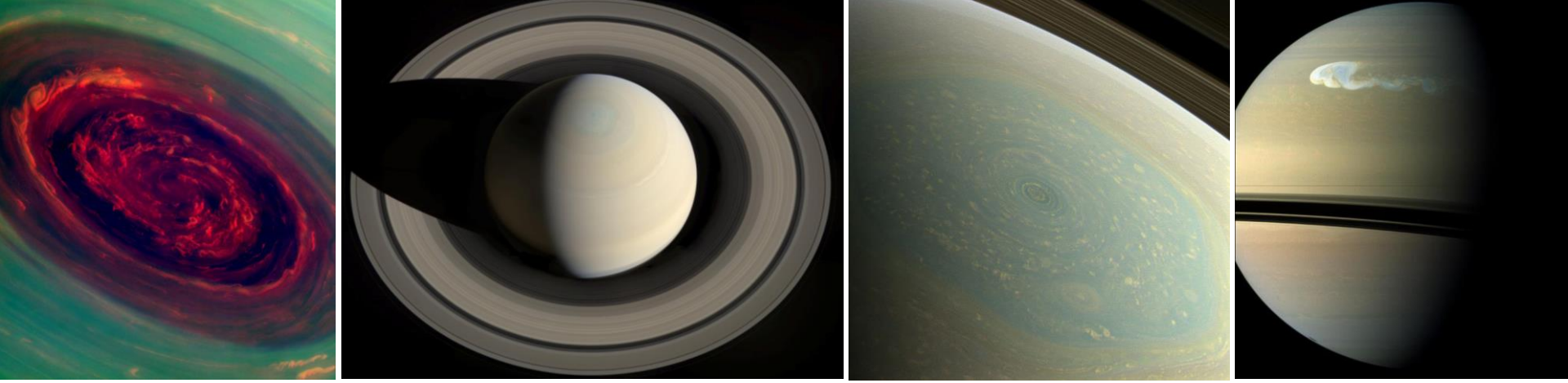

Science Planning & Sequence Team
CASSINI

SATURN TARGET WORKING TEAM

Rev 44 Segment Legacy Package

Segment Boundary: May 10, 2007 – May 12, 2007
2007-130T05:14 – 2007-132T04:59 (SCET)

Integration Began 04/28/2003
Segment Delivered to S30 Sequence 01/05/2007
Lead Integrator was Scott Edgington

Legacy Package Assembled by Kyle Cloutier

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*** N.A. = Slide present but content not available.**

Segment Overview and Final Products

Segment Summary

- Saturn 44 was a 2 day periapse segment in the Prime Mission. The segment was executed during an inclined orbit phase of the mission.

- Saturn science focused mainly around the Saturn occultations. RSS observes both ingress and egress ionospheric/atmospheric Saturn occultations and an egress only ring occultation. UVIS and VIMS also observe. Surrounding the occultation, CIRS takes spectra in the vicinity of RSS occultation points to obtain a new He determination. A Live Movable Block (LMB) was utilized to adjust timing for the occultation observations.

- Other observations include CIRS and UVIS limb observations and VIMS cylindrical maps and a 0 phase scan. CDA observes ring plane crossing inside the E-ring, inbound to periapse.

- Solar viewing constraints impacted science placement, but no CMT constraint management was required during the occulted period since Radio Science and UVIS were prime at the time and pointed XBAND to Earth or UVIS solar occultation port to Sun.

Final Sequenced SPASS (1 of 2)

Request	Riders	Start (SCET)	Start (Epoch)	Duration	End	Primary	Secondary	Comments
SATURN rev 44 Segment		2007-130T05:14:00		001T23:45:00	2007-132T04:59:00			
SP_044SA_WAYPTTURN130_PRIME	C, M	2007-130T05:14:00		000T00:30:00	2007-130T05:44:00	ISS_NAC to Saturn	NEG_Z to NSP	SP Turn to Waypoint
NEW WAYPOINT		2007-130T05:44:00		000T07:46:00	2007-130T13:30:00	ISS_NAC to Saturn	NEG_Z to NSP	
CIRS_044SA_NADIROCC004_PRIME	M	2007-130T05:44:00		000T03:00:00	2007-130T08:44:00	CIRS_FPB to Saturn	NEG_Z to NSP	
CIRS_044RI_SHADCAS001_PRIME	C, M, R, V	2007-130T08:44:00		000T04:26:00	2007-130T13:10:00	CIRS_FP1 to Rings	NEG_Z to NSP	
SP_044EA_WAYPTTURN530_PRIME	M, R	2007-130T13:10:00		000T00:20:00	2007-130T13:30:00	XBAND to Earth (0.0,0.0,-5.0 deg. offset)	POS_X to NSP	SP Turn to Waypoint
NEW WAYPOINT		2007-130T13:30:00		000T05:38:00	2007-130T19:08:00	XBAND to Earth (0.0,0.0,-5.0 deg. offset)	POS_X to NSP	
SP_044EA_DEADTIME130_PRIME	M	2007-130T13:30:00		000T00:15:00	2007-130T13:45:00	XBAND to Earth	POS_X to NSP	
RSS_044SA_OCC002_PRIME	M	2007-130T13:45:33	LMB_E044_SATURN_RSS_OCC_1_ING-000T00:49:31	000T00:54:00	2007-130T14:39:33	XBAND to Earth	POS_X to NSP	
UVIS_044SU_USUNOCC001_PRIME	M, R, V	2007-130T14:39:33	LMB_E044_SATURN_RSS_OCC_1_ING+000T00:04:29	000T01:30:00	2007-130T16:09:33	ISS_NAC to Sun (-20.0,0.0,-0.109 deg. offset)	POS_X to NSP	
RSS_044SA_OCC003_PRIME	M	2007-130T16:09:33	LMB_E044_SATURN_RSS_OCC_1_ING+000T01:34:29	000T00:50:00	2007-130T16:59:33	XBAND to Earth	POS_X to NSP	
RSS_044RI_OCC002_PRIME	M	2007-130T16:59:33	LMB_E044_SATURN_RSS_OCC_1_ING+000T02:24:29	000T01:23:00	2007-130T18:22:33	XBAND to Earth	POS_X to NSP	
SP_044EA_DEADTIME430_PRIME	M	2007-130T18:23:00		000T00:15:00	2007-130T18:38:00	XBAND to Earth	POS_X to NSP	
SP_044SA_WAYPTTURN430_PRIME	C, M	2007-130T18:38:00		000T00:08:00	2007-130T18:46:00	XBAND to Earth (0.0,-20.0,30.0 deg. offset)	POS_X to NSP	SP Turn to Waypoint; Needed to split turn to avoid FR violations.
SP_044SA_WAYPTTURN530_PRIME	C, M	2007-130T18:46:00		000T00:22:00	2007-130T19:08:00	ISS_NAC to Saturn	POS_Z to NSP	SP Turn to Waypoint
NEW WAYPOINT		2007-130T19:08:00		000T12:42:00	2007-131T07:50:00	ISS_NAC to Saturn	POS_Z to NSP	
CDA_044RE_ERNGRPX001_PRIME	M	2007-130T19:08:00		000T01:35:00	2007-130T20:43:00	POS_Y to Sun (0.0,-45.0,0.0 deg. offset)	POS_Z to NSP	CDA-CAPS-MIMI
CIRS_044SA_OCCLIMB001_PRIME	C, M	2007-130T20:43:00		000T00:30:00	2007-130T21:13:00	CIRS_FPB to Saturn	POS_Z to NSP	
UVIS_044SA_LIMBSKIM001_PRIME	M	2007-130T21:13:00		000T00:55:00	2007-130T22:08:00	UVIS_FUV to Saturn	POS_X to Saturn	
CIRS_044SA_LIMBINT003_PRIME	C, M, R	2007-130T22:08:00		000T02:12:00	2007-131T00:20:00	CIRS_FPB to Saturn	POS_Z to NSP	point to left limb for CAPS
Periapse R = 4.3 Rs, lat = ...		2007-130T22:46:55		000T00:00:01	2007-130T22:46:56			
SP_044EA_DLTURN131_PRIME	C, M, R	2007-131T00:20:00		000T00:30:00	2007-131T00:50:00	XBAND to Earth	POS_X to 331.36/73.51	SP Turn to Waypoint; the original secondary way POS_X to NSP with an offset of (0,0,-5).
SP_044EA_G70METNON130_PRIME	C, E, M, R	2007-131T00:50:00		000T06:00:00	2007-131T06:50:00	XBAND to Earth	3_Hr_Rolling	May require a waiver of the CIRS thermal FRs. MAPS will have to provide justification for this waiver. Note that the original secondary way POS_X to NSP with an offset of (0,0,-5).
NAV_044SK_OPNAV311_PRIME	M, R	2007-131T06:50:00		000T00:59:00	2007-131T07:49:00	ISS_NAC to Satellites (0.0,10.0,0.0 deg. offset)	NEG_X to Sun	Starts at Earth point, ends at NEW waypoint
NAV_044SA_WAYPTTURN311_PRIME	M	2007-131T07:49:00		000T00:01:00	2007-131T07:50:00	ISS_NAC to Saturn (0.0,10.0,0.0 deg. offset)	NEG_X to NEP	

