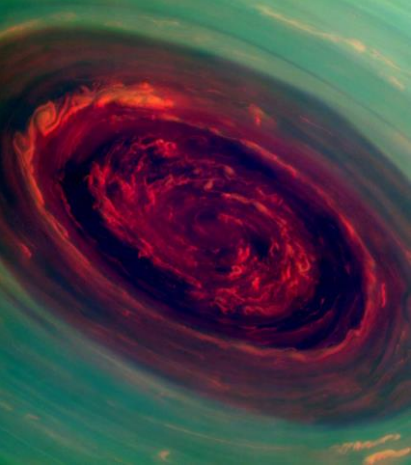
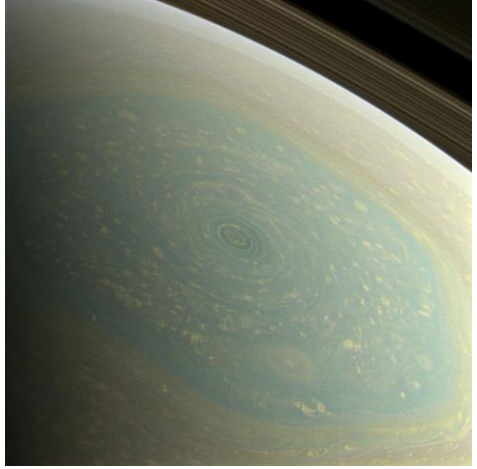
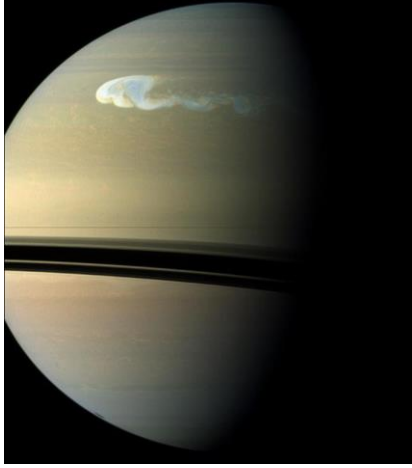


Science Planning & Sequence Team
CASSINI

SATURN TARGET WORKING TEAM

Rev 38 Segment Legacy Package

Segment Boundary: January 30, 2007 – February 6, 2007
2007-030T12:12:00 – 2007-037T11:37:00 (SCET)

Integration Began 03/10/2003
Segment Delivered to S27 Sequence 08/24/2006
Lead Integrators were Shawn Boll & Barbara Larsen

Legacy Package Assembled by Shawn Boll

Table of Contents

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

Segment Overview and Final Products

Segment Summary

- The Rev 38 segment was roughly a week long, in an inclined phase of the Prime Mission. It began about 12 hours before and ended 5 days after periapse.
- Approaching Saturn, the views were of the dark side. At periapse, the spacecraft had swung around to the lit side.
- Saturn science at periapse included CIRS regional mapping, VIMS S. Pole mapping, and ISS high latitude photopolarimetry. Continued ISS photopolarimetry was the main focus during the outbound days.
- There were several notable out-of-discipline activities, including looks at Titan with CIRS and RADAR, Enceladus with UVIS, Dione with CIRS and ISS at low/zero phase, and Mimas with ISS. RADAR, CIRS and ISS also viewed the Rings, including ISS focus on spoke formation.
- The A8.7.5 Attitude and Articulation Control Subsystem (AACS) flight software (FSW) patch was completed during this segment.
- One waypoint was chosen for the entire segment.

