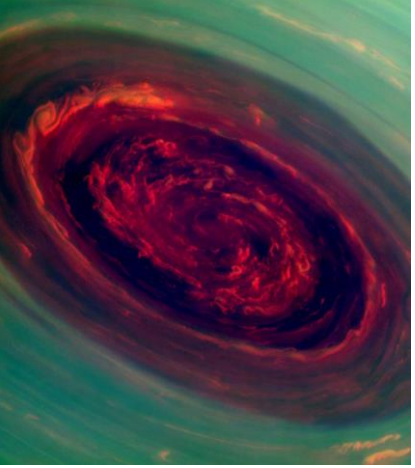

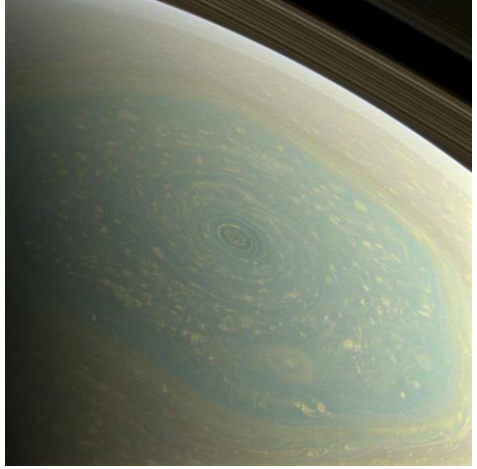
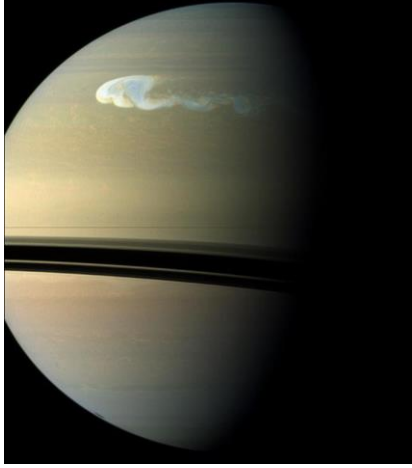

Science Planning & Sequence Team
CASSINI

SATURN TARGET WORKING TEAM

Rev 45 Segment Legacy Package

Segment Boundary: May 24, 2007 – May 26, 2007
2007-144T04:12:00 – 2007-146T04:12:00 (SCET)

Integration Began 04/21/2003
Segment Delivered to S30 Sequence 06/04/2003
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 was a short 2 day segment in an inclined orbit during the Prime Mission. The views of Saturn were of the northern hemisphere as the spacecraft was inbound to periapse. Periapse was not covered by this segment.
- Saturn science included VIMS-led ORS global mapping and ISS lightning searches with the WAC. UVIS also conducted a movie of the northern aurora.
- Out-of-discipline activities included a VIMS look at the rings, optical navigation images of satellites and a magnetometer calibration roll.
- One waypoint was sufficient for this short segment.