Final Sequenced SPASS (2 of 2)

Request	Riders	Start (SCET)	Start (Epoch)	Duration	End	Primary	Secondary	Comments
NEW WAYPOINT		2007-131T07:50:00		000T21:39:00	2007-132T05:29:00	ISS_NAC to Saturn (0.0,10.0,0.0 deg. offset)	NEG_X to NEP	
VIMS_044SA_CYLMAP001_PRIME	M	2007-131T07:50:00		000T06:30:00	2007-131T14:20:00	ISS_NAC to Saturn	NEG_X to NSP	
CIRS_044SA_NADIROCCB004_PRIME	M	2007-131T14:20:00		000T03:00:00	2007-131T17:20:00	CIRS_FPB to Saturn	NEG_Z to NSP	
VIMS_044SA_CYLMAP002_PRIME	M	2007-131T17:20:00		000T02:09:00	2007-131T19:29:00	ISS_NAC to Saturn	NEG_X to NSP	
VIMS_044RI_OPHASE001_PRIME	C, I, M	2007-131T19:29:00		000T03:00:00	2007-131T22:29:00	POS_Y to Sun	NEG_X to North_Pole_Dir	
SP_044EA_DLTURN431_PRIME	C, M	2007-131T22:29:00		000T00:30:00	2007-131T22:59:00	XBAND to Earth	POS_X to 330.86/74.52	SP Turn to Waypoint; the original secondary way POS_X to NSP with an offset of (0,0,-5).
SP_044EA_G70METNON131_PRIME	C, M	2007-131T22:59:00		000T06:00:00	2007-132T04:59:00	XBAND to Earth	3_Hr_Rolling	May require a waiver of the CIRS thermal FRs. MAPS will have to provide justification for this waiver. Note that the original secondary was POS_X to NSP with an offset of (0,0,-0.5).

Final Sequenced SMT and Data Volume

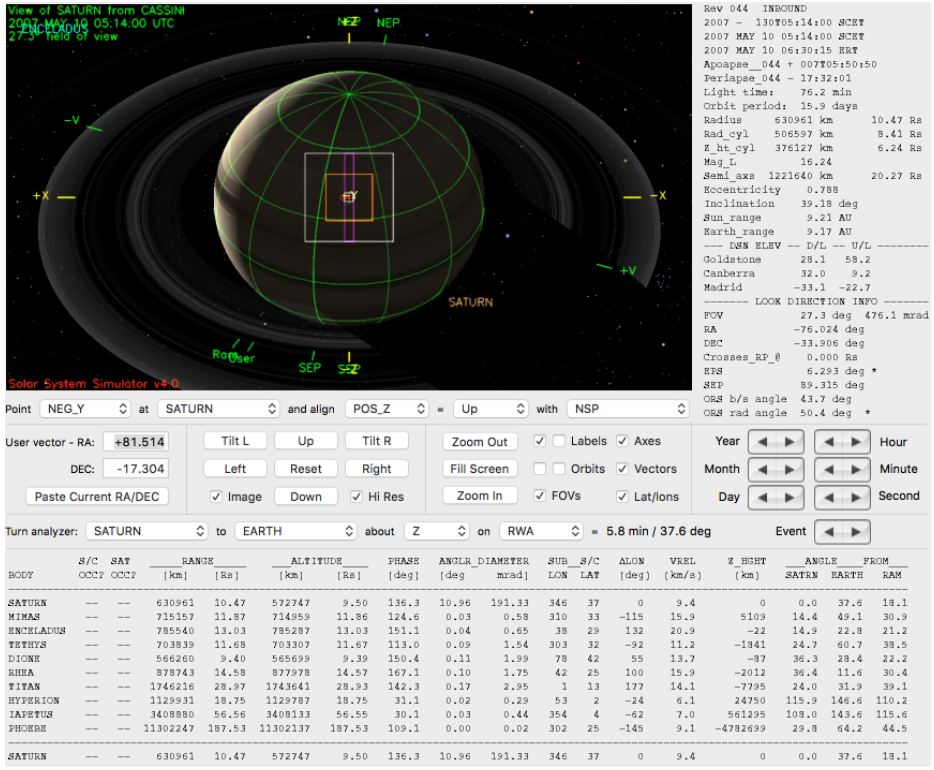
DATA VOLUME SUMMARY --- TRANSFER FRAME OVERHEAD INCLUDED (80 BITS PER 8800-BIT FRAME)

