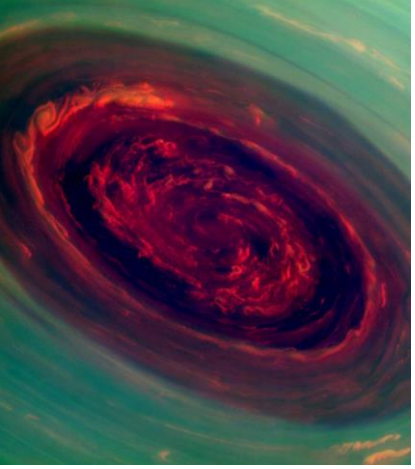

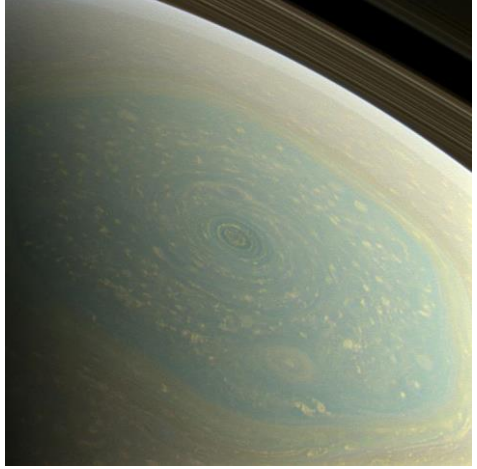
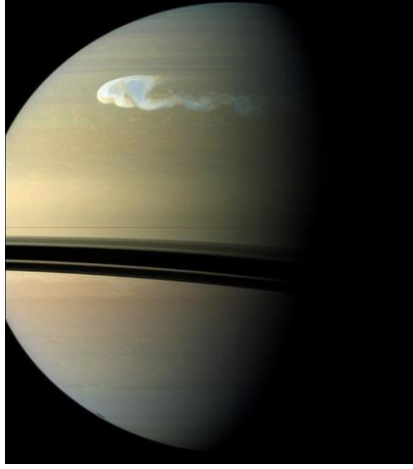

Science Planning & Sequence Team
CASSINI

SATURN TARGET WORKING TEAM

Rev 202 Segment Legacy Package

Segment Boundary: March 10, 2014 – March 13, 2014
2014-069T15:12:00 – 2014-072T21:12:00 (SCET)

Integration Began 4/15/2013
Segment Delivered to S82 Sequence 7/02/2013
Lead Integrator was Kathleen Kelleher

Legacy Package Assembled by Kathleen Kelleher

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Segment Overview and Final Products

Segment Summary

- Saturn 202 was a 3-day slice of a 27-day “CAKE” (Cassini Apoapse for Kronian Exploration) split by a sequence boundary. Saturn 202 was towards the end of the second inclined phase (IN-1B) of Solstice Mission in S82.
  - Saturn 202 was 3+ days long in S82, an outbound segment ~2 days after periapse.
  - The second part of this CAKE continued in S83.
- The timeline was filled with UVIS EUV/FUVs, Auroral Stares by UVIS and VIMS to map the southern polar region, and CIRS-led composition and mapping. Other Saturn observations included a VIMS regional map and some limb scans by ISS.
- There were only two observation periods, so two different waypoints were chosen to maximize science with minimal turn time.
- Significant data cuts in several rounds and one station upgrade were necessary to fit the data volume into available resources.