Final Sequenced SPASS

Request	Riders	Start (SCET)	Start (Epoch)	Duration	End (SCET)	Primary	Secondary	Comments
Start Sequence S027		2007-005T13:50:00	E036_SEQUENCE_027+000T00:00:00	042T21:02:00	2007-048T10:52:00			
SATURN rev 38 Segment		2007-030T12:12:00		006T23:25:00	2007-037T11:37:00			
SP_038SA_WAYPTTURN031_PRIME	M	2007-030T12:12:00		000T00:30:00	2007-030T12:42:00	ISS_NAC to Saturn	NEG_X to Sun	
NEW WAYPOINT		**2007-030T12:42:00**		**007T01:18:00**	**2007-037T14:00:00**	**ISS_NAC to Saturn**	**NEG_X to Sun**	
ISS_038SA_HILTATMAB001_PRIME	M, V	2007-030T12:42:00		000T03:55:00	2007-030T16:37:00	ISS_NAC to Saturn	NEG_X to Sun	
CIRS_038TI_TEMPMAP011_PRIME	M, V	2007-030T16:37:00		000T06:00:00	2007-030T22:37:00	CIRS_FPB to Titan	NEG_X to Sun	
ISS_038SA_HILTATMAB002_PRIME	M, V	2007-030T22:37:00		000T05:10:00	2007-031T03:47:00	ISS_NAC to Saturn	NEG_X to Sun	
SP_038EA_DLTURN031_PRIME	M	2007-031T03:47:00		000T00:30:00	2007-031T04:17:00	XBAND to Earth	NEG_X to NEP	
SP_038EA_G34HEFNON031_PRIME	C, M	2007-031T04:17:00		000T06:00:00	2007-031T10:17:00	XBAND to Earth	Rolling/SRU	
NAV_038SK_OPNAV311_PRIME	M	2007-031T10:17:00		000T00:59:00	2007-031T11:16:00	ISS_NAC to Satellites	NEG_X to Sun	Starts at Earth point, ends at waypoint
NAV_038SA_WAYPTTURN311_PRIME	M	2007-031T11:16:00		000T00:01:00	2007-031T11:17:00	ISS_NAC to Saturn	NEG_X to Sun	
ISS_038SA_HILTATMAB003_PRIME	M, V	2007-031T11:17:00		000T02:00:00	2007-031T13:17:00	ISS_NAC to Saturn	NEG_X to Sun	
CIRS_038SA_REGMAPA014_PRIME	M	2007-031T13:17:00		000T08:03:00	2007-031T21:20:00	CIRS_FPB to Saturn	POS_Z to North_Pole_Dir	
UVIS_038EN_ICYOCC011_PRIME	M	2007-031T21:20:00		000T01:00:00	2007-031T22:20:00	UVIS_FUV to Enceladus	POS_X to North_Pole_Dir	
CIRS_038SA_REGMAPB014_PRIME	M	2007-031T22:20:00		000T02:57:00	2007-032T01:17:00	CIRS_FPB to Saturn	POS_Z to North_Pole_Dir	
ISS_038SA_HILTATMAC001_PRIME	M, V	2007-032T01:17:00		000T01:05:00	2007-032T02:22:00	ISS_NAC to Saturn	NEG_X to Sun	
SP_038EA_DLTURN032_PRIME	M	2007-032T02:22:00		000T00:30:00	2007-032T02:52:00	XBAND to Earth	NEG_X to NEP	
SP_038EA_G70METOTP032_PRIME	C, M, N	2007-032T02:52:00		000T09:00:00	2007-032T11:52:00	XBAND to Earth	NEG_X to NEP	
Periapse R = 15.6 Rs, lat =...		2007-032T09:57:52		000T00:00:01	2007-032T09:57:53			
SP_038SA_WAYPTTURN032_PRIME	M	2007-032T11:52:00		000T00:30:00	2007-032T12:22:00	ISS_NAC to Saturn	NEG_X to Sun	
ISS_038SA_HILTATMAC002_PRIME	M, V	2007-032T12:22:00		000T01:00:00	2007-032T13:22:00	ISS_NAC to Saturn	NEG_X to Sun	
ISS_038RI_SPKHRLPLF001_PRIME	C, M, V	2007-032T13:22:00		000T06:00:00	2007-032T19:22:00	ISS_NAC to Rings	PIC	
VIMS_038SA_POLMAPDUO002_PRIME	C, I, M	2007-032T19:22:00		000T22:00:00	2007-033T17:22:00	ISS_NAC to Saturn	NEG_X to Sun	
ISS_038SA_HILTATMAC003_PRIME	M, V	2007-033T17:22:00		000T01:00:00	2007-033T18:22:00	ISS_NAC to Saturn	NEG_X to Sun	
NAV_038SK_OPNAV331_PRIME	M	2007-033T18:22:00		000T00:59:00	2007-033T19:21:00	ISS_NAC to Satellites	NEG_X to Sun	Starts at waypoint, ends at Earth point
NAV_038EA_DLTURN331_PRIME	M	2007-033T19:21:00		000T00:01:00	2007-033T19:22:00	XBAND to Earth	NEG_Y to Saturn	
Prime uplink window for AAC...		2007-033T19:22:00		000T09:00:00	2007-034T04:22:00	XBAND to Earth		
SP_038EA_M70METOTB033_PRIME	M, N	2007-033T19:22:00		000T09:00:00	2007-034T04:22:00	XBAND to Earth	Rolling	
SP_038SA_WAYPTTURN034_PRIME	M	2007-034T04:22:00		000T00:30:00	2007-034T04:52:00	ISS_NAC to Saturn	NEG_X to Sun	
ISS_038SA_HILTATMAD001_PRIME	M, R, V	2007-034T04:52:00		000T02:28:00	2007-034T07:20:00	ISS_NAC to Saturn	NEG_X to Sun	CAPS must agree to changes to secondary pointing
ISS_038DI_LOWPHASEA001_PRIME	M, R, U	2007-034T07:20:00		000T00:45:00	2007-034T08:05:00	ISS_NAC to Dione	NEG_Z to North_Pole_Dir	
ISS_038SA_HILTATMAD002_PRIME	M, R, V	2007-034T08:05:00		000T01:05:00	2007-034T09:10:00	ISS_NAC to Saturn	NEG_X to Sun	CAPS must agree to changes to secondary pointing
RADAR_038TI_SOUTH6CAL001_PRIME	M	2007-034T09:10:00		000T01:00:00	2007-034T10:10:00	NEG_Z to Titan	NEG_X to NEP	RADAR must control primary and secondary axes to obtain correct polarization.
ISS_038DI_ZEROPHASE001_PRIME	C, M, U, V	2007-034T10:10:00		000T02:00:00	2007-034T12:10:00	ISS_NAC to Dione	NEG_Z to North_Pole_Dir	S_N_ER5
UVIS_038SA_EUVFUV001_PRIME	M	2007-034T12:10:00		000T10:59:00	2007-034T23:09:00	ISS_NAC to Saturn	NEG_Z to NSP	CAPS must agree to changes to secondary axis pointing
ISS_038MI_MUTUALEVE001_PRIME	M	2007-034T23:09:00		000T00:31:00	2007-034T23:40:00	ISS_NAC to Mimas	NEG_X to Sun	CAPS must agree to changes to secondary pointing
ISS_038SA_HILTATMAD003_PRIME	M	2007-034T23:40:00		000T05:27:00	2007-035T05:07:00	ISS_NAC to Saturn	NEG_X to Sun	CAPS must agree to changes to secondary pointing
SP_038EA_DLTURN035_PRIME	M	2007-035T05:07:00		000T00:30:00	2007-035T05:37:00	XBAND to Earth	NEG_X to 53.8/4.8	
Backup uplink window for AA...		2007-035T05:37:00		000T06:00:00	2007-035T11:37:00	XBAND to Earth		
SP_038EA_G70METNON035_PRIME	C, M	2007-035T05:37:00		000T06:00:00	2007-035T11:37:00	XBAND to Earth	3_Hr_Rolling	3 hr Roll due to AACS gyro parameter update.
NAV_038SK_OPNAV351_PRIME	M, N	2007-035T11:37:00		000T00:59:00	2007-035T12:36:00	ISS_NAC to Satellites	NEG_X to Sun	Starts at Earth point, ends at waypoint
NAV_038SA_WAYPTTURN351_PRIME	M	2007-035T12:36:00		000T00:01:00	2007-035T12:37:00	ISS_NAC to Saturn	NEG_X to Sun	
ISS_038SA_HILTATMAE002_PRIME	M, V	2007-035T12:37:00		000T01:30:00	2007-035T14:07:00	ISS_NAC to Saturn	NEG_X to Sun	
CIRS_038RI_SUBMMLP001_PRIME	C, M, R, U, V	2007-035T14:07:00		000T05:15:00	2007-035T19:22:00	CIRS_FP1 to Rings	POS_Z to North_Pole_Dir	
ISS_038SA_HILTATMAE003_PRIME	M, R, V	2007-035T19:22:00		000T01:30:00	2007-035T20:52:00	ISS_NAC to Saturn	NEG_X to Sun	
RADAR_038RI_038MATCH2001_PRIME	M	2007-035T20:52:00		000T08:30:00	2007-036T05:22:00	NEG_Z to Saturn	POS_X to North_Pole_Dir	RADAR must control both primary & secondary axes for polarization orientations.
ISS_038SA_HILTATMAE004_PRIME	M, V	2007-036T05:22:00		000T00:45:00	2007-036T06:07:00	ISS_NAC to Saturn	NEG_X to Sun	
SP_038EA_DLTURN036_PRIME	M	2007-036T06:07:00		000T00:30:00	2007-036T06:37:00	XBAND to Earth	NEG_X to 53.8/4.8	
Backup uplink window for AA...		2007-036T06:37:00		000T06:00:00	2007-036T12:37:00	XBAND to Earth		
SP_038EA_G34BWGNON036_PRIME	C, E, M	2007-036T06:37:00		000T06:00:00	2007-036T12:37:00	XBAND to Earth	NEG_X to 53.8/4.8	No Roll due to AACS gyro parameter update
38TI (nt) TITAN outbound 90...		2007-036T07:42:36		000T00:00:01	2007-036T07:42:37			
SP_038SA_WAYPTTURN036_PRIME	M	2007-036T12:37:00		000T00:30:00	2007-036T13:07:00	ISS_NAC to Saturn	NEG_X to Sun	
ISS_038OT_SATELLORB002_PRIME	M	2007-036T13:07:00		000T00:30:00	2007-036T13:37:00	ISS_NAC to Rocks	NEG_X to Sun	
ISS_038SA_1X2WPH40001_PRIME	M, V	2007-036T13:37:00		000T03:30:00	2007-036T17:07:00	ISS_NAC to Saturn	NEG_X to Sun	
ISS_038RI_PHOTDRK001_PRIME	C, M, V	2007-036T17:07:00		000T05:00:00	2007-036T22:07:00	ISS_NAC to Rings	NEG_Z to NSP	Work out exact s/c pointing with CIRS (Spilker) who desires FP1 in one ring during integration.
ISS_038SA_HILTATMAF001_PRIME	M, V	2007-036T22:07:00		000T03:30:00	2007-037T01:37:00	ISS_NAC to Saturn	NEG_X to Sun	
CIRS_038DI_FP3FP1OBS001_PRIME	M, U	2007-037T01:37:00		000T00:37:00	2007-037T02:14:00	CIRS_FP3 to Dione	NEG_X to Sun	
SP_038EA_DLTURN037_PRIME	M, U	2007-037T02:14:00		000T00:23:00	2007-037T02:37:00	XBAND to Earth	NEG_Y to Saturn	
SP_038EA_G70METNON037_PRIME	C, M	2007-037T02:37:00		000T09:00:00	2007-037T11:37:00	XBAND to Earth	Rolling/SRU	

