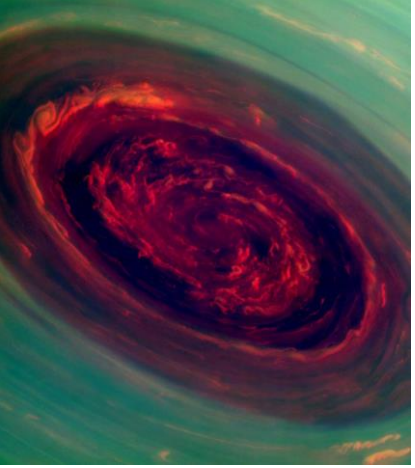

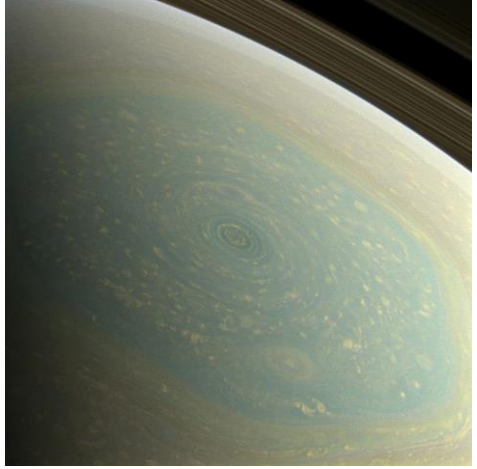
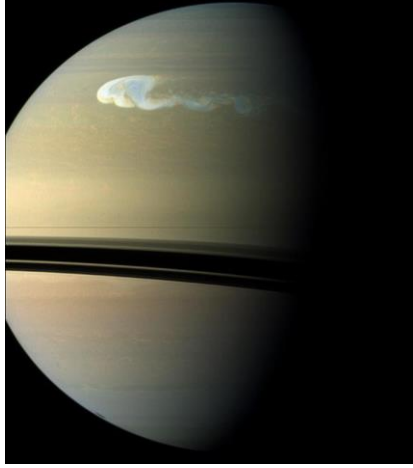

Science Planning & Sequence Team
CASSINI

SATURN TARGET WORKING TEAM

Rev 140 Segment Legacy Package

Segment Boundary: Nov 7, 2010 – Nov 10, 2010
2010-311T13:04:00 – 2010-314T20:19:00 (SCET)

Integration Began 03/08/2010
Segment Delivered to S64 Sequence 04/26/2010
Lead Integrator was Anna Marie Aguinaldo

Legacy Package Assembled by Keven Uchida

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Segment Overview and Final Products

Segment Summary

- This is an ~3 day long Solstice Mission, periapsis segment. The S/C is in an equatorial orbit.
- This short segment contained four high priority/value “PIE” observations. CIRS led three of the PIE observations – two out of discipline studies of the thermal structure/patterns of Enceladus and Dione, and one to measure the vertical temperature structure near Saturn’s equator. ISS led the remaining PIE, observing Saturn’s limb (viewing the high haze layers of Saturn’s stratosphere) during solar occultation (page 9). VIMS led the remaining activities – several regional mapping activities and one stellar occultation by Saturn.
- On DOY 313 the Sun was occulted by Saturn during most of the ISS_140SA_LIMBSCAN002_PIE activity. ISS requested CMT management during the occultation (see page 18), to allow observing with ORS boresight to sun angles of < 12 degrees.

