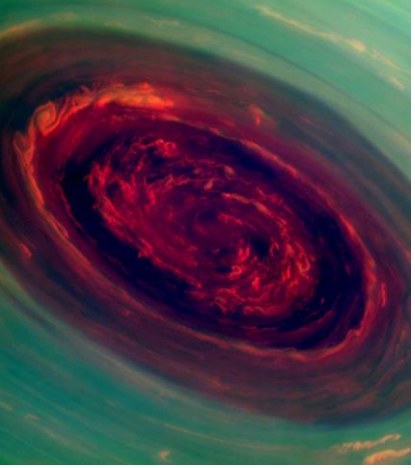
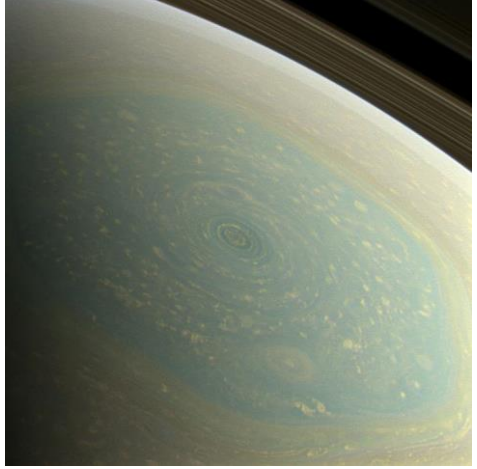
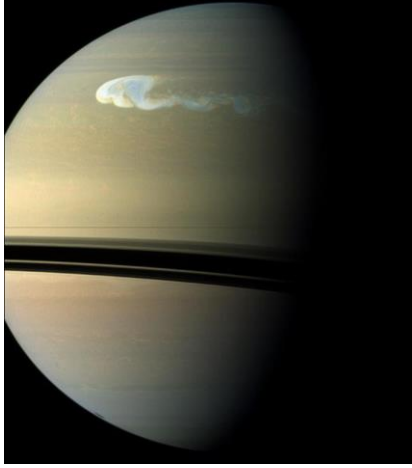


Science Planning & Sequence Team
CASSINI

SATURN TARGET WORKING TEAM

Rev 292 Segment Legacy Package

Segment Boundary: Sept 8, 2017 – Sept 11, 2017
2017-251T10:21:00 – 2017-254T04:37:00 (SCET)

Integration Began 11/14/2016
Segment Delivered to S101 Sequence 01/19/2017
Lead Integrator was Martin Brennan

Legacy Package Assembled by Martin Brennan

Table of Contents

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

Segment Overview and Final Products

Segment Summary

- Saturn 292 was the final Saturn segment. It was a periapse segment during the Proximal Orbits with a closest approach of 1.025 R_S , starting ~14 hours before perikrone and ending 2 days after.
- The high inclination segment began on the night side, approaching the N. Pole, then passed through perikrone on the day side, where the POST (Proximal periapse pre-integration) science was planned, including a He/H_2 ratio measurement (CIRS N ADIROCC and VIMS GAMCRUOCC) and the second to last INMS atmosphere measurement.
- This low altitude (1704km) Saturn segment skimmed along the upper atmosphere of Saturn for unique INMS/RADAR in-situ compositional measurements
- The INMS/RADAR POST science warranted a Dual Playback of 129Mb.
- Before integration kickoff, 1.3 Gb of data volume was volunteered to be cut by RPWS, remedying all SSR oversubscription data issues.
- An additional observational time (~12 min) was negotiated for VIMS/CIRS GAMCRUOCC PIE activity by reallocating the turn for the INMS/RADAR attitude to be fully within the INMS PIE request (on RCS),while giving an additional 8 min for the turn.
- In order to achieve INMS_292CO_SATAMOS001 POST science, major CIRS/VIMS heating was negotiated with CIRS ΔT_{max} = 16.58K and VIMS ΔT_{max} = 8.27K.
- This segment contained a “jumpstart” period. Due to the challenging geometry and unique science of this phase of the mission, the timeline for the days around periapse was decided in advance of full segment integration. Detailed pointing analysis, constraint checking, and reaction-wheel bias optimization (RBOT) was performed on the periapse period. No changes were required due to relaxed RBOT constraints