			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 (%)	CAROVR (Mb)
SP_044EA_G70METNON130_PRIME	131 00:50	131 06:50	0	1372	67	1439	3511	2073	0	1090	35	2564	2314	-250	104	1%	250
SP_044EA_G70METNON131_PRIME	131 22:59	132 04:59	250	1740	68	2058	3511	1454	18	317	35	2415	2596	181	104	1%	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	130 05:14	131 00:50	228.1	72.0	167.5	7.3	0.0	56.8	76.1	0.0	502.3	106.0	131.6	0.0	0.0	1347.7
OBSERVATION_SI	130 05:14	131 00:50	0.0	0.0	12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.0
SP_044EA_G70METNON130_PRIME	131 00:50	131 06:50	21.6	7.1	75.6	1.1	0.0	13.0	25.9	0.0	933.8	1.6	0.0	0.0	0.0	1079.7
DAILY TOTAL SCIENCE	130 05:14	131 06:50	249.7	79.2	255.1	8.4	0.0	69.7	102.0	0.0	1436.1	107.6	131.6	0.0		
OBSERVATION_NOR	131 06:50	131 22:59	58.1	19.2	93.6	45.9	500.0	57.4	93.0	0.0	268.2	0.8	588.2	0.0	13.2	1737.7
OBSERVATION_OPN	131 06:50	131 22:59	0.0	0.0	0.0	0.0	17.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.4
SP_044EA_G70METNON131_PRIME	131 22:59	132 04:59	144.5	7.1	75.6	1.1	0.0	21.3	34.6	0.0	28.3	1.6	0.0	0.0	0.0	314.1
DAILY TOTAL SCIENCE	131 06:50	132 04:59	202.6	26.3	169.2	47.0	500.0	78.8	127.6	0.0	296.5	2.5	588.2	0.0		

Segment Geometry (1 of 2)

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Rev 044  INBOUND
2007 -  130T05:14:00 SCET
2007 MAY 10 05:14:00 SCET
2007 MAY 10 06:30:15 ERT
Apoapse__044 + 007T05:50:50
Periapse__044 - 17:32:01
Light time:    76.2 min
Orbit period:  15.9 days
Radius      630961 km      10.47 Rs
Rad_cyl     506597 km       8.41 Rs
Z_ht_cyl    376127 km       6.24 Rs
Mag_L          16.24
Semi_axs   1221640 km      20.27 Rs
Eccentricity    0.788
Inclination    39.18 deg
Sun_range       9.21 AU
Earth_range     9.17 AU
--- DSN ELEV -- D/L -- U/L --------
Goldstone      28.1   58.2
Canberra       32.0    9.2
Madrid        -33.1  -22.7
------- LOOK DIRECTION INFO -------
FOV            27.3 deg  476.1 mrad
RA           -76.024 deg
DEC          -33.906 deg
Crosses_RP_@    0.000 Rs
EPS             6.293 deg *
SEP            89.315 deg
ORS b/s angle  43.7 deg
ORS rad angle  50.4 deg  *
```

Point NEG_Y at SATURN and align POS_Z = Up with NSP

User vector - RA: +81.514 DEC: -17.304 Paste Current RA/DEC

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

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

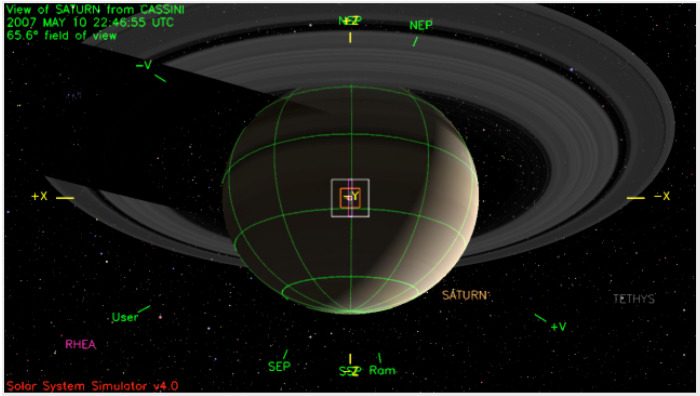
Year Month Day Hour Minute Second

Turn analyzer: SATURN to EARTH about Z on RWA = 5.8 min / 37.6 deg Event

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	--	--	630961	10.47	572747	9.50	136.3	10.96	191.33	346	37	0	9.4	0	0.0	37.6	18.1
MIMAS	--	--	715157	11.87	714959	11.86	124.6	0.03	0.58	310	33	-115	15.9	5109	14.4	49.1	30.9
ENCELADUS	--	--	785540	13.03	785287	13.03	151.1	0.04	0.65	38	29	132	20.9	-22	14.9	22.8	21.2
TETHYS	--	--	703839	11.68	703307	11.67	113.0	0.09	1.54	303	32	-92	11.2	-1841	24.7	60.7	38.5
DIONE	--	--	566260	9.40	565699	9.39	150.4	0.11	1.99	78	42	55	13.7	-87	36.3	28.4	22.2
RHEA	--	--	878743	14.58	877978	14.57	167.1	0.10	1.75	42	25	100	15.9	-2012	36.4	11.6	30.4
TITAN	--	--	1746216	28.97	1743641	28.93	142.3	0.17	2.95	1	13	177	14.1	-7795	24.0	31.9	39.1
HYPERION	--	--	1129931	18.75	1129787	18.75	31.1	0.02	0.29	53	2	-24	6.1	24750	115.9	146.6	110.2
IAPETUS	--	--	3408880	56.56	3408133	56.55	30.1	0.03	0.44	354	4	-62	7.0	561295	108.0	143.6	115.6
PHOEBE	--	--	11302247	187.53	11302137	187.53	109.1	0.00	0.02	302	25	-145	9.1	-4782699	29.8	64.2	44.5
SATURN	--	--	630961	10.47	572747	9.50	136.3	10.96	191.33	346	37	0	9.4	0	0.0	37.6	18.1

Segment Start: 2007-130T05:14

Periapse: 2007-130T22:46:55




