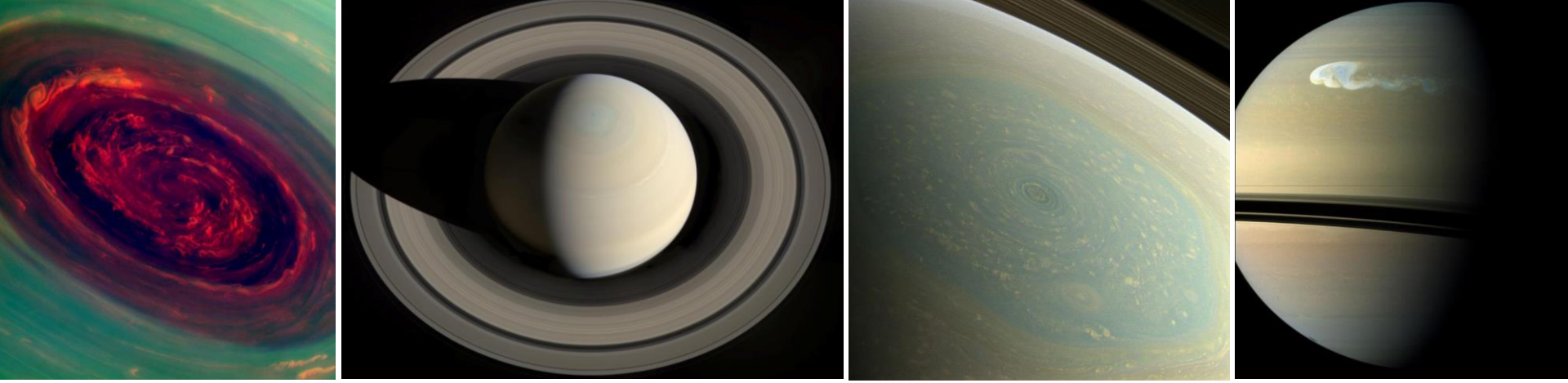

Science Planning & Sequence Team
CASSINI

SATURN TARGET WORKING TEAM

Rev 23 Segment Legacy Package

Segment Boundary: April 27, 2006 – April 30, 2006
2006-117T04:59 – 2006-120T04:44 (SCET)

Integration Began 07/22/2002
Segment Delivered to S20- Sequence 11/11/2002
Lead Integrator was Jerod Gross

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 23 is a periapse segment in the Prime mission. The spacecraft stays equatorial throughout the period. Surrounding periapse, science observations included VIMS and CIRS Saturn feature tracks, ISS color imaging of Janus and an ISS observation to determine orbits of newly discovered satellites.

- Other science observations included two UVIS stellar occultations, and two satellite transits across Titan (by Janus and and Epimetheus), VIMS thermal cylindrical mapping, CIRS F-ring rotation movie, and global color mapping of Rhea.

- Heading into the following TOST segment (T13), RADAR obtains distant Titan scatterometry and radiometer calibration data at near-zero Titan sub-spacecraft latitudes, near-zero sub-spacecraft longitude, and low phase angle.

- CDA requested pointing preference on DOY 119 (NEG_Y to Saturn) for observations surrounding ring plane crossing.