Final Sequenced SPASS

Rev 292 Jumpstart

Gap 1

Request	Riders	Start (SCET)	Start (Epoch)	Duration	End	Primary	Secondary	Comments
Sequence 5101, length=67...		2017-191T01:14:00		067T19:22:00	2017-258T20:36:00			
SATURN_292 Segment		2017-251T10:21:00		002T18:16:00	2017-254T04:37:00			
SP_292SA_WAYPTTURN251_PRIME		2017-251T10:21:00		000T00:37:00	2017-251T10:58:00	ISS_NAC to Saturn	POS_Z to INSP	Turn from XBAND to Earth; NEG_Y to Saturn
NEW WAYPOINT		2017-251T10:58:00		000T15:21:59	2017-252T02:19:59	ISS_NAC to Saturn	POS_Z to INSP	
CIRS_292SA_NADIROCC001_PRIME		2017-251T10:58:00		000T02:00:00	2017-251T12:58:00	CIRS_FP4 to Saturn	POS_Z to INSP	PIE, Track occ lat=4.14N (Phil), lon~334 in DIGIT
VIMS_292SA_NPOLEMAP001_PRIME	C, I, U	2017-251T12:58:00		000T06:37:00	2017-251T19:35:00	ISS_NAC to Saturn	POS_Z to INSP	
SP_292SA_DEADTIME251_PRIME		2017-251T19:50:00		000T00:19:59	2017-251T20:09:59	ISS_NAC to Saturn	POS_Z to INSP	Start absolute, End epoch
Begin Custom		2017-251T20:09:59	LMB_E292_Peri-000T04:08:05	000T00:00:01	2017-251T20:10:00	ISS_NAC to Saturn	POS_Z to INSP	
VIMS_292RI_GAMCRUOCC001_PRIME	C	2017-251T20:09:59	LMB_E292_Peri-000T04:08:05	000T01:38:00	2017-251T21:47:59	VIMS_IR to 187.791/-57.113	POS_Z to INSP	No Preference to Secondary pointing. Pick up at ISS_NAC to Saturn, POS_Z to INSP; Hand off at VIMS_IR to 187.791/-57.113, POS_Z to INSP.
VIMS_292SA_GAMCRUOCC001_PIE	C, M	2017-251T21:47:59	LMB_E292_Peri-000T02:30:05	000T01:21:05	2017-251T23:09:04	VIMS_IR to 187.791/-57.113	PIC	Collaborative Rider(s): CIRS. Pick up at VIMS_IR to 187.791/-57.113, POS_Z to INSP; Hand off at NEG_Y to 235.73/-56.14 (0.0,-27.0,0.0 deg. offset), POS_X to INSP.
ENGR_292SC_RADRCS251_PRIME	M	2017-251T23:09:04	LMB_E292_Peri-000T01:09:00	000T00:01:00	2017-251T23:10:04	NEG_Y to 235.73/-56.14 (0.0,-27.0,0.0 deg. offset)	POS_X to INSP	Pick up at NEG_Y to 235.73/-56.14 (0.0,-27.0,0.0 deg. offset), POS_X to INSP; Hand off at NEG_Y to 235.73/-56.14 (0.0,-27.0,0.0 deg. offset), POS_X to INSP. Deadband=(2,2,20).
INMS_292CO_SATAMOS001_PIE	I, M, R	2017-251T23:10:04	LMB_E292_Peri-000T01:08:00	000T02:08:00	2017-252T01:18:04	POS_X to COROT	NEG_Z to Saturn	Collaborative Rider(s): RADAR. Pick up at NEG_Y to 235.73/-56.14 (0.0,-27.0,0.0 deg. offset), POS_X to INSP; Hand off at NEG_Z to Saturn, POS_Y to Sun.
Begin Dual Playback Science		2017-252T00:03:04	LMB_E292_Peri-000T00:15:00	000T00:00:01	2017-252T00:03:05			
Periapse RR=1.025Rs, lat...		2017-252T00:18:05		000T00:00:01	2017-252T00:18:06			
End Dual Playback Science		2017-252T00:28:04	LMB_E292_Peri+000T00:10:00	000T00:00:01	2017-252T00:28:05			
SP_292SA_WAYPTTURN452_PRIME	M	2017-252T01:18:04	LMB_E292_Peri+000T01:00:00	000T00:03:00	2017-252T01:21:04	NEG_Z to B50.45/57.79	POS_Y to Sun	Pick up at NEG_Z to Saturn, POS_Y to Sun; Hand off at NEG_Z to B50.45/57.79, POS_Y to Sun. Turn to Quiescent Attitude for RWA Transition.