```
Rev 044 OUTBOUND
2007 -  130T22:46:55 SCET
2007 MAY 10 22:46:55 SCET
2007 MAY 11 00:03:14 ERT
Apoapse__044 + 007T23:23:45
Periapse__044 + 00:00:54
Light time:    76.3 min
Orbit period:  16.0 days
Radius      258542 km       4.29 Rs
Rad_cyl     236832 km       3.93 Rs
Z_ht_cyl   -103703 km      -1.72 Rs
Mag_L          5.11
Semi_axs   1224237 km      20.31 Rs
Eccentricity    0.789
Inclination    39.19 deg
Sun_range       9.21 AU
Earth_range     9.18 AU
--- DSN ELEV -- D/L -- U/L --------
Goldstone      57.9   27.7
Canberra      -36.4  -64.9
Madrid         15.5   44.3
------- LOOK DIRECTION INFO -------
FOV            65.6 deg 1145.1 mrad
RA             26.824 deg
DEC            17.377 deg
Crosses_RP_@    0.000 Rs
EPS             6.294 deg *
SEP            88.661 deg
ORS b/s angle  66.6 deg
ORS rad angle 145.2 deg
```

Point NEG_Y at SATURN and align POS_Z = Up with NSP

User vector - RA: +81.514 DEC: -17.304 Paste Current RA/DEC

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

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

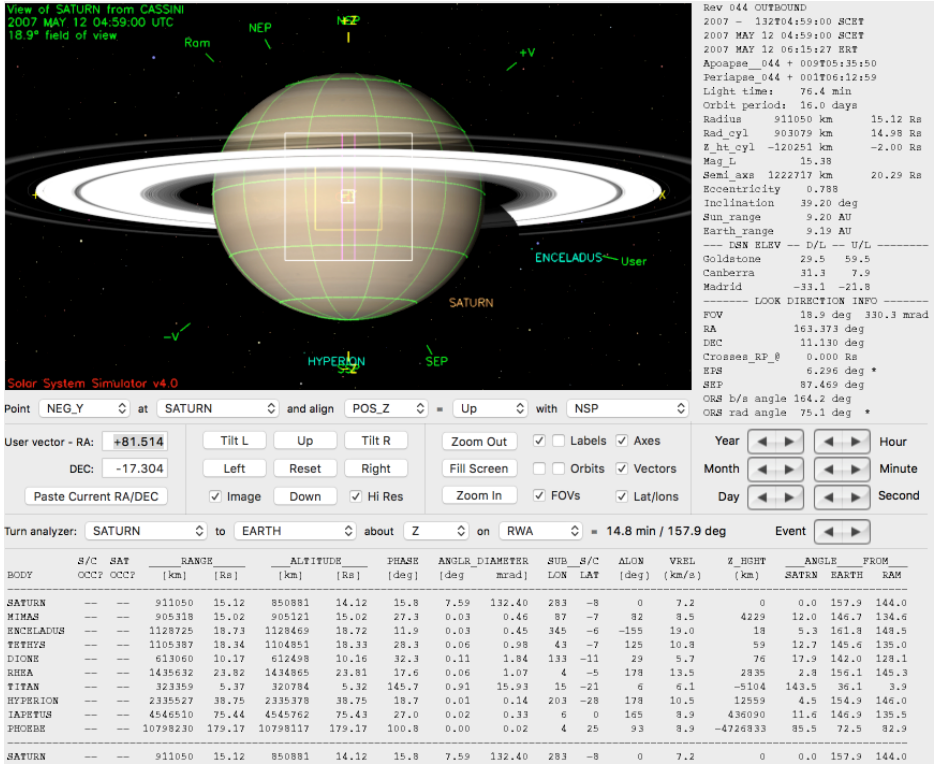
Year Month Day Hour Minute Second

Turn analyzer: SATURN to EARTH about Z on RWA = 8.4 min / 72.9 deg Event

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	--	--	258542	4.29	199219	3.31	113.4	26.96	470.54	121	-24	0	16.2	0	0.0	72.9	90.2
MIMAS	--	SE	247356	4.10	247160	4.10	72.1	0.10	1.68	69	-26	63	19.8	412	42.5	114.1	104.9
ENCELADUS	--	--	183675	3.05	183424	3.04	51.2	0.16	2.79	75	-34	37	14.2	23	62.2	135.0	123.3
TETHYS	--	--	500055	8.30	499516	8.29	140.2	0.12	2.16	340	-11	-133	23.3	4826	27.2	45.9	76.9
DIONE	--	--	333878	5.54	333316	5.53	37.3	0.19	3.38	39	-18	57	16.4	-55	77.9	148.8	114.6
RHEA	--	--	732218	12.15	731451	12.14	92.9	0.12	2.10	15	-8	140	23.5	1174	30.8	93.1	82.5
TITAN	--	--	1266312	21.01	1263737	20.97	160.4	0.23	4.07	349	-5	-102	17.1	-7350	67.4	20.0	75.5
HYPERION	--	--	1394006	23.13	1393862	23.13	15.0	0.01	0.24	130	-2	62	15.4	21072	105.5	167.5	112.4
IAPETUS	--	--	3477967	57.71	3477219	57.70	22.0	0.02	0.43	5	-2	33	14.3	516628	131.9	152.1	125.4
PHOEBE	--	--	10569323	175.37	10569214	175.37	107.7	0.00	0.02	265	24	-46	17.8	-4762666	137.5	65.5	73.9
SATURN	--	--	258542	4.29	199219	3.31	113.4	26.96	470.54	121	-24	0	16.2	0	0.0	72.9	90.2

	Saturn Range	Phase Angle	Sub-S/C Lat.
Segment Start	10.47 Rs	136.3 deg	37
Periapse	4.29 Rs	113.4 deg	-24
Segment End	15.12 Rs	15.8 deg	-8

Segment Geometry (2 of 2)