Final Sequenced SMT and Data Volume (1 of 2)

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

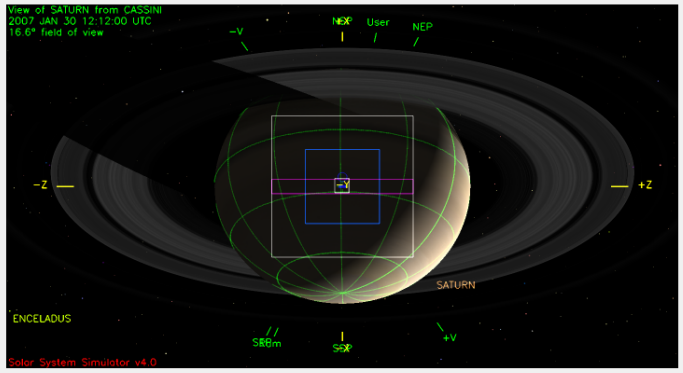
			OBSERVATION_PERIOD							DOWNLINK_PASS						
			P4						P5	RECORDED		PLAYBACK				
DOWNLINK PASS NAME	Start doy hh:mm	End doy hh:mm	START (Mb)	SCI (Mb)	HK+E (Mb)	TOTAL (Mb)	CPACTY (Mb)	MRGN (Mb)	OPNAV (Mb)	SCI (Mb)	ENGR (Mb)	TOTAL (Mb)	CPACTY (Mb)	MARGN (Mb)	NET_MARGN (Mb)	CAROVR (%)
SP_038EA_G34HEFNON031_PRIME	031 04:17	031 10:17	0	1571	55	1625	3516	1890	0	171	35	1832	839	-994	1507	7% 993
SP_038EA_G70METOTP032_PRIME	032 02:52	032 11:52	993	960	56	2009	3516	1507	9	455	53	2526	3853	1326	1870	8% 0
SP_038EA_M70METOTB033_PRIME	033 19:22	034 04:22	0	2865	107	2972	3516	543	9	280	53	3315	4472	1157	1160	6% 0
SP_038EA_G70METNON035_PRIME	035 05:37	035 11:37	0	3424	90	3513	3516	2	0	317	35	3865	3036	-830	255	2% 830
SP_038EA_G34BWGNON036_PRIME	036 06:37	036 12:37	830	1195	75	2100	3516	1416	18	170	35	2323	680	-1643	255	2% 1643
SP_038EA_G70METNON037_PRIME	037 02:37	037 11:37	1643	1570	48	3261	3516	255	0	1135	53	4449	4575	126	314	2% 0

Final Sequenced SMT and Data Volume (2 of 2)