Final Sequenced SPASS

Request	Riders	Start (SCET)	Start (Epoch)	Duration	End	Primary	Secondary	Comments
SATURN rev 23 Segment		2006-117T04:59:00		002T23:45:00	2006-120T04:44:00			
NAV_023SK_OPNAV171_PRIME	N	2006-117T04:59:00		000T02:00:00	2006-117T06:59:00	ISS_NAC to Satellites	POS_Z to NSP	Starts at Earth point, ends at NEW waypoint
NAV_023SA_WAYPTTURN171_PRIME		2006-117T06:59:00		000T00:01:00	2006-117T07:00:00	ISS_NAC to Saturn	POS_Z to NSP	
NEW WAYPOINT		**2006-117T07:00:00**		**001T11:30:00**	**2006-118T18:30:00**	**ISS_NAC to Saturn**	**POS_Z to NSP**	
VIMS_023SA_FEATRACK004_PRIME	C, U	2006-117T07:00:00		000T06:00:00	2006-117T13:00:00	ISS_NAC to Saturn	POS_Z to NSP	
VIMS_023SA_THRCYLMAP001_PRIME	C	2006-117T13:00:00		000T06:29:00	2006-117T19:29:00	VIMS_IR to Saturn	POS_Z to NSP	
SP_023EA_DLTURN117_PRIME		2006-117T19:29:00		000T00:30:00	2006-117T19:59:00	XBAND to Earth	NEG_Y to Saturn	
SP_023EA_G34BWGOTB117_PRIME	C, N	2006-117T19:59:00		000T09:00:00	2006-118T04:59:00	XBAND to Earth	NEG_Y to Saturn	Secondary axis chosen for MIMI science.
SP_023SA_WAYPTTURN118_PRIME		2006-118T04:59:00		000T00:30:00	2006-118T05:29:00	ISS_NAC to Saturn	POS_Z to NSP	
UVIS_023ST_BETORI003_PRIME	I	2006-118T05:55:00		000T01:10:00	2006-118T07:05:00	UVIS_FUV to 78.63/-8.2	POS_Z to NSP	
ISS_023JA_MUTUALEVE014_PRIME		2006-118T07:05:00		000T00:45:00	2006-118T07:50:00	ISS_NAC to Janus	POS_Z to NSP	
ISS_023EP_MUTUALEVE014_PRIME		2006-118T07:50:00		000T00:45:00	2006-118T08:35:00	ISS_NAC to Epimetheus	POS_Z to NSP	
UVIS_023ST_EPSORI003_PRIME	I	2006-118T08:35:00		000T01:00:00	2006-118T09:35:00	UVIS_FUV to Star	POS_Z to NSP	
ISS_023RH_ORSRHCOL001_PRIME	C, U, V	2006-118T09:35:00		000T01:25:00	2006-118T11:00:00	ISS_NAC to Rhea (0.0,-50.0,0.0 deg. offset)	POS_Z to NSP	
SP_023EA_DLTURN118_PRIME		2006-118T11:00:00		000T00:30:00	2006-118T11:30:00	XBAND to Earth	POS_X to NEP	
SP_023EA_M34HEFNON118_PRIME	C, M	2006-118T11:30:00		000T06:30:00	2006-118T18:00:00	XBAND to Earth	POS_X to NEP	No roll possible b/c CIRS request within 4 hrs. of end of downlink.
SP_023SA_WAYPTTURN418_PRIME	C, M	2006-118T18:00:00		000T00:30:00	2006-118T18:30:00	ISS_NAC to Saturn	POS_X to NSP	
NEW WAYPOINT		**2006-118T18:30:00**		**001T10:44:00**	**2006-120T05:14:00**	**ISS_NAC to Saturn**	**POS_X to NSP**	
CIRS_023SA_FTRACK005_PRIME	I, M, V	2006-118T18:30:00		000T06:00:00	2006-119T00:30:00	CIRS_FPB to Saturn	POS_X to NSP	
Periapse R = 5.5 Rs, lat = ...		2006-118T23:59:10		000T00:00:01	2006-118T23:59:11			
ISS_023JA_COLORF006_PRIME	C, M, U	2006-119T00:30:00		000T01:00:00	2006-119T01:30:00	ISS_NAC to Janus	POS_X to NSP	
ISS_023OT_RETHIEQPL005_PRIME	M	2006-119T01:30:00		000T01:11:00	2006-119T02:41:00	ISS_NAC to Retargetable	POS_X to NSP	
VIMS_023SA_FEATRACK003_PRIME	M	2006-119T02:41:00		000T06:03:00	2006-119T08:44:00	ISS_NAC to Saturn	NEG_Z to NSP	
CIRS_023RF_FMOVIEB002_PRIME	I, M, R	2006-119T08:44:00		000T08:30:00	2006-119T17:14:00	CIRS_FP1 to Rings	NEG_Z to NSP	
RADAR_023TI_SCATT1CAL001_PRIME	M	2006-119T17:14:00		000T02:00:00	2006-119T19:14:00	NEG_Z to Titan	POS_X to North_Pole_Dir	
SP_023EA_DLTURN119_PRIME	M, R	2006-119T19:14:00		000T00:30:00	2006-119T19:44:00	XBAND to Earth	NEG_X to NEP	
SP_023EA_G70ARRNON119_PRIME	C, M, R	2006-119T19:44:00		000T09:00:00	2006-120T04:44:00	XBAND to Earth	Rolling	