Final Sequenced SPASS

Gap 1

Gap 2

Request	Riders	Start (SCET)	Start (Epoch)	Duration	End (SCET)	Primary	Secondary	Comments
Sequence 582, length = 76 days		2013-362T01:47:00		075T19:25:00	2014-072T21:12:00			
SATURN_202 Segment		2014-069T15:12:00		003T06:00:00	2014-072T21:12:00			
SP_202SA_WAYPTTURN069_PRIME		2014-069T15:12:00		000T00:40:00	2014-069T15:52:00	ISS_NAC to R_ANSA_A	NEG_X to NSP	
NEW WAYPOINT		**2014-069T15:52:00**		**000T14:20:00**	**2014-070T06:12:00**	**ISS_NAC to R_ANSA_A**	**NEG_X to NSP**	
VIMS_202SA_SAURSTARE001_PRIME	C, I, U	2014-069T15:52:00		000T06:30:00	2014-069T22:22:00	ISS_NAC to Saturn	NEG_X to NSP	
UVIS_202SA_AURSTARE001_PRIME	C, V	2014-069T22:22:00		000T07:10:00	2014-070T05:32:00	UVIS_FUV to Saturn	NEG_X to NSP	
SP_202EA_DLTURN070_PRIME		2014-070T05:32:00		000T00:40:00	2014-070T06:12:00	XBAND to Earth	NEG_Y to 20.0/6.0	NEG_Y to Saturn (0,0,-9.5), MIMI, same as DTP. CIRS heating
NEW WAYPOINT		**2014-070T06:12:00**		**000T09:40:00**	**2014-070T15:52:00**	**XBAND to Earth**	**NEG_Y to 20.0/6.0**	
SP_202EA_G34HEFOTB070_PRIME	C, N	2014-070T06:12:00		000T09:00:00	2014-070T15:12:00	XBAND to Earth	Rolling	MIMI. Same as DTP pass. OTB
SP_202SA_WAYPTTURN070_PRIME		2014-070T15:12:00		000T00:40:00	2014-070T15:52:00	ISS_NAC to Saturn	NEG_X to Sun	
NEW WAYPOINT		**2014-070T15:52:00**		**001T20:20:00**	**2014-072T12:12:00**	**ISS_NAC to Saturn**	**NEG_X to Sun**	
VIMS_202SA_REGMAP001_PRIME		2014-070T15:52:00		000T02:00:00	2014-070T17:52:00	ISS_NAC to Saturn	NEG_X to NSP	
ISS_202SA_LIMBSCAN001_PRIME	U, V	2014-070T17:52:00		000T02:00:00	2014-070T19:52:00	ISS_NAC to Saturn	NEG_X to Sun	
CIRS_202SA_MIRTMAP001_PRIME	V	2014-070T19:52:00		000T22:00:00	2014-071T17:52:00	CIRS_FP3 to Saturn	POS_Z to NSP	EQ to 60S for 11 hours then 60N to EQ for 11 hours Ring plane crossing at 2014-071T01:26:48 for 5.5 hrs into map
ISS_202SA_LIMBSCAN002_PRIME	U, V	2014-071T17:52:00		000T02:00:00	2014-071T19:52:00	ISS_NAC to Saturn	NEG_X to Sun	
UVIS_202SA_EUVFUV001_PRIME	I	2014-071T19:52:00		000T08:00:00	2014-072T03:52:00	UVIS_FUV to Saturn (0.33,0.0,2.278 deg. offset)	NEG_X to Sun	
CIRS_202SA_COMPSIT001_PRIME	U, V	2014-072T03:52:00		000T07:40:00	2014-072T11:32:00	CIRS_FP3 to Saturn	POS_Z to NSP	
SP_202EA_DLTURN072_PRIME		2014-072T11:32:00		000T00:40:00	2014-072T12:12:00	XBAND to Earth	NEG_X to 13.0/25.0	
NEW WAYPOINT		**2014-072T12:12:00**		**000T09:00:00**	**2014-072T21:12:00**	**XBAND to Earth**	**NEG_X to 13.0/25.0**	
SP_202EA_C70METSEQ072_PRIME	C	2014-072T12:12:00		000T09:00:00	2014-072T21:12:00	XBAND to Earth	NEG_X to 13.0/25.0	CDA. NEG_X to (313/25). EOS

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_202EA_G34HEFOTB070_PRIME	070 06:12	070 15:12	0	721	64	785	3322	2537	0	161	53	1000	739	-261	0	0%	261
SP_202EA_C70METSEQ072_PRIME	072 12:12	072 16:42	261	2597	190	3048	3322	274	0	75	27	3149	1880	-1270	0	0%	1270
SP_202EA_C34HEFSEQ072_PRIME	072 16:42	072 21:12	1270	0	0	1270	3322	2052	0	86	27	1382	448	-935	0	0%	935

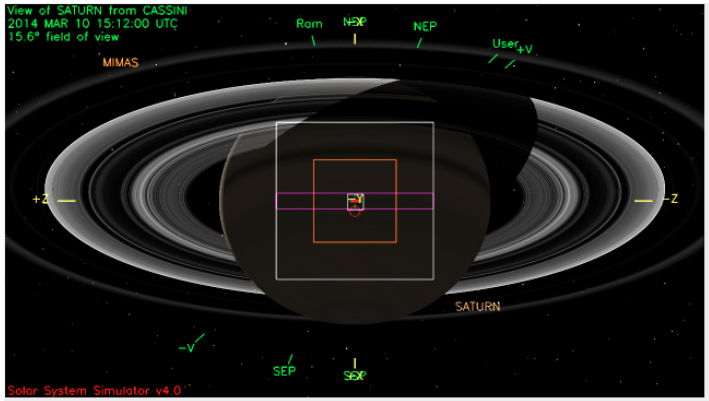
DATA VOLUME REPORT --- TRANSFER FRAME OVERHEAD NOT INCLUDED

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	069 15:02	070 06:12	0.0	14.5	100.2	5.5	130.0	13.6	32.9	0.0	49.4	247.7	121.0	0.0	63.4	778.1
SP_202EA_G34HEFOTB070_PRIME	070 06:12	070 15:12	0.0	8.5	86.4	3.2	0.0	8.0	19.4	0.0	29.2	4.9	0.0	0.0	0.0	159.7
DAILY TOTAL SCIENCE	069 15:02	070 15:12	0.0	23.0	186.6	8.7	130.0	21.6	52.3	0.0	78.5	252.6	121.0	0.0	63.4	
OBSERVATION_NOR	070 15:12	072 12:12	0.0	42.4	429.6	16.2	549.5	40.0	97.2	0.0	145.8	242.4	1010.0	0.0	188.1	2761.2
SP_202EA_C70METSEQ072_PRIME	072 12:12	072 16:42	0.0	4.2	37.8	1.6	0.0	4.0	9.7	0.0	14.6	2.5	0.0	0.0	0.0	74.4
SP_202EA_C34HEFSEQ072_PRIME	072 16:42	072 21:12	0.0	4.2	48.6	1.6	0.0	4.0	9.7	0.0	14.6	2.5	0.0	0.0	0.0	85.2
DAILY TOTAL SCIENCE	070 15:12	072 21:12	0.0	50.9	516.0	19.4	549.5	48.0	116.6	0.0	175.0	247.3	1010.0	0.0	188.1	

