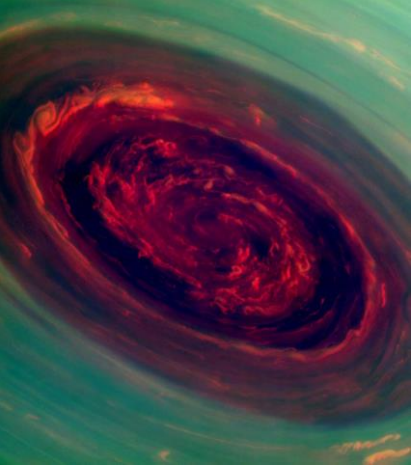
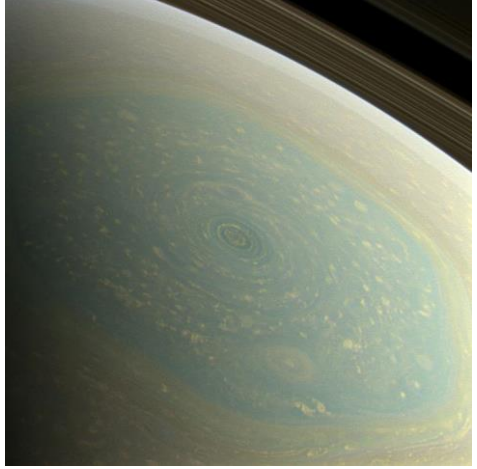
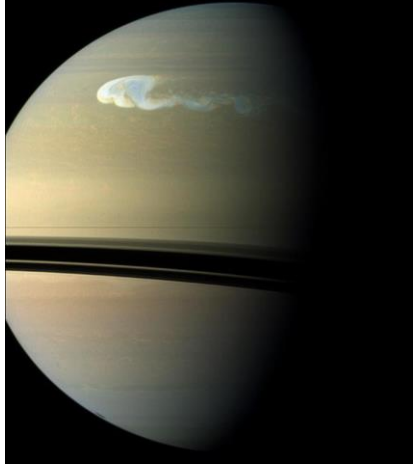


Science Planning & Sequence Team
CASSINI

SATURN TARGET WORKING TEAM

Rev 15 Segment Legacy Package

Segment Boundary: September 22, 2005 – September 25, 2005
2005-265T18:43 – 2005-268T13:40 (SCET)

Integration Began 10/29/2001
Segment Delivered to S14 Sequence 02/15/2002
Lead Integrator was Jerod Gross

Legacy Package Assembled by Kyle Cloutier

Table of Contents

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

Segment Overview and Final Products

Segment Summary

- Saturn 15 is a periapse segment in the Prime mission. The spacecraft stays near the equatorial plane throughout the period. Before and after periapse, ring plane crossing dust hazards presented challenges to science placement and pointing. The spacecraft turned HGA to RAM for protection and closed the main engine cover.

- Just after periapse, observations focus on a close flyby of Tethys (1500 km). A custom period was utilized to coordinate pointing between ISS and CIRS.

- Cassini's first passive RADAR observations of Saturn's atmosphere took place near Saturn periapsis, both pre- and post- Tethys flyby. At the time, these observations probed the deepest atmospheric levels yet.

- During sequence implementation, it was realized that ring plane crossing had moved later in time due to the new spacecraft trajectory. This impacted the RADAR global map on DOY 267, reducing the observation to an unacceptable duration. The fix was to pull out the following VIMS Lightning observation, and give the additional 1hr 20min duration to RADAR.

Final Sequenced SPASS (1 of 2)