Final Sequenced SMT and Data Volume

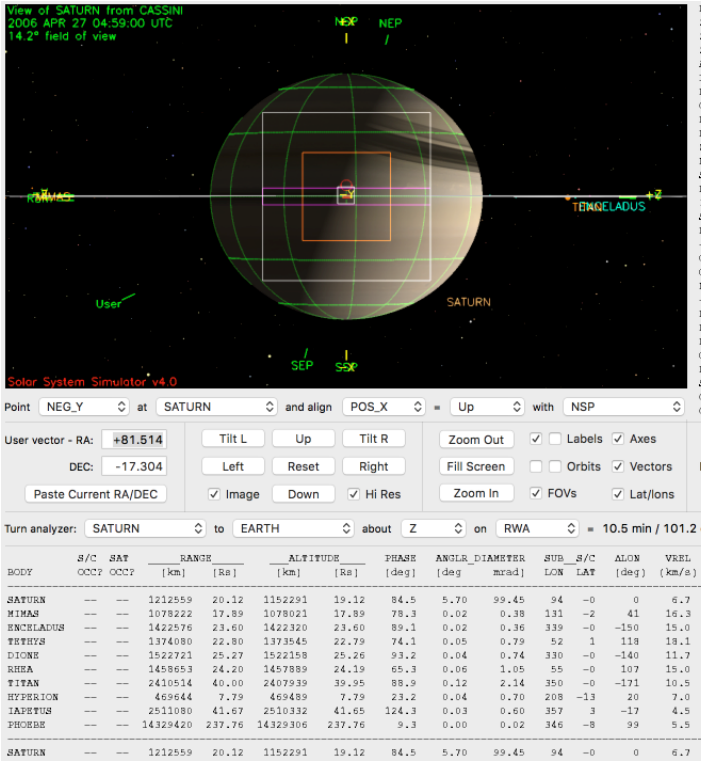
DATA VOLUME SUMMARY --- TRANSFER FRAME OVERHEAD INCLUDED (80 BITS PER 8800-BIT FRAME)

			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_023EA_G34BWGOTB117_PRIME	117 19:59	118 04:59	0	902	51	953	3491	2538	35	243	53	1284	844	-440	51	0% 440
SP_023EA_M34HEFNON118_PRIME	118 11:30	118 18:00	440	673	22	1135	3491	2356	0	205	38	1378	647	-731	51	0% 731
SP_023EA_G70ARRNON119_PRIME	119 19:44	120 04:44	731	2612	97	3441	3491	51	0	860	53	4354	4416	63	65	0% 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	117 04:59	117 19:59	54.0	22.8	133.1	2.7	0.0	32.4	64.5	0.0	70.7	23.7	490.0	0.0	0.0	894.0
OBSERVATION_OPN	117 04:59	117 19:59	0.0	0.0	0.0	0.0	34.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	34.8
SP_023EA_G34BWGOTB117_PRIME	117 19:59	118 04:59	32.4	16.9	86.4	1.6	0.0	19.4	38.9	0.0	42.4	2.5	0.0	0.0	0.0	240.5
DAILY TOTAL SCIENCE	117 04:59	118 04:59	86.4	39.6	219.5	4.3	0.0	51.8	103.4	0.0	113.2	26.2	490.0	0.0		
OBSERVATION_NOR	118 04:59	118 11:30	23.5	44.7	20.4	1.2	336.9	14.1	28.2	0.0	30.7	159.2	7.7	0.0	0.0	666.5
SP_023EA_M34HEFNON118_PRIME	118 11:30	118 18:00	23.4	12.1	82.8	1.2	0.0	14.0	36.9	0.0	30.7	1.8	0.0	0.0	0.0	202.8
DAILY TOTAL SCIENCE	118 04:59	118 18:00	46.9	56.8	103.2	2.3	336.9	28.1	65.1	0.0	61.4	161.0	7.7	0.0		
OBSERVATION_NOR	118 18:00	119 19:44	130.7	187.1	222.9	37.5	709.7	75.3	147.0	161.1	383.5	3.6	530.0	0.0	8.6	2596.9
SP_023EA_G70ARRNON119_PRIME	119 19:44	120 04:44	152.3	16.9	86.4	3.2	0.0	64.0	38.9	0.0	488.1	2.5	0.0	0.0	0.0	852.2
DAILY TOTAL SCIENCE	118 18:00	120 04:44	283.0	203.9	309.3	40.7	709.7	139.3	185.9	161.1	871.6	6.1	530.0	0.0		

Segment Geometry



Rev 023 INBOUND
2006 - 117T04:59:00 SCET
2006 APR 27 04:59:00 SCET
2006 APR 27 06:14:44 ERT
Apoapse_023 + 017T18:53:56
Periapse_023 - 001T19:00:14
Light time: 75.7 min
Orbit period: 39.1 days

Radius	1212559 km	20.12 Rs
Rad_cyl	1212552 km	20.12 Rs
Z_ht_cyl	-3968 km	-0.07 Rs
Mag_L	20.12	
Semi_axs	2223407 km	36.89 Rs
Eccentricity	0.852	
Inclination	0.37 deg	
Sun_range	9.13 AU	
Earth_range	9.11 AU	

--- DSN ELEV -- D/L -- U/L --------

Goldstone	31.8	62.0
Canberra	28.0	5.5
Madrid	-29.7	-18.8

------- LOOK DIRECTION INFO -------

FOV	14.2 deg	248.3 mrad
RA	51.531 deg	
DEC	-6.159 deg	
Crosses_RP_@	0.000 Rs	
EPS	6.328 deg *	
SEP	88.034 deg	
ORS b/s angle	95.4 deg	
ORS rad angle	107.7 deg	

