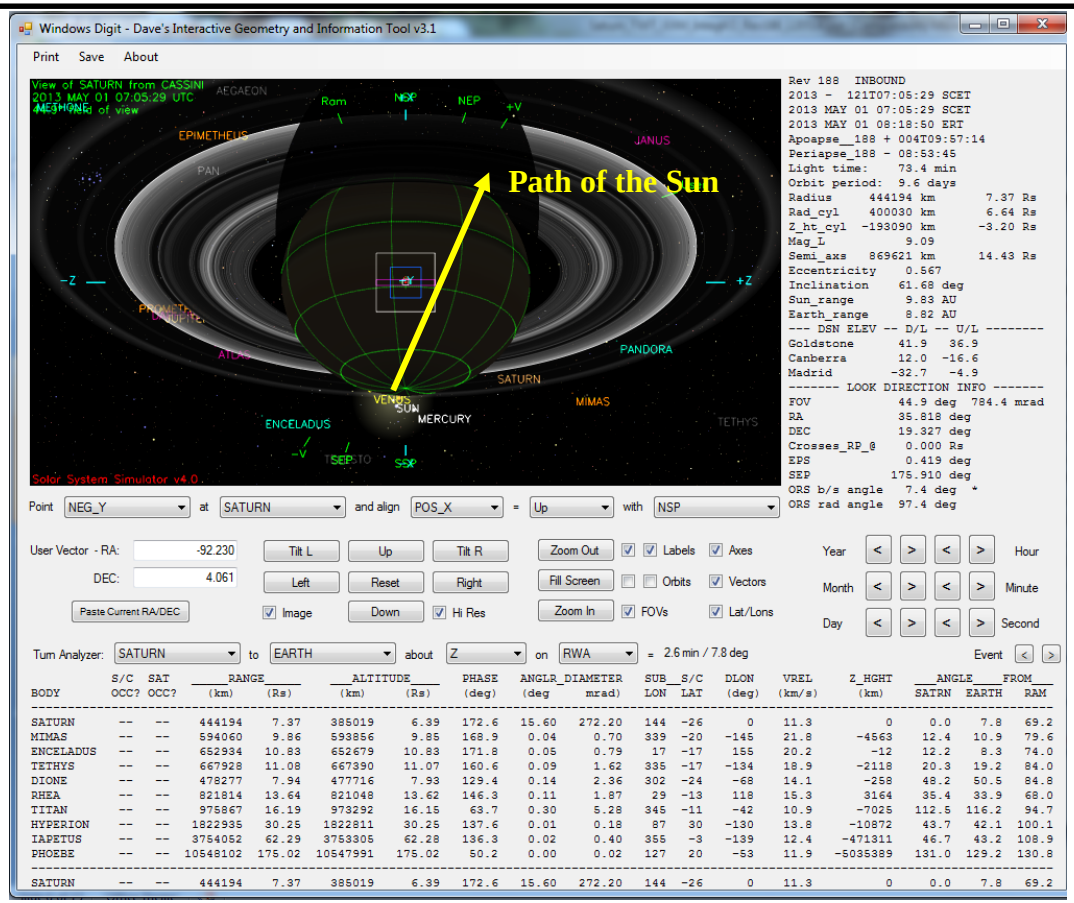




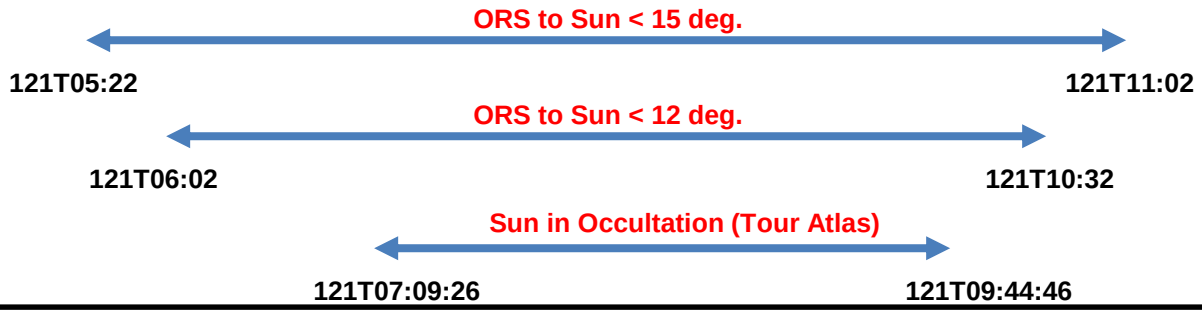


	Saturn Range	Phase Angle	Sub-S/C Lat.
Segment Start	17.6 Rs	86.3º	-52º
Periapse	6.25 Rs	132.1º	22º
Segment End	21.86 Rs	34.9º	-10º