DATA VOLUME REPORT --- TRANSFER FRAME OVERHEAD NOT INCLUDED

Event	Start doy hh:mm	End doy hh:mm	CAPS (Mb)	CDA (Mb)	CIRS (Mb)	INMS (Mb)	ISS (Mb)	MAG (Mb)	MIMI (Mb)	RADAR (Mb)	RPWS (Mb)	UVIS (Mb)	VIMS (Mb)	PROBE (Mb)	ENGR (Mb)	TOTAL (Mb)
OBSERVATION_NOR	030 12:12	031 04:17	57.9	11.6	86.4	2.8	927.5	34.7	69.5	0.0	75.8	0.0	290.0	0.0	0.0	1556.2
SP_038EA_G34HEFNON031_PRIME	031 04:17	031 10:17	21.6	4.3	75.6	1.1	0.0	13.0	25.9	0.0	28.3	0.0	0.0	0.0	0.0	169.8
DAILY TOTAL SCIENCE	030 12:12	031 10:17	79.5	15.9	162.0	3.9	927.5	47.7	95.4	0.0	104.1	0.0	290.0	0.0		
OBSERVATION_NOR	031 10:17	032 02:52	59.7	11.9	158.4	3.0	412.2	35.8	71.6	0.0	78.2	15.0	105.0	0.0	0.0	950.9
OBSERVATION_OPN	031 10:17	032 02:52	0.0	0.0	0.0	0.0	8.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.7
SP_038EA_G70METOTP032_PRIME	032 02:52	032 11:52	32.4	6.5	86.4	1.6	0.0	19.4	38.9	0.0	265.3	0.0	0.0	0.0	0.0	450.5
DAILY TOTAL SCIENCE	031 10:17	032 11:52	92.1	18.4	244.8	4.6	412.2	55.3	110.5	0.0	343.5	15.0	105.0	0.0		
OBSERVATION_NOR	032 11:52	033 19:22	113.4	22.6	205.9	5.7	1383.0	68.0	136.1	0.0	221.4	0.0	683.0	0.0	0.0	2839.1
OBSERVATION_OPN	032 11:52	033 19:22	0.0	0.0	0.0	0.0	8.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.7
SP_038EA_M70METOTB033_PRIME	033 19:22	034 04:22	109.1	6.5	0.0	1.6	0.0	34.5	45.4	0.0	80.7	0.0	0.0	0.0	0.0	277.7
DAILY TOTAL SCIENCE	032 11:52	034 04:22	222.5	29.0	205.9	7.3	1383.0	102.5	181.5	0.0	302.1	0.0	683.0	0.0		
OBSERVATION_NOR	034 04:22	035 05:37	630.3	15.4	28.8	9.1	1537.4	179.6	163.6	5.3	389.2	243.7	190.0	0.0	3.4	3395.8
SP_038EA_G70METNON035_PRIME	035 05:37	035 11:37	102.7	3.2	75.6	1.7	0.0	28.9	32.9	0.0	68.8	0.0	0.0	0.0	0.0	313.7
DAILY TOTAL SCIENCE	034 04:22	035 11:37	732.9	18.6	104.4	10.7	1537.4	208.5	196.5	5.3	458.1	243.7	190.0	0.0		
OBSERVATION_NOR	035 11:37	036 06:37	68.4	10.3	75.6	3.3	412.2	41.0	82.1	42.9	89.6	94.5	259.9	0.0	9.4	1189.3
OBSERVATION_OPN	035 11:37	036 06:37	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
OBSERVATION_SI	035 11:37	036 06:37	0.0	0.0	4.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.5
SP_038EA_G34BWGNON036_PRIME	036 06:37	036 12:37	21.6	3.2	75.6	1.1	0.0	13.0	25.9	0.0	28.3	0.0	0.0	0.0	0.0	168.7
DAILY TOTAL SCIENCE	035 11:37	036 12:37	90.0	13.5	155.7	4.4	412.2	54.0	108.0	42.9	117.9	94.5	259.9	0.0		
OBSERVATION_NOR	036 12:37	037 02:37	50.4	7.6	80.9	2.5	982.8	30.2	60.5	0.0	66.0	14.2	260.7	0.0	0.0	1555.7
SP_038EA_G70METNON037_PRIME	037 02:37	037 11:37	399.9	4.9	86.4	1.6	0.0	19.4	38.9	0.0	573.4	0.0	0.0	0.0	0.0	1124.6
DAILY TOTAL SCIENCE	036 12:37	037 11:37	450.3	12.4	167.3	4.1	982.8	49.7	99.4	0.0	639.5	14.2	260.7	0.0		

Segment Geometry

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Rev 038  INBOUND
2007 -  030T12:12:00 SCET
2007 JAN 30 12:12:00 SCET
2007 JAN 30 13:20:24 ERT
Apoapse__038 + 005T23:52:41
Periapse_038 - 001T21:45:18
Light time:    68.4 min
Orbit period:  18.1 days
Radius     1084064 km      17.99 Rs
Rad_cyl     982154 km      16.30 Rs
Z_ht_cyl   -458878 km      -7.61 Rs
Mag_L          21.91
Semi_axs   1330722 km      22.08 Rs
Eccentricity    0.294
Inclination    58.83 deg
Sun_range       9.19 AU
Earth_range     8.22 AU
--- DSN ELEV -- D/L -- U/L --------
Goldstone      27.2   54.3
Canberra       33.3   13.1
Madrid        -34.4  -25.8
------- LOOK DIRECTION INFO -------
FOV            16.6 deg  290.5 mrad
RA             12.000 deg
DEC            19.401 deg
Crosses_RP_@    0.000 Rs
EPS             1.322 deg
SEP           167.574 deg
ORS b/s angle  58.8 deg
ORS rad angle 120.5 deg
```

Point NEG_Y at SATURN and align POS_X = Up with NSP

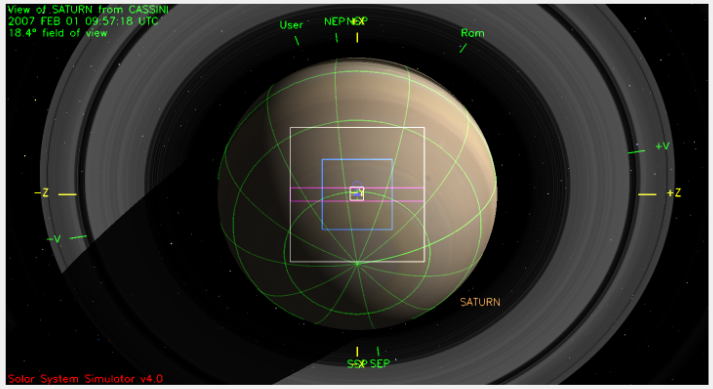
User Vector - RA: 228.65 DEC: 74.87 | Tilt L | Up | Tilt R | Left | Reset | Right | Paste Current RA/DEC | Image | Down | Hi Res | Zoom Out | Fill Screen | Zoom In | Labels | Axes | Orbits | Vectors | FOVs | Lat/Lons | Year | Month | Day | Hour | Minute | Second

Turn Analyzer: SATURN to EARTH about Z on RWA = 7.2 min / 57.5 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	DLON (deg)	VREL (km/s)	Z_HGHT (km)	ANGLE FROM SATRN	ANGLE FROM EARTH	ANGLE FROM RAM
SATURN	--	--	1084064	17.99	1024820	17.00	121.2	6.37	111.25	59	-25	0	6.4	0	0.0	57.5	75.2
MIMAS	--	--	1135750	18.84	1135552	18.84	128.7	0.02	0.37	295	-23	-102	13.3	4057	9.1	50.1	78.5
ENCELADUS	--	--	1240966	20.59	1240713	20.59	116.1	0.02	0.41	44	-22	131	18.2	-28	8.8	62.5	69.1
TETHYS	--	--	1054248	17.49	1053717	17.48	131.8	0.06	1.03	272	-25	-75	8.6	2502	15.8	47.1	83.7
DIONE	--	--	1017169	16.88	1016608	16.87	133.7	0.06	1.11	270	-27	-68	7.0	100	20.3	45.3	87.1
RHEA	--	--	1534995	25.47	1534229	25.46	133.3	0.06	1.00	344	-18	-151	11.8	-3013	12.1	45.5	72.7
TITAN	--	--	560655	9.30	558080	9.26	75.6	0.53	9.19	330	-55	-9	5.0	-63	93.2	104.8	168.0
HYPERION	--	--	1526806	25.33	1526677	25.33	144.7	0.01	0.21	262	-15	-76	4.9	-23606	59.0	35.5	106.0
IAPETUS	--	--	4112387	68.24	4111640	68.22	77.6	0.02	0.36	12	-7	113	9.3	766045	50.2	100.9	63.6
PHOEBE	--	--	12989795	215.53	12989681	215.53	159.2	0.00	0.02	206	-9	-153	6.2	-2356268	41.3	19.3	61.6
SATURN	--	--	1084064	17.99	1024820	17.00	121.2	6.37	111.25	59	-25	0	6.4	0	0.0	57.5	75.2

Seg Start (Left)

Periapse (below)