Final Sequenced SPASS

Gap 1 | Gap 2 | Gap 3 | Gap 4 | Gap 5 | Gap 6

Request	Riders	Start (SCET)	Start (Epoch)	Duration	End (SCET)	Primary	Secondary	Comments
SATURN_140 Segment		2010-311T13:04:00		003T07:15:00	2010-314T20:19:00			
SP_140EA_WAYPTTURN311_PRIME		2010-311T13:04:00		000T00:40:00	2010-311T13:44:00	ISS_NAC to Saturn	NEG_X to 68.0/84.0	
NEW WAYPOINT		**2010-311T13:44:00**		**001T13:45:00**	**2010-313T03:29:00**	**ISS_NAC to Saturn**	**NEG_X to 68.0/84.0**	
VIMS_140SA_REGMAP001_PRIME		2010-311T13:44:00		000T13:25:00	2010-312T03:09:00	ISS_NAC to Saturn	NEG_X to 68.0/84.0	
SP_140EA_DLTURN312_PRIME		2010-312T03:09:00		000T00:40:00	2010-312T03:49:00	XBAND to Earth	NEG_Y to 332.17/-85.65	
SP_140EA_M70METOTP312_PRIME	C, E, N	2010-312T03:49:00		000T09:00:00	2010-312T12:49:00	XBAND to Earth	4_Hr_Rolling	same as OTB
SP_140EA_WAYPTTURN312_PRIME		2010-312T12:49:00		000T00:40:00	2010-312T13:29:00	ISS_NAC to Saturn	NEG_X to 68.0/84.0	
VIMS_140SA_REGMAP002_PRIME		2010-312T13:29:00		000T03:40:00	2010-312T17:09:00	ISS_NAC to Saturn	NEG_X to 68.0/84.0	
SP_140EA_DLTURN412_PRIME		2010-312T17:09:00		000T00:40:00	2010-312T17:49:00	XBAND to Earth	NEG_Y to 332.17/-85.65	
SP_140EA_C34BWGOTB312_PRIME	N	2010-312T17:49:00		000T09:00:00	2010-313T02:49:00	XBAND to Earth	NEG_Y to 332.17/-85.65	NEG_Y to 332.17/-85.65 (POS_Y to NSP equiv); CAPS
SP_140EA_WAYPTTURN313_PRIME		2010-313T02:49:00		000T00:40:00	2010-313T03:29:00	UVIS_SOL_OFF to Sun	NEG_X to NSP	
NEW WAYPOINT		**2010-313T03:29:00**		**000T05:31:00**	**2010-313T09:00:00**	**UVIS_SOL_OFF to Sun**	**NEG_X to NSP**	
ISS_140SA_LIMBSCAN002_PIE		2010-313T03:29:00		000T04:26:00	2010-313T07:55:00	ISS_NAC to Saturn	NEG_X to NSP	
SP_140EA_WAYPTTURN413_PRIME		2010-313T08:45:00		000T00:15:00	2010-313T09:00:00	ISS_NAC to Saturn (0.0,0.0,10.0 deg. offset)	NEG_X to NSP	
NEW WAYPOINT		**2010-313T09:00:00**		**000T06:00:00**	**2010-313T15:00:00**	**ISS_NAC to Saturn (0.0,0.0,10.0 deg. offset)**	**NEG_X to NSP**	
CIRS_140DI_FP3SECLX001_PRIME	C, I, U, V	2010-313T09:00:00		000T03:00:00	2010-313T12:00:00	CIRS_FP3 to Dione (0.22,0.0,0.286 deg. offset)	NEG_X to 2.583/47.548	This is a PIE, temporarily renamed PRIME for CIRS's convenience, per Marcia's request. This comment inserted here per Scott's request of 4/26/10.
VIMS_140SA_ALPCETOCC001_PRIME	C, I, M	2010-313T12:00:00		000T02:45:00	2010-313T14:45:00	CIRS_FPB to 45.57/4.09	POS_Z to 266.729/84.572	No return to waypoint, custom handoff to CIRS; COLLABORATIVE
SP_140EA_WAYPTTURN513_PRIME	M	2010-313T14:45:00		000T00:15:00	2010-313T15:00:00	ISS_NAC to Saturn	NEG_X to 68.0/84.0	Turn does not exist in SASF, left in for waypoint purposes
NEW WAYPOINT		**2010-313T15:00:00**		**000T18:49:00**	**2010-314T09:49:00**	**ISS_NAC to Saturn**	**NEG_X to 68.0/84.0**	
CIRS_140EN_ENCELADUS001_PRIME	I, M, U, V	2010-313T15:00:00		000T04:00:00	2010-313T19:00:00	ISS_NAC to Enceladus (0.159,-20.001,-0.159 deg. c	NEG_X to 143.3/86.0	This request is a PIE, temporarily renamed PRIME for CIRS's convenience, per Marcia's request. This comment inserted here per Scott's request of 4/26/10.
Periapse R = 4.100 Rs, lat ...		2010-313T18:16:29		000T00:00:01	2010-313T18:16:30			
VIMS_140SA_HIRESMAP001_PRIME		2010-313T19:00:00		000T02:00:00	2010-313T21:00:00	ISS_NAC to Saturn	NEG_X to 68.0/84.0	
CIRS_140SA_LIMBZON001_PRIME	C, I	2010-313T21:00:00		000T04:00:00	2010-314T01:00:00	CIRS_FPB to Saturn	NEG_X to NSP	PIE Coordination with UVIS & ISS Latitude = 0 Dayside (right) limb This request is a PIE, temporarily renamed PRIME for CIRS's convenience, per Marcia's request. This comment inserted here per Scott's request of 4/26/10.
VIMS_140SA_REGMAP003_PRIME	I	2010-314T01:00:00		000T08:09:00	2010-314T09:09:00	ISS_NAC to Saturn	NEG_X to 68.0/84.0	
SP_140EA_DLTURN314_PRIME		2010-314T09:09:00		000T00:40:00	2010-314T09:49:00	XBAND to Earth	POS_X to NSP	
NEW WAYPOINT		**2010-314T09:49:00**		**000T11:10:00**	**2010-314T20:59:00**	**XBAND to Earth**	**POS_X to NSP**	
ENGR_140SC_KPTYBIAS314_PRIME		2010-314T09:49:00		000T01:30:00	2010-314T11:19:00	POS_Z to DELTA_H (0.0,0.0,-34.0 deg. offset)	NEG_X to Sun	
SP_140EA_G70METNON314_PRIME	C	2010-314T11:19:00		000T09:00:00	2010-314T20:19:00	XBAND to Earth	POS_X to NSP	POS X to NSP, CAPS, pre-TOST

Final Sequenced SMT and Data Volume

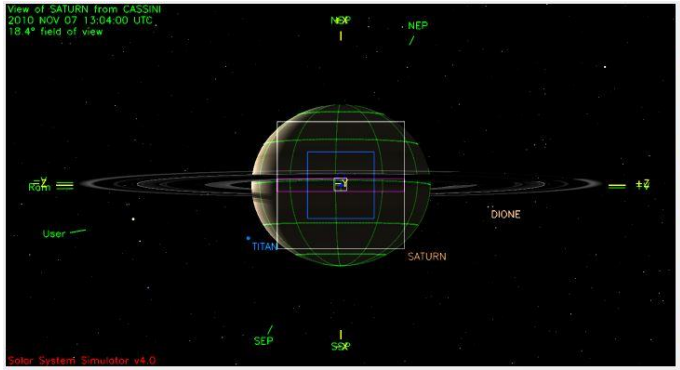
DATA VOLUME SUMMARY --- TRANSFER FRAME OVERHEAD INCLUDED (80 BITS PER 8800-BIT FRAME)

			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_140EA_M70METOTP312_PRIME	312 03:49	312 12:49	148	1519	62	1730	3311	1581	0	658	53	2441	2351	-90	-339	-1%	90
SP_140EA_C34BWGOTB312_PRIME	312 17:49	313 02:49	90	338	21	449	3311	2862	0	201	53	703	631	-73	-339	-1%	72
SP_140EA_G70METNON314_PRIME	314 11:19	314 18:19	72	2609	137	2819	3311	492	0	231	41	3091	2496	-596	-339	-1%	595