Point NEG_Y at SATURN and align POS_X = 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

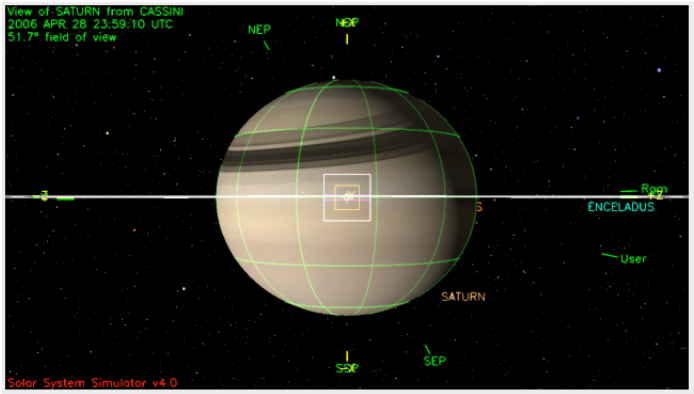
Year Month Day Hour Minute Second

Turn analyzer: SATURN to EARTH about Z on RWA = 10.5 min / 101.2 deg Event

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	--	--	1212559	20.12	1152291	19.12	84.5	5.70	99.45	94	-0	0	6.7	0	0.0	101.2	16.6
MIMAS	--	--	1078222	17.89	1078021	17.89	78.3	0.02	0.38	131	-2	41	16.3	2814	6.6	107.4	10.0
ENCELADUS	--	--	1422576	23.60	1422320	23.60	89.1	0.02	0.36	339	-0	-150	15.0	35	4.8	96.7	21.4
TETHYS	--	--	1374080	22.80	1373545	22.79	74.1	0.05	0.79	52	1	118	18.1	9	11.0	111.4	5.6
DIONE	--	--	1522721	25.27	1522158	25.26	93.2	0.04	0.74	330	-0	-140	11.7	61	3.1	92.6	25.7
RHEA	--	--	1458653	24.20	1457889	24.19	65.3	0.06	1.05	55	-0	107	15.0	3077	20.2	120.0	3.7
TITAN	--	--	2410514	40.00	2407939	39.95	88.9	0.12	2.14	350	-0	-171	10.5	3089	4.6	96.8	21.2
HYPERION	--	--	469644	7.79	469489	7.79	23.2	0.04	0.70	208	-13	20	7.0	-6806	99.2	151.0	82.6
IAPETUS	--	--	2511080	41.67	2510332	41.65	124.3	0.03	0.60	357	3	-17	4.5	-692055	149.3	49.6	161.5
PHOEBE	--	--	14329420	237.76	14329306	237.76	9.3	0.00	0.02	346	-8	99	5.5	5542984	76.9	176.6	62.0
SATURN	--	--	1212559	20.12	1152291	19.12	84.5	5.70	99.45	94	-0	0	6.7	0	0.0	101.2	16.6

Segment Start: 2006-117T04:59

Periapse: 2006-118T23:59:10



Rev 023 INBOUND
2006 - 118T23:59:10 SCET
2006 APR 28 23:59:10 SCET
2006 APR 29 01:15:09 ERT
Apoapse_023 + 019T13:54:06
Periapse_023 - 00:00:04
Light time: 76.0 min
Orbit period: 39.3 days

Radius	330013 km	5.48 Rs
Rad_cyl	330011 km	5.48 Rs
Z_ht_cyl	-886 km	-0.01 Rs
Mag_L	5.48	
Semi_axs	2230471 km	37.01 Rs
Eccentricity	0.852	
Inclination	0.37 deg	
Sun_range	9.13 AU	
Earth_range	9.14 AU	

--- DSN ELEV -- D/L -- U/L --------

Goldstone	72.6	46.2
Canberra	-21.5	-52.3
Madrid	2.7	30.8

------- LOOK DIRECTION INFO -------

FOV	51.7 deg	903.2 mrad
RA	176.930 deg	
DEC	4.840 deg	
Crosses_RP_@	0.000 Rs	
EPS	6.322 deg *	
SEP	86.307 deg	
ORS b/s angle	135.8 deg	
ORS rad angle	107.6 deg	

Point NEG_Y at SATURN and align POS_X = 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