```
Rev 038  INBOUND
2007 -  032T09:57:18 SCET
2007 FEB 01 09:57:18 SCET
2007 FEB 01 11:05:35 ERT
Apoapse__038 + 007T21:37:59
Periapse_038 + 00:00:00
Light time:    68.3 min
Orbit period:  18.1 days
Radius      939454 km      15.59 Rs
Rad_cyl     492011 km       8.16 Rs
Z_ht_cyl   -800312 km     -13.28 Rs
Mag_L          56.83
Semi_axs   1330145 km      22.07 Rs
Eccentricity    0.294
Inclination    58.82 deg
Sun_range       9.18 AU
Earth_range     8.21 AU
--- DSN ELEV -- D/L -- U/L --------
Goldstone      52.4   69.8
Canberra       14.9  -11.0
Madrid        -27.0   -7.3
------- LOOK DIRECTION INFO -------
FOV            18.4 deg  320.3 mrad
RA             86.979 deg
DEC            54.263 deg
Crosses_RP_@    0.000 Rs
EPS             1.104 deg
SEP           169.657 deg
ORS b/s angle 121.6 deg
ORS rad angle  66.9 deg  *
```

Point NEG_Y at SATURN and align POS_X = Up with NSP

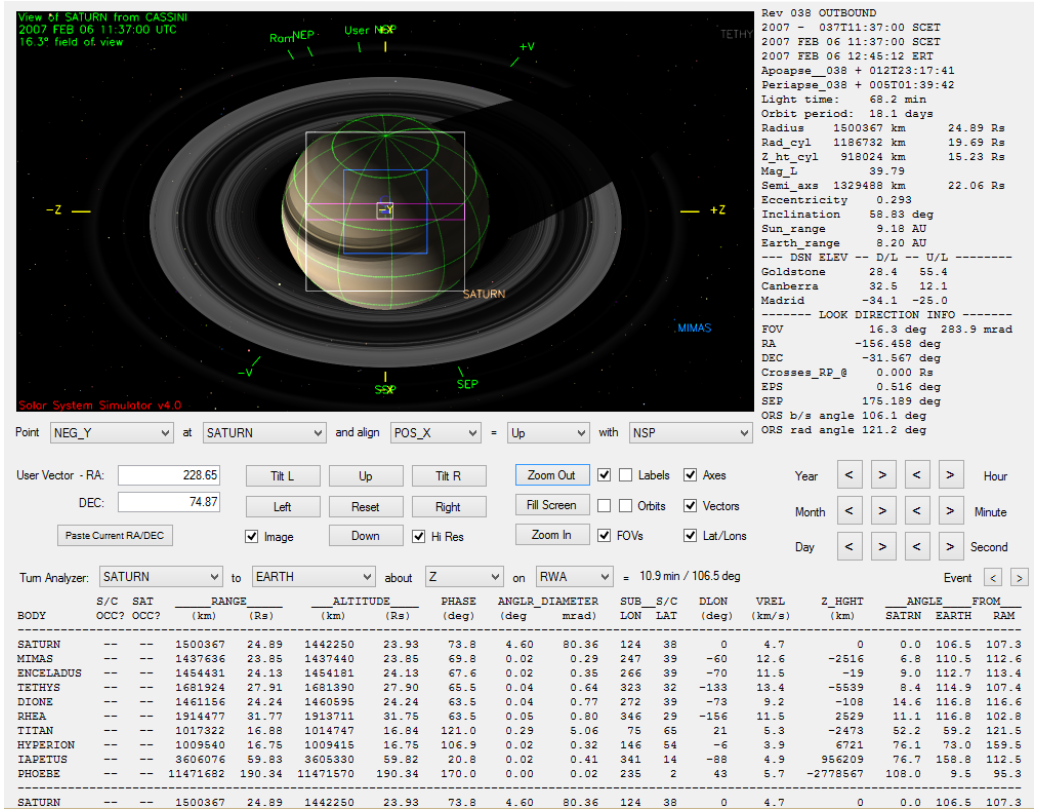
User Vector - RA: 228.65 DEC: 74.87 | Tilt L | Up | Tilt R | Left | Reset | Right | Paste Current RA/DEC | Image | Down | Hi Res | Zoom Out | Fill Screen | Zoom In | Labels | Axes | Orbits | Vectors | FOVs | Lat/Lons | Year | Month | Day | Hour | Minute | Second

Turn Analyzer: SATURN to EARTH about Z on RWA = 12.0 min / 120.7 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	DLON (deg)	VREL (km/s)	Z_HGHT (km)	ANGLE FROM SATRN	ANGLE FROM EARTH	ANGLE FROM RAM
SATURN	--	--	939454	15.59	883424	14.66	58.4	7.36	128.39	81	-58	0	7.2	0	0.0	120.7	90.0
MIMAS	--	--	873537	14.49	873345	14.49	67.7	0.03	0.47	227	-67	-27	9.6	4507	10.8	111.5	79.2
ENCELADUS	--	--	934200	15.50	933951	15.50	48.1	0.03	0.55	82	-59	73	11.8	26	14.6	131.2	95.4
TETHYS	--	--	827851	13.74	827322	13.73	66.1	0.07	1.31	171	-76	5	4.2	2840	17.8	113.4	76.9
DIONE	--	--	1114293	18.49	1113731	18.48	39.7	0.06	1.01	31	-46	126	14.9	-71	18.8	139.4	107.3
RHEA	--	--	1251647	20.77	1250881	20.76	37.4	0.07	1.23	22	-40	140	14.4	3297	22.6	141.6	112.4
TITAN	--	--	1163847	19.31	1161272	19.27	72.2	0.25	4.42	19	-43	32	3.1	-5397	70.3	108.3	73.6
HYPERION	--	--	1267398	21.03	1267239	21.03	127.9	0.01	0.26	15	-14	-30	4.0	-24345	76.9	51.8	13.2
IAPETUS	--	--	4249994	70.52	4249247	70.51	55.4	0.02	0.35	358	-9	-172	10.5	844931	36.0	123.4	113.7
PHOEBE	--	--	11837985	196.42	11837870	196.42	160.2	0.00	0.02	183	-9	-68	8.3	-2473623	107.2	18.5	44.2
SATURN	--	--	939454	15.59	883424	14.66	58.4	7.36	128.39	81	-58	0	7.2	0	0.0	120.7	90.0

DOY	Saturn Range (Rs)	Phase Angle (Deg.)	Subspace Latitude
2007-031T00:00:00	17	107	-37
2007-032T00:00:00	15.72	73.4	-57
2007-032T09:53:27	15.59 (Periapse)	58.6	-59
2007-033T00:00:00	15.85	38	-50
2007-034T00:00:00	17.33	15.9	-24
2007-035T00:00:00	19.53	30.5	-1
2007-036T00:00:00	21.86	50	18

Segment Geometry