Segment Geometry

Seg Start (Left)

Seg End (below)




```
Rev 202 OUTBOUND
2014 -  069T15:12:00 SCET
2014 MAR 10 15:12:00 SCET
2014 MAR 10 16:30:18 ERT
Apoapse__202 + 017T22:26:32
Periapse_202 + 001T19:46:13
Light time:    78.3 min
Orbit period:  32.0 days
Radius     1135620 km      18.84 Rs
Rad_cyl    1062712 km      17.63 Rs
Z_ht_cyl   -400345 km      -6.64 Rs
Mag_L         21.52
Semi_axs   1942178 km      32.23 Rs
Eccentricity    0.558
Inclination    45.46 deg
Sun_range       9.90 AU
Earth_range     9.42 AU
--- DSN ELEV -- D/L -- U/L --------
Goldstone       7.9    31.8
Canberra       59.5    28.7
Madrid        -65.8   -48.4
------- LOOK DIRECTION INFO -------
FOV            15.6 deg  271.7 mrad
RA             27.616 deg
DEC            14.349 deg
Crosses_RP_@    0.000 Rs
EPS             5.140 deg *
SEP           116.701 deg
ORS b/s angle  17.9 deg
ORS rad angle  91.8 deg
```

Point NEG_Y at SATURN and align NEG_X = Up with NSP

User vector – RA: -113.093 DEC: +27.149 Paste Current RA/DEC

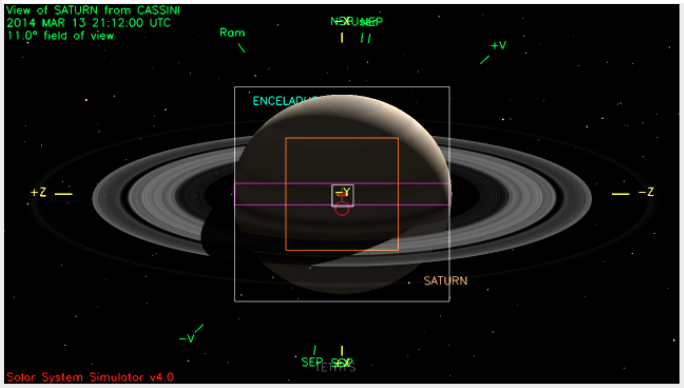
Tilt L | Up | Tilt R | Left | Reset | Right | Image | Down | Hi Res

Zoom Out | Fill Screen | Zoom In | Labels | Axes | Orbits | Vectors | FOVs | Lat/lons

Year / Month / Day / Hour / Minute / Second / Event

Turn analyzer: SATURN to EARTH about Z on RWA = 4.5 min / 22.9 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	--	--	1135620	18.84	1076060	17.85	162.1	6.08	106.19	45	-21	0	6.9	0	0.0	22.9	123.2
IO	--	--	1967M	32.63K	1967M	32.63K	42.0	0.00	0.00	17	4	139	36.4	858256751	38.1	15.5	99.8
EUROPA	--	--	1966M	32.62K	1966M	32.62K	42.0	0.00	0.00	243	4	139	17.5	857828404	38.0	15.5	99.8
GANYMEDE	--	--	1966M	32.62K	1966M	32.62K	42.0	0.00	0.00	266	4	139	21.1	857894450	38.0	15.5	99.8
CALLISTO	--	--	1964M	32.59K	1964M	32.59K	42.1	0.00	0.00	194	4	139	12.2	857105324	38.0	15.5	99.8
MIMAS	--	--	994095	16.49	993894	16.49	167.8	0.02	0.42	141	-25	32	8.5	987	6.6	16.9	118.5
ENCELADUS	--	--	1190114	19.75	1189862	19.74	150.7	0.02	0.43	294	-20	-98	18.1	-21	11.4	34.2	125.9
TETHYS	--	--	1347570	22.36	1347033	22.35	152.8	0.05	0.80	325	-18	-135	17.8	-5468	9.5	32.2	128.3
DIONE	--	--	1295013	21.49	1294451	21.48	176.0	0.05	0.87	55	-18	108	9.9	215	16.2	8.5	119.6
RHEA	--	--	715750	11.88	714985	11.86	145.3	0.12	2.14	220	-33	-20	8.3	-3020	20.4	38.6	111.9
TITAN	--	--	1408519	23.37	1405944	23.33	140.0	0.21	3.66	45	-17	71	4.3	7477	57.8	35.0	91.6
HYPERION	--	--	1478834	24.54	1478675	24.53	87.0	0.01	0.22	345	-14	-60	8.9	-30398	75.8	97.4	101.1




```
Rev 202 OUTBOUND
2014 -  072T21:12:00 SCET
2014 MAR 13 21:12:00 SCET
2014 MAR 13 22:29:56 ERT
Apoapse__202 + 021T04:26:32
Periapse_202 + 005T01:46:13
Light time:    77.9 min
Orbit period:  31.9 days
Radius     1924834 km      31.94 Rs
Rad_cyl    1853943 km      30.76 Rs
Z_ht_cyl    517572 km       8.59 Rs
Mag_L         34.43
Semi_axs   1941420 km      32.21 Rs
Eccentricity    0.557
Inclination    45.46 deg
Sun_range       9.91 AU
Earth_range     9.37 AU
--- DSN ELEV -- D/L -- U/L --------
Goldstone      -64.1   -34.8
Canberra        28.4    59.0
Madrid          -8.1   -37.6
------- LOOK DIRECTION INFO -------
FOV            11.0 deg  192.1 mrad
RA             65.766 deg
DEC           -21.470 deg
Crosses_RP_@    0.000 Rs
EPS             4.987 deg *
SEP           119.968 deg
ORS b/s angle  41.2 deg
ORS rad angle 126.1 deg
```