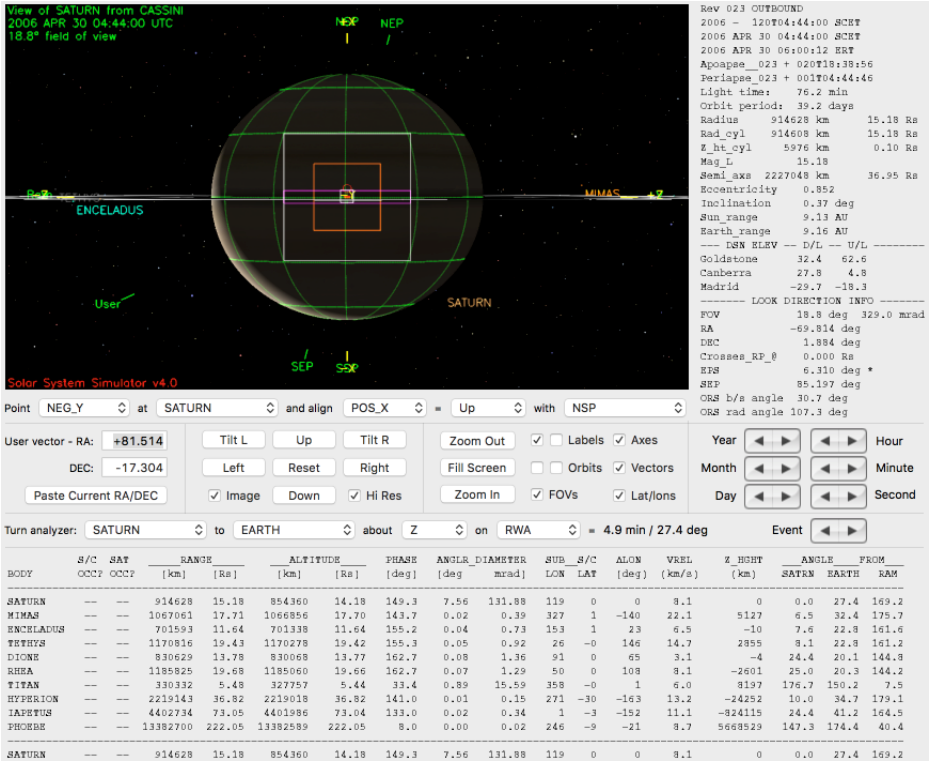
Year Month Day Hour Minute Second

Turn analyzer: SATURN to EARTH about Z on RWA = 12.6 min / 129.5 deg Event

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	--	--	330013	5.48	269745	4.48	44.2	21.05	367.31	341	-0	0	14.6	0	0.0	129.5	90.0
MIMAS	--	--	506701	8.41	506494	8.40	37.3	0.05	0.82	344	0	-158	28.3	-0	7.8	136.4	82.1
ENCELADUS	--	--	527100	8.75	526844	8.74	28.4	0.06	0.97	338	-0	-135	25.1	-38	18.6	145.4	71.4
TETHYS	--	--	473606	7.86	473070	7.85	17.7	0.13	2.28	317	-0	-98	19.8	1736	38.0	158.2	52.0
DIONE	--	--	577874	9.59	577311	9.58	79.7	0.11	1.95	33	-0	109	20.3	48	38.0	94.3	128.0
RHEA	--	--	623143	10.34	622377	10.33	98.6	0.14	2.46	35	0	90	16.9	-1739	57.7	75.7	147.7
TITAN	--	--	1249827	20.74	1247252	20.70	40.9	0.24	4.12	339	-0	-86	15.1	7256	79.0	143.4	11.1
HYPERION	--	--	1468101	24.36	1467983	24.36	99.8	0.01	0.22	234	-59	109	17.2	-19590	58.8	74.5	148.8
IAPETUS	--	--	3670429	60.90	3669681	60.89	117.9	0.02	0.41	12	1	100	15.3	-776197	74.9	56.0	161.2
PHOEBE	--	--	14353092	238.15	14352978	238.15	6.1	0.00	0.02	210	-7	-134	13.6	5618830	48.9	175.9	49.1
SATURN	--	--	330013	5.48	269745	4.48	44.2	21.05	367.31	341	-0	0	14.6	0	0.0	129.5	90.0

	Saturn Range	Phase Angle	Sub-S/C Lat.
Segment Start	20.12 Rs	84.5 deg	0
Periapse	5.48 Rs	44.2 deg	0
Segment End	15.18 Rs	149.3 deg	0

Segment Geometry



Segment End: 2006-120T04:44

	Saturn Range	Phase Angle	Sub-S/C Lat.
Segment Start	20.12 Rs	84.5 deg	0
Periapse	5.48 Rs	44.2 deg	0
Segment End	15.18 Rs	149.3 deg	0

Solar Geometry – ORS Boresight Concerns

No ORS Boresight Solar Constraints on Science Pointing Noted.

Daily Science Highlights

No Daily Science Highlights Noted.