```
Rev 044 OUTBOUND
2007 -  132T04:59:00 SCET
2007 MAY 12 04:59:00 SCET
2007 MAY 12 06:15:27 ERT
Apoapse__044 + 009T05:35:50
Periapse_044 + 001T06:12:59
Light time:    76.4 min
Orbit period:  16.0 days
Radius      911050 km      15.12 Rs
Rad_cyl     903079 km      14.98 Rs
Z_ht_cyl   -120251 km      -2.00 Rs
Mag_L          15.38
Semi_axs   1222717 km      20.29 Rs
Eccentricity    0.788
Inclination    39.20 deg
Sun_range       9.20 AU
Earth_range     9.19 AU
--- DSN ELEV -- D/L -- U/L --------
Goldstone      29.5   59.5
Canberra       31.3    7.9
Madrid        -33.1  -21.8
------- LOOK DIRECTION INFO -------
FOV            18.9 deg  330.3 mrad
RA           163.373 deg
DEC           11.130 deg
Crosses_RP_@   0.000 Rs
EPS            6.296 deg *
SEP           87.469 deg
ORS b/s angle 164.2 deg
ORS rad angle  75.1 deg  *
```

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	--	--	911050	15.12	850881	14.12	15.8	7.59	132.40	283	-8	0	7.2	0	0.0	157.9	144.0
MIMAS	--	--	905318	15.02	905121	15.02	27.3	0.03	0.46	87	-7	82	8.5	4229	12.0	146.7	134.6
ENCELADUS	--	--	1128725	18.73	1128469	18.72	11.9	0.03	0.45	345	-6	-155	19.0	18	5.3	161.8	148.5
TETHYS	--	--	1105387	18.34	1104851	18.33	28.3	0.06	0.98	43	-7	125	10.8	59	12.7	145.6	135.0
DIONE	--	--	613060	10.17	612498	10.16	32.3	0.11	1.84	133	-11	29	5.7	76	17.9	142.0	128.1
RHEA	--	--	1435632	23.82	1434865	23.81	17.6	0.06	1.07	4	-5	178	13.5	2835	2.8	156.1	145.3
TITAN	--	--	323359	5.37	320784	5.32	145.7	0.91	15.93	15	-21	6	6.1	-5104	143.5	36.1	3.9
HYPERION	--	--	2335527	38.75	2335378	38.75	18.7	0.01	0.14	203	-28	178	10.5	12559	4.5	154.9	146.0
IAPETUS	--	--	4546510	75.44	4545762	75.43	27.0	0.02	0.33	6	0	165	8.9	436090	11.6	146.9	135.5
PHOEBE	--	--	10798230	179.17	10798117	179.17	100.8	0.00	0.02	4	25	93	8.9	-4726833	85.5	72.5	82.9
SATURN	--	--	911050	15.12	850881	14.12	15.8	7.59	132.40	283	-8	0	7.2	0	0.0	157.9	144.0

← Segment End: 2007-132T04:59

	Saturn Range	Phase Angle	Sub-S/C Lat.
Segment Start	10.47 Rs	136.3 deg	37
Periapse	4.29 Rs	113.4 deg	-24
Segment End	15.12 Rs	15.8 deg	-8

Solar Geometry – ORS Boresight Concerns

- ISS_NAC to Saturn, NEG_X to NSP
  - Safe from ~130T05:14:00 to ~130T16:00:00 and ~131T04:00:00 to ~131T16:00:00
  - Except during Solar Occultation Period where CMT boresight violations occur. Waypoint cannot have FR violations!
- ISS_NAC to Saturn, POS_X to NSP
  - Safe from ~130T16:00:00 to ~131T04:00:00 (periapse)
  - Except during Solar Occultation Period where CMT boresight violations occur. Waypoint cannot have FR violations!
- ISS_NAC to Saturn, NEG_X to NSP
  - Safe for most of the segment
  - Except during Solar Occultation Period where CMT boresight violations occur. Waypoint cannot have FR violations!

Daily Science Highlights

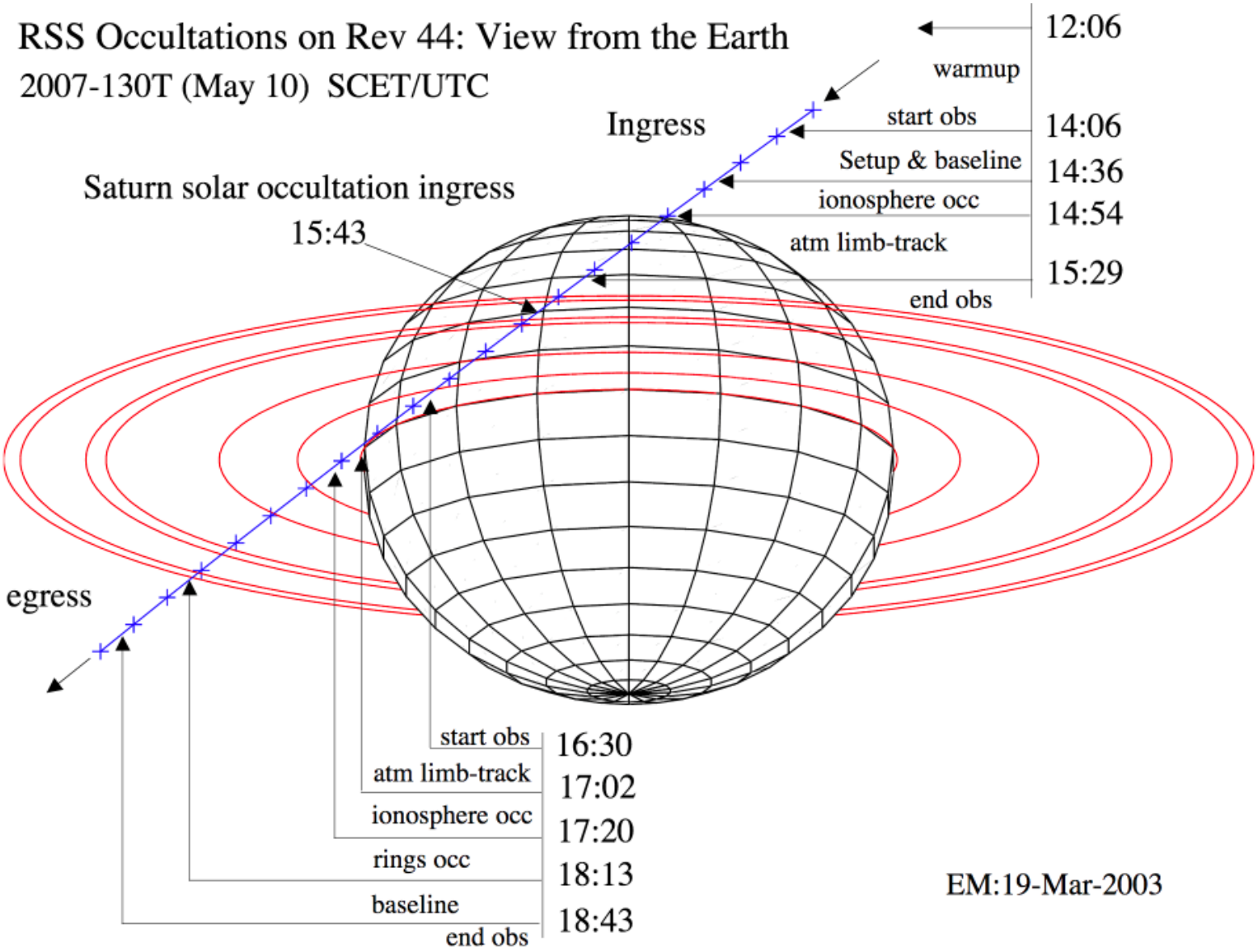