Point NEG_Y at SATURN and align NEG_X = Up with NSP

User vector – RA: -113.093 DEC: +27.149 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 / Event

Turn analyzer: SATURN to EARTH about Z on RWA = 6.0 min / 40.2 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	ALON (deg)	VREL (km/s)	Z_HGHT (km)	ANGLE_FROM SATRN	ANGLE_FROM EARTH	ANGLE_FROM RAM
SATURN	--	--	1924834	31.94	1864975	30.94	138.8	3.59	62.63	122	16	0	4.5	0	0.0	40.2	128.9
IO	--	--	1966M	32.62K	1966M	32.62K	42.1	0.00	0.00	318	4	176	34.5	858153327	41.6	15.7	91.1
EUROPA	--	--	1965M	32.60K	1965M	32.60K	42.1	0.00	0.00	212	4	176	9.8	857701559	41.6	15.7	91.1
GANYMEDE	--	--	1966M	32.62K	1966M	32.62K	42.1	0.00	0.00	70	4	176	29.1	858316775	41.6	15.7	91.1
CALLISTO	--	--	1965M	32.61K	1965M	32.61K	42.1	0.00	0.00	264	4	176	20.7	857769988	41.6	15.7	91.2
MIMAS	--	--	1925774	31.95	1925577	31.95	140.9	0.01	0.22	276	14	-87	16.5	753	5.5	38.8	131.9
ENCELADUS	--	--	2150232	35.68	2149977	35.67	139.5	0.01	0.24	16	14	166	15.3	-17	2.2	39.2	126.7
TETHYS	--	--	1642634	27.26	1642095	27.25	136.1	0.04	0.66	177	17	3	9.3	2130	2.7	42.9	130.8
DIONE	--	--	1885720	31.29	1885159	31.28	132.3	0.03	0.60	90	16	78	8.7	-29	11.3	45.5	122.5
RHEA	--	--	2217112	36.79	2216348	36.77	133.8	0.04	0.69	52	14	119	9.4	1911	12.2	43.8	120.1
TITAN	--	--	1286670	21.35	1284095	21.31	106.2	0.23	4.00	100	24	39	3.9	-1213	39.8	70.5	110.3
HYPERION	--	--	2020784	33.53	2020662	33.53	132.4	0.01	0.16	209	60	-69	7.1	-23624	47.0	51.7	143.6

	Saturn Range	Phase Angle	Sub-S/C Lat.
Segment Start	18.8 R_{Sat}	162.1°	21° S
Segment End	31.9 R_{Sat}	138.8°	16° N

Daily Science Highlights

DOY 69: The Saturn_202 segment kicked off the first 3 days of a 27-day Saturn CAKE to end S82. First a VIMS southern polar auroral map (stare) was conducted, followed by a UVIS stare and then slews across the auroral oval.

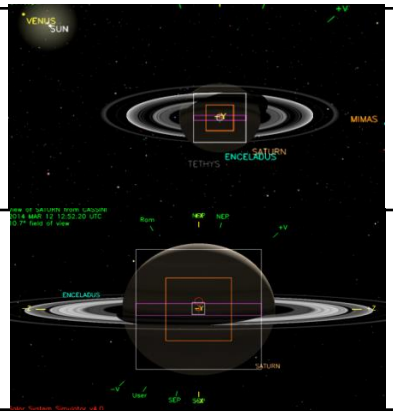
DOY 70: Finishing up the UVIS stare/slew, a downlink was performed followed by a a VIMS regional map of the planet doing a couple of mosaics. Then an ISS Limb scan imaging along the bright limb of Saturn was performned, followed by the start of a CIRS observation to map Saturn's atmosphere with its mid-infrared sensor.

DOY 71: Finishing up the 22-hour CIRS map, another ISS Limb scan was conducted , followed by the start of a UVIS EUVFUV as part of the normal Saturn CAKE template, with CIRS and ISS riding.