Request	Riders	Start (SCET)	Start (Epoch)	Duration	End	Primary	Secondary	Comments
SATURN rev 15 Segment		2005-265T18:43:00		002T18:57:00	2005-268T13:40:00			
SP_015SA_WAYPTTURN265_PRIME	M, R	2005-265T18:43:00		000T00:27:00	2005-265T19:10:00	ISS_NAC to Saturn (0.0,-20.0,0.0 deg. offset)	POS_X to NSP	(0, -20¿ ,0) offset for 2nd axis
NEW WAYPOINT		**2005-265T19:10:00**		**000T16:05:00**	**2005-266T11:15:00**	**ISS_NAC to Saturn (0.0,-20.0,0.0 deg. offset)**	**POS_X to NSP**	
ISS_015MI_238W042PH001_PRIME	M, U	2005-265T19:10:00		000T00:30:00	2005-265T19:40:00	ISS_NAC to Mimas (0.0,-20.0,0.0 deg. offset)	POS_X to NSP	(0, -20 ,0) offset for 2nd axis
VIMS_015SA_CYLMAP002_PRIME	C, M, U	2005-265T19:40:00		000T04:35:00	2005-266T00:15:00	ISS_NAC to Saturn (0.0,-20.0,0.0 deg. offset)	POS_Z to NSP	(0, -20 ,0) offset for 2nd axis
VIMS_015TE_VMAP001_PRIME	M	2005-266T00:15:00		000T01:00:00	2005-266T01:15:00	ISS_NAC to Tethys (0.0,-20.0,0.0 deg. offset)	POS_Z to NSP	ISS NAC to Tethys
SP_015EA_DLTURN266_PRIME	M	2005-266T01:15:00		000T00:30:00	2005-266T01:45:00	XBAND to Earth	NEG_X to Sun	SP Turn to Earth
SP_015EA_M70METOTP266_PRIME	M, N	2005-266T01:45:00		000T09:00:00	2005-266T10:45:00	XBAND to Earth	Rolling	OTM-34 prime; no roll after maneuver; 2nd axis for MIMI
SP_015SA_WAYPTTURN266_PRIME	M, R	2005-266T10:45:00		000T00:30:00	2005-266T11:15:00	NEG_Z to Saturn	POS_X to NSP	
NEW WAYPOINT		**2005-266T11:15:00**		**000T06:08:00**	**2005-266T17:23:00**	**NEG_Z to Saturn**	**POS_X to NSP**	
RADAR_015SA_GLOBALMAP001_PRIME	M	2005-266T11:15:00		000T04:15:00	2005-266T15:30:00	NEG_Z to Saturn (0.0,-8.25,0.0 deg. offset)	POS_X to NSP	
VIMS_015CP_CALYPSO001_PRIME	C, I, M, U	2005-266T15:30:00		000T01:45:00	2005-266T17:15:00	NEG_Y to Calypso (0.0,-20.0,0.0 deg. offset)	POS_X to NSP	(0, -20 ,0) offset for 2nd axis
SP_015DR_RAMAVOID266_PRIME	M	2005-266T17:15:00		000T00:08:00	2005-266T17:23:00	NEG_Z to Dust_RAM	POS_X to NSP	Ring plane crossing; 2nd axis for Mag
NEW WAYPOINT		**2005-266T17:23:00**		**000T01:28:00**	**2005-266T18:51:00**	**NEG_Z to Dust_RAM**	**POS_X to NSP**	
MP_015DR_DUSTHAZRD001_PRIME	M	2005-266T17:23:00		000T01:17:00	2005-266T18:40:00	NEG_Z to Dust_RAM	POS_X to NSP	
SP_015SA_WAYPTTURN466_PRIME	M	2005-266T18:40:00		000T00:11:00	2005-266T18:51:00	NEG_Z to Saturn	POS_X to NSP	Ring plane crossing; 2nd axis for Mag
NEW WAYPOINT		**2005-266T18:51:00**		**000T10:09:00**	**2005-267T05:00:00**	**NEG_Z to Saturn**	**POS_X to NSP**	
RADAR_015SA_GLOBALMAP002_PRIME	M	2005-266T18:51:00		000T05:09:00	2005-267T00:00:00	NEG_Z to Saturn (0.0,-18.0,0.0 deg. offset)	POS_X to NSP	2nd axis for Mag
Periapse per = 18.6 d, inc ...		2005-266T21:35:47		000T00:00:01	2005-266T21:35:48			
Begin Custom		**2005-267T00:00:00**		**000T00:01:00**	**2005-267T00:01:00**	**NEG_Z to Saturn**	**POS_X to NSP**	
ISS_015TE_STEREO001_PRIME	C, M, U	2005-267T00:00:00		000T01:10:00	2005-267T01:10:00	ISS_NAC to Tethys (0.0,-45.0,0.0 deg. offset)	POS_X to NSP	Pick up at NEG_Z to Saturn, POS_X to NSP; Hand off at ISS_NAC to Tethys (0.0,-45.0,0.0 deg. offset), NEG_Z to NSP. pickup at NEG_Z to SA, POS_X to NSP, handoff at ISS_NAC to TE (0,-45,0), POS_X to NSP
CIRS_015TE_EWSCAN001_PRIME	I, M, U	2005-267T01:10:00		000T00:30:00	2005-267T01:40:00	CIRS_FP3 to Tethys (0.0,-45.0,0.0 deg. offset)	POS_X to NSP	Pick up at ISS_NAC to Tethys, NEG_Z to NSP; Hand off at ISS_NAC to Tethys, NEG_Z to NSP.
ISS_015TE_REGMAP001_PRIME	C, M, U	2005-267T01:40:00		000T01:50:00	2005-267T03:30:00	ISS_NAC to Tethys	NEG_Z to NSP	Pick up at ISS_NAC to Tethys, NEG_Z to NSP; Hand off at ISS_NAC to Tethys, POS_X to NSP. turn to UVIS_FUV to ra/dec 81.5729,28.6075, NEG_X to ra/dec 358.4,-12.3 for stellar occ.
CIRS_015TE_FP1FP3MAP001_PRIME	I, M, U	2005-267T03:30:00		000T00:57:00	2005-267T04:27:00	CIRS_FP1 to Tethys	POS_X to NSP	Pick up at NEG_Y to Tethys, POS_Z to North_Pole_Dir; Hand off at NEG_Z to Saturn, POS_X to NSP.
End Custom		**2005-267T04:27:00**		**000T00:01:00**	**2005-267T04:28:00**	**NEG_Z to Saturn**	**POS_X to NSP**	
SP_015DR_RAMAVOID267_PRIME	M	2005-267T04:27:00		000T00:33:00	2005-267T05:00:00	NEG_Z to Dust_RAM	POS_X to NSP	Ring plane crossing

Final Sequenced SPASS (2 of 2)