Solar Geometry – ORS Boresight Concerns



- Pointing to NEG_Y to Saturn (center) would lead to a CMT violation between ~2013-121T06:02:00 and ~2013-121T10:32:00.
- Minimum NEG_Y to Sun angle is ~3.2° at 2013-121T08:22:00.
- <15 deg period begins during Gap 3a
- <12 deg period begins during UVIS_188SU_USUNOCC001_PIE
- Gap 3b during <12 deg period and only 30 minutes – give to following PIE or leave empty?
- Minimum ORS to Sun angle during UVIS_188ST_URLAMTAU001_PIE
- >12 deg during Gap 3c; may have to manage CMT depending on what is done here.
- >15 deg during SP turn to new waypoint.



Daily Science Highlights

===== Apr 29 2013 =====
DOY119:
VIMS conducted sit and stare imaging of Saturn's southern pole for aurora while all the other ORS instruments rode along.
UVIS conducted Saturn auroral observations by slewing across the pole. CIRS and VIMS rode along.
MAPS instruments continued their survey of the magnetosphere, with RPWS specifically observing the auroral and SKR source regions.

===== Apr 30 2013 =====
DOY 120:
VIMS performed mosaic mapping of Saturn's south pole with CIRS riding.
VIMS continued observing Saturn by imaging repeated mosaics of the south pole for a movie while CIRS rode along.
MAPS instruments continued their survey of the magnetosphere.

===== May 01 2013 =====
DOY 121:
VIMS, with CIRS riding along, performed regional mapping mosaics of the southern hemisphere of Saturn, focusing on "Storm Alley".
UVIS observed an ingress solar occultation by Saturn, while VIMS rode along.
While the Sun is behind Saturn's night-side limb, ISS conducted a limb scan observation with VIMS riding.
UVIS and VIMS observed stellar ring occultations with CIRS.
CIRS conducted regional mapping of Saturn at latitudes of 75 to 80 degrees south. ISS and VIMS rode along, with ISS searching for lightning.
ISS led joint ORS observations of Enceladus plumes.
CIRS observed Saturn with sit and stare imaging at one location to derive composition, specifically targeting the beacon at 37 degree north latitude while VIMS rode along.
MAPS instruments sampled the inner magnetosphere with special emphasis on the conditions as the spacecraft crosses the ring plane.
RPWS continued campaign to obtain high resolution WBR data in the narrow band emission source region.

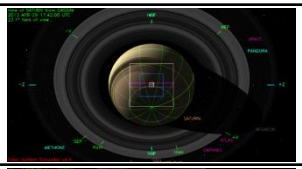
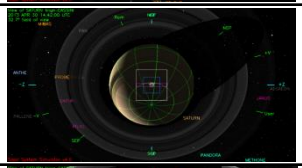
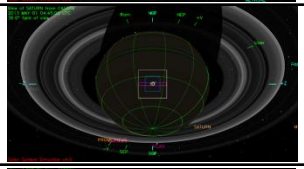
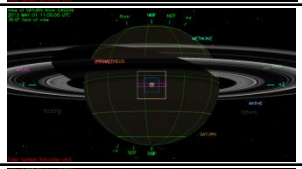
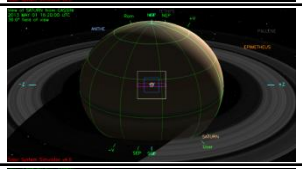
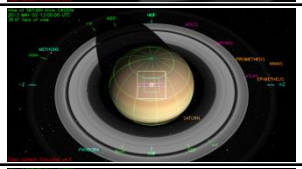
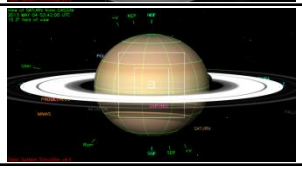
===== May 02 2013 =====
DOY 122:
VIMS , along with ISS and CIRS, conducted mosaic imaging of the North Pole to investigate cloud motion and atmospheric dynamics.
MAPS teams continued to make magnetospheric and auroral measurements

===== May 03 2013 =====
DOY 123:
VIMS performed regional mapping mosaics of Saturn's northern hemisphere, with ISS riding.
ISS imaged selected Saturn latitudes at a range of emission angles as the planet rotates. VIMS rode along.
MAPS instruments continued their survey of the magnetosphere.