DOY 72: After the completion of the UVIS scan, a CIRS Compsit was conducted before turning to downlink to end the segment and the S82 sequence.

Segment Integration Planning

Timeline Gaps and Suggested Observations (1 of 2)

Gap	Start	End	Duration	Phase angle	Range (R_{Saturn})	SSC latitude	Snapshot (mid-gap - no TCMs)
1*	2014-069T15:52:00	070T06:12:00	000T13:40:00	163.3° – 166.6°	18.9 – 21.45	20° S – 10° S	
2	2014-070T15:52:00	072T11:32:00	001T19:40:00	163.2 – 142.5	23.1 – 30.47	5° S - 13° N	

* This gap includes a period of time when NEG_Y to Saturn is below 15º from 2014-069T19:46 – 070T11:46.

This will require a waiver for any violation.

Timeline Gaps and Suggested Observations (2 of 2)

Suggestions:

GAP 1:

ISS_202RI_PHOLCLOSE001_PRIME	U	2014-069T15:52:00	000T13:40:00	2014-070T05:32:00	27Mb/hr
OR					
VIMS Bright Limb Mapping/Aurora	U	2014-069T15:52:00	000T04:00:00	2014-069T19:52:00	50Mb/hr
ISS Bright Limb		2014-069T19:52:00	000T02:00:00	2014-069T21:52:00	100Mb/hr
VIMS Bright Limb Mapping/Aurora	U	2014-069T21:52:00	000T04:00:00	2014-070T01:52:00	50Mb/hr
ISS Bright Limb		2014-070T01:52:00	000T03:40:00	2014-070T05:32:00	100Mb/hr

Note: Gap 1 has difficult geometry. NEG_Y to Saturn is below 15º from 2014-069T19:46 – 070T11:46 and requires a waiver for any violation.

GAP 2:

Observation	Riders	Start	Duration	End	DV Assumed
CAPS_202CO_IONCALPTG001_PRIME		2014-070T15:52:00	000T04:00:00	2014-070T19:52:00	36.7Mb/hr
ISS_202OT_TAQROT029_PRIME		2014-070T19:52:00	001T15:00:00	2014-072T10:52:00	13.2Mb/hr
OR					
VIMS Bright Limb Mapping/Aurora	U	2014-070T15:52:00	000T04:00:00	2014-070T19:52:00	50Mb/hr
CIRS MAP		2014-070T19:52:00	000T22:00:00	2014-071T17:52:00	14.6Mb/hr
ISS Bright Limb		2014-071T17:52:00	000T02:00:00	2014-071T19:52:00	100Mb/hr
UVIS EUVFUV	C	2014-071T19:52:00	000T08:00:00	2014-072T04:52:00	18.1Mb/hr
CIRS COMPSIT	U	2014-072T04:52:00	000T06:40:00	2014-072T06:52:00	7.2Mb/hr

Note: The data volume usage is either what's already in CIMS or assumed at rates *only used to estimate data volume for a mock SMT run*.

Initial SMT and Data Volume (1 of 3)

As is currently in CIMS: **Only MIMI and RPWS are at minimal rates!!**

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_202EA_G34HEFOTB070_PRIME	070 06:12	070 15:12	0	583	63	647	3322	2675	0	202	53	901	739	-163	1810	40%	163
SP_202EA_C70METSEQ072_PRIME	072 12:12	072 21:12	163	1159	190	1512	3322	1810	0	201	53	1766	3806	2040	2040	54%	0

As is currently in CIMS (estimate assuming all MAPS at Minimal):

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_202EA_G34BWGOTB070_PRIME	070 06:12	070 15:12	0	558	63	622	3322	2700	0	184	53	859	629	-230	1950	44%	230
SP_202EA_C70METSEQ072_PRIME	072 12:12	072 21:12	230	952	190	1372	3322	1950	0	183	53	1608	3806	2197	2198	58%	0

REMINDER: MAPS must go to Minimal for the entire CAKE!
(**2014-069T15:12:00** to **2014-096T19:45:00**)

Initial SMT and Data Volume (2 of 3)

Currently in CIMS:

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	069 15:12	070 06:12	37.8	28.3	0.0	5.4	378.7	26.7	32.4	0.0	48.6	20.1	0.0	0.0	62.7	640.6
SP_202EA_G34HEFOTB070_PRIME	070 06:12	070 15:12	22.7	17.0	86.4	3.2	0.0	16.0	19.4	0.0	29.2	6.1	0.0	0.0	0.0	200.0
DAILY TOTAL SCIENCE	069 15:12	070 15:12	60.5	45.3	86.4	8.6	378.7	42.7	51.8	0.0	77.8	26.1	0.0	0.0	62.7	
OBSERVATION_NOR	070 15:12	072 12:12	260.3	84.9	0.0	16.2	464.1	80.0	97.2	0.0	145.8	0.0	0.0	0.0	188.1	1336.6
SP_202EA_C70METSEQ072_PRIME	072 12:12	072 21:12	22.7	17.0	86.4	3.2	0.0	16.0	19.4	0.0	29.2	4.9	0.0	0.0	0.0	198.8
DAILY TOTAL SCIENCE	070 15:12	072 21:12	283.0	101.9	86.4	19.4	464.1	96.0	116.6	0.0	175.0	4.9	0.0	0.0	188.1	

	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)	343.4	147.1	172.8	28.1	842.8	138.7	168.5	0.0	252.7	31.1	0.0	0.0

MAPS must go to minimal rates: Currently, only CAPS, MIMI and RPWS has done this!!