Just prior to periapse, on May 10th, the Radio Science team performed ring occultation measurements. The ingress occultation covered a Saturn northern latitude of about 71 degs, the highest latitude probed in both the Cassini nominal and extended missions. Collectively, the occultations provided important information about the atmosphere thermal structure, the microwave absorbing species, the hydrogen-to-helium ratio, and Saturn's puzzling winds. The egress ring occultation is one of two occultations that were especially designed to view the rings at an intermediate opening angle B of ~15 degs (the other on rev 46). Other RSS ring occultations during the nominal mission primarily sampled the rings when they were either relatively open (B > ~20 degs) or relatively closed (B < ~10 degs). The spread in B allows investigation of ring extinction and forward scattering behavior over broad observation geometry, important for characterization of both radial and vertical ring structure. The RSS occultations were followed by CIRS and UVIS Saturn limb observations and VIMS cylindrical mapping.

Segment Integration Planning

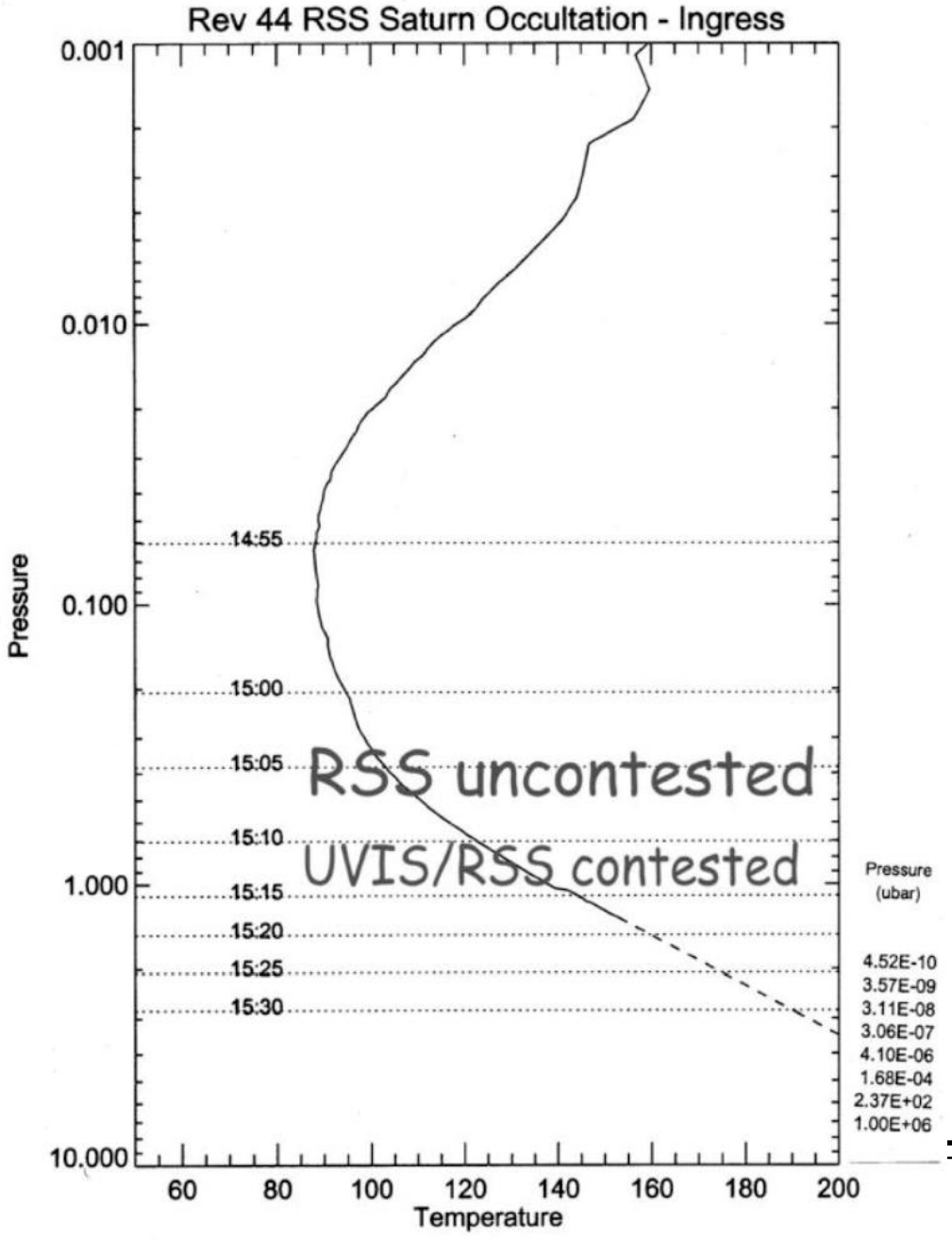
Timeline Gaps and Suggested Observations (1 of 3)

Request		Start Time	Epoch Relative Start Time	Duration	EndTime
SP_044NA_SATURNSEG130_NA		2007-130T05:14:00		001T23:45:00	2007-132T04:59:00
SP Turn		2007-130T05:14:00		000T00:30:00	2007-130T05:44:00
CIRS_044SA_NADIROCC004_PRIME		2007-130T05:44:00		000T03:00:00	2007-130T08:44:00
CIRS_044RI_SHADCAS001_PRIME		2007-130T08:44:00		000T05:00:00	2007-130T13:44:00
OCC Period Start		2007-130T14:06:00			
RSS_044SA_OCC002_PRIME		2007-130T14:06:00		000T01:23:00	2007-130T15:29:00
Contested time - begin					
UVIS_044SU_USUNOCC001_PRIME		2007-130T14:49:00		000T01:30:00	2007-130T16:19:00
MP_044EA_OCCSATURN044_NA		2007-130T14:55:30		000T02:05:49	2007-130T17:01:19
VIMS_044SA_SOLOCC001_PRIME		2007-130T15:15:00		000T00:45:00	2007-130T16:00:00
ISS_044RI_DIFFVHIPH001_PRIME		2007-130T15:30:00		000T03:00:00	2007-130T18:30:00
MP_044EA_OCCRING044_NA		2007-130T15:39:32		000T00:59:45	2007-130T16:39:17
MP_044SU_OCCSATURN044_NA		2007-130T15:43:04		000T02:15:36	2007-130T17:58:40
ISS_044SA_SOLNGRESS001_PRIME		2007-130T15:49:00		000T00:30:00	2007-130T16:19:00
VIMS_044RG_HIPHASE001_PRIME		2007-130T16:00:00		000T01:00:00	2007-130T17:00:00
Contested time - end					
RSS_044SA_OCC003_PRIME		2007-130T16:30:00		000T00:50:00	2007-130T17:20:00
VIMS_044DI_DIONE001_PRIME		2007-130T16:30:00		000T03:12:00	2007-130T19:42:00
MP_044SU_OCCRING044_NA		2007-130T16:33:07		000T00:39:58	2007-130T17:13:05
CIRS_044DI_FP1FAZ0P5026_PRIME		2007-130T17:00:00		000T01:30:00	2007-130T18:30:00
RSS_044RI_OCC002_PRIME		2007-130T17:20:00		000T01:23:00	2007-130T18:43:00
ISS_044SA_SOLEGRESS001_PRIME		2007-130T17:44:00		000T00:20:00	2007-130T18:04:00
OCC Period End		2007-130T18:43:00			
CDA_044RE_ERNGRPX001_PRIME	?????	2007-130T19:00:00		000T02:00:00	2007-130T21:00:00
SP Turn RAM		2007-130T19:04:01		000T00:30:01	2007-130T19:34:01
RAM_AVOID		**2007-130T19:34:01**		**000T00:33:56**	**2007-130T20:07:57**