```
Rev 038 OUTBOUND
2007 -  037T11:37:00 SCET
2007 FEB 06 11:37:00 SCET
2007 FEB 06 12:45:12 ERT
Apoapse__038 + 012T23:17:41
Periapse_038 + 005T01:39:42
Light time:    68.2 min
Orbit period:  18.1 days
Radius     1500367 km      24.89 Rs
Rad_cyl    1186732 km      19.69 Rs
Z_ht_cyl    918024 km      15.23 Rs
Mag_L         39.79
Semi_axs   1329488 km      22.06 Rs
Eccentricity    0.293
Inclination    58.83 deg
Sun_range       9.18 AU
Earth_range     8.20 AU
--- DSN ELEV -- D/L -- U/L --------
Goldstone      28.4   55.4
Canberra       32.5   12.1
Madrid        -34.1  -25.0
------- LOOK DIRECTION INFO -------
FOV            16.3 deg  283.9 mrad
RA           -156.458 deg
DEC           -31.567 deg
Crosses_RP_@    0.000 Rs
EPS             0.516 deg
SEP           175.189 deg
ORS b/s angle 106.1 deg
ORS rad angle 121.2 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	DLON (deg)	VREL (km/s)	Z_HGHT (km)	ANGLE FROM SATRN	ANGLE FROM EARTH	ANGLE FROM RAM
SATURN	--	--	1500367	24.89	1442250	23.93	73.8	4.60	80.36	124	38	0	4.7	0	0.0	106.5	107.3
MIMAS	--	--	1437636	23.85	1437440	23.85	69.8	0.02	0.29	247	39	-60	12.6	-2516	6.8	110.5	112.6
ENCELADUS	--	--	1454431	24.13	1454181	24.13	67.6	0.02	0.35	266	39	-70	11.5	-19	9.0	112.7	113.4
TETHYS	--	--	1681924	27.91	1681390	27.90	65.5	0.04	0.64	323	32	-133	13.4	-5539	8.4	114.9	107.4
DIONE	--	--	1461156	24.24	1460595	24.24	63.5	0.04	0.77	272	39	-73	9.2	-108	14.6	116.8	116.6
RHEA	--	--	1914477	31.77	1913711	31.75	63.5	0.05	0.80	346	29	-156	11.5	2529	11.1	116.8	102.8
TITAN	--	--	1017322	16.88	1014747	16.84	121.0	0.29	5.06	75	65	21	5.3	-2473	52.2	59.2	121.5
HYPERION	--	--	1009540	16.75	1009415	16.75	106.9	0.02	0.32	146	54	-6	3.9	6721	76.1	73.0	159.5
IAPETUS	--	--	3606076	59.83	3605330	59.82	20.8	0.02	0.41	341	14	-88	4.9	956209	76.7	158.8	112.5
PHOEBE	--	--	11471682	190.34	11471570	190.34	170.0	0.00	0.02	235	2	43	5.7	-2778567	108.0	9.5	95.3
SATURN	--	--	1500367	24.89	1442250	23.93	73.8	4.60	80.36	124	38	0	4.7	0	0.0	106.5	107.3

Seg End (Left)

Solar Geometry – ORS Boresight Concerns

No ORS Boresight Solar Constraints on Science Pointing.

Daily Science Highlights

Tuesday, January 30 (DOY 030): Today CIRS made a temperature map in the infrared to obtain information of the thermal structure of Titan's stratosphere from roughly 70 to 400 km in altitude. Variations in longitude, latitude, and altitude are all of interest in understanding the dynamics of the stratosphere.

Wednesday, January 31 (DOY 031): Science observations on Wednesday included Ultraviolet Imaging Spectrograph (UVIS) observations of the occultation of a star by Enceladus. Saturn's moons Tethys and Rhea were imaged for optical navigation use.

Thursday, February 1 (DOY 032): Two different types of observations today focused on the high latitudes of Saturn. The Imaging Science Subsystem (ISS) used photopolarimetry to study the physical properties of particulate matter in Saturn's atmosphere by measuring the intensity and polarization at different wavelengths. VIMS made simultaneous observations. Periapsis of orbit 38 was at 2007-032T09:57:52 at a distance of 15.6 Rs. The Radio and Plasma Wave Science (RPWS) instrument took advantage of the proximity at periapsis to observe Saturn Kilometric Radiation (SKR) at millisecond resolution to characterize its temporal structure. Outbound from periapsis, ISS, CIRS, and VIMS began a campaign to try to catch a spoke forming on the rings near the morning shadow edge at a ring radius of 110,000 km.

Friday, February 2 (DOY 033): A non-targeted flyby of Titan occurred today. For this flyby RADAR turned its attention toward the satellite for radiometer data of the southern latitudes. Optical navigation images were taken today of Rhea and Enceladus. Saturday provides an opportunity to observe Dione at low phase and even at zero-phase. In this geometry, since phase angle measures the angle from Sun to satellite to Cassini, there are no shadows on the surface. As the phase approaches zero, the observing instruments see an opposition surge in which the target brightens far more than would normally be expected. Also on Saturday, ISS observed a transit of Saturn's moon Mimas in front of the much smaller Helene. The exact time when the satellites are aligned in the instrument's field of view helps to refine determination of their orbits.

Sunday, February 4 (DOY 035): Early in the day, Cassini crossed through the ring plane from south to north at approximately 20Rs from Saturn. The MAPS (Magnetosphere And Plasma Science) instruments used this crossing to measure the vertical profile of the Titan torus. The opportunity will be repeated at this distance but in a descending crossing on the 16th of February. Saturn with all of its rings and its satellites Dione and Telesto were captured together in a single image. Tethys, Mimas, and Epimetheus starred in another image with the rings. Mimas was the object of an optical navigation image.