ENGR_292SC_DFPWBIAS252_PPS	M	2017-252T01:21:04	LMB_E292_Peri+000T01:03:00	000T00:21:05	2017-252T01:42:09	NEG_Z to B50.45/57.79	POS_Y to Sun	Pick up at NEG_Z to B50.45/57.79, POS_Y to Sun; Hand off at NEG_Z to B50.45/57.79, POS_Y to Sun.
SP_292SA_WAYPTTURN252_PRIME	M	2017-252T01:42:09	LMB_E292_Peri+000T01:24:05	000T00:37:50	2017-252T02:19:59	ISS_NAC to Saturn	NEG_Z to INSP	Pick up at NEG_Z to B50.45/57.79, POS_Y to Sun; Hand off at ISS_NAC to Saturn, NEG_Z to INSP.
NEW WAYPOINT		2017-252T02:19:59		000T09:17:01	2017-252T11:37:00	ISS_NAC to Saturn	NEG_Z to INSP	
End Custom		2017-252T02:19:59	LMB_E292_Peri+000T02:01:55	000T00:00:01	2017-252T02:20:00	ISS_NAC to Saturn	NEG_Z to INSP	
SP_292SA_DEADTIME252_PRIME		2017-252T02:19:59	LMB_E292_Peri+000T02:01:55	000T00:20:01	2017-252T02:40:00	ISS_NAC to Saturn	NEG_Z to INSP	Start epoch, End absolute
UVIS_292SA_AURSLEW001_PRIME		2017-252T02:40:00		000T04:09:00	2017-252T06:49:00	UVIS_FUV to Saturn	NEG_Z to INSP	
UVIS_292SA_AURNSTARE001_PRIME	I	2017-252T06:49:00		000T04:08:00	2017-252T10:57:00	ISS_NAC to Saturn	NEG_Z to INSP	
SP_292EA_DLTURN252_PRIME		2017-252T10:57:00		000T00:40:00	2017-252T11:37:00	XBAND to Earth	POS_X to NEP	
NEW WAYPOINT		2017-252T11:37:00		000T12:45:00	2017-253T00:22:00	XBAND to Earth	POS_X to NEP	
ENGR_292SC_KPTYBIAS252_PRIME		2017-252T11:37:00		000T01:30:00	2017-252T13:07:00	NEG_Z to DELTA_H (0.0,0.0,32.997 deg. offset)	NEG_X to Sun	
SP_292EA_M70METNON252_PRIME	C	2017-252T13:07:00		000T07:45:00	2017-252T20:52:00	XBAND to Earth	Rolling/SRU	SRU.
Pointer Reset in preparatio...		2017-252T20:52:00		000T00:00:01	2017-252T20:52:01			
SP_292EA_G70METNON252_PRIME		2017-252T20:52:00		000T03:00:00	2017-252T23:52:00	XBAND to Earth	POS_X to NEP	
SP_292SA_WAYPTTURN253_PRIME		2017-252T23:52:00		000T00:30:00	2017-253T00:22:00	ISS_NAC to Saturn	NEG_Z to INSP	
NEW WAYPOINT		2017-253T00:22:00		000T20:00:00	2017-253T20:22:00	ISS_NAC to Saturn	NEG_Z to INSP	
ISS_292TI_M90R1CLD252_PRIME	C, V	2017-253T00:22:00	E292_M90R1CLD252+000T00:00	000T02:00:00	2017-253T02:22:00	ISS_NAC to Titan	NEG_X to INSP	
CIRS_292SA_COMPSIT001_PRIME	U, V	2017-253T02:22:00		000T08:40:00	2017-253T11:02:00	CIRS_FP1 to Saturn	NEG_Z to INSP	southern hemisphere
VIMS_292SA_FULLDISK001_PRIME	C	2017-253T11:02:00		000T09:00:00	2017-253T20:02:00	ISS_NAC to Saturn	NEG_Z to INSP	
SP_292EA_DLTURN253_PRIME		2017-253T20:02:00		000T00:20:00	2017-253T20:22:00	XBAND to Earth	NEG_Y to Saturn	
NEW WAYPOINT		2017-253T20:22:00		000T08:55:00	2017-254T05:17:00	XBAND to Earth	NEG_Y to Saturn	
SP_292EA_G70METNON253_PRIME	C	2017-253T20:22:00		000T08:15:00	2017-254T04:37:00	XBAND to Earth	Rolling/Bias	SRU.