Final Sequenced SPASS

Request	Riders	Start (SCET)	Start (Epoch)	Duration	End (SCET)	Primary	Secondary	Comments
Sequence S030, length = 37 ...		2007-124T22:00:00	E044_SEQUENCE_030+000T00:00:00	037T05:10:00	2007-162T03:10:00			
SATURN rev 45 Segment		2007-144T04:12:00		002T00:00:00	2007-146T04:12:00			
SP_045SA_WAYPTTURN144_PRIME	M	2007-144T04:12:00		000T00:17:00	2007-144T04:29:00	ISS_NAC to Saturn	NEG_X to Sun	
NEW WAYPOINT		**2007-144T04:29:00**		**002T00:01:00**	**2007-146T04:30:00**	**ISS_NAC to Saturn**	**NEG_X to Sun**	
VIMS_045SA_GLOMAP001_PRIME	C, I, M, U	2007-144T04:29:00		000T10:00:00	2007-144T14:29:00	ISS_NAC to Saturn	NEG_X to Sun	
ISS_045SA_WALGTNG10001_PRIME	C, M, U, V	2007-144T14:29:00		000T05:15:00	2007-144T19:44:00	ISS_NAC to Saturn	NEG_X to Sun	
SP_045SA_DLTURN144_PRIME	M	2007-144T19:44:00		000T00:17:00	2007-144T20:01:00	XBAND to Earth	POS_X to NSP	
SP_045EA_G34BWGNON144_PRIME	C, M	2007-144T20:01:00		000T06:00:00	2007-145T02:01:00	XBAND to Earth	POS_X to NSP	
NAV_045SK_OPNAV451_PRIME	C, M	2007-145T02:01:00		000T00:59:00	2007-145T03:00:00	ISS_NAC to Satellites	NEG_X to Sun	Starts at Earth point, ends at waypoint
NAV_045SA_WAYPTTURN451_PRIME	C, M	2007-145T03:00:00		000T00:01:00	2007-145T03:01:00	ISS_NAC to Saturn	NEG_X to Sun	
MAG_045SU_CALROLL001_PRIME	M	2007-145T03:01:00		000T04:38:00	2007-145T07:39:00	NEG_X to Sun (0.0,0.0,-30.0 deg. offset)	Rolling	
VIMS_045RI_LATPHASE003_PRIME	C, I, M, U	2007-145T07:39:00		000T03:00:00	2007-145T10:39:00	VIMS_IR to Rings	NEG_X to Sun	
UVIS_045SA_NAURMOV001_PRIME	I, M	2007-145T10:39:00		000T08:15:00	2007-145T18:54:00	ISS_NAC to Saturn	NEG_X to Sun	
SP_045SA_DLTURN145_PRIME	M	2007-145T18:54:00		000T00:18:00	2007-145T19:12:00	XBAND to Earth	POS_X to 283.8/69.6	
SP_045EA_G70METOTP145_PRIME	C, M, N	2007-145T19:12:00		000T09:00:00	2007-146T04:12:00	XBAND to Earth	POS_X to 283.8/69.6	

Final Sequenced SMT and Data Volume

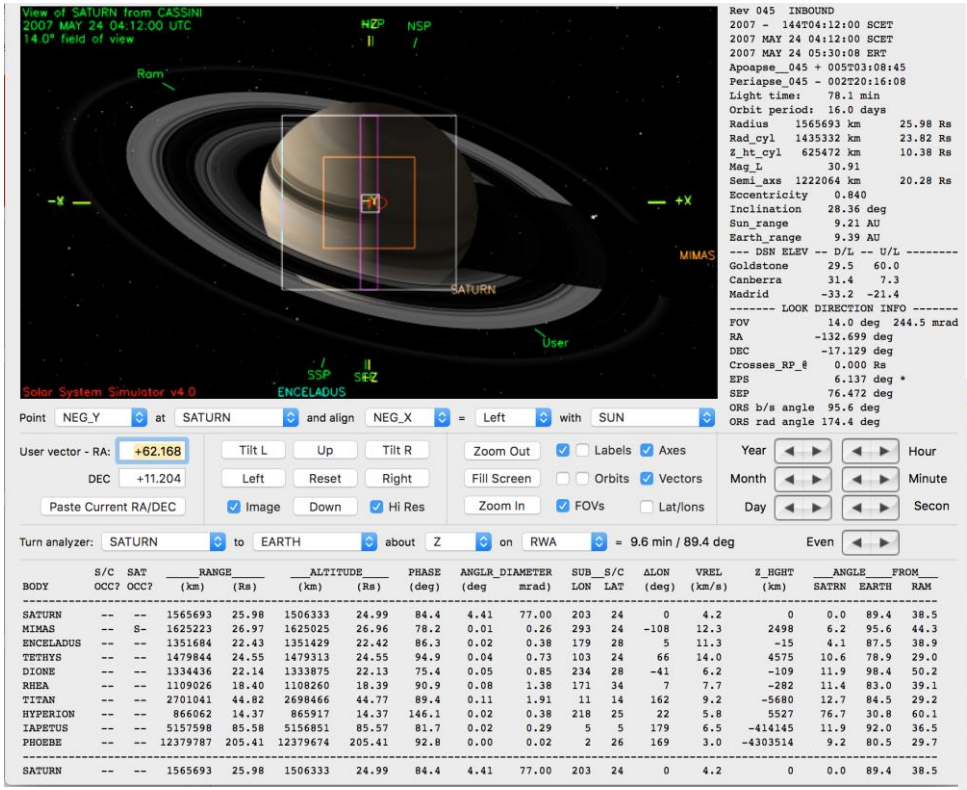
DATA VOLUME SUMMARY --- TRANSFER FRAME OVERHEAD INCLUDED (80 BITS PER 8800-BIT FRAME)