===== May 04 2013 =====
DOY 124:
CIRS observed Saturn with sit and stare imaging at one location to derive composition, while UVIS rode along.
RSS conducted an Operations Readiness Test, while the spacecraft was turned to Earth for downlink, to demonstrate DSN and RSSG preparedness to support upcoming Rev189 Saturn rings and atmospheric occultations.

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	2013-119T11:42:00	2013-120T01:22:00	000T13:40:00	86.9 to 100.9	17.5 to 14.9	-52 to -59	
	VIMS+UVIS Auroral 6:20/ea; 1h VIMS map						
2	2013-120T11:42:00	2013-120T17:37:00	000T05:55:00	115.9 to 127.6	12.4 to 10.9	-62 to -58	
	VIMS South Pole Movie						
3a	2013-121T03:57:00	2013-121T05:45:00	000T01:48:00	158.9 to 166.5	8.1 to 7.7	-37 to -31	
	VIMS Regional Map						
GAP 3b = Sun occulted, used for GMB Deadtime							
3c	2013-121T10:00:00	2013-121T11:25:00	000T01:25:00	170.5 to 162.2	6.8 to 6.6	-12 to -5	
	ISS Shimmering Limb						
3d	2013-121T14:20:00	2013-121T18:30:00	000T04:10:00	143.3 to 115.0	6.3 to 6.35	12 to 36	
	CIRS Compositional Sit & Stare						
3e/f	3013-121T21:16:00 2013-122T11:00:00	2013-122T00:00:00 2013-122T15:52:00	000T00:44:00 000T04:52:00	40.4 to 28.8	10.0 to 11.3	52 to 44	
	Extend VIMS North Pole PIE						
4	2013-123T03:42:00	2013-124T23:22:00	001T19:40:00	9.5 to 21.0	14.2 to 28.4	28 to -5	
	ISS/VIMS Mapping and then CIRS						

Initial SMT and Data Volume

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_188EA_G34BWGOTP120_PRIME	120 02:02	120 11:02	0	399	63	462	3322	2860	0	331	53	847	654	-194	2906	26%	193
SP_188EA_M70METOTB120_PRIME	120 18:17	121 03:17	193	193	31	416	3322	2906	0	331	53	801	3197	**2396**	3248	30%	0
SP_188EA_M70METNON122_PRIME	122 18:02	123 03:02	0	2306	164	2470	3322	**852**	0	331	53	2854	3107	**252**	2372	32%	0
SP_188EA_M34BWGNON124_PRIME	124 18:02	125 01:32	0	1038	165	1202	3322	**2120**	0	200	44	1446	635	-812	2511	57%	811
SP_188EA_G70METNON125_PRIME	125 01:32	125 10:32	811	0	0	811	3322	2511	0	332	53	1196	3767	2571	2571	68%	0

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	119 11:02	120 02:02	54.0	28.3	0.0	5.4	0.0	26.7	45.9	0.0	235.2	0.0	0.0	0.0	62.7	458.2
SP_188EA_G34BWGOTP120_PRIME	120 02:02	120 11:02	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	119 11:02	120 11:02	86.4	45.3	86.4	8.6	0.0	42.7	73.4	0.0	376.0	4.9	0.0	0.0	62.7	
OBSERVATION_NOR	120 11:02	120 18:17	26.1	13.7	0.0	2.6	0.0	12.9	22.2	0.0	113.4	0.0	0.0	0.0	30.3	221.2
SP_188EA_M70METOTB120_PRIME	120 18:17	121 03:17	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	120 11:02	121 03:17	58.5	30.7	86.4	5.9	0.0	28.9	49.7	0.0	254.3	4.9	0.0	0.0	30.3	
OBSERVATION_NOR	121 03:17	122 18:02	139.5	100.4	42.0	24.0	300.0	68.9	118.6	0.0	413.5	189.1	889.0	0.0	162.0	2447.0
SP_188EA_M70METNON122_PRIME	122 18:02	123 03:02	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	121 03:17	123 03:02	171.9	117.4	128.4	27.3	300.0	84.9	146.1	0.0	554.4	194.0	889.0	0.0	162.0	
OBSERVATION_NOR	123 03:02	124 18:02	140.4	73.6	0.0	14.0	0.0	69.4	119.3	0.0	611.5	0.0	0.0	0.0	163.0	1191.2
SP_188EA_M34BWGNON124_PRIME	124 18:02	125 01:32	27.0	14.1	0.0	2.7	0.0	13.3	23.0	0.0	117.6	0.0	0.0	0.0	0.0	197.8
SP_188EA_G70METNON125_PRIME	125 01:32	125 10:32	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	123 03:02	125 10:32	199.8	104.7	86.4	20.0	0.0	98.7	169.8	0.0	870.3	4.9	0.0	0.0	163.0	