Final Sequenced SMT and Data Volume

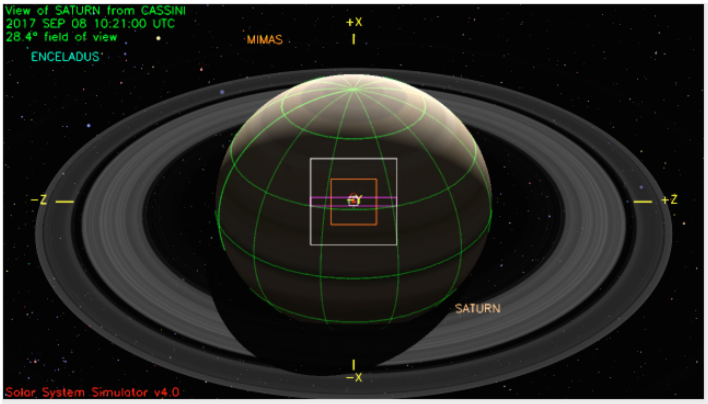
DATA VOLUME SUMMARY --- TRANSFER FRAME OVERHEAD INCLUDED (80 BITS PER 8800-BIT FRAME)

			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_292EA_M70METNON252_PRIME	252 13:07	252 20:52	152	2916	129	3197	3322	125	0	184	46	3426	1906	-1520	66	0%	1520
SP_292EA_G70METNON252_PRIME	252 20:52	252 23:52	1520	0	0	1520	3322	1802	0	173	18	1710	922	-789	66	1%	788
SP_292EA_G70METNON253_PRIME	253 20:22	254 04:37	788	1286	87	2161	3322	1161	0	197	49	2406	2448	42	66	1%	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	251 10:21	252 13:07	0.0	90.3	108.8	23.1	400.0	130.5	111.4	38.9	1240.3	269.9	476.0	0.0	127.2	3016.4
SP_292EA_M70METNON252_PRIME	252 13:07	252 20:52	0.0	14.6	72.9	2.8	0.0	27.6	23.7	0.0	36.3	4.3	0.0	0.0	0.0	182.1
SP_292EA_G70METNON252_PRIME	252 20:52	252 23:52	0.0	5.7	0.0	1.1	0.0	10.7	9.2	0.0	14.0	1.6	0.0	0.0	129.2	171.5
DAILY TOTAL SCIENCE	251 10:21	252 23:52	0.0	110.6	181.7	26.9	400.0	168.7	144.3	38.9	1290.6	275.8	476.0	0.0	256.4	
OBSERVATION_NOR	252 23:52	253 20:22	0.0	38.7	156.0	7.4	73.5	72.9	62.7	0.0	96.5	31.4	735.0	0.0	85.7	1359.8
SP_292EA_G70METNON253_PRIME	253 20:22	254 04:37	0.0	15.6	78.3	3.0	0.0	29.3	25.2	0.0	38.9	4.5	0.0	0.0	0.0	194.9
DAILY TOTAL SCIENCE	252 23:52	254 04:37	0.0	54.2	234.3	10.4	73.5	102.3	88.0	0.0	135.4	35.9	735.0	0.0	85.7	