			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_045EA_G34BWGNON144_PRIME	144 20:01	145 02:01	0	1921	54	1975	3511	1537	0	175	35	2185	545	-1641	421	2%	1640
SP_045EA_G70METOTP145_PRIME	145 19:12	146 04:12	1640	895	58	2593	3511	918	26	248	53	2920	3248	327	421	2%	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	144 04:12	144 20:01	109.7	16.0	181.8	3.7	724.9	58.4	78.9	0.0	174.6	55.3	500.0	0.0	0.0	1903.3
SP_045EA_G34BWGNON144_PRIME	144 20:01	145 02:01	21.6	6.1	75.6	1.1	0.0	13.0	25.9	0.0	28.3	1.6	0.0	0.0	0.0	173.2
DAILY TOTAL SCIENCE	144 04:12	145 02:01	131.3	22.1	257.4	4.8	724.9	71.3	104.8	0.0	202.9	56.9	500.0	0.0		
OBSERVATION_NOR	145 02:01	145 19:12	61.9	17.4	57.6	5.1	312.0	76.2	74.2	0.0	81.0	149.1	52.0	0.0	0.0	886.5
OBSERVATION_OPN	145 02:01	145 19:12	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_045EA_G70METOTP145_PRIME	145 19:12	146 04:12	32.4	9.1	86.4	1.6	0.0	32.0	38.9	0.0	42.4	2.5	0.0	0.0	0.0	245.3
DAILY TOTAL SCIENCE	145 02:01	146 04:12	94.3	26.5	144.0	6.7	312.0	108.2	113.1	0.0	123.5	151.6	52.0	0.0		

Segment Geometry

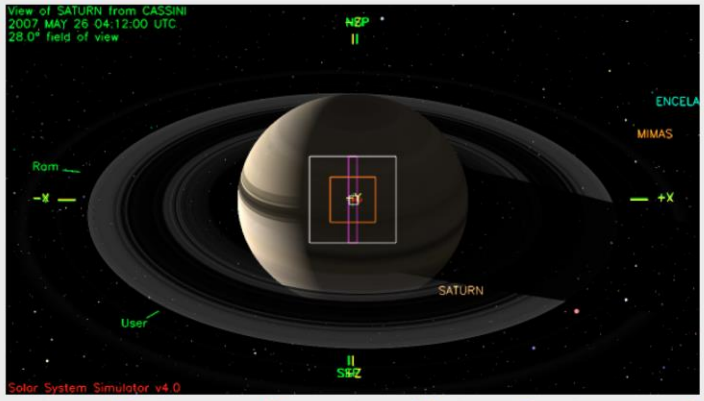



```
Rev 045  INBOUND
2007 -  144T04:12:00 SCET
2007 MAY 24 04:12:00 SCET
2007 MAY 24 05:30:08 ERT
Apoapse__045 + 005T03:08:45
Periapse_045 - 002T20:16:08
Light time:    78.1 min
Orbit period:  16.0 days
Radius     1565693 km      25.98 Rs
Rad_cyl    1435332 km      23.82 Rs
Z_ht_cyl    625472 km      10.38 Rs
Mag_L         30.91
Semi_axs   1222064 km      20.28 Rs
Eccentricity    0.840
Inclination    28.36 deg
Sun_range       9.21 AU
Earth_range     9.39 AU
--- DSN ELEV -- D/L -- U/L --------
Goldstone       29.5    60.0
Canberra        31.4     7.3
Madrid         -33.2   -21.4
------- LOOK DIRECTION INFO -------
FOV             14.0 deg  244.5 mrad
RA           -132.699 deg
DEC           -17.129 deg
Crosses_RP_@    0.000 Rs
EPS             6.137 deg *
SEP            76.472 deg
ORS b/s angle  95.6 deg
ORS rad angle 174.4 deg
```