	CAPS (Mb)	CDA (Mb)	CIRS (Mb)	INMS (Mb)	ISS (Mb)	MAG (Mb)	MIMI (Mb)	RADAR (Mb)	RPWS (Mb)	UVIS (Mb)	VIMS (Mb)	PROBE (Mb)
TOTAL RECORDED (OPNAV data not included)	516.6	298.0	387.6	61.7	300.0	255.2	439.1	0.0	2054.9	208.9	889.0	0.0

Waypoint Selection

RBOT - Friendly

PRIMARY AXIS IS **NEG_Y to SATURN**

OBSERVATION PERIOD	START	END	POS_X	NEG_X	POS_Z	NEG_Z
SP_188NA_OBSERV119_NA	2013-119T11:02:00	2013-120T02:02:00	137.2/ 29.3	------	------	137.2/ 29.3
SP_188NA_OBSERV120_NA	2013-120T11:02:00	2013-120T18:17:00	137.2/ 29.3	------	------	137.2/ 29.3
SP_188NA_OBSERV121_NA	2013-121T03:17:00	2013-122T18:02:00	------	------	------	------
SP_188NA_OBSERV123_NA	2013-123T03:02:00	2013-125T01:32:00	137.1/ 29.3	------	------	------

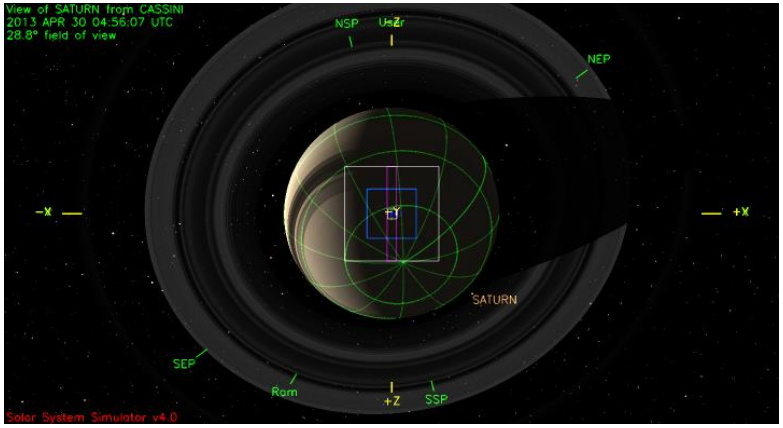
- **121T03:57 – 11:00 → UVIS_SOL_OFF to Sun; NEG_Z to NSP (best)**
  POS_Z to NSP (minor Saturn heating)
  NEG_X to NSP (minor Saturn heating)
  POS_X to NSP (minor Saturn heating)

- **121T11:15 – 122T15:52 → ISS_NAC to Saturn; NEG_Z to NSP (bad)**
  POS_Z to NSP (safe)
  NEG_X to NSP (safe)
  POS_X to NSP (bad)