Request	Riders	Start (SCET)	Start (Epoch)	Duration	End	Primary	Secondary	Comments
NEW WAYPOINT		2005-267T05:00:00		000T01:00:00	2005-267T06:00:00	NEG_Z to Dust_RAM	POS_X to NSP	
MP_015DR_DUSTHAZRD002_PRIME	M	2005-267T05:00:00		000T00:27:00	2005-267T05:27:00	NEG_Z to Dust_RAM	POS_X to NSP	
SP_015SA_WAYPTTURN267_PRIME	M	2005-267T05:27:00		000T00:33:00	2005-267T06:00:00	NEG_Z to Saturn	POS_X to NSP	Ring plane crossing
NEW WAYPOINT		2005-267T06:00:00		000T04:50:00	2005-267T10:50:00	NEG_Z to Saturn	POS_X to NSP	
RADAR_015TE_SCATTRAD003_PRIME	M	2005-267T06:00:00		000T01:31:00	2005-267T07:31:00	NEG_Z to Tethys	POS_X to NSP	
RADAR_015SA_GLOBALMAP003_PRIME	M	2005-267T07:31:00		000T02:37:00	2005-267T10:08:00	NEG_Z to Saturn (0.0,-7.25,0.0 deg. offset)	POS_X to NSP	
SP_015EA_DLTURN267_PRIME	N	2005-267T10:08:00		000T00:17:00	2005-267T10:25:00	XBAND to Earth	NEG_X to NEP	SP Turn to Earth
SP_015EA_G34BWGOTB267_PRIME	N	2005-267T10:20:00		000T09:00:00	2005-267T19:20:00	XBAND to Earth	Rolling	OTM-34 back-up; no roll after maneuver; 2nd axis for MIMI
SP_015EA_RWDTURN467_PRIME	N	2005-267T10:25:00		000T00:25:00	2005-267T10:50:00	XBAND to Earth	NEG_X to 255.0/10.0	Turn is done during downlink (as noted by the "RWD")
NEW WAYPOINT		2005-267T10:50:00		000T09:00:00	2005-267T19:50:00	XBAND to Earth	NEG_X to 255.0/10.0	
SP_015TI_WAYPTTURN267_PRIME		2005-267T19:20:00		000T00:30:00	2005-267T19:50:00	ISS_NAC to Titan	POS_X to NEP	SP Turn to Waypoint
NEW WAYPOINT		2005-267T19:50:00		000T18:20:00	2005-268T14:10:00	ISS_NAC to Titan	POS_X to NEP	
CIRS_015TI_COMPMAP005_PRIME	I	2005-267T19:50:00		000T08:15:00	2005-268T04:05:00	CIRS_FPB to Titan (0.0,20.0,0.0 deg. offset)	POS_X to NEP	original pointing was NEG_Y to Titan
NAV_015SK_OPNAV681_PRIME	C	2005-268T04:05:00		000T00:44:00	2005-268T04:49:00	ISS_NAC to Satellites	NEG_Z to NEP	Starts at waypoint, ends at Earth point
NAV_015EA_DLTURN681_PRIME	C	2005-268T04:49:00		000T00:01:00	2005-268T04:50:00	XBAND to Earth	NEG_X to 235.0/36.1	
SP_015EA_M70ARRNON268_PRIME	C	2005-268T04:50:00		000T08:50:00	2005-268T13:40:00	XBAND to Earth	NEG_X to 235.0/36.1	2nd axis for CDA; RA = 223.0, Dec = +7.0

Final Sequenced SMT and Data Volume

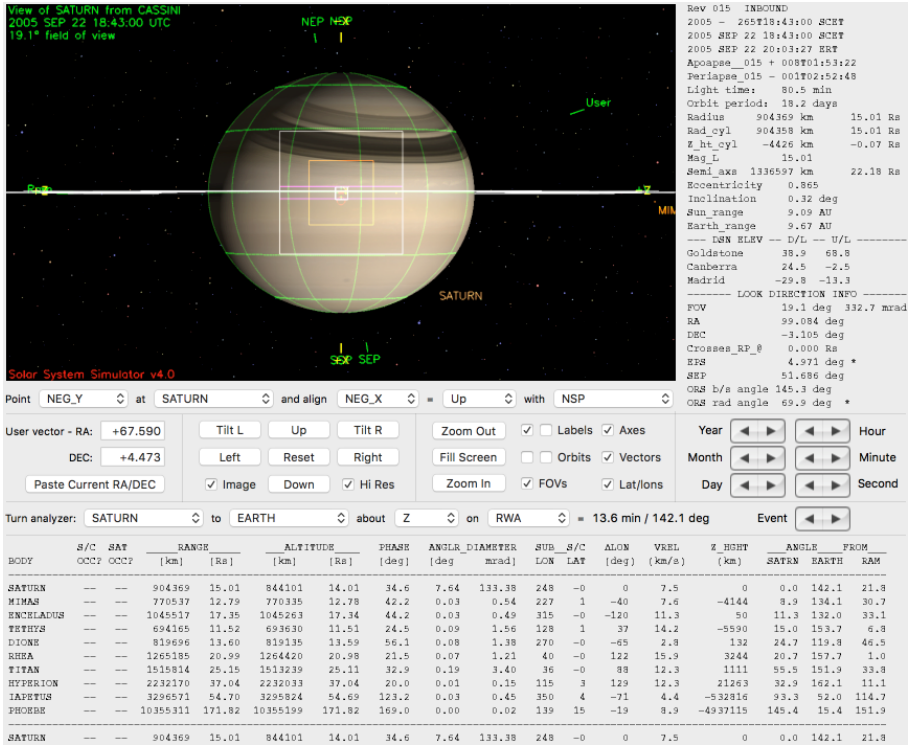
DATA VOLUME SUMMARY --- TRANSFER FRAME OVERHEAD INCLUDED (80 BITS PER 8800-BIT FRAME)

			OBSERVATION_PERIOD							DOWNLINK_PASS						
			P4					P5	RECORDED		PLAYBACK				
DOWNLINK PASS NAME	Start doy hh:mm	End doy hh:mm	START (Mb)	SCI (Mb)	HK+E (Mb)	TOTAL (Mb)	CPACTY (Mb)	MRGN (Mb)	OPNAV (Mb)	SCI (Mb)	ENGR (Mb)	TOTAL (Mb)	CPACTY (Mb)	MARGN (Mb)	NET_MARGN (Mb)	CAROVR (%)
SP_015EA_M70METOTP266_PRIME	266 01:45	266 10:45	2309	691	24	3024	3421	398	0	313	53	3390	2750	-640	59	0%
SP_015EA_G34BWGOTB267_PRIME	267 10:20	267 19:20	641	2629	93	3362	3421	59	0	191	53	3606	702	-2904	94	1%
SP_015EA_M70ARRNON268_PRIME	268 04:50	268 13:40	2905	390	32	3327	3421	95	9	363	52	3750	3576	-174	94	1%