Segment Geometry




```
Rev 292  INBOUND
2017 -  251T10:21:00 SCET
2017 SEP 08 10:21:00 SCET
2017 SEP 08 11:43:30 ERT
Apoapse__292 + 002T15:33:06
Periapse_292 - 13:57:06
Light time:    82.5 min
Orbit period:  6.5 days
Radius      606883 km      10.07 Rs
Rad_cyl     522184 km       8.66 Rs
Z_ht_cyl    309242 km       5.13 Rs
Mag_L          13.60
Semi_axs    668857 km      11.10 Rs
Eccentricity    0.908
Inclination    61.69 deg
Sun_range      10.06 AU
Earth_range     9.92 AU
--- DSN ELEV -- D/L -- U/L --------
Goldstone     -57.5  -24.1
Canberra       43.1   73.8
Madrid        -22.5  -53.6
------- LOOK DIRECTION INFO -------
FOV            28.4 deg  494.9 mrad
RA             99.090 deg
DEC           -34.178 deg
Crosses_RP_@    0.000 Rs
EPS             5.719 deg *
SEP            95.381 deg
ORS b/s angle  57.7 deg
ORS rad angle  33.0 deg  *
```

Point NEG_Y at SATURN and align POS_X = Up with NSP

User vector - RA: +179.793 DEC: -51.562 Paste Current RA/DEC

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

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

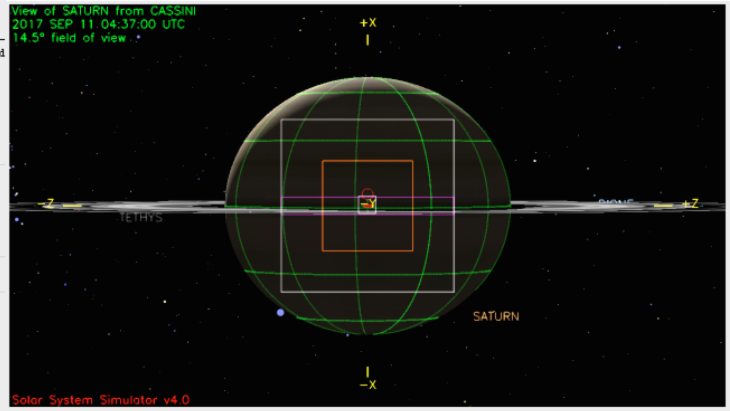
Year / Month / Day / Hour / Minute / Second