SP Turn RAM		2007-130T20:07:57		000T00:30:03	2007-130T20:38:00
MP_044SA_RPXDESCEN044_NA		2007-130T19:46:56		000T00:00:01	2007-130T19:46:57
CIRS_044SA_OCCLIMB001_PRIME		2007-130T20:38:00		000T00:30:00	2007-130T21:08:00
UVIS_044SA_LIMBSKIM001_PRIME		2007-130T21:08:00	E044_Peri-000T02:20:00	000T00:40:00	2007-130T21:48:00
CIRS_044SA_LIMBINT003_PRIME		2007-130T21:48:00		000T02:12:00	2007-131T00:00:00
MP_044SA_PERIAPSE044_NA		2007-130T22:55:50		000T00:00:01	2007-130T22:55:51
SP Turn		2007-131T00:00:00		000T00:30:00	2007-131T00:30:00
SP_044EA_G34BWGOTB130_PRIME		2007-131T00:30:00		000T06:00:00	2007-131T06:30:00
NAV_044SK_OPNAV311_PRIME		2007-131T06:30:00		000T00:30:00	2007-131T07:30:00
VIMS_044SA_CYLMAP001_PRIME		2007-131T07:30:00		000T06:50:00	2007-131T14:20:00
CIRS_044SA_NADIROCCB004_PRIME		2007-131T14:20:00		000T03:00:00	2007-131T17:20:00
GAP		2007-131T17:20:00		000T02:09:00	2007-131T19:29:00
SP Turn		2007-131T19:29:00		000T00:30:00	2007-131T19:59:00
SP_044EA_G34HEFNON131_PRIME		2007-131T19:59:00		000T09:00:00	2007-132T04:59:00

Timeline Gaps and Suggested Observations (2 of 3)



Timeline Gaps and Suggested Observations (3 of 3)



Initial SMT and Data Volume

Beginning of Integration:

DATA VOLUME SUMMARY

			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)	MARGIN (Mb)	MARGIN (%)	OPNAV (Mb)	SCI (Mb)	ENGR (Mb)	TOTAL (Mb)	CPACTY (Mb)	MARGIN (Mb)	MARGIN (%)	CAROVR (Mb)
SP_044EA_G34BWGNON131_PRIME	131 00:50	131 06:50	0	1321	68	1389	3567	2178	61%	0	217	35	1641	500	-1142	-228%	1142
SP_044EA_G70METNON131_PRIME	131 22:59	132 04:59	1142	1585	56	2782	3534	751	21%	17	163	35	2998	2548	-450	-18%	450

DATA VOLUME REPORT

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	130 05:14	131 00:50	228.1	36.8	172.6	4.1	79.1	56.8	75.3	0.0	502.3	106.0	50.0	0.0	0.0	1310.9
OBSERVATION_SI	130 05:14	131 00:50	0.0	0.0	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.0
SP_044EA_G34BWGNON131_PRIME	131 00:50	131 06:50	21.6	4.3	80.4	1.1	0.0	13.0	25.9	0.0	70.5	0.0	0.0	0.0	0.0	216.8
DAILY TOTAL SCIENCE	130 05:14	131 06:50	249.7	41.1	263.0	5.1	79.1	69.7	101.2	0.0	572.8	106.0	50.0	0.0		
OBSERVATION_NOR	131 06:50	131 22:59	58.1	11.6	96.0	2.9	500.0	34.9	66.5	0.0	76.2	0.0	738.5	0.0	0.0	1584.7
OBSERVATION_OPN	131 06:50	131 22:59	0.0	0.0	0.0	0.0	17.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.4
SP_044EA_G70METNON131_PRIME	131 22:59	132 04:59	21.6	4.3	75.6	1.1	0.0	13.0	19.4	0.0	28.3	0.0	0.0	0.0	0.0	163.3
DAILY TOTAL SCIENCE	131 06:50	132 04:59	79.7	15.9	171.6	4.0	500.0	47.8	86.0	0.0	104.5	0.0	738.5	0.0		

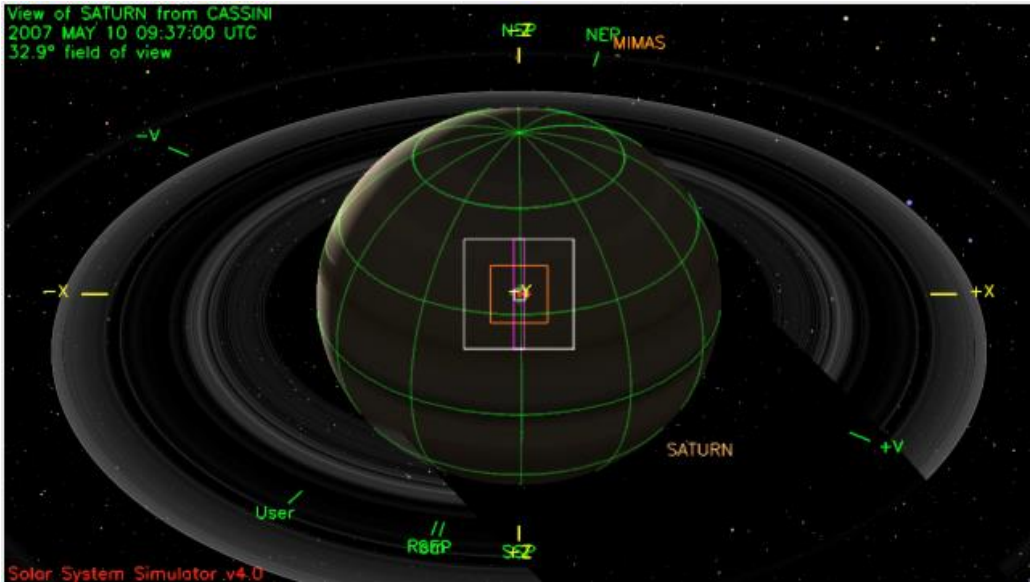
	CAPS (Mb)	CDA (Mb)	CIRS (Mb)	INMS (Mb)	ISS (Mb)	MAG (Mb)	MIMI (Mb)	RADAR (Mb)	RPWS (Mb)	UVIS (Mb)	VIMS (Mb)	PROBE (Mb)
TOTAL RECORDED (OPNAV data not included)	329.4	57.0	434.6	9.1	579.1	117.6	187.2	0.0	677.3	106.0	788.5	0.0

Waypoint Selection

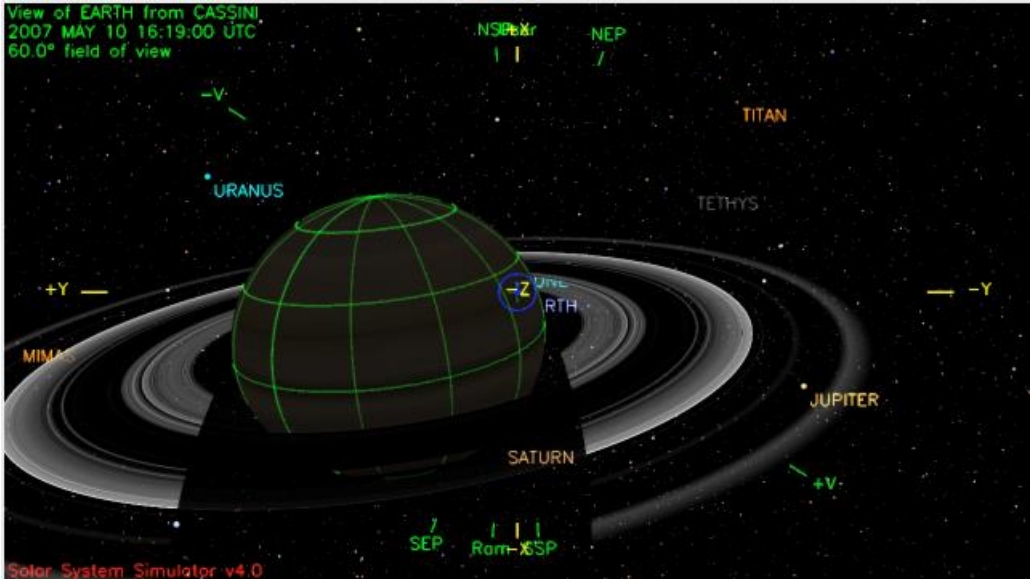
- UVIS Occ Port to Sun????, Secondary???
  - In theory, this should be violation free