Segment Integration Planning

Timeline Gaps and Suggested Observations

- Trying to integrate the following requests into the plan:
  - Periodic feature track prior to and following the primary feature track
  - UVIS occultations
  - One of the Ring movies
  - Janus
  - Radar

Geometry Events

- Periapse = 2006-118T23:55
- Ring Plane Crossing = 2006-119T02:41

Periapse Info

- Range = 5.47 Rs
- Phase @ -1 day = 66°
- Phase @ periapse = 45°
- Phase @ +1 day = 144°

Proposed Order For Rev 23 Strawman
VIMS Feature Track
ISS SatOrbs
OTM 58 back-up over Madrid (moved ~1 day earlier)
VIMS Feature Track
UVIS Stellar Occs
RADAR Titan
Downlink over 6-hr Madrid pass (for Nav? For Data Volume?)
ORS Feature Track
Janus & ISS Retargs
ORS Feature Track (resolve CIRS-VIMS timing discrepancy)
CIRS Rings F Movie
RADAR Titan
Downlink over Gold 70-m

Initial SMT and Data Volume

Beginning of Integration:

- SMT data below - current data volume plan fits perfectly - can only accommodate zero-sum changes

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_023EA_G34BWGOTB117_PRIME	117 19:59	118 04:59	0	1143	51	1193	3481	2288	66%	44	144	53	1434	844	-590	-70%	590
SP_023EA_M34HEFNON118_PRIME	118 11:30	118 18:00	590	564	22	1176	3566	2390	67%	0	236	38	1450	647	-803	-124%	803
SP_023EA_G70ARRNON119_PRIME	119 19:44	120 04:44	803	2669	87	3559	3564	6	0%	0	475	53	4086	4454	368	8%	0

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	117 04:59	117 19:59	54.0	22.8	179.8	2.7	0.0	32.4	48.6	0.0	70.7	21.7	710.0	0.0	0.0	1142.7
OBSERVATION_OPN	117 04:59	117 19:59	0.0	0.0	0.0	0.0	43.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	43.5
SP_023EA_G34BWGOTB117_PRIME	117 19:59	118 04:59	32.4	16.9	0.0	1.6	0.0	19.4	29.2	0.0	42.4	2.5	0.0	0.0	0.0	144.4
OBSERVATION_NOR	118 04:59	118 11:30	23.5	24.7	10.8	1.2	188.0	14.1	21.1	0.0	30.7	250.3	0.0	0.0	0.0	564.4
SP_023EA_M34HEFNON118_PRIME	118 11:30	118 18:00	23.4	44.1	86.4	1.2	0.0	14.0	34.3	0.0	30.7	1.8	0.0	0.0	0.0	235.8
OBSERVATION_NOR	118 18:00	119 19:44	135.6	189.1	208.8	5.3	709.7	75.3	137.1	114.3	383.5	0.0	710.0	0.0	0.0	2668.7
SP_023EA_G70ARRNON119_PRIME	119 19:44	120 04:44	129.6	16.9	86.4	3.2	0.0	64.0	58.8	0.0	113.4	2.5	0.0	0.0	0.0	474.8

Waypoint Selection

Pointing notes:

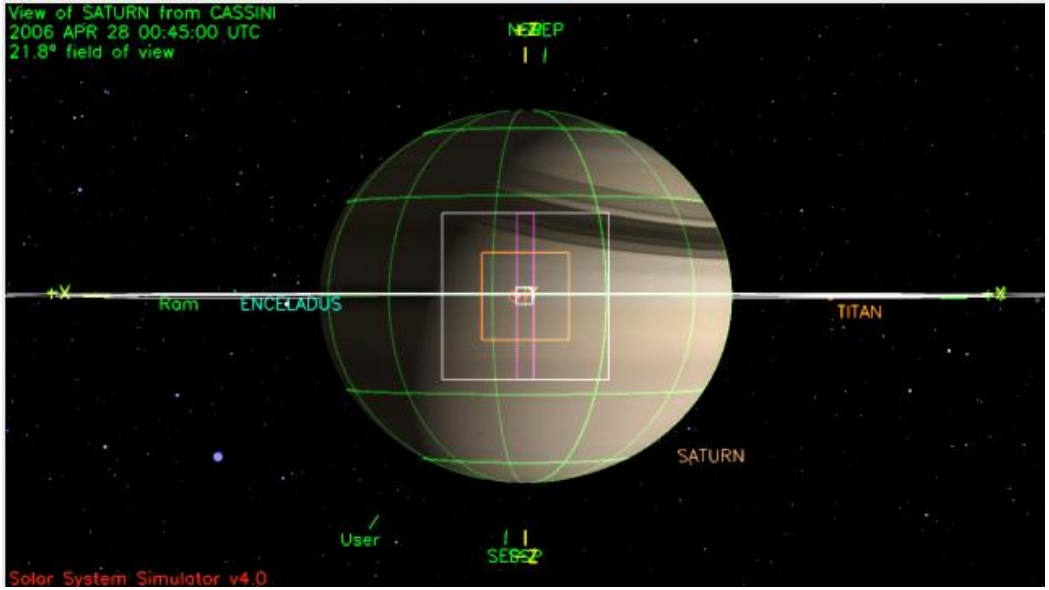
– CDA requires -Y to Saturn pointing (+/- 1 Rs of Saturn's mass center) from 119T02:41 to 05:30.
  • Can ISS_23OT_RETHIEQPL010_PRIME (119T01:30 - 04:30) meet this requirement?