BODY	S/C OCC?	SAT OCC?	RANGE (km)	RANGE (Rs)	ALTITUDE (km)	ALTITUDE (Rs)	PHASE (deg)	ANGLR_DIAMETER (deg	ANGLR_DIAMETER mrad)	SUB_S/C LON	SUB_S/C LAT	ALON (deg)	VREL (km/s)	Z_HGHT (km)	ANGLE_FROM_ SATRN	ANGLE_FROM_ EARTH	ANGLE_FROM_ RAM
SATURN	--	--	1565693	25.98	1506333	24.99	84.4	4.41	77.00	203	24	0	4.2	0	0.0	89.4	38.5
MIMAS	--	S-	1625223	26.97	1625025	26.96	78.2	0.01	0.26	293	24	-108	12.3	2498	6.2	95.6	44.3
ENCELADUS	--	--	1351684	22.43	1351429	22.42	86.3	0.02	0.38	179	28	5	11.3	-15	4.1	87.5	38.9
TETHYS	--	--	1479844	24.55	1479313	24.55	94.9	0.04	0.73	103	24	66	14.0	4575	10.6	78.9	29.0
DIONE	--	--	1334436	22.14	1333875	22.13	75.4	0.05	0.85	234	28	-41	6.2	-109	11.9	98.4	50.2
RHEA	--	--	1109026	18.40	1108260	18.39	90.9	0.08	1.38	171	34	7	7.7	-282	11.4	83.0	39.1
TITAN	--	--	2701041	44.82	2698466	44.77	89.4	0.11	1.91	11	14	162	9.2	-5680	12.7	84.5	29.2
HYPERION	--	--	866062	14.37	865917	14.37	146.1	0.02	0.38	218	25	22	5.8	5527	76.7	30.8	60.1
IAPETUS	--	--	5157598	85.58	5156851	85.57	81.7	0.02	0.29	5	5	179	6.5	-414145	11.9	92.0	36.5
PHOEBE	--	--	12379787	205.41	12379674	205.41	92.8	0.00	0.02	2	26	169	3.0	-4303514	9.2	80.5	29.7
SATURN	--	--	1565693	25.98	1506333	24.99	84.4	4.41	77.00	203	24	0	4.2	0	0.0	89.4	38.5

Seg Start (Left)

Seg End (below)