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	265 18:43	266 01:45	25.8	13.2	66.0	1.3	50.0	15.6	28.0	0.0	34.2	29.0	421.7	0.0	0.0	684.7
SP_015EA_M70METOTP266_PRIME	266 01:45	266 10:45	32.4	38.7	0.0	1.6	0.0	19.4	38.2	0.0	177.8	2.5	0.0	0.0	0.0	310.6
DAILY TOTAL SCIENCE	265 18:43	266 10:45	58.2	51.9	66.0	2.9	50.0	35.0	66.2	0.0	212.0	31.5	421.7	0.0		
OBSERVATION_NOR	266 10:45	267 10:20	138.9	163.8	89.3	4.2	261.3	106.4	144.2	307.6	1041.0	287.1	60.8	0.0	11.5	2616.1
SP_015EA_G34BWGOTB267_PRIME	267 10:20	267 19:20	32.4	23.2	0.0	1.6	0.0	19.4	29.2	0.0	81.4	2.5	0.0	0.0	0.0	189.6
DAILY TOTAL SCIENCE	266 10:45	267 19:20	171.3	187.0	89.3	5.9	261.3	125.9	173.3	307.6	1122.4	289.5	60.8	0.0		
OBSERVATION_NOR	267 19:20	268 04:50	34.2	53.5	129.6	1.7	67.0	20.5	30.8	0.0	48.8	0.1	0.0	0.0	0.0	386.2
OBSERVATION_OPN	267 19:20	268 04:50	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_015EA_M70ARRNON268_PRIME	268 04:50	268 13:40	31.8	13.2	86.4	1.6	0.0	19.1	28.6	0.0	176.4	2.4	0.0	0.0	0.0	359.4
DAILY TOTAL SCIENCE	267 19:20	268 13:40	66.0	66.7	216.0	3.3	67.0	39.6	59.4	0.0	225.2	2.5	0.0	0.0		

Segment Geometry



Rev 015 INBOUND
2005 - 265T18:43:00 SCET
2005 SEP 22 18:43:00 SCET
2005 SEP 22 20:03:27 ERT
Periapse_015 - 001T02:52:48
Light time: 80.5 min
Orbit period: 18.2 days
Radius 904369 km 15.01 Rs
Rad_cyl 904358 km 15.01 Rs
Z_ht_cyl -4426 km -0.07 Rs
Mag_L 15.01
Semi_axs 1336597 km 22.18 Rs
Eccentricity 0.865
Inclination 0.32 deg
Sun_range 9.09 AU
Earth_range 9.67 AU
--- DSN ELEV -- D/L -- U/L --------
Goldstone 38.9 68.8
Canberra 24.5 -2.5
Madrid -29.8 -13.3
-------- LOOK DIRECTION INFO --------
FOV 19.1 deg 332.7 mrad
RA 99.084 deg
DEC -3.105 deg
Crosses_RP_@ 0.000 Rs
EPS 4.971 deg *
SEP 51.686 deg
ORS b/s angle 145.3 deg
ORS rad angle 69.9 deg *

Point NEG_Y at SATURN and align NEG_X = Up with NSP

User vector - RA: +67.590
DEC: +4.473
Paste Current RA/DEC

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

Zoom Out | Fill Screen | Zoom In

Labels | Orbits | FOVs | Axes | Vectors | Lat/lons

Year | Month | Day | Hour | Minute | Second

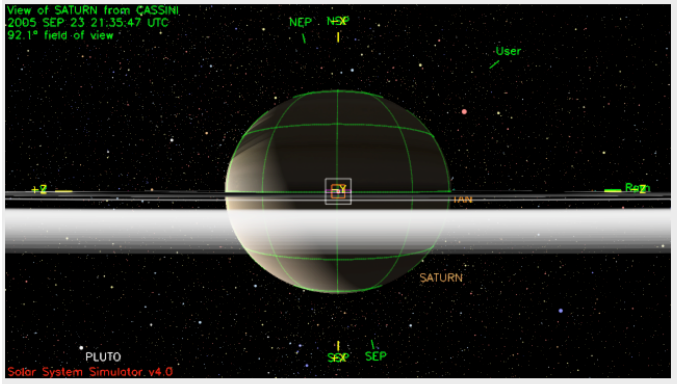
Turn analyzer: SATURN to EARTH about Z on RWA = 13.6 min / 142.1 deg Event

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	--	--	904369	15.01	844101	14.01	34.6	7.64	133.38	248	-0	0	7.5	0	0.0	142.1	21.8
MIMAS	--	--	770537	12.79	770335	12.78	42.2	0.03	0.54	227	1	-40	7.6	-4144	8.9	134.1	30.7
ENCELADUS	--	--	1045517	17.35	1045263	17.34	44.2	0.03	0.49	315	-0	-120	11.3	50	11.3	132.0	33.1
TETHYS	--	--	694165	11.52	693630	11.51	24.5	0.09	1.56	128	1	37	14.2	-5590	15.0	153.7	6.8
DIONE	--	--	819696	13.60	819135	13.59	56.1	0.08	1.38	270	-0	-65	2.8	132	24.7	119.8	46.5
RHEA	--	--	1265185	20.99	1264420	20.98	21.5	0.07	1.21	40	-0	122	15.9	3244	20.7	157.7	1.0
TITAN	--	--	1515814	25.15	1513239	25.11	32.9	0.19	3.40	36	-0	88	12.3	1111	55.5	151.9	33.8
HYPERION	--	--	2232170	37.04	2232033	37.04	20.0	0.01	0.15	115	3	129	12.3	21263	32.9	162.1	11.1
IAPETUS	--	--	3296571	54.70	3295824	54.69	123.2	0.03	0.45	350	4	-71	4.4	-532816	93.3	52.0	114.7
PHOEBE	--	--	10355311	171.82	10355199	171.82	169.0	0.00	0.02	139	15	-19	8.9	-4937115	145.4	15.4	151.9
SATURN	--	--	904369	15.01	844101	14.01	34.6	7.64	133.38	248	-0	0	7.5	0	0.0	142.1	21.8

	Saturn Range	Phase Angle	Sub-S/C Lat.
Segment Start	15.01 Rs	34.6 deg	0
Periapse	3.00 Rs	106.6 deg	0
Segment End	19.5 Rs	105.6 deg	0