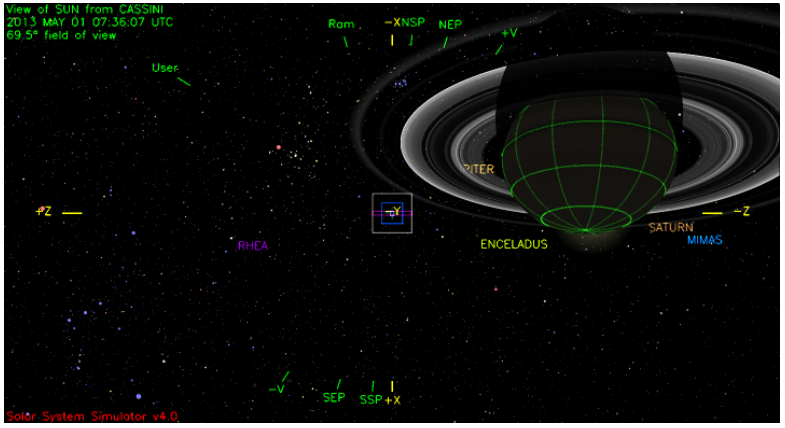
*** NEG_Y to Saturn not safe from 2013-121T05:22 to11:02(ORS to Sun < 15 deg.).**
- Minimum ORS to SUN angle is appx. 3.2 deg.

Waypoints Chosen

Waypoint 1 (2013-119T11:42:00 – 2013-121T03:41:00): ISS_NAC to Saturn; NEG_Z to 137.2/29.3

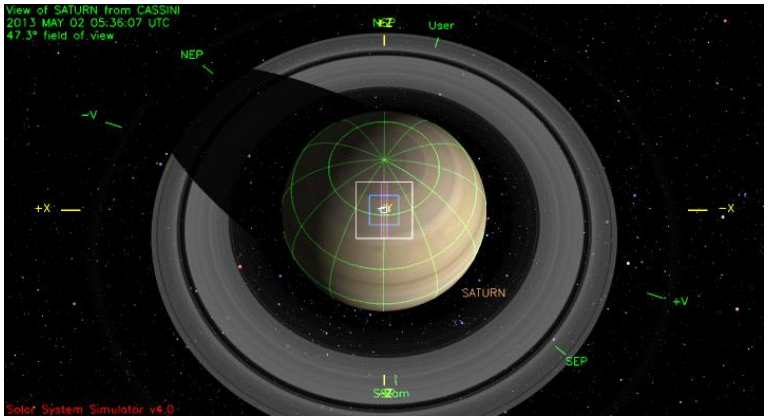


Waypoint 2 (2013-121T03:41:00 – 2013-121T11:25:00): UVIS_SOL_OFF to Sun, NEG_X to NSP

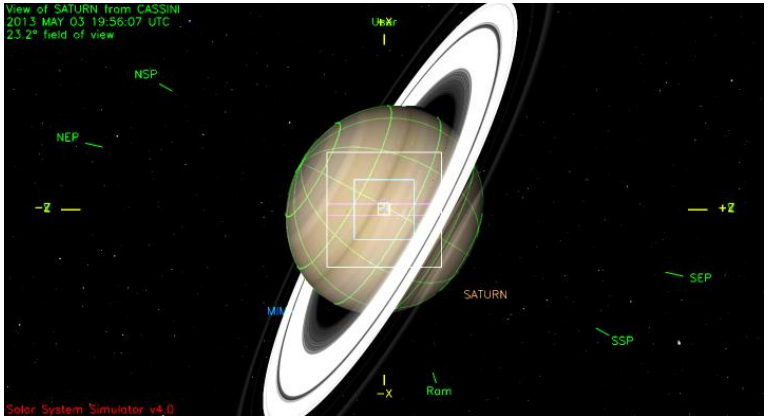


Waypoints Chosen

Waypoint 3 (2013-121T11:25:00 – 2013-123T03:42:00): ISS_NAC to Saturn; POS_Z to NSP



Waypoint 4 (2013-123T03:42:00 – 2013-124T16:32:00): ISS_NAC to Saturn; POS_X to 137.1/29.3



Notes & Liens

- Pointing:
  - RBOT-friendly secondaries were used except were a safe one was not provided (the observation period surrounding periapse).
- Data Volume:
  - Nothing to note
- DSN:
  - Nothing to note
- Resource checker:
  - All gaps in the SPASS are intentional.
- Opmodes:
  - Nothing to note
- Hydrazine:
  - N/A
- Special Activities:
  - CMT management required on DOY 121 during Saturn Solar occultation.

Sequence Liens (should all be SPLAT items):

- CMT management on DOY 121. SPLAT item added in CIMS for S78.

CMT Management: -Y to Sun violation

- -Y to Sun CMT Management and flight rule waivers were needed for the ISS Limb Scan on DOY 121 during the solar occultation
  - Time of Saturn Solar Occultation is from the tour atlas.
  - Timing pad is ± 7 minutes as determined using Brad Wallis' "ask_carnac.pro"