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Rev 045  INBOUND
2007 -  146T04:12:00 SCET
2007 MAY 26 04:12:00 SCET
2007 MAY 26 05:30:25 ERT
Apoapse__045 + 007T03:08:45
Periapse_045 - 20:16:08
Light time:    78.4 min
Orbit period:  16.0 days
Radius     728490 km      12.09 Rs
Rad_cyl    641371 km      10.64 Rs
Z_ht_cyl   345457 km       5.73 Rs
Mag_L         15.59
Semi_axs   1222014 km      20.28 Rs
Eccentricity    0.840
Inclination    28.36 deg
Sun_range       9.21 AU
Earth_range     9.43 AU
--- DSN ELEV -- D/L -- U/L --------
Goldstone       27.9    58.8
Canberra        32.3     8.6
Madrid         -33.3   -22.4
------- LOOK DIRECTION INFO -------
FOV             28.0 deg  489.0 mrad
RA           -101.984 deg
DEC           -23.241 deg
Crosses_RP_@    0.000 Rs
EPS             6.088 deg *
SEP            74.709 deg
ORS b/s angle  66.3 deg
ORS rad angle 156.3 deg
```

BODY	S/C OCC?	SAT OCC?	RANGE (km)	RANGE (Rs)	ALTITUDE (km)	ALTITUDE (Rs)	PHASE (deg)	ANGLR_DIAMETER (deg	ANGLR_DIAMETER mrad)	SUB_S/C LON	SUB_S/C LAT	ALON (deg)	VREL (km/s)	Z_HGHT (km)	ANGLE_FROM_ SATRN	ANGLE_FROM_ EARTH	ANGLE_FROM_ RAM
SATURN	--	--	728490	12.09	669514	11.11	113.7	9.49	165.65	352	28	0	8.5	0	0.0	60.2	17.4
MIMAS	--	--	824453	13.68	824254	13.68	102.3	0.03	0.50	310	26	-120	13.9	4930	11.8	71.6	28.7
ENCELADUS	--	--	883739	14.66	883485	14.66	101.5	0.03	0.58	326	23	-129	13.9	19	12.9	72.4	29.5
TETHYS	--	--	728646	12.09	728116	12.08	137.0	0.08	1.48	77	28	77	17.6	3052	23.3	36.9	6.9
DIONE	--	--	807857	13.40	807296	13.40	141.6	0.08	1.40	61	25	88	17.1	11	27.9	32.3	10.7
RHEA	--	--	1067945	17.72	1067180	17.71	87.9	0.08	1.44	329	19	-119	9.8	1430	26.5	86.0	43.2
TITAN	--	--	1810869	30.05	1808294	30.00	132.2	0.16	2.84	11	11	149	13.8	-7790	25.8	42.2	14.5
HYPERION	--	--	1145512	19.01	1145404	19.01	113.2	0.02	0.29	261	76	26	8.9	18879	119.9	71.6	107.4
IAPETUS	--	--	4280262	71.02	4279514	71.01	93.4	0.02	0.35	2	3	-157	9.8	-541588	24.4	80.5	38.9
PHOEBE	--	--	11536515	191.42	11536406	191.42	93.5	0.00	0.02	65	26	-157	8.2	-4218885	19.9	79.9	37.0
SATURN	--	--	728490	12.09	669514	11.11	113.7	9.49	165.65	352	28	0	8.5	0	0.0	60.2	17.4

	Saturn Range	Phase Angle	Sub-S/C Lat.
Segment Start	25.98	84.4	24
Segment End	12.09	113.7	28

Solar Geometry – ORS Boresight Concerns

No ORS Boresight Solar Constraints on Science Pointing.

Daily Science Highlights

No Daily Science Highlights Noted for these days.

Segment Integration Planning

Timeline Gaps and Suggested Observations

Rev 45 - TOL