Segment Start: 2005-265T18:43

Periapse: 2005-266T21:35:47



Rev 015 INBOUND
2005 - 266T21:35:47 SCET
2005 SEP 23 21:35:47 SCET
2005 SEP 23 22:56:09 ERT
Apoapse_015 - 009T04:46:09
Periapse_015 - 00:00:01
Light time: 80.4 min
Orbit period: 18.6 days
Radius 180925 km 3.00 Rs
Rad_cyl 180922 km 3.00 Rs
Z_ht_cyl 959 km 0.02 Rs
Mag_L 3.00
Semi_axs 1354879 km 22.48 Rs
Eccentricity 0.866
Inclination 0.32 deg
Sun_range 9.09 AU
Earth_range 9.66 AU
--- DSN ELEV -- D/L -- U/L --------
Goldstone 3.5 35.7
Canberra 35.8 26.5
Madrid -24.0 -30.5
-------- LOOK DIRECTION INFO --------
FOV 92.1 deg 1607.8 mrad
RA -124.380 deg
DEC 5.939 deg
Crosses_RP_@ 0.000 Rs
EPS 5.035 deg *
SEP 52.696 deg
ORS b/s angle 73.4 deg
ORS rad angle 69.8 deg *

Point NEG_Y at SATURN and align NEG_X = Up with NSP

User vector - RA: +67.590
DEC: +4.473
Paste Current RA/DEC

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

Zoom Out | Fill Screen | Zoom In

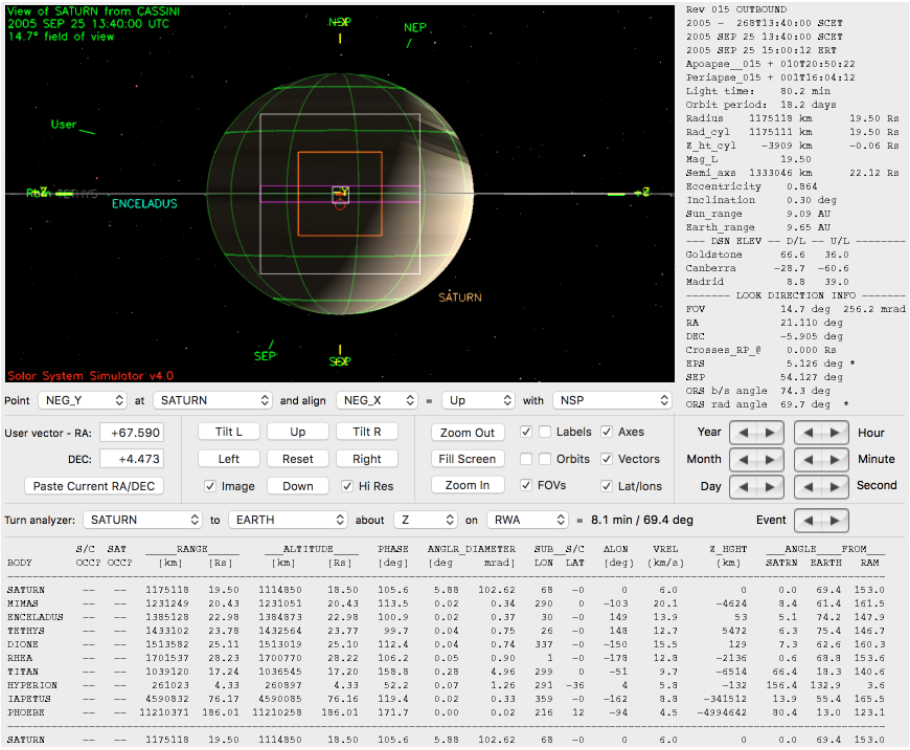
Labels | Orbits | FOVs | Axes | Vectors | Lat/lons

Year | Month | Day | Hour | Minute | Second

Turn analyzer: SATURN to EARTH about Z on RWA = 8.8 min / 77.9 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	--	--	180925	3.00	120657	2.00	106.6	38.92	679.20	300	0	0	19.8	0	0.0	77.9	90.0
MIMAS	--	--	98615	1.64	98417	1.63	158.5	0.24	4.21	70	-1	31	10.6	1122	79.2	18.6	169.2
ENCELADUS	--	--	277708	4.61	277454	4.60	155.4	0.11	1.85	44	0	82	22.0	5	57.8	26.5	147.8
TETHYS	--	--	193071	3.20	192533	3.19	19.4	0.32	5.60	324	-0	-39	13.2	4933	103.9	162.7	14.0
DIONE	--	--	375243	6.23	374680	6.22	36.7	0.17	3.00	332	0	-76	19.8	-118	76.5	148.3	13.5
RHEA	--	--	705780	11.71	705013	11.70	113.9	0.12	2.17	6	0	169	28.2	-332	7.9	70.5	97.9
TITAN	--	--	1410997	23.41	1408422	23.37	90.0	0.21	3.65	358	0	-160	25.0	-2348	17.6	94.6	72.4
HYPERION	--	--	1577962	26.18	1577814	26.18	49.2	0.01	0.21	173	-33	-112	22.6	13618	61.5	135.7	28.5
IAPETUS	--	--	3378395	56.06	3377648	56.04	134.6	0.03	0.44	7	-0	60	18.5	-458848	117.1	40.4	151.6
PHOEBE	--	--	11175793	185.43	11175683	185.43	167.5	0.00	0.02	106	13	119	18.7	-4961172	63.7	17.4	141.5
SATURN	--	--	180925	3.00	120657	2.00	106.6	38.92	679.20	300	0	0	19.8	0	0.0	77.9	90.0