- Waypoint Strategy
  - Below is the Attitude Strategy for the Rev 23 segment
  - I've made some educated guesses on the waypoints and observation attitudes, but we need to finalize these.

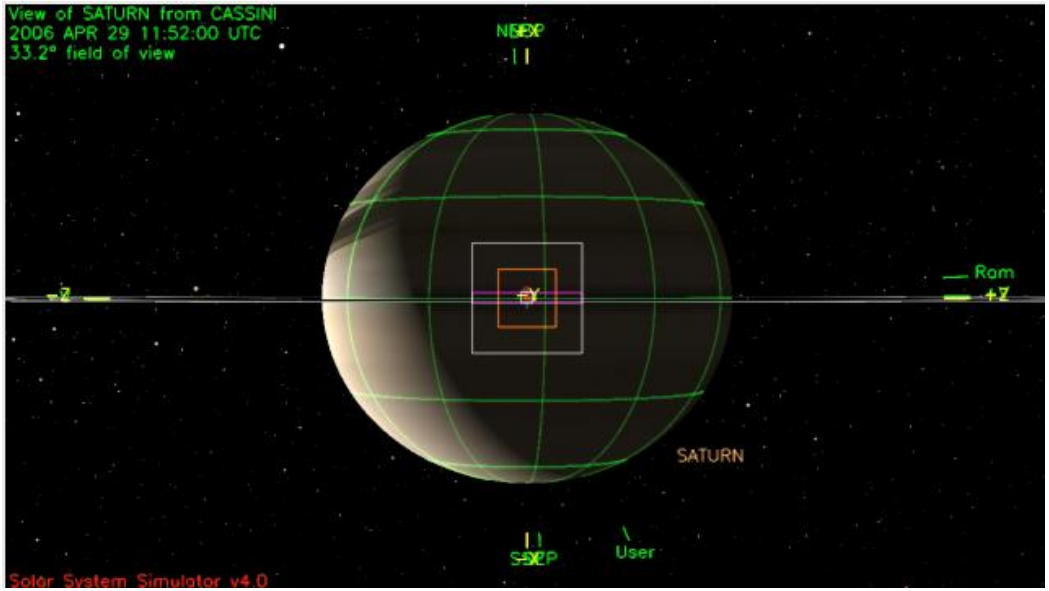
						Observation Attitude		
Request	Riders	Start (SCET	t (Ep	Dur	End (SCET)	Primary	Secondary	Comments
Start Saturn 23 Segment		2006-117T04:59:00			2006-220T04:44:00			
NAV_023SA_OPNAV171_PRIME		2006-117T04:59:00		00T02:01:00	2006-117T07:00:00	ISS_NAC to RA_DEC	POS_Z to NSP	Include turn from XBAND to Earth, ???
NEW WAYPOINT		**2006-117T07:00**			**2006-118T05:29**	**ISS_NAC to Saturn**	**POS_Z to NSP**	
VIMS_023SA_FEATRACK004_PRIME		2006-117T07:00:00		00T06:00:00	2006-117T13:00:00	ISS_NAC to Saturn	POS_Z to NSP	
VIMS_023SA_THRCYLMAP001_PRIME		2006-117T13:00:00		00T06:29:00	2006-117T19:29:00	ISS_NAC to Saturn	POS_Z to NSP	
SP_023EA_DLTURN117_PRIME		2006-117T19:29:00		00T00:30:00	2006-117T19:59:00	XBAND to Earth	POS_X to NEP	
SP_023EA_G34BWGOTB117_PRIME		2006-117T19:59:00		00T09:00:00	2006-118T04:59:00	XBAND to Earth	rolling	OTM-58 Backup
SP_023SA_WAYPTTURN118_PRIME		2006-118T04:59:00		00T00:30:00	2006-118T05:29:00	ISS_NAC to Saturn	POS_X to NSP	
NEW WAYPOINT		**2006-118T05:29**			**2006-120T04:44:00**	**ISS_NAC to Saturn**	**???**	
UVIS_023ST_BETORI003_PRIME		2006-118T05:55:00		00T01:10:00	2006-118T07:05:00		???	
ISS_023JA_MUTUALEVE014_PRIME		2006-118T07:05:00		00T00:45:00	2006-118T07:50:00	ISS_NAC to Janus	???	
ISS_023EP_MUTUALEVE014_PRIME		2006-118T07:50:00		00T00:45:00	2006-118T08:35:00	ISS_NAC to Epimetheus	???	
UVIS_023ST_EPSORI003_PRIME		2006-118T08:35:00		00T01:00:00	2006-118T09:35:00		???	
ISS_023RH_GLOCOL001_PRIME		2006-118T09:35:00		00T00:40:00	2006-118T10:15:00	ISS_NAC to Rhea	???	
CIRS_023RH_FP1FAZ0P5293_PRIME		2006-118T10:15:00		00T00:45:00	2006-118T11:00:00	CIRS_FP1 to Rhea	???	
SP_023EA_DLTURN118_PRIME		2006-118T11:00:00		00T00:30:00	2006-118T11:30:00	XBAND to Earth	POS_X to NEP	
SP_023EA_M34HEFNON118_PRIME		2006-118T11:30:00		00T06:30:00	2006-118T18:00:00	XBAND to Earth	POS_X to NEP	No roll possible b/c CIRS request within 4 hrs. of end of downlink
SP_023SA_WAYPTTURN418_PRIME		2006-118T18:00:00		00T00:30:00	2006-118T18:30:00	ISS_NAC to Saturn	POS_X to NSP	
CIRS_023SA_FTRACK005_PRIME		2006-118T18:30:00		00T06:00:00	2006-119T00:30:00	ISS_NAC to Saturn	POS_X to NSP	
ISS_023JA_COLORF006_PRIME		2006-119T00:30:00		00T01:00:00	2006-119T01:30:00	ISS_NAC to Janus	???	
ISS_023OT_RETHIEQPL010_PRIME		2006-119T01:30:00		00T00:30:00	2006-119T04:30:00	Retarg	???	CDA requires -Y to Saturn (+/- 2 Rs) from 119T02:41 - 05:30
VIMS_023SA_FEATRACK003_PRIME		2006-119T04:30:00		00T04:14:00	2006-119T08:44:00	ISS_NAC to Saturn	POS_Z to NSP	CDA requires -Y to Saturn (+/- 2 Rs) from 119T02:41 - 05:30
CIRS_023RF_FMOVIEB002_PRIME		2006-119T08:44:00		00T08:30:00	2006-119T17:14:00	ISS_NAC to Rings	POS_Z to NSP	
RADAR_023TI_SCATT1CAL001_PRIME		2006-119T17:14:00		00T01:00:00	2006-119T18:14:00	NEG_Z to Titan	PIC	
RADAR_023TI_RAD1CALIB001_PRIME		2006-119T18:14:00		00T01:00:00	2006-119T19:14:00	NEG_Z to Titan	PIC	
SP_023EA_DLTURN119_PRIME		2006-119T19:14:00		00T00:30:00	2006-119T19:44:00	XBAND to Earth	POS_X to NEP	
SP_023EA_G70ARRNON119_PRIME		2006-119T19:44:00		00T09:00:00	2006-120T04:44:00	XBAND to Earth	rolling	No roll possible if CIRS within 4 hrs. of end of downlink