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	311 13:04	312 03:49	53.1	27.8	0.0	15.4	135.0	26.2	63.7	0.0	584.1	0.0	600.0	0.0	61.6	1567.0
SP_140EA_M70METOTP312_PRIME	312 03:49	312 12:49	129.6	17.0	86.4	3.2	0.0	16.0	38.9	0.0	356.4	4.9	0.0	0.0	0.0	652.4
DAILY TOTAL SCIENCE	311 13:04	312 12:49	182.7	44.8	86.4	18.6	135.0	42.2	102.6	0.0	940.5	4.9	600.0	0.0	61.6	
OBSERVATION_NOR	312 12:49	312 17:49	18.0	9.4	0.0	1.8	38.0	8.9	15.3	0.0	23.5	0.0	220.0	0.0	20.9	355.8
SP_140EA_C34BWGOTB312_PRIME	312 17:49	313 02:49	32.4	73.3	0.0	3.2	0.0	16.0	27.5	0.0	42.1	4.9	0.0	0.0	0.0	199.6
DAILY TOTAL SCIENCE	312 12:49	313 02:49	50.4	82.8	0.0	5.0	38.0	24.9	42.8	0.0	65.6	4.9	220.0	0.0	20.9	
OBSERVATION_NOR	313 02:49	314 11:19	117.0	306.5	178.6	21.8	666.2	80.0	99.4	0.0	224.1	172.1	702.5	0.0	135.8	2704.1
OBSERVATION_SI	313 02:49	314 11:19	0.0	0.0	17.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.5
SP_140EA_G70METNON314_PRIME	314 11:19	314 18:19	25.2	66.0	64.8	2.5	0.0	12.4	21.4	0.0	32.8	3.8	0.0	0.0	0.0	229.0
DAILY TOTAL SCIENCE	313 02:49	314 18:19	142.2	372.6	260.9	24.3	666.2	92.5	120.9	0.0	256.8	175.9	702.5	0.0	135.8	

Segment Geometry

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Rev 140   INBOUND
2010 -  311T13:04:00 SCET
2010 NOV 07 13:04:00 SCET
2010 NOV 07 14:30:25 ERT
Apoapse__140 + 009T18:57:42
Periapse_140 - 002T05:12:34
Light time:    86.4 min
Orbit period:  24.0 days
Radius      1395489 km      23.15 Rs
Rad_cyl     1393667 km      23.12 Rs
Z_ht_cyl     -71286 km      -1.18 Rs
Mag_L          23.22
Semi_axs    1604819 km      26.63 Rs
Eccentricity    0.846
Inclination     2.98 deg
Sun_range       9.58 AU
Earth_range    10.39 AU
--- DSN ELEV -- D/L -- U/L --------
Goldstone      33.4   -0.0
Canberra      -35.8   -51.8
Madrid         14.7    41.3
------- LOOK DIRECTION INFO -------
FOV            18.4 deg  321.0 mrad
RA           -34.151 deg
DEC            1.237 deg
Crosses_RP_@   0.000 Rs
EPS            3.223 deg
SEP           32.902 deg
ORS b/s angle  43.2 deg
ORS rad angle  85.3 deg  *
```

Point NEG_Y at SATURN and align POS_X = Up with NSP

User Vector - RA: 82.465 DEC: -15.068 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

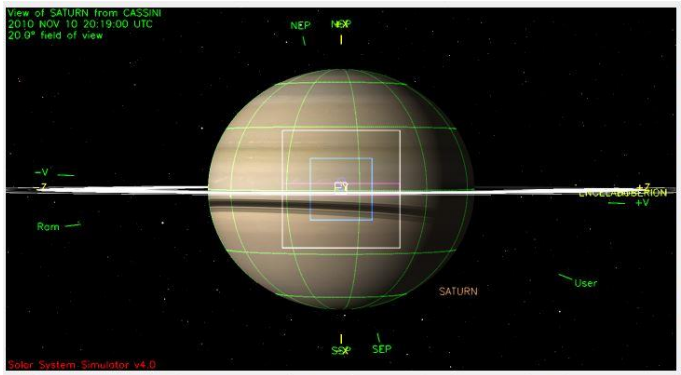
Turn Analyzer: SATURN to EARTH about Z on RWA = 6.4 min / 46.1 deg Event

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	DLON (deg)	VREL (km/s)	Z_HGHT (km)	ANGLE_FROM_ SATRN	ANGLE_FROM_ EARTH	ANGLE_FROM_ RAM
SATURN	--	--	1395489	23.15	1335236	22.15	136.8	4.95	86.40	237	-3	0	5.5	0	0.0	46.1	25.5
MIMAS	--	--	1572524	26.09	1572317	26.09	138.6	0.02	0.26	13	-2	164	18.9	3179	1.9	44.2	23.6
ENCELADUS	--	--	1434446	23.80	1434194	23.80	146.3	0.02	0.36	80	-3	95	17.7	36	9.6	36.6	16.0
TETHYS	--	--	1383879	22.96	1383347	22.95	148.9	0.04	0.78	87	-4	82	16.0	5564	12.2	34.0	13.4
DIONE	--	--	1754940	29.12	1754377	29.11	132.7	0.04	0.64	345	-2	-161	12.5	-154	4.1	50.2	29.6
RHEA	--	--	1792497	29.74	1791731	29.73	124.2	0.05	0.86	328	-2	-132	8.8	-3306	12.6	58.6	38.1
TITAN	--	--	2576620	42.79	2576045	42.74	139.1	0.11	2.00	1	-2	174	10.2	-5661	3.0	43.8	23.0
HYPERION	--	--	234525	3.89	234414	3.89	64.8	0.08	1.40	74	-68	-9	4.5	14749	77.1	116.9	101.1
IAPETUS	--	--	3159389	52.42	3158642	52.41	37.9	0.03	0.47	343	-7	-58	2.7	3004	99.6	144.4	125.1
PHOEBE	--	--	13285429	220.44	13285319	220.44	66.7	0.00	0.02	281	-11	15	6.2	5789197	146.5	109.6	129.8
SATURN	--	--	1395489	23.15	1335236	22.15	136.8	4.95	86.40	237	-3	0	5.5	0	0.0	46.1	25.5

	Saturn Range	Phase Angle	Sub-S/C Lat.
Segment Start	23.15	136.8	-3
Periapse	4.10	80.3	+2
Segment End	14.31	43.7	+1

Seg Start (Left)

Seg End (below)