Segment Geometry



BODY	S/C OCCP	SAT OCCP	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	--	--	1175118	19.50	1114850	18.50	105.6	5.88	102.62	68	-0	0	6.0	0	0.0	69.4	153.0
MIMAS	--	--	1231249	20.43	1231051	20.43	113.5	0.02	0.34	290	0	-103	20.1	-4624	8.4	61.4	161.5
ENCELADUS	--	--	1385128	22.98	1384873	22.98	100.9	0.02	0.37	30	-0	149	13.9	53	5.1	74.2	147.9
TETHYS	--	--	1433102	23.78	1432564	23.77	99.7	0.04	0.75	26	-0	148	12.7	5472	6.3	75.4	146.7
DIONE	--	--	1513582	25.11	1513019	25.10	112.4	0.04	0.74	337	-0	-150	15.5	129	7.3	62.6	160.3
RHEA	--	--	1701537	28.23	1700770	28.22	106.2	0.05	0.90	1	-0	-178	12.8	-2136	0.6	68.8	153.6
TITAN	--	--	1039120	17.24	1036545	17.20	158.8	0.28	4.96	299	0	-51	9.7	-6514	66.4	18.3	140.6
HYPERION	--	--	261023	4.33	260897	4.33	52.2	0.07	1.26	291	-36	4	5.8	-132	156.4	132.9	3.6
IAPETUS	--	--	4590832	76.17	4590085	76.16	119.4	0.02	0.33	359	-0	-162	8.8	-341512	13.9	55.4	165.5
PHOEBE	--	--	11210371	186.01	11210258	186.01	171.7	0.00	0.02	216	12	-94	4.5	-4994642	80.4	13.0	123.1
SATURN	--	--	1175118	19.50	1114850	18.50	105.6	5.88	102.62	68	-0	0	6.0	0	0.0	69.4	153.0

⬅ Segment End: 2005-268T13:40

	Saturn Range	Phase Angle	Sub-S/C Lat.
Segment Start	15.01 Rs	34.6 deg	0
Periapse	3.00 Rs	106.6 deg	0
Segment End	19.5 Rs	105.6 deg	0

Solar Geometry – ORS Boresight Concerns

No ORS Boresight Solar Constraints on Science Pointing Noted.

Daily Science Highlights

Friday, September 23 (DOY 266):
Non-targeted flybys of Calypso, Mimas, Prometheus, and Tethys occurred today. The Tethys flyby was at 1500 km, closer than most non-targeteds.

Amongst the many exciting activities at the end of the week were the two most hazardous dust crossings of the tour as the spacecraft passed through the E Ring. Neither of these crossings was considered to be particularly risky, but they were the two "dustiest" that the spacecraft was expected to experience. Spacecraft Operations had Cassini assume a protective attitude by pointing the High Gain Antenna in the ring particle ram direction and commanding the main engine cover to be deployed or "closed" to protect the engines.

Cassini's first passive RADAR observations of Saturn's atmosphere took place this day near Saturn periapsis, both pre- and post- Tethys flyby. These observations were expected to probe the deepest atmospheric levels yet.

Saturday, September 24 (DOY 267):
A non-targeted flyby of Titan occurred this day.

ISS notes: ISS performed a very close flyby of Tethys. We expected to obtain high-resolution stereo coverage of Ithaca Chasma and surrounding regions along with color imaging and detailed geomorphological data. This coverage included some of our last good views of the south polar region. Other highlights included some of our best planned imaging of Calypso.

Segment Integration Planning

Timeline Gaps and Suggested Observations

- **Rev 15 Segment (2005-265T19:40 to 2005-268T13:50)**
  - Periapse = 266T20:42, so the segment runs from peri-0T23:00 to peri+1T17:10

- **Proposed Strawman**
- VIMS Cyl Map moved 6:50 earlier
- OTM-34 b/u moved 9:40 earlier
- CIRS Saturn Limb moved 3:45 later
- VIMS Lightning moved 0:30 earlier
- ISS Titan moved 7:00 later, lengthened
- CIRS Titan moved 7:30 earlier
- UVIS EUVFUV moved 14:30 earlier
- New pass on 266, skip pass on 267, new pass on 268
- **Questions**
- All moves OK?
- What other activities can we fit in gaps?

Observation	Start Time	Dur	End Time
VIMS Saturn Cylindrical Map	265T19:40	11:00	266T06:40
MIMI INCA FR violated for Saturn	266T09:36	12:00	266T21:36
Downlink, OTM-34 b/u, CIRS Cal	266T10:20	9:15	266T19:35
Periapse	266T20:42		
CIRS Saturn Limb Map	266T21:30	6:00	267T03:30
VIMS Saturn Lightning	267T03:30	4:00	267T07:30
ISS Titan Photometry	26707:30	1:00	267T08:30
CIRS Titan Composition Map	267T08:30	8:00	267T16:30
UVIS Saturn EUVFUV	267T16:30	9:50	268T02:20
Turn to Earth for Downlink	268T02:20	0:30	268T02:50
Downlink, CIRS Cal	268T02:50	9:00	268T11:50

Initial SMT and Data Volume

Beginning of Integration:

Playback	Start doy hh:mm	End doy hh:mm	Volume (Mb)	5% (Mb)	ENG+HK (Mb)	SCIENCE (Mb)	TOTAL (Mb)	MARGIN (Mb)
PLAYBACK****	266 01:35	266 11:00	877	44	76	925	1001	-168
PLAYBACK**	267 10:05	267 19:35	957	48	136	3156	3292	-2383
PLAYBACK****	268 04:35	268 13:10	4093	205	81	500	581	3307
Total			5927				4874	1053

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)	VIMS (Mb)	ENG (Mb)	SCIENC (Mb)	TOTAL (Mb)
OBSERVATION	265 19:25	266 01:35	22.2	11.5	80.4	1.1	0.0	13.3	24.4	0.0	29.1	20.2	400.0	0.0	15.9	5.7	623.9
PLAYBACK****	266 01:35	266 11:00	33.9	39.5	0.0	1.7	0.0	20.3	40.4	0.0	184.1	2.5	0.0	0.0	54.2	0.0	376.7
OBSERVATION	266 11:00	267 10:05	83.1	160.2	68.4	4.2	221.3	109.3	141.8	93.1	806.5	173.3	1051.1	0.0	59.7	21.4	2993.3
PLAYBACK**	267 10:05	267 19:35	34.2	17.7	0.0	1.7	0.0	20.5	30.8	0.0	92.1	46.8	0.0	0.0	54.7	0.0	298.5
OBSERVATION	267 19:35	268 04:35	32.4	16.9	122.4	1.6	4.0	19.4	29.2	0.0	47.9	0.0	0.0	0.0	23.3	8.3	305.4
PLAYBACK****	268 04:35	268 13:10	30.9	13.0	90.0	1.5	2.0	18.5	27.8	0.0	40.5	2.3	0.0	0.0	49.3	0.0	275.9

Waypoint Selection

Notes regarding waypoints:

- **Ring plane crossing** will force us to be RAM pointed during the following times.