Monday, February 5 (DOY 036): ISS continued making Saturn photopolarimetry observations and high latitude mapping. ISS also observed the rings.

Tuesday, February 6 (DOY 037): Dione was the first target of observation today with CIRS observing in the infrared and UVIS in the ultraviolet.

Segment Integration Planning

Timeline Gaps and Suggested Observations (1 of 2)

Rev 38 – Proposed TOL DOY 30-34

Activity	Start Time	Duration	Pointing	Notes	TLM
Segment Start/Turn to Waypoint	2007-030T12:12:00	000T00:30:00	NAC to Saturn; NEG X to Sun		
ISS High Latitude Map Block	2007-030T12:42:00	000T03:55:00	NAC to Saturn;		
CIRS Temperature Map	2007-030T16:37:00	000T06:00:00	CIRS_FPB to Titan;POS_X to Pole_Dir		
ISS High Latitude Map Block	2007-030T22:37:00	000T04:00:00	NAC to Saturn;		
SP_TURN to Downlink	2007-031T02:37:00	000T00:30:00	XBAND to Earth;		
Downlink (70M Goldstone)	2007-031T03:07:00	000T06:00:00	XBAND to Earth;	Cut 3hrs. Off Back End & Upgraded to 70	
OPNAV	2007-031T10:17:00	000T01:00:00			
ISS High Latitude Map Block	2007-031T11:17:00	000T02:00:00	NAC to Saturn;		
CIRS Regional Map (part a)	2007-031T13:17:00	000T08:33:00			
UVIS Enceladus Icy Occultation	2007-031T21:10:00	000T01:00:00			
CIRS Regional Map (part b)	2007-031T22:10:00	000T02:27:00			
ISS High Latitude Map Block	2007-032T00:37:00	000T01:45:00	NAC to Saturn;		
SP_TURN to Downlink	2007-032T02:22:00	000T00:30:00	XBAND to Earth;		
Downlink (G34HEF OTM Pri. U/L)	2007-032T02:52:00	000T09:00:00	XBAND to Earth;		
SP_TURN to WAYPOINT	2007-032T11:52:00	000T00:30:00	NAC to Saturn; NEG X to Sun		
ISS High Latitude Map Block	2007-032T12:22:00	000T01:00:00	NAC to Saturn;		
ISS_Rings Spoke Formation	2007-032T13:22:00	000T06:00:00	NAC to Rings;		
VIMS Saturn Polar Map	2007-032T19:22:00	000T22:00:00	NAC to Saturn;		
ISS High Latitude Map Block	2007-033T17:22:00	000T01:00:00	NAC to Saturn;		
OPNAV	2007-033T18:22:00	000T01:00:00			
Downlink (M70 OTM Backup U/L)	2007-033T19:22:00	000T09:00:00	XBAND to Earth;	Removed Goldstone passes on DOY 33 & 34	

Timeline Gaps and Suggested Observations (2 of 2)

Rev 38 – Proposed TOL DOY 34-37

Activity	Start Time	Duration	Pointing	Notes	TLM
SP_TURN to WAYPOINT	2007-034T04:22:00	000T00:30:00	NAC to Saturn; NEG X to Sun		
ISS High Latitude Map Block	2007-034T04:52:00	000T04:18:00	NAC to Saturn;		
RADAR Titan South Cal	2007-034T09:10:00	000T01:00:00			
ISS Dione Zero Phase	2007-034T10:10:00	000T02:00:00	NAC to Dione;		
UVIS EUV/FUV Map	2007-034T12:10:00	000T10:59:25			
ISS Mutual Event	2007-034T23:09:25	000T00:31:10			
ISS Dione Low Phase	2007-034T23:40:35	000T49:25:00	NAC to Dione;		
ISS High Latitude Map Block	2007-035T00:30:00	000T04:37:00	NAC to Saturn;		
SP_TURN to Downlink	2007-035T05:07:00	000T00:30:00	XBAND to Earth;		
Downlink (Goldstone 70m)	2007-035T02:37:00	000T06:00:00	XBAND to Earth;	Cut 3hrs off front & upgraded to 70m	
OPNAV	2007-035T11:37:00	000T01:00:00			
ISS High Latitude Map Block	2007-035T12:37:00	000T01:30:00	NAC to Saturn;		
ISS Satorb	2007-035T14:07:00	000T00:30:00	NAC to Saturn;		
CIRS Ring Temperature Scan	2007-035T14:37:00	000T03:00:00			
RADAR Rings Observation	2007-035T17:37:00	000T08:30:00			
SP_TURN to Downlink	2007-036T02:37:00	000T00:30:00	XBAND to Earth;		
Downlink (Goldstone 34BWG)	2007-036T02:37:00	000T09:00:00	XBAND to Earth;		
SP_TURN to WAYPOINT	2007-036T11:37:00	000T00:30:00			
ISS Satorb	2007-036T12:07:00	000T00:30:00	NAC to Saturn;		
Atmospheres	2007-036T12:37:00	000T13:00:00	NAC to Saturn;	This period for ISS,VIMS and other atm. Observations.	
ISS Satorb	2007-037T01:07:00	000T00:30:00	NAC to Saturn;		
OPNAV	2007-037T01:37:00	000T01:00:00			
Downlink (Goldstone 34BWG)	2007-037T02:37:00	000T09:00:00	XBAND to Earth;		

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)	(%)	OPNAV (Mb)	SCI (Mb)	ENGR (Mb)	TOTAL (Mb)	CPACTY (Mb)	MARGIN (Mb)	(%)	CAROVR (Mb)
SP_038EA_G70METNON031_PRIME	031 04:17	031 10:17	0	951	54	1005	3568	2563	72%	0	170	35	1210	3036	1825	60%	0
SP_038EA_G34HEFOTP032_ PRIME	032 02:52	032 11:52	0	1376	56	1432	3508	2076	59%	22	569	53	2075	1044	-1031	-99%	1031
SP_038EA_M70METNON033_PRIME	033 19:22	034 04:22	1031	3842	106	4979	3516	-1463	-42%	26	278	53	3873	4273	400	9%	0
SP_038EA_G70METNON035_PRIME	035 05:37	035 11:37	0	3176	85	3261	3561	299	8%	0	314	35	3610	2991	-619	-21%	619
SP_038EA_G34BWGNON036 PRIME	036 02:37	036 11:37	619	742	51	1411	3516	2105	60%	26	226	53	1716	1046	-671	-64%	671
SP_038EA_G34BWGNON037_PRIME	037 02:37	037 11:37	671	1330	51	2051	3516	1466	42%	26	226	53	2355	1046	-1310	-125%	1310