```
Rev 140 OUTBOUND
2010 -  314T20:19:00 SCET
2010 NOV 10 20:19:00 SCET
2010 NOV 10 21:45:05 ERT
Apoapse__140 + 013T02:12:42
Periapse_140 + 001T02:02:26
Light time:    86.1 min
Orbit period:  24.0 days
Radius      862369 km      14.31 Rs
Rad_cyl     862306 km      14.31 Rs
Z_ht_cyl     10494 km       0.17 Rs
Mag_L          14.31
Semi_axs    1605857 km      26.65 Rs
Eccentricity    0.846
Inclination     2.98 deg
Sun_range       9.57 AU
Earth_range    10.35 AU
--- DSN ELEV -- D/L -- U/L --------
Goldstone      16.9   45.7
Canberra       48.9   17.6
Madrid        -52.5  -35.7
------- LOOK DIRECTION INFO -------
FOV            20.0 deg  348.9 mrad
RA           -127.650 deg
DEC             5.631 deg
Crosses_RP_@    0.000 Rs
EPS             3.475 deg
SEP            35.835 deg
ORS b/s angle 136.3 deg
ORS rad angle  83.7 deg  *
```

Point NEG_Y at SATURN and align POS_X = Up with NSP

User Vector - RA: 82.465 DEC: -15.068 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

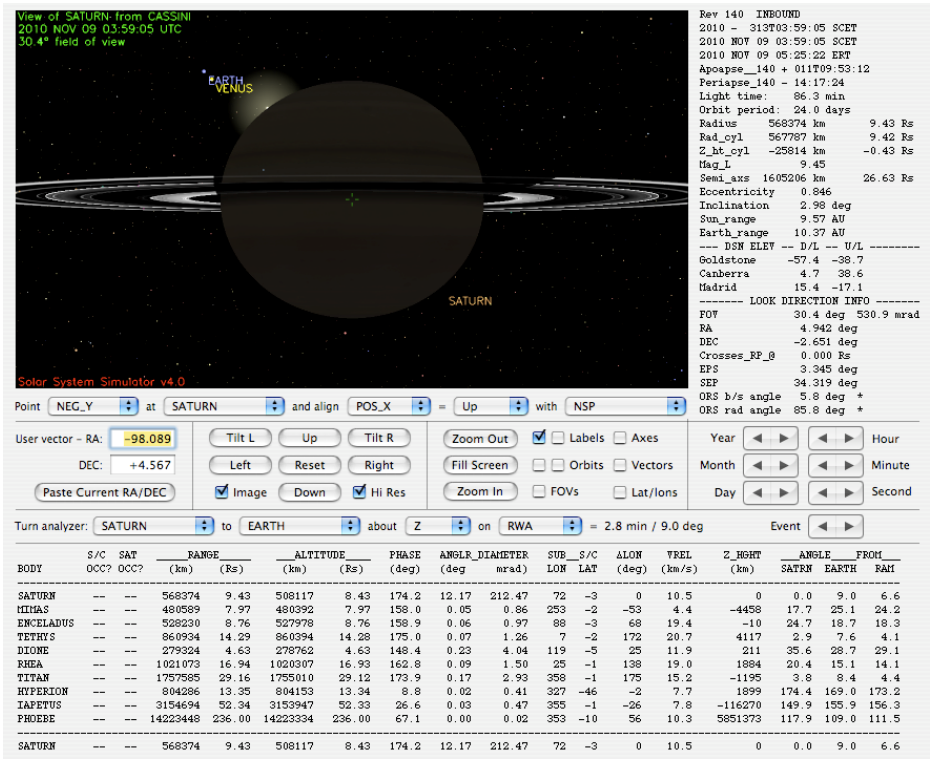
Turn Analyzer: SATURN to EARTH about Z on RWA = 13.3 min / 139.1 deg Event

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	DLON (deg)	VREL (km/s)	Z_HGHT (km)	ANGLE_FROM_ SATRN	ANGLE_FROM_ EARTH	ANGLE_FROM_ RAM
SATURN	--	--	862369	14.31	802102	13.31	43.7	8.01	139.89	127	1	0	8.0	0	0.0	139.1	164.1
MIMAS	--	--	935283	15.52	935083	15.52	32.8	0.03	0.44	301	-1	-107	21.9	-3309	11.0	149.8	174.7
ENCELADUS	--	SE	1068006	17.72	1067751	17.72	36.8	0.03	0.48	338	1	-147	20.4	-44	7.0	145.9	171.0
TETHYS	--	--	854230	14.17	853699	14.17	63.2	0.07	1.27	82	-0	79	5.4	780	19.8	119.7	144.4
DIONE	--	--	574990	9.54	574428	9.53	63.4	0.11	1.96	129	1	31	3.9	-175	20.0	119.5	144.2
RHEA	--	--	1261875	20.94	1261108	20.93	25.1	0.07	1.22	331	0	-129	16.5	660	19.0	157.3	176.3
TITAN	--	--	350179	5.81	347604	5.77	146.1	0.84	14.71	2	1	3	6.0	3958	169.5	31.4	5.5
HYPERION	--	--	2258879	37.48	2258758	37.48	35.6	0.01	0.15	31	-61	-167	12.7	-11977	8.2	147.0	172.1
IAPETUS	--	--	4490972	74.52	4490224	74.50	31.5	0.02	0.33	2	-1	-165	10.6	-238021	12.2	151.2	174.0
PHOEBE	--	--	14358021	238.24	14357910	238.23	63.0	0.00	0.02	114	-9	-76	7.2	5914302	99.6	113.0	95.7
SATURN	--	--	862369	14.31	802102	13.31	43.7	8.01	139.89	127	1	0	8.0	0	0.0	139.1	164.1

Solar Geometry – ORS Boresight Concerns

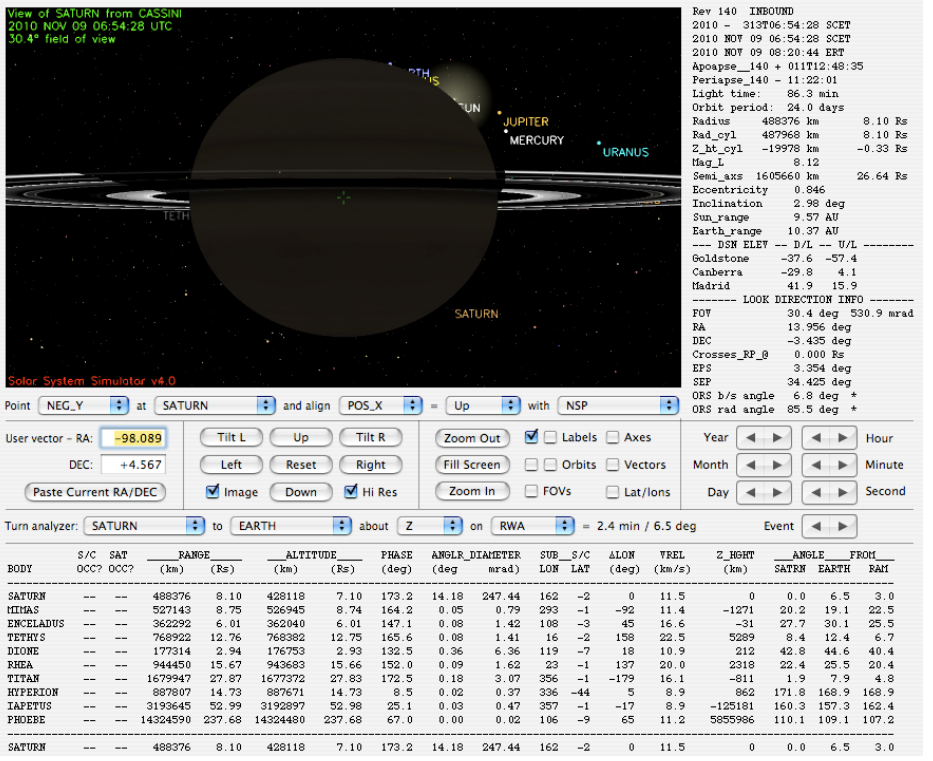