AVERAGE DATA RATE REPORT (calculated over observation periods and downlink passes)

Event	Start doy hh:mm	End doy hh:mm	CAPS (bps)	CDA (bps)	INMS (bps)	MAG (bps)	MIMI (bps)	RPWS (bps)	UVIS (bps)
SP_202NA_OBSERV069_NA	069 15:12	070 06:12	700.0	524.0	100.0	494.0	600.0	900.0	371.6
SP_202EA_G34HEFOTB070_PRIME	070 06:12	070 15:12	700.0	524.0	100.0	494.0	600.0	900.0	187.4
SP_202NA_OBSERV070_NA	070 15:12	072 12:12	1606.7	524.0	100.0	494.0	600.0	900.0	0.0
SP_202EA_C70METSEQ072_PRIME	072 12:12	072 21:12	700.0	524.0	100.0	494.0	600.0	900.0	152.5

Initial SMT and Data Volume (3 of 3)

Going with the VIMS/ISS/CIRS/UVIS observations instead of current ISS rocks and CAPS (presupposed 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_202EA_G34HEFOTB070_PRIME	070 06:12	070 15:12	0	1163	63	1227	3322	2096	0	183	53	1463	739	-725	922	20%	724
SP_202EA_C70METSEQ072_PRIME	072 12:12	072 21:12	724	1486	190	2400	3322	922	0	183	53	2637	3806	1169	1169	31%	0

If we go with the VIMS/ISS/CIRS/UVIS obs. at the assumed data volume rates on Page 5, there will be ~920Mb left over for any riders not listed or primes who want more data volume than what is listed.

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	069 15:12	070 06:12	37.8	14.1	0.0	5.4	567.0	13.3	35.1	0.0	48.6	29.0	402.2	0.0	62.7	1215.3
SP_202EA_G34HEFOTB070_PRIME	070 06:12	070 15:12	22.7	8.5	86.4	3.2	0.0	8.0	21.1	0.0	29.2	2.5	0.0	0.0	0.0	181.5
DAILY TOTAL SCIENCE	069 15:12	070 15:12	60.5	22.6	86.4	8.6	567.0	21.3	56.2	0.0	77.8	31.5	402.2	0.0	62.7	
OBSERVATION_NOR	070 15:12	072 12:12	113.4	42.4	424.8	16.2	200.0	40.0	105.3	0.0	145.8	183.6	201.1	0.0	188.1	1660.7
SP_202EA_C70METSEQ072_PRIME	072 12:12	072 21:12	22.7	8.5	86.4	3.2	0.0	8.0	21.1	0.0	29.2	2.5	0.0	0.0	0.0	181.5
DAILY TOTAL SCIENCE	070 15:12	072 21:12	136.1	50.9	511.2	19.4	200.0	48.0	126.4	0.0	175.0	186.0	201.1	0.0	188.1	

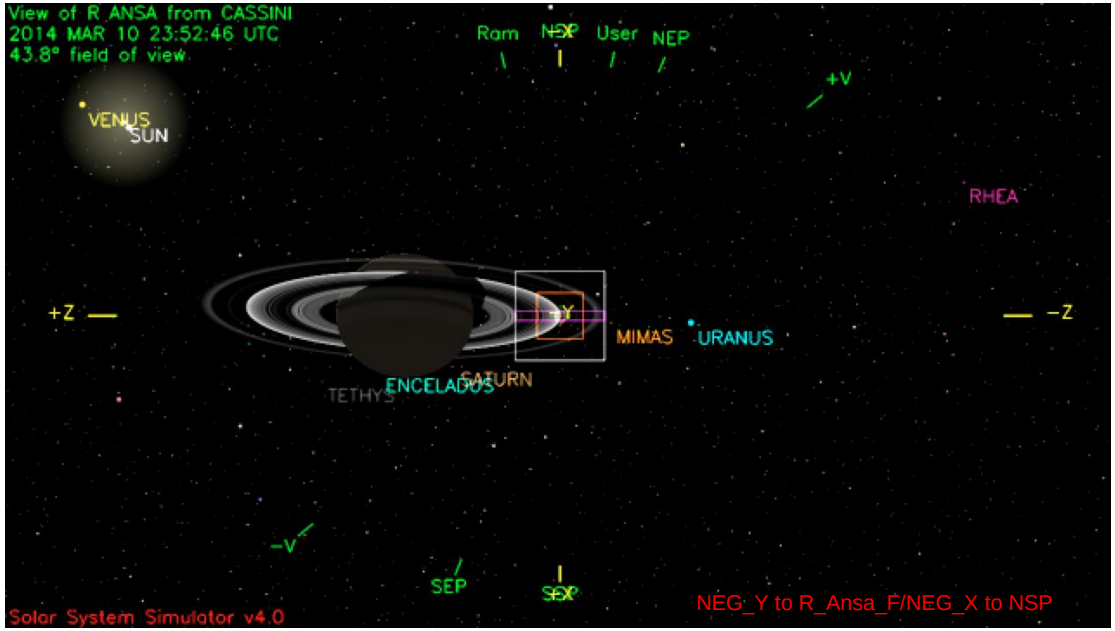
	CAPS (Mb)	CDA (Mb)	CIRS (Mb)	INMS (Mb)	ISS (Mb)	MAG (Mb)	MIMI (Mb)	RADAR (Mb)	RPWS (Mb)	UVIS (Mb)	VIMS (Mb)	PROBE (Mb)
TOTAL RECORDED (OPNAV data not included)	196.6	73.6	597.6	28.1	767.0	69.4	182.5	0.0	252.7	217.5	603.4	0.0