- ISS_NAC to Saturn, NEG_X to NSP
  - Safe from ~130T05:14:00 to ~130T16:00:00 and ~131T04:00:00 to ~131T16:00:00
  - Except during Solar Occultation Period where CMT boresight violations occur. Waypoint cannot have FR violations!
- ISS_NAC to Saturn, POS_X to NSP
  - Safe from ~130T16:00:00 to ~131T04:00:00 (periapse)
  - Except during Solar Occultation Period where CMT boresight violations occur. Waypoint cannot have FR violations!
- ISS_NAC to Saturn, NEG_X to NSP
  - Safe for most of the segment
  - Except during Solar Occultation Period where CMT boresight violations occur. Waypoint cannot have FR violations!
- XBAND to Earth, POS_X to NSP
  - Safe from ~130T16:00:00 to ~131T04:00:00; CIRS delta T = 4.8K (Saturn heating)
- XBAND to Earth, NEG_X to NSP
  - Safe for entire period; CIRS delta T = 0.9K (Saturn heating)
- XBAND to Earth, POS_X to NEP
  - Safe from for entire period; CIRS delta T = 1.4 K (Saturn heating)
- XBAND to Earth, NEG_X to Saturn
  - Safe from 130T14:30:00 to 131T18:00:00; CIRS delta T = 4.8K (Saturn heating)
- XBAND to Earth, POS_Y to NSP
  - Safe from 130T13:30:00 to 131T19:00:00; CIRS delta T = 0.9K (Saturn heating)
- XBAND to Earth, POS_Y to NEP
  - Safe from 130T13:30:00 to 131T19:00:00; CIRS delta T = 1.2K (Saturn heating)

Waypoints Chosen (1 of 2)

Waypoint 1 (2007-130T05:44 – 130T13:30):
NAC to Saturn, NEG_Z to NSP

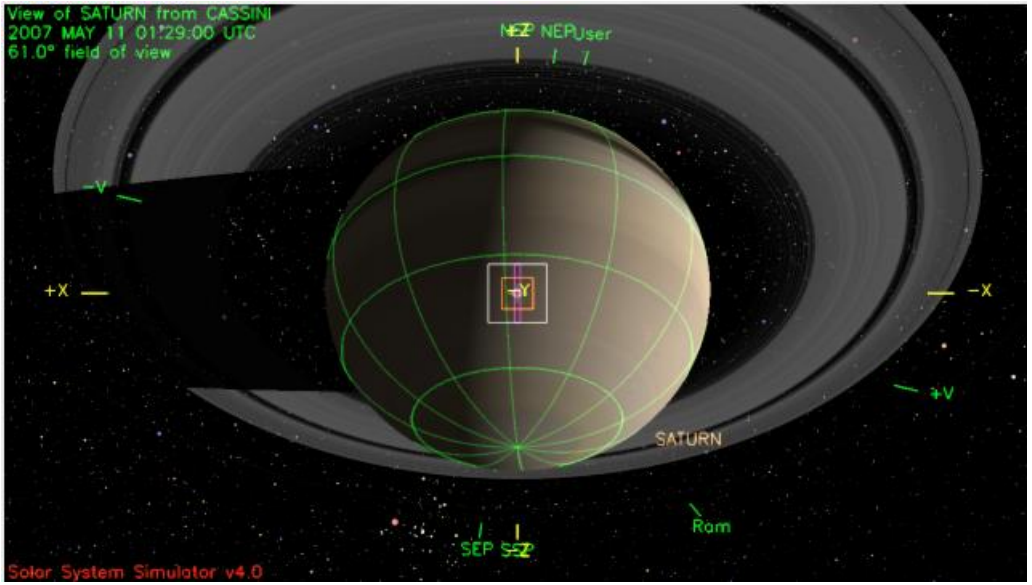


Waypoint 2 (2007-130T13:30 – 130T19:08):
XBAND to Earth (0, 0, -5 deg offset),
POS_X to NSP

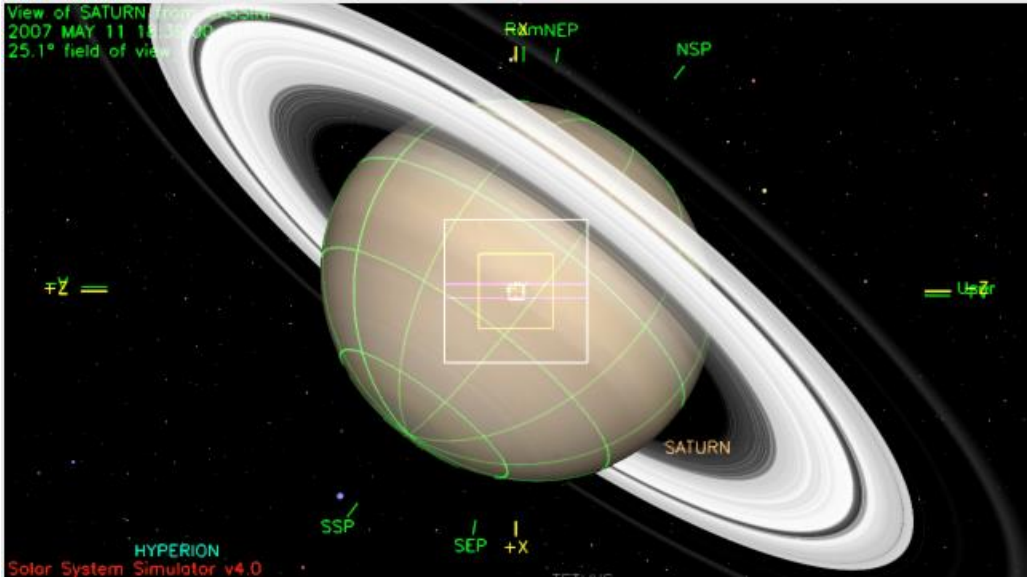


Waypoints Chosen (2 of 2)

Waypoint 3 (2007-130T19:08 – 131T07:50):
NAC to Saturn, POS_Z to NSP



Waypoint 4 (2007-131T07:50 – 132T05:29):
NAC to Saturn (0, 10, 0 deg offset),
NEG_X to NEP



Notes & Liens

- **Pointing Issues**
  - Several Saturn observations on DOY 130 do not meet the '004 Pointing Requirements. A Live IVP Update is required to improve the pointing. RSS is most sensitive to this.
- **Data Volume Issues**
  - None
- **Telemetry Mode Issues**
  - None
- **CIMS Issues**
  - None
- **Power/OPMODE Issues**
  - INMS will be asleep during the RSS Occultation periods
  - Update: INMS no longer needs to be in sleep mode during the RSS Occultation
- **Flight Rule/Mission Planning Guideline and Constraint Issues**
  - Not checked
- **DSN Issues**
  - DSS 63 on DOY 130 is overlaps with maintenance by 1.7 hours. We wish to waive this for the occultation.
  - DSS 14 on DOY 131 overlaps with maintenance by 0.5 hours. Nav needs 6 hours of two way. We wish to waive the overlap period.
- **Other Issues**
  - The RSS needs to coordinate with the SP/MP/DSN for the proper station configuration and coverage. Per MP advice, the DSN Pass Blocks remain in their standard ap_downlink configuration.
  - Update: RPWS would like to obtain a whistler activity over one of the two downlinks on DOY 131. A SPLAT item is open since the full approval requires analysis during SOPU and/or SSUP.