Legacy Note: On DOY 313 the sun was occulted between the times shown below, during the ISS_140SA_LIMBSCAN002_PIE activity. ISS requested CMT management during the occultation (see page 18), to allow observing with ORS boresight to sun angles of < 12 degrees.

Beginning of occultation 2010-313T03:59:05



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	ΔLON (deg)	VREL (km/s)	Z_HGHT (km)	ANGLE_FROM SATRN	ANGLE_FROM EARTH	ANGLE_FROM RAM
SATURN	--	--	568374	9.43	508117	8.43	174.2	12.17	212.47	72	-3	0	10.5	0	0.0	9.0	6.6
MIMAS	--	--	480589	7.97	480392	7.97	158.0	0.05	0.86	253	-2	-53	4.4	-4458	17.7	25.1	24.2
ENCELADUS	--	--	528230	8.76	527978	8.76	158.9	0.06	0.97	88	-3	68	19.4	-10	24.7	18.7	18.3
TETHYS	--	--	860934	14.29	860394	14.28	175.0	0.07	1.26	7	-2	172	20.7	4117	2.9	7.6	4.1
DIONE	--	--	279324	4.63	278762	4.63	148.4	0.23	4.04	119	-5	25	11.9	211	35.6	28.7	29.1
RHEA	--	--	1021073	16.94	1020307	16.93	162.8	0.09	1.50	25	-1	138	19.0	1884	20.4	15.1	14.1
TITAN	--	--	1757585	29.16	1755010	29.12	173.9	0.17	2.93	358	-1	175	15.2	-1195	3.8	8.4	4.4
HYPERION	--	--	804286	13.35	804153	13.34	8.8	0.02	0.41	327	-46	-2	7.7	1899	174.4	169.0	173.2
IAPETUS	--	--	3154694	52.34	3153947	52.33	26.6	0.03	0.47	355	-1	-26	7.8	-116270	149.9	155.9	156.3
PHOEBE	--	--	14223448	236.00	14223334	236.00	67.1	0.00	0.02	353	-10	56	10.3	5851373	117.9	109.0	111.5
SATURN	--	--	568374	9.43	508117	8.43	174.2	12.17	212.47	72	-3	0	10.5	0	0.0	9.0	6.6

End of occultation 2010-313T06:54:28



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	ΔLON (deg)	VREL (km/s)	Z_HGHT (km)	ANGLE_FROM SATRN	ANGLE_FROM EARTH	ANGLE_FROM RAM
SATURN	--	--	488376	8.10	428118	7.10	173.2	14.18	247.44	162	-2	0	11.5	0	0.0	6.5	3.0
MIMAS	--	--	527143	8.75	526945	8.74	164.2	0.05	0.79	293	-1	-92	11.4	-1271	20.2	19.1	22.5
ENCELADUS	--	--	362292	6.01	362040	6.01	147.1	0.08	1.42	108	-3	45	16.6	-31	27.7	30.1	25.5
TETHYS	--	--	768922	12.76	768382	12.75	165.6	0.08	1.41	16	-2	158	22.5	5289	8.4	12.4	6.7
DIONE	--	--	177314	2.94	176753	2.93	132.5	0.36	6.36	119	-7	18	10.9	212	42.8	44.6	40.4
RHEA	--	--	944450	15.67	943683	15.66	152.0	0.09	1.62	23	-1	137	20.0	2318	22.4	25.5	20.4
TITAN	--	--	1679947	27.87	1677372	27.83	172.5	0.18	3.07	356	-1	-179	16.1	-811	1.9	7.9	4.8
HYPERION	--	--	887807	14.73	887671	14.73	8.5	0.02	0.37	336	-44	5	8.9	862	171.8	168.9	168.9