Waypoint Selection (1 of 2)

RBOT – Friendly as per CTV:

OBS_NAME	START	END	POS_X_2_NSP	POS_X_2_NEP	NEG_X_2_NSP	NEG_X_2_NEP	POS_Z_2_NSP	POS_Z_2_NEP	NEG_Z_2_NSP	NEG_Z_2_NEP	NEG_X_2_SUN	NEG_Z_2_EARTH
SP_202NA_OBSERV069_NA	2014-069T15:12:00	2014-070T06:12:00	**BAD**	**BAD**	**BAD**	**BAD**	**BAD**	**BAD**	**BAD**	**BAD**	**BAD**	**BAD**
SP_202NA_OBSERV070_NA	2014-070T15:12:00	2014-072T12:12:00	**BAD**	**BAD**	OK	OK	**BAD**	**BAD**	**BAD**	**BAD**	OK	**BAD**

Period 1: NEG_Y to Saturn is below 15º from 2014-069T19:46 – 070T11:46 and requires a waiver for any violation.

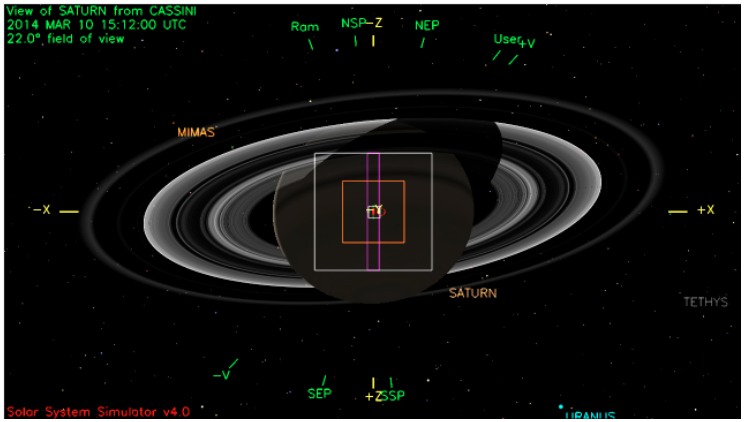


NEG_Y to R_Ansa_F with NEG_X or NEG_Z to NSP as a secondary works as a safe waypoint for Period 1.

Waypoint Selection (2 of 2)