Activity	Start	Duration	Pointing	Notes	TLM
Segment Start/Turn to Waypoint	2007-144T04:12:00	00:30:00			
Waypoint					
VIMS Global Map	144T04:42:00	11:00:00			
ISS Satorb	144T15:42:00	00:30:00			
ISS Saturn WALGTNG	144T16:12:00	03:22:00			
ISS Phoebe Occultation	144T19:34:00	00:30:00			
ISS Saturn 1x2 WPH	144T20:04:00	01:38:00			
Turn to Downlink	144T21:42:00	00:30:00	XBAND to Earth;		
Downlink	144T22:12:00	06:00:00		34M Goldstone BWG	
Turn to Waypoint	145T04:12:00	00:30:00			
UVIS North Auroal Movie	145T04:42:00	14:00:00			
Turn to Downlink	145T18:42:00	00:30:00	XBAND to Earth;		
Downlink	145T19:12:00	09:00:00		34M Goldstone HEF	

Initial SMT and Data Volume

Beginning of Integration:

DATA VOLUME SUMMARY

DOWNLINK PASS NAME	Start doy hh:mm	End doy hh:mm	OBSERVATION_PERIOD START (Mb)	SCI (Mb)	HK+E (Mb)	TOTAL (Mb)	CPACTY (Mb)	MARGIN (Mb)	MARGIN (%)	DOWNLINK_PASS OPNAV (Mb)	SCI (Mb)	ENGR (Mb)	TOTAL (Mb)	CPACTY (Mb)	MARGIN (Mb)	MARGIN (%)	CAROVR (Mb)
SP_045EA_G70METNON144_PRIME	144 22:12	145 04:12	0	2428	61	2489	3568	1080	30%	0	169	35	2692	2504	-189	-8%	189
SP_045EA_G34HEFOTP145_PRIME	145 19:12	146 04:12	189	781	51	1020	3516	2496	71%	26	140	53	1238	784	-455	-58%	455

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	144 04:12	144 22:12	117.6	9.7	244.8	4.1	958.8	63.1	88.3	0.0	220.1	61.6	660.0	0.0	0.0	2428.1
SP_045EA_G70METNON144_PRIME	144 22:12	145 04:12	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
OBSERVATION_NOR	145 04:12	145 19:12	54.0	8.1	150.7	2.7	160.0	32.4	64.8	0.0	70.7	185.2	52.0	0.0	0.0	780.7
OBSERVATION_OPN	145 04:12	145 19:12	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_045EA_G34HEFOTP145_PRIME	145 19:12	146 04:12	32.4	4.9	0.0	1.6	0.0	19.4	38.9	0.0	42.4	0.0	0.0	0.0	0.0	139.6
TOTAL (OPNAV data not included)			225.6	25.9	471.1	9.5	1118.8	127.9	217.9	0.0	361.6	246.8	712.0	0.0	0.0	

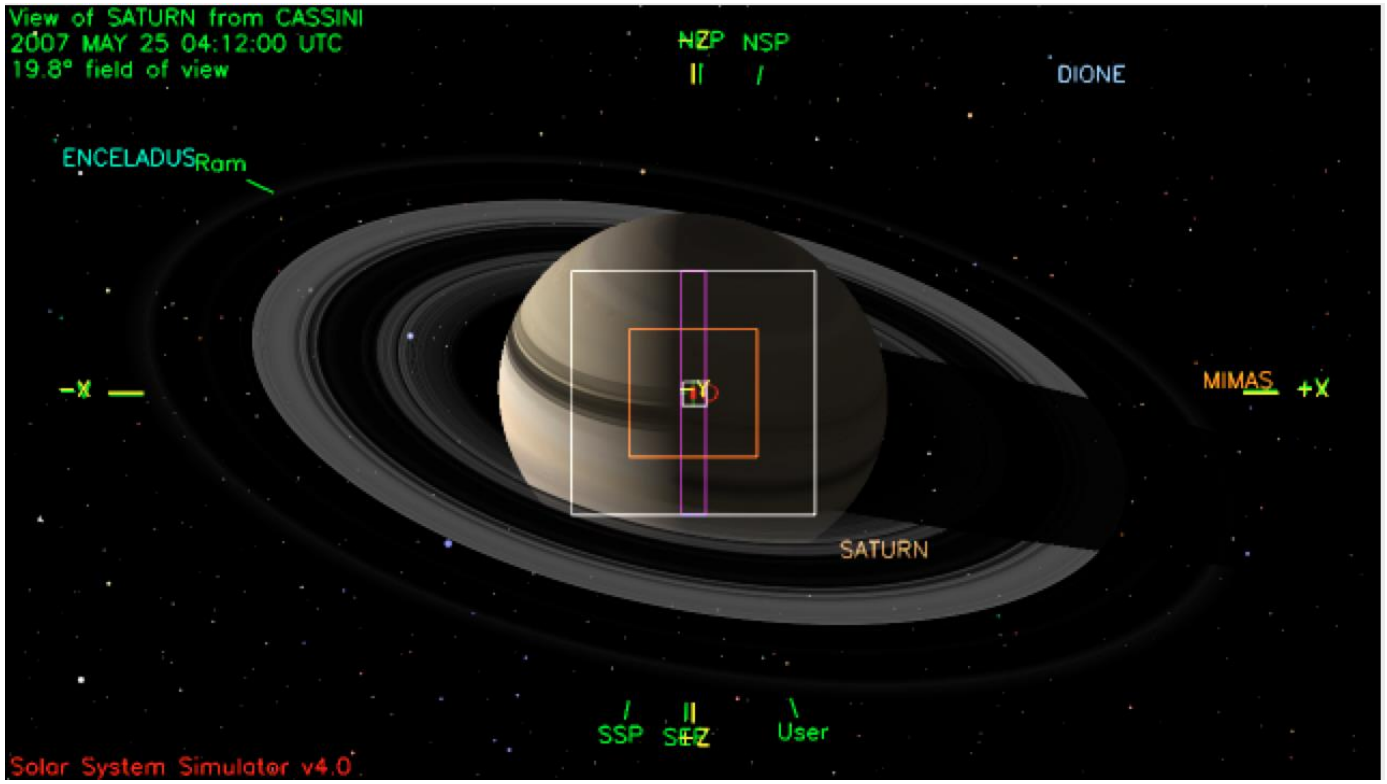
Rev 45 Waypoint Options

SAFE WAYPOINTS:

- NAC to Saturn; POS_X to POLE_DIR
- NAC to Saturn; NEG_X to Sun
- NAC to Saturn; POS_X to NEP
- NAC to Saturn; NEG_Z to POLE_DIR

Waypoints Chosen

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



Saturn Rev 45 Open Issues

- **Pointing Issues**
  - None
- **Data Volume Issues**
  - None
- **Telemetry Mode Issues**
  - None
- **CIMS Issues**
  - None
- **Power/OPMODE Issues**
  - None
- **Flight Rule/Mission Planning Guideline and Constraint Issues**
  - None
- **Other Issues**
  - The DSN Station request may be 5-10 minutes earlier than necessary.