IAPETUS	--	--	3193645	52.99	3192897	52.98	25.1	0.03	0.47	357	-1	-17	8.9	-125181	160.3	157.3	162.4
PHOEBE	--	--	14324590	237.68	14324480	237.68	67.0	0.00	0.02	106	-9	65	11.2	5855986	110.1	109.1	107.2
SATURN	--	--	488376	8.10	428118	7.10	173.2	14.18	247.44	162	-2	0	11.5	0	0.0	6.5	3.0

Daily Science Highlights

Nov 7 (DOY 311): VIMS made a regional map of the hemisphere of Saturn not vignetted by rings.

Nov 8 (DOY 312): VIMS made another regional map of the Saturn hemisphere

Nov 9 (DOY 313): ISS observed the Saturn limb during solar occultation. This observation provided a special opportunity to view high haze layers in Saturn's stratosphere. The spacecraft was in Saturn's shadow looking at the limb. Only the highest altitude hazes particles and gas molecules are illuminated in this geometry, giving us the best opportunity to probe haze structure in the high atmosphere. Similar observations of the south polar haze in the past have revealed a wave structure, probably an inertia-gravity wave. Structures such as these are only revealed in high-resolution (near periapse) images. This high priority observation lasted for over four hours. CIRS then observed Dione's changing temperature patterns as it emerges from Saturn's shadow. Following this CIRS PIE, VIMS observed Saturn's atmosphere in stellar occultation mode. CIRS then performed high priority thermal mapping of Enceladus. VIMS made a high resolution regional map of Saturn's hemisphere to look for and characterize meteorological features and equatorial plumes. Finally, CIRS performed a zonal scan at the equator to monitor the vertical structure of the temperature wave that has been observed in the past.

Nov 10 (DOY 314): VIMS made another regional map of Saturn's hemisphere.

Segment Integration Planning

Timeline Gaps and Suggested Observations

- GAP 1 (2010-311T13:44 to 2010-312T03:09 - Duration 13h25m)
  - VIMS Regional Map
  - ISS lightning rider to VIMS
- GAP 2 (2010-312T13:29 to 2010-312T17:09 – Duration 3h40m)
- GAP 3 (2010-313T07:55 to 2010-313T09:00 -- Duration1h5m)
  - Waypoint turn from solar occultation attitude to Saturn center waypoint
- GAP 4 (2010-313T12:00 to 313T15:00 – Duration 3h)
  - VIMS Hi Res Plume
  - INMS Ring Plane Crossing
- GAP 5 (2010-313T19:00 to 313T21:00 – Duration 2h)
  - VIMS Hi Res
- GAP 6 (2010-314T01:00 to 314T10:39 – Duration 9h39m)
  - VIMS Regional Map