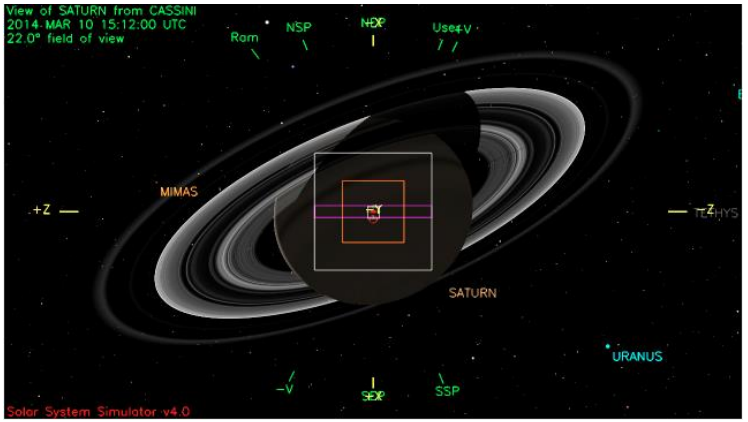
Second Period

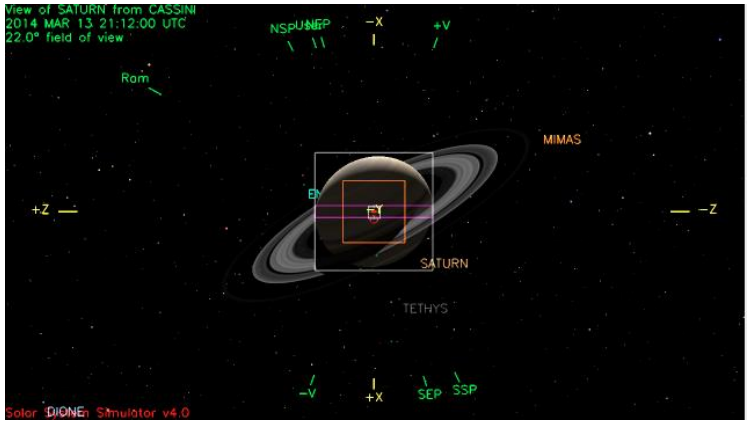
Potential RBOT problem: NEG_X to SUN



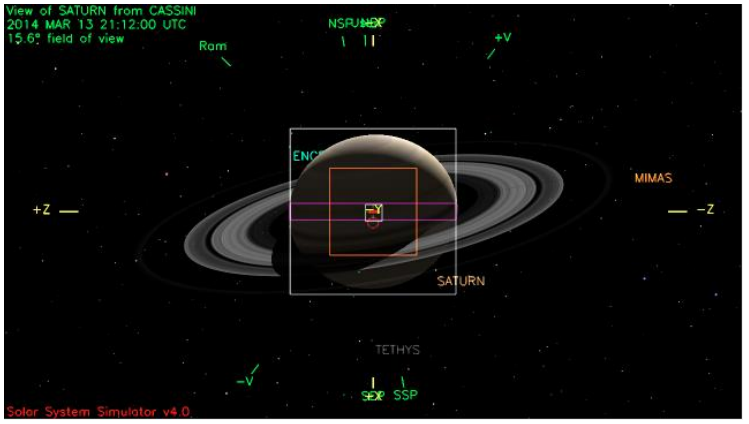
Beginning of segment

RBOT – Friendly: NEG_X to NEP





End of observation time



End of segment

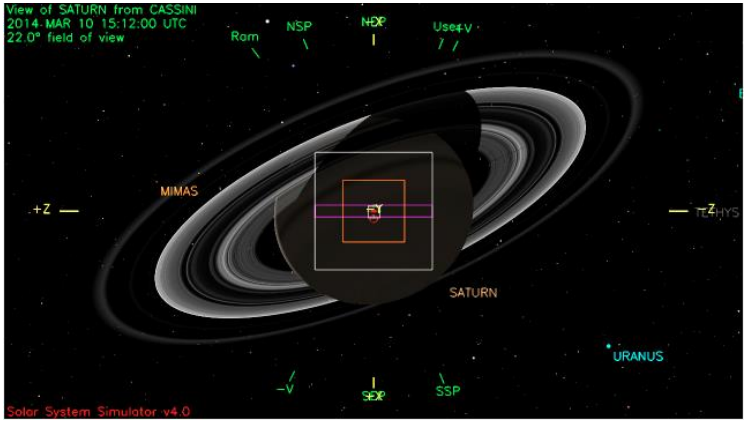
RBOT – Friendly: POS_Z to NEP

RBOT – Friendly: POS_Z to NSP

Waypoints Chosen

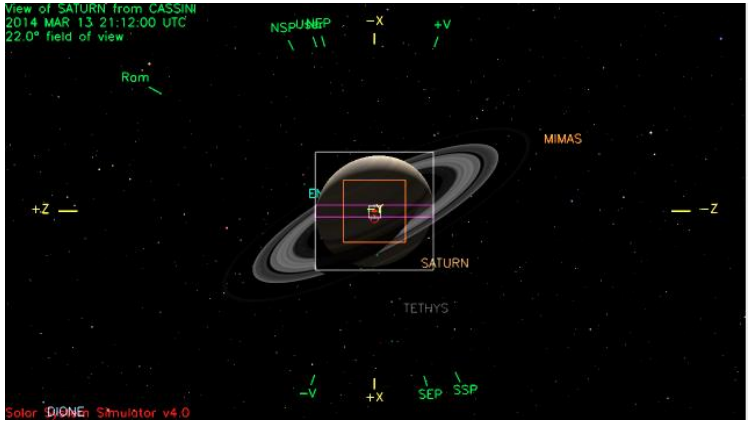
First Period:

RBOT – Friendly: NEG_X to NEP



Second Period

NEG_X to SUN



Notes & Liens

- Pointing:
  - CIRS heating (>1.6˚) during SP_202EA_G34HEFOTB070_PRIME downlink. Attitude determined by DLWG for MIMI. This is also an OTB, so the secondary needs to be the same as the OTP.
  - No YGAPs. The first downlink is OTB and the other is the last downlink of the sequence, will be followed by BOS Bias.
  - No PIEs.

- RBOT friendly secondaries used except:
  - ISS_NAC to Right_Ansa_A is used as waypoint on 2014-069T15:52:00 - 070T06:12
    - Sun is off left Ansa and there was no RBOT Friendly waypoint identified. (ISS_NAC to SA < 15 deg.)
    - Use 129475.0 km for waypoint A-Ring radial distance from Saturn in all designs

    Other distances: see https://cassini.jpl.nasa.gov/sp/doc/ANSA_DEFS.pdf

- Data Volume:
  - 275Mb of carryover accepted from Rings TWT.
- DSN:
  - No issues.
- Resource checker:
  - No items
- SPLAT:
  - No items.
- Opmodes: None.
  - Only OpModes used were DFPW and DFPW-TCM.
- Hydrazine:
  - None
- Special Activities:
  - None