Waypoints Chosen

Waypoint 1 (2006-117T07:00 – 118T18:30):
NAC to Saturn, POS_Z to NSP



Waypoint 2 (2006-118T18:30 – 120T05:14):
NAC to Saturn, POS_X to NSP



Notes & Liens

- **Pointing**
  - All waypoints have been verified as being Flight Rule-safe.
  - All downlink attitudes have been verified as being Flight-Rule safe.
  - All SP turns have been allocated enough time and are Flight Rule-safe.
- **Data Volume**
  - No issues. We carry data over for the first two passes, then empty the SSRs with 9% margin at the end of the third and final pass.
- **CIMS**
  - All of the expected requests for this delivery are approved in CIMS.
- **OpModes**
  - All OpMode transitions are in the CIMS delivery. No issues at this time.
- **Flight Rule / Mission Planning Guideline & Constraint Issues**
  - None known at this time.
- **Other Notes & Issues**
  - Originally OTM-58 b/u was scheduled on DOY 118 over periapse. In agreement with the X-D TWT (K. Perry) & NAV (J. Jones), OTM-58 was moved to DOY 116 in the X-D 22/23 segment, and OTM-58 b/u was moved to DOY 117. To compensate for the "missing pass" at periapse, a short DSN pass was added to DOY 118 (see below).
  - The DSN pass at 118T11:30 is only 6.5 hours and provides only 4:49 of two-way coverage. Nav (J. Jones) has agreed to the shortened pass and the reduced two-way coverage.