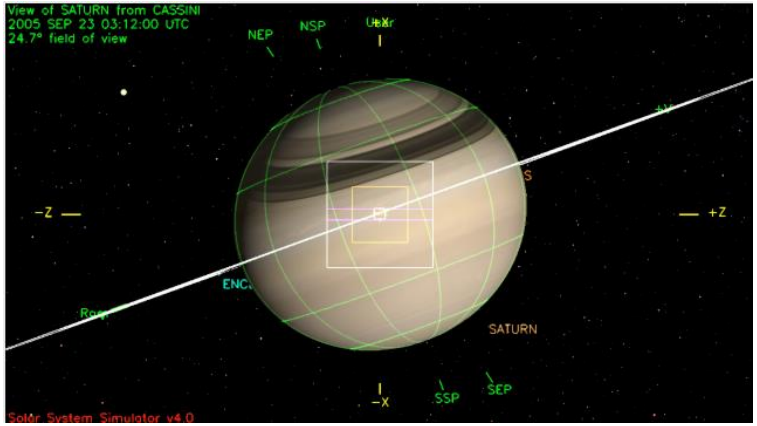
  A.) 266T15:45 to 18:00

  B.) 267T03:15 to 04:15

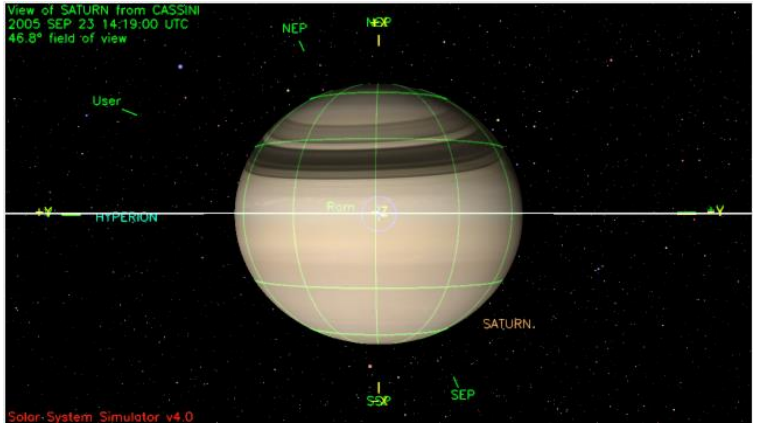
- Restrictions on the spacecraft attitude are: -Z to RAM, 2nd axis free but need to accommodate MAG by having X within 45° of Saturn pole.
- A.) About half of the ORS Calypso time wiped out, including closest approach (~16:00). It also wipes out the first hour of RADAR's Global map.
- B.) About an hour of RADAR Saturn radiometry wiped out.

Waypoints Chosen

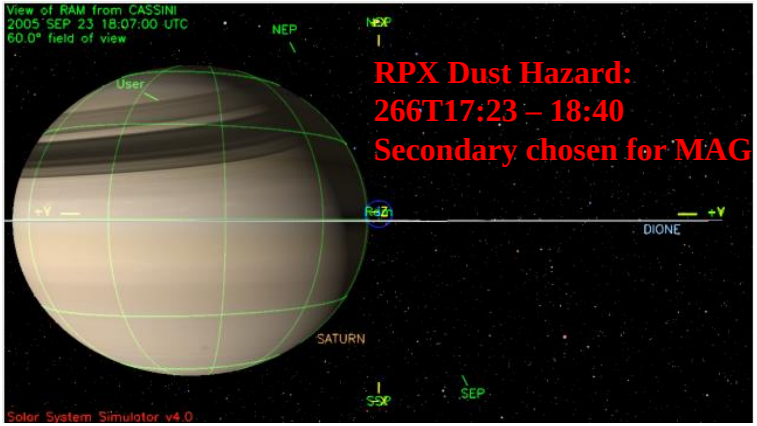
Waypoint 1 (2005-265T19:10 – 266T11:15):
NAC to Saturn (0, -20, 0 deg. offset), POS_X to NSP