DATA VOLUME REPORT

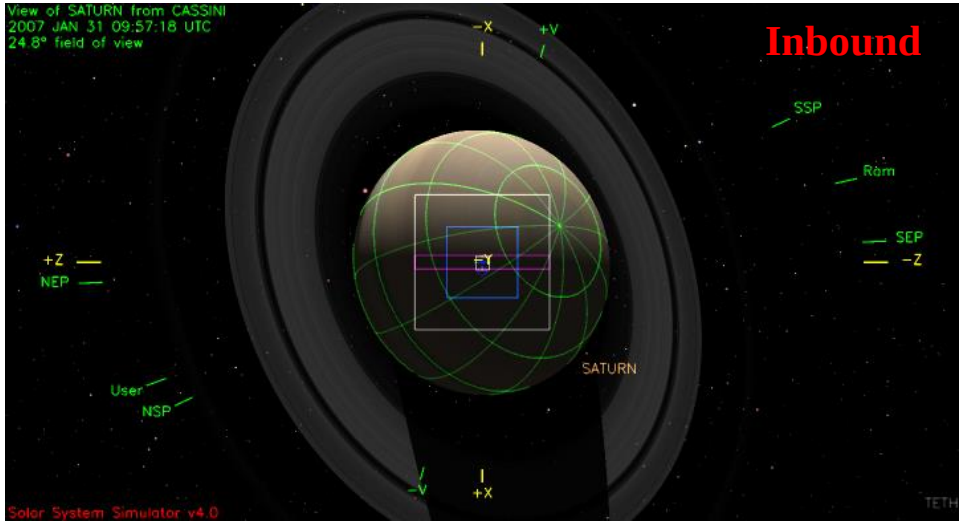
Event	Start doy hh:mm	End doy hh:mm	CAPS (Mb)	CDA (Mb)	CIRS (Mb)	INMS (Mb)	ISS (Mb)	MAG (Mb)	MIMI (Mb)	RADAR (Mb)	RPWS (Mb)	UVIS (Mb)	VIMS (Mb)	PROBE (Mb)	ENGR (Mb)	TOTAL (Mb)
OBSERVATION_NOR	030 12:12	031 04:17	57.9	11.6	86.4	2.9	612.2	34.7	69.5	0.0	75.8	0.0	0.0	0.0	0.0	951.0
SP_038EA_G70METNON031_PRIME	031 04:17	031 10:17	21.6	4.3	75.6	1.1	0.0	13.0	25.9	0.0	28.3	0.0	0.0	0.0	0.0	169.8
OBSERVATION_NOR	031 10:17	032 02:52	59.7	11.9	158.4	3.0	841.6	35.8	71.6	0.0	78.2	115.5	0.0	0.0	0.0	1375.8
OBSERVATION_OPN	031 10:17	032 02:52	0.0	0.0	0.0	0.0	21.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	21.7
SP_038EA_G34HEFOTP032_PRIME	032 02:52	032 11:52	32.4	6.5	86.4	1.6	85.9	19.4	38.9	0.0	298.2	0.0	0.0	0.0	0.0	569.3
OBSERVATION_NOR	032 11:52	033 19:22	113.4	22.6	403.2	5.7	1537.2	68.0	136.1	0.0	235.6	0.0	1320.0	0.0	0.0	3841.8
OBSERVATION_OPN	032 11:52	033 19:22	0.0	0.0	0.0	0.0	26.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	26.1
SP_038EA_M70METNON033_PRIME	033 19:22	034 04:22	108.8	6.5	0.0	2.2	0.0	34.5	45.4	0.0	80.7	0.0	0.0	0.0	0.0	278.0

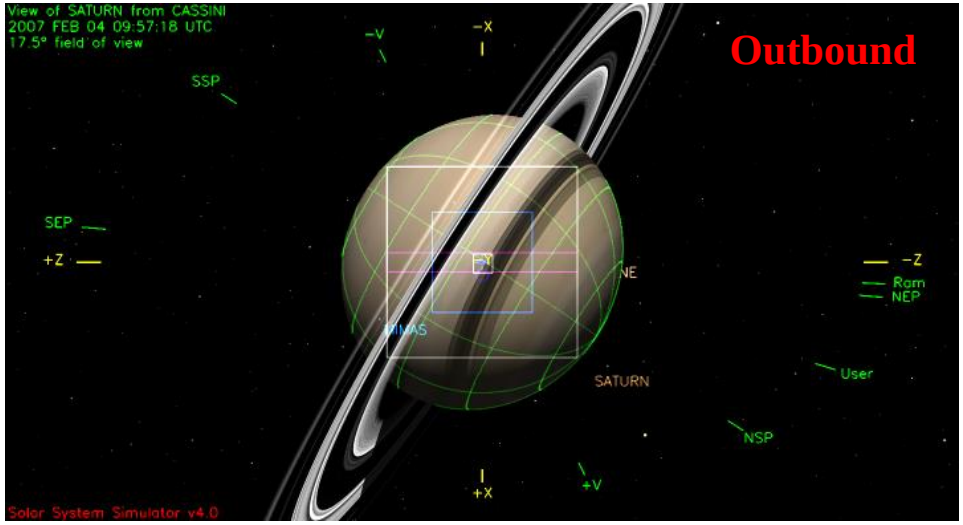
Rev 38 Safe Waypoint Options

- Good for Entire Time Period
  - **NAC to Saturn; NEG X to Sun**
- Good for Pre-Periapse
  - NAC to Saturn; POS Z to NEP
  - NAC to Saturn; POS Z to NSP (North_Pole_Dir)
- Good for Post-Periapse
  - NAC to Saturn; NEG X to Sun

Waypoints Chosen

Waypoint 1 (Whole Segment): ISS_NAC to Saturn; NEG_X to Sun





Notes & Liens

- Timing
  - Start 2007-030T12:12:00
  - End 2007-037T11:37:00
- Pointing
  - Waypoints have been re-validated
  - Downlink attitudes have been re-validated
  - SP turns are safe
- Data Volume
  - OK if DSS-63 is truly available as announced
- CIMS
  - All requests are currently approved
- OpModes
  - DFPW, DFPW TCM, RADWU035, RADRWA035
  - Timing on page 15
- DSN
  - 70M Usage is 67% over 6 passes
  - Stations Used:
    - DSS-63 (Madrid 70M) on DOY 033. Proposed return to service is DOY 02.
    - DSS-14
    - DSS-15 (Goldstone 34M)
    - DSS-25 (Goldstone 34M)