Turn analyzer: SATURN to EARTH about Z on RWA = 7.4 min / 58.9 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	--	--	606883	10.07	548112	9.09	122.3	11.40	198.94	287	31	0	8.3	0	0.0	58.9	41.6
MIMAS	--	--	767250	12.73	767046	12.73	128.5	0.03	0.54	14	25	161	19.8	2794	8.3	53.4	34.7
ENCELADUS	--	--	771432	12.80	771178	12.80	125.6	0.04	0.67	37	24	133	20.1	-25	14.6	57.2	27.0
TETHYS	--	--	404481	6.71	403950	6.70	103.3	0.15	2.67	223	48	-21	9.7	5437	25.0	76.0	64.6
DIONE	--	--	897673	14.89	897110	14.89	132.1	0.07	1.26	336	20	-138	9.6	74	18.8	47.2	54.0
RHEA	--	--	865816	14.37	865051	14.35	114.1	0.10	1.77	42	21	101	16.7	-2289	37.0	70.4	13.8
TITAN	--	--	1416613	23.51	1414038	23.46	100.0	0.21	3.64	21	13	93	13.6	2586	62.3	85.5	27.9
HYPERION	--	--	1064376	17.66	1064239	17.66	9.3	0.02	0.31	235	-24	1	8.1	-28347	130.8	166.6	133.5
IAPETUS	--	--	3614590	59.98	3613843	59.96	108.7	0.02	0.41	356	7	-100	5.8	-139816	70.6	65.9	107.4
PHOEBE	--	--	11599791	192.47	11599678	192.47	53.8	0.00	0.02	320	3	-50	9.6	-3746421	108.3	120.2	148.2
SATURN	--	--	606883	10.07	548112	9.09	122.3	11.40	198.94	287	31	0	8.3	0	0.0	58.9	41.6

← Seg 292 Start (Left)

↓ Seg 292 End (below)




```
Rev 292 OUTBOUND
2017 -  254T04:37:00 SCET
2017 SEP 11 04:37:00 SCET
2017 SEP 11 05:59:55 ERT
Apoapse__292 + 005T09:49:06
Periapse_292 + 002T04:18:54
Light time:    82.9 min
Orbit period:  6.5 days
Radius     1187156 km      19.70 Rs
Rad_cyl    1187002 km      19.70 Rs
Z_ht_cyl     19119 km       0.32 Rs
Mag_L          19.70
Semi_axs    668759 km      11.10 Rs
Eccentricity    0.908
Inclination    61.82 deg
Sun_range      10.07 AU
Earth_range     9.97 AU
--- DSN ELEV -- D/L -- U/L --------
Goldstone       7.4   29.2
Canberra       59.6   26.0
Madrid        -71.2  -47.0
------- LOOK DIRECTION INFO -------
FOV            14.5 deg  253.6 mrad
RA             76.696 deg
DEC            -6.154 deg
Crosses_RP_@    0.000 Rs
EPS             5.731 deg *
SEP            92.758 deg
ORS b/s angle  30.0 deg
ORS rad angle  62.4 deg  *
```

Point NEG_Y at SATURN and align POS_X = Up with NSP

User vector - RA: DEC: -51.562 Paste Current RA/DEC

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

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

Year / Month / Day / Hour / Minute / Second

Turn analyzer: SATURN to EARTH about Z on RWA = 5.0 min / 28.4 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	--	--	1187156	19.70	1126890	18.70	149.9	5.82	101.58	25	1	0	2.7	0	0.0	28.4	111.6
MIMAS	--	--	1371607	22.76	1371400	22.76	150.9	0.02	0.30	11	2	166	14.7	4204	1.9	27.8	109.8
ENCELADUS	--	--	1282087	21.27	1281834	21.27	152.4	0.02	0.40	66	1	108	11.2	-28	10.2	28.1	101.9
TETHYS	--	--	1457352	24.18	1456812	24.17	151.5	0.04	0.74	22	1	154	11.5	-5599	5.1	27.9	106.8
DIONE	--	--	1548711	25.70	1548147	25.69	148.1	0.04	0.73	346	1	-161	11.7	65	4.6	29.4	115.9
RHEA	--	--	1620497	26.89	1619730	26.88	143.8	0.05	0.95	334	1	-139	10.6	3183	12.4	32.6	123.2
TITAN	--	--	287235	4.77	284660	4.72	97.5	1.03	17.93	76	5	13	4.9	-6031	91.2	88.2	30.3
HYPERION	--	--	1408784	23.38	1408648	23.37	101.5	0.01	0.23	360	48	-66	7.3	-16222	64.0	72.8	164.0
IAPETUS	--	--	4348746	72.16	4347999	72.14	126.5	0.02	0.34	351	4	-132	5.4	76967	36.3	48.2	144.3
PHOEBE	--	--	11376779	188.77	11376665	188.77	55.4	0.00	0.02	11	3	-67	2.9	-3877044	105.5	118.7	142.8
SATURN	--	--	1187156	19.70	1126890	18.70	149.9	5.82	101.58	25	1	0	2.7	0	0.0	28.4	111.6