Initial SMT and Data Volume (1 of 2)

Beginning of Integration:

- Needed data cuts now at **270 Mb** from 313T02:49 to 314T20:19
  - RPWS cut 720 Mb
  - VIMS offered 190 Mb
  - ISS offered 100 Mb

- Need to decide if we should upgrade 34M station to 70M to eliminate carryover or can an additional 640 Mb be cut from 311T13:04 to 314T20:19

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)	NET_MARGN (%)	CAROVR (Mb)
SP_140EA_M34HEFOTP312_PRIME	312 03:49	312 12:49	0	845	62	907	3316	2409	0	232	53	1192	539	-654	-390	-8%	653
SP_140EA_C34BWGOTB312_PRIME	312 17:49	313 02:49	653	300	21	974	3316	2342	0	244	53	1271	631	-640	-390	-10%	640
SP_140EA_G70METNON314_PRIME	314 11:19	314 20:19	640	2831	137	3708	3316	-289	0	341	53	3710	3091	-620	0	0%	620

SMT report modeled with RPWS, VIMS and ISS data cuts
Full SMT report: https://cassini.jpl.nasa.gov/sp/saturn_twt/xm/xmdocs/Saturn_140/Saturn_140_100326.rpt

Initial SMT and Data Volume (2 of 2)

Beginning of Integration:

Continued

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	311 13:04	312 03:49	53.1	27.8	0.0	15.4	0.0	26.2	45.1	0.0	69.6	0.0	600.0	0.0	61.6	898.9
SP_140EA_M34HEFOTP312_PRIME	312 03:49	312 12:49	32.4	17.0	86.4	3.2	0.0	16.0	27.5	0.0	42.4	4.9	0.0	0.0	0.0	229.9
DAILY TOTAL SCIENCE	311 13:04	312 12:49	85.5	44.8	86.4	18.6	0.0	42.2	72.7	0.0	112.0	4.9	600.0	0.0	61.6	
OBSERVATION_NOR	312 12:49	312 17:49	18.0	9.4	0.0	1.8	0.0	8.9	15.3	0.0	23.5	0.0	220.0	0.0	20.9	317.8
SP_140EA_C34BWGOTB312_PRIME	312 17:49	313 02:49	32.4	115.6	0.0	3.2	0.0	16.0	27.5	0.0	42.1	4.9	0.0	0.0	0.0	241.8
DAILY TOTAL SCIENCE	312 12:49	313 02:49	50.4	125.0	0.0	5.0	0.0	24.9	42.8	0.0	65.6	4.9	220.0	0.0	20.9	
OBSERVATION_NOR	313 02:49	314 11:19	117.0	490.5	198.0	21.8	624.5	80.0	99.4	0.0	296.1	172.1	702.5	0.0	135.8	3037.7
OBSERVATION_SI	313 02:49	314 11:19	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0
SP_140EA_G70METNON314_PRIME	314 11:19	314 20:19	32.4	125.3	86.4	3.2	0.0	16.0	27.5	0.0	42.1	4.9	0.0	0.0	0.0	337.9
DAILY TOTAL SCIENCE	313 02:49	314 20:19	149.4	615.7	286.4	25.0	624.5	96.0	127.0	0.0	338.2	177.0	702.5	0.0	135.8	

	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)	285.3	785.5	372.8	48.7	624.5	163.2	242.5	0.0	515.8	186.9	1522.5	0.0

Waypoint Selection

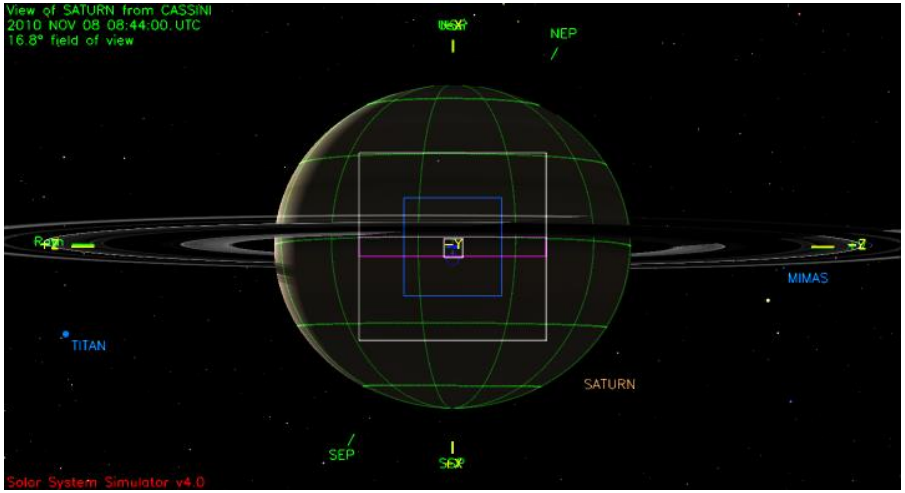
Saturn Rev 140 Valid Waypoints

				Secondary				
				RBOT Friendly		Others		