Waypoint 2 (2005-266T11:15 – 266T17:23):
NEG_Z to Saturn, POS_X to NSP

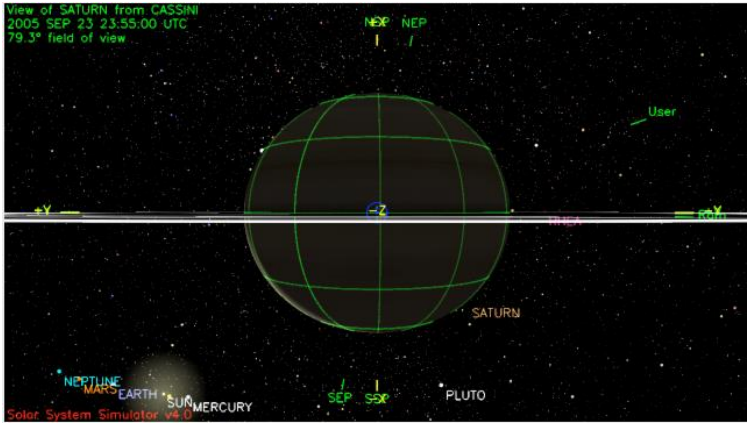


Waypoint 3 (2005-266T17:23 – 266T18:51):
NEG_Z to Dust_RAM, POS_X to NSP



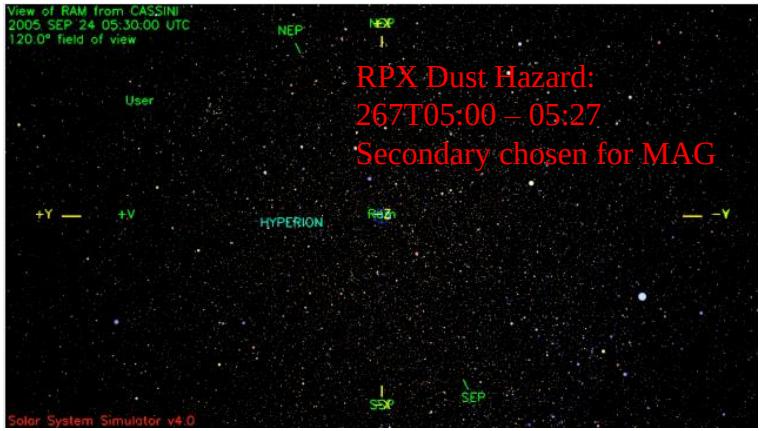
Waypoint 4 (2005-266T18:51 – 267T05:00):
NEG_Z to Saturn, POS_X to NSP

Custom Period: 2005-267T00:00 – 267T04:28

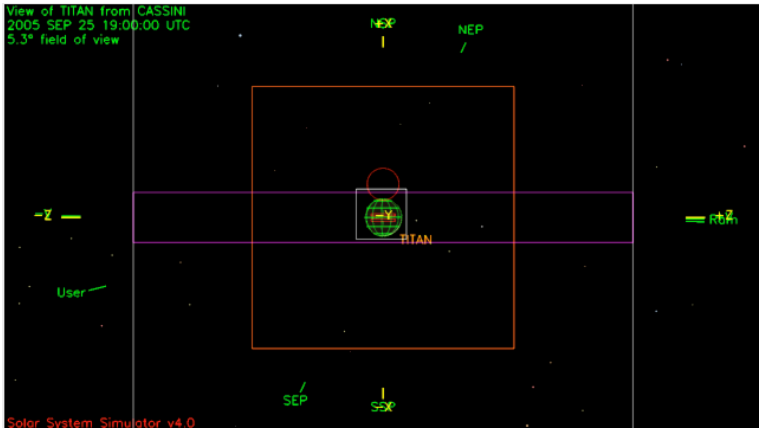


Waypoints Chosen

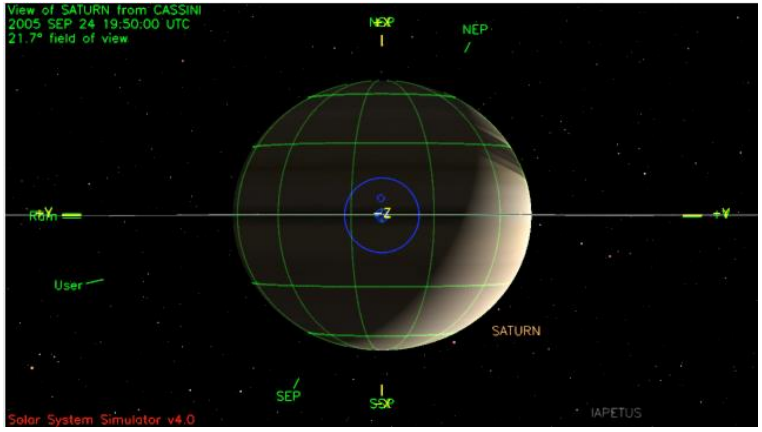
Waypoint 5 (2005-267T05:00 – 267T06:00):
NEG_Z to Dust_RAM, POS_X to NSP



Waypoint 7 (2005-267T19:50 – 268T14:10):
NAC to Titan, POS_X to NEP



Waypoint 6 (2005-267T06:00 – 267T19:50):
NEG_Z to Saturn, POS_X to NSP



Notes & Liens

- **Pointing Issues**
  - The waypoint is NAC to Saturn, +X to Saturn N. Pole (0, -20°, 0 offset) between 265T18:50 and 267T19:35. The waypoint is NAC to Titan, +Z to Titan N. Pole from 267T19:35 to 268T13:50.
  - To protect the spacecraft during the ring plane crossings, the spacecraft will be oriented -Z to RAM (+X to Saturn N. Pole to accommodate Mag field measurements) during the following periods (times from Mission Planning):
    - 266T15:45 to 266T18:00
    - 267T03:15 to 267T04:15
- **Data Volume Issues**
  - The data volume collected is equal to the capability for science, engineering, and housekeeping.
  - There is one OpNav in this segment.
- **CIMS Issues**
  - None
- **Power Issues**
  - None
- **Flight Rule / Mission Planning Guideline & Constraint Issues**
  - At the time of integration, no instrument had a particle impact flight rule in place. If CIRS (or anyone else) should write a new one, this segment will have to be re-evaluated.
- **Other Issues**
  - RADAR agrees to give up the first 15 minutes of warm-up (267T01:15 to 01:30) in order to allow the UVIS Tethys occ to complete using S_N_ER_3. This was the preferred solution over shortening the warm-up from 3:00 to 2:45 in duration.
  - CDA wants to make high rate (4192 bps) ring-place crossing measurements at some TBD times between 266T11:47 and 267T09:35. However, RADAR is observing in S_N_ER_5a (CDA = 524 bps) from 266T18:00-267T00:00 and 267T04:15-267T08:30. RADAR is willing to give up **some** of their warm-up time (266T15:00-266T18:00 and 267T01:30-267T04:15) to accommodate CDA. CDA has yet to submit a formal request for their desired times that fall during RADAR warm-up.