	Saturn Range	Phase Angle	Sub-S/C Lat.
Segment Start	10.07	122.3	31
Periapse	1.03	34.9	-7
Segment End	19.70	149.9	1

Solar Geometry – ORS Boresight Concerns

No ORS Boresight Solar Constraints on Science Pointing

Periapse Quicklooks

Rev 292

CIRS_292SA_NADIROCC001_PRIME
VIMS_292SA_NPOLEMAP001_PRIME
SP_292SA_DEADTIME251_PRIME
Begin Custom
VIMS_292RI_GAMCRUOCC001_PRIME
VIMS_292SA_GAMCRUOCC001_PIE
ENGR_292SC_RADRCS251_PRIME
INMS_292CO_SATAMOS001_PIE
Begin Dual Playback Science
Periapse R = 1.025 Rs, lat ...
End Dual Playback Science
SP_292SA_WAYPTTURN452_PRIME
ENGR_292SC_DFPWBIAS252_PPS
SP_292SA_WAYPTTURN252_PRIME
NEW WAYPOINT
End Custom
SP_292SA_DEADTIME252_PRIME
UVIS_292SA_AURSLEW001_PRIME
UVIS_292SA_AURNSTARE001_PRIME

- CIRS NADIROCC worked in combination with the following VIMS GAMCRUOCC PIE activity in order to determine Saturn's helium abundance. The CIRS NADIROCC at 9.79 -8.83 R_S was to yield the temperature at the same latitude (4.1 deg N.) and longitude of the VIMS Gamma Crucis stellar occultation point.
- VIMS performed multiple mosaics of Saturn's North Pole region at altitudes of 7.86 - 3.93 R_S .
- VIMS tracked the star Gamma Crucis for 3 hours during a back-to-back ingress occultation of the F-D Rings and then Saturn. This type of Ring occultation provided our best-quality profiles of dense regions in the B ring.
- The VIMS Saturn occultation yields T/mu near the 1 mbar level. In combination with the temperature data from the prior CIRS NADIROCC, we can solve for mu (the mean molecular weight of the atmosphere) and thus the helium abundance.
- Spacecraft switched from RWA to RCS thruster control
- INMS performed the second to last in situ composition measurements of Saturn's upper atmosphere at 1704 km altitude . INMS measured densities of H_2, HD, and He in the neutral exospheres of Saturn and the rings, and perhaps oxygen-bearing species depending on their densities. INMS will be able to map the other very important ion species, for example H_3^+, in Saturn's topside ionosphere, with 100-km resolution along Cassini's trajectory, and will also study the ring atmosphere-ionosphere.
- A dual playback strategy was implemented for the high value INMS science and RPX data for the period: RPX – 10 min to Periapse +10 min
- RADAR rode along with the INMS proximal periapse activity. This RADAR pass was in the passive mode, and is nadir-pointed to obtain high spatial resolution of Saturn's 2-cm wavelength thermal emission in scans through latitude. The 2-cm thermal emission measures the variation in ammonia concentration in the atmosphere just below the ammonia cloud base, enabling studies of the small-scale structure of Saturn's atmosphere as opposed to regional averages, and give unique insights into the actual weather occurring in and below Saturn's ammonia clouds.
- ISS also rode along with the INMS proximal periapse activity to capture an iconic