Observation Period	Start Time	End Time	Primary	NEG_X	NEG_Z	NEG_X	NEG_Z	NEG_X,POS_Z,NEG_Z
SP_140NA_OBSERV311_NA	2010-311T13:04:00	2010-312T03:49:00	Saturn	68.1/84.2	68.1/84.2	NSP	NSP	Sun
SP_140NA_OBSERV312_NA	2010-312T12:49:00	2010-312T17:49:00	Saturn	68.0/84.2	68.0/84.2	NSP	NSP	Sun
Solar Occulation	2010-313T02:49:00	2010-313T09:05:00	Saturn (30,0,0)	----	----	NSP	----	----
SP_140NA_OBSERV313_NA	2010-313T09:05:00	2010-314T11:19:00	Saturn	67.9/84.2	----	NSP	NSP	Sun

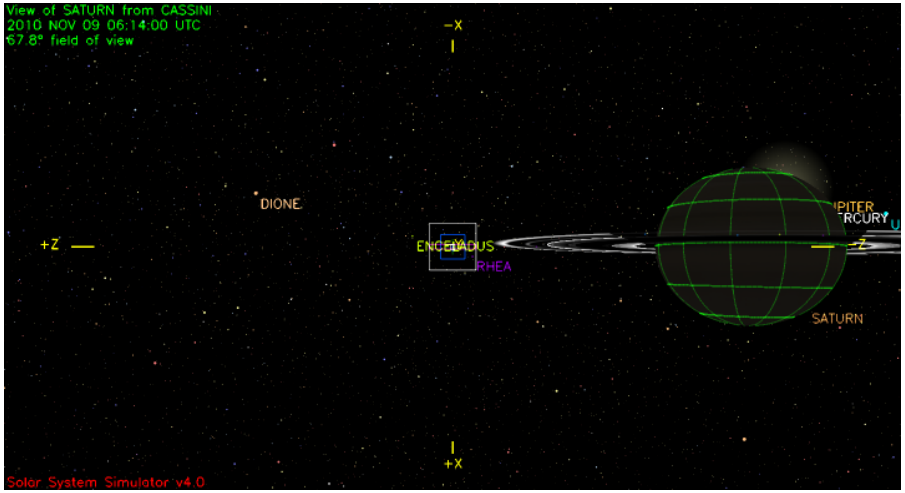
- ORS to SUN violations after the occultation from 2010-313T06:54 till 2010-313T09:05 with Saturn Center as primary

Waypoints Chosen (1/2)

Waypoint 1 (2010-311T13:44:00 – 313T03:29:00): NEG_Y to Saturn, NEG_X to 68.0/84.0

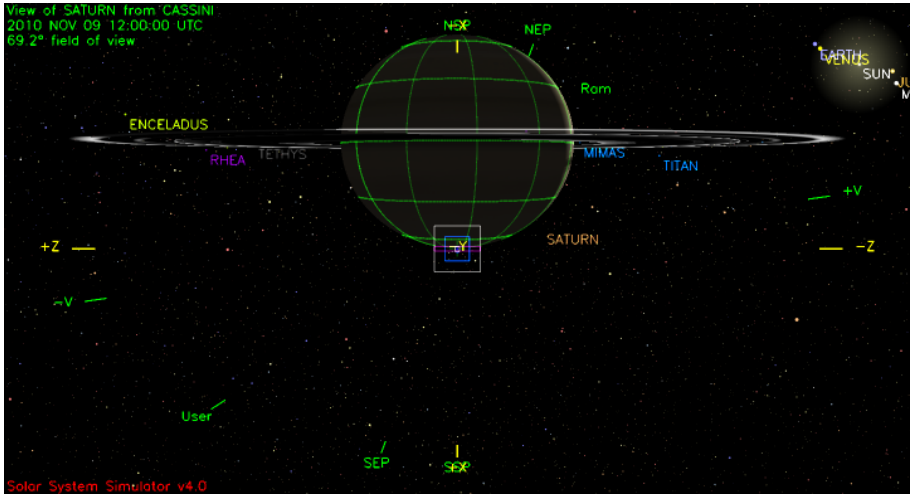


Waypoint 2 (2010-313T03:29:00 – 313T09:00:00): UVIS_SOL_OFF to Sun, NEG_X to NSP

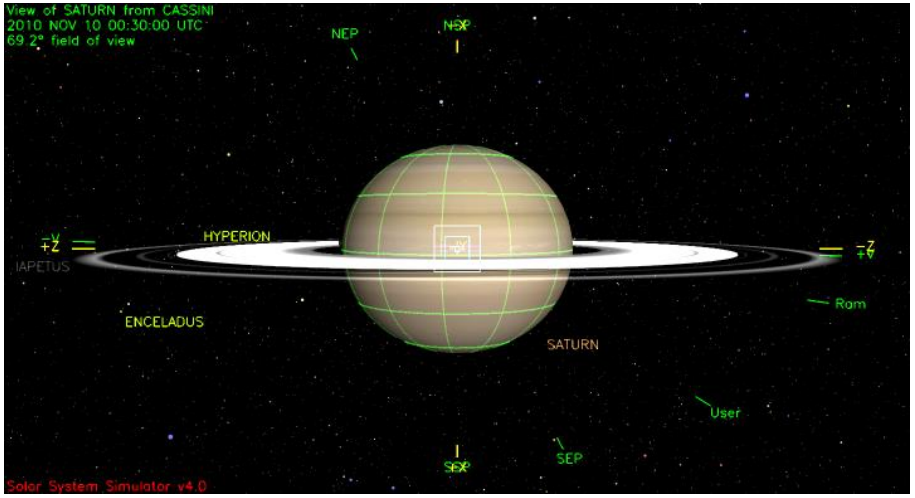


Waypoints Chosen (1/2)

Waypoint 3 (2010-313T09:00:00 – 313T15:00:00): NEG_Y to Saturn (0,0,10.0), NEG_X to NSP



Waypoint 4 (2010-313T15:00:00 – 314T09:49:00): NEG_Y to Saturn, NEG_X to NSP



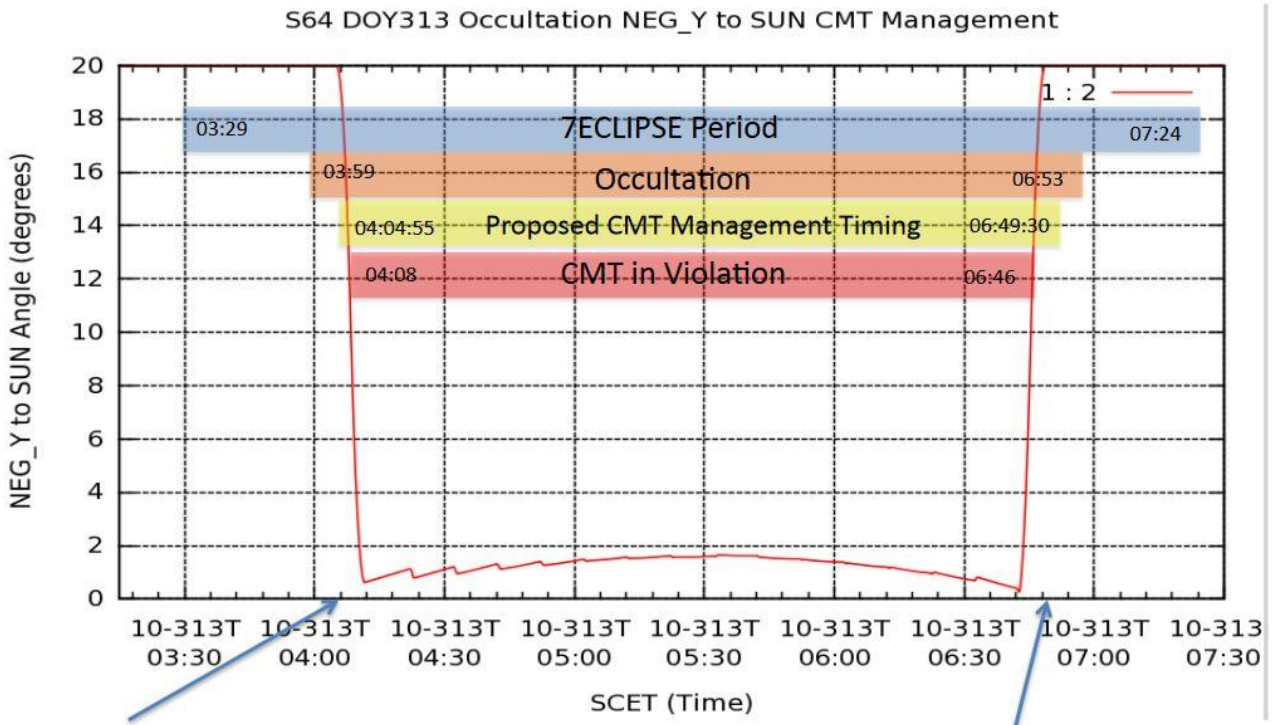
Notes and Liens

- Pointing:
  - Collaborative prime/rider coordination designs
    - CIRS_140DI_FP3SECLX001_PIE
    - VIMS_140SA_ALPCETOCC001_PRIME
    - CIRS_140EN_ENCELADUS001_PIE
    - CIRS_140SA_LIMBZON001_PIE
  - RBOT friendliness of delivery
    - RBOT friendly waypoint secondaries used except during the solar occultation when an RBOT friendly waypoint secondary could not be determined
    - RBOT friendly or waypoint secondary used for all observations except:
      - VIMS_140SA_ALPCETOCC001_PRIME: used POS_Z because the waypoint secondary NEG_X to NSP or NEG_X to 68/84 is not radiator-safe during the occultation
      - CIRS_140EN_ENCELADUS001_PIE: used NEG_X to 143.3/86.0 because it's the best option to minimize CIRS heating
- Data Volume:
  - none
- DSN:
  - none
- Opmodes:
  - None
- Special Activities:
  - CMT management for –Y to Sun waiver (see next slide)

Sequence Liens:

- none

CMT Management: -Y to Sun violation



2010-313T04:05:00
•ISS Begins the turn that violates the CMT cone

2010-313T06:49:00
•ISS Completes the turn that ends the CMT cone violation

AACS Proposed CMT management timing:
NEG_Y to SUN OFF: 2010-313T04:04:55
NEG_Y to SUN ON: 2010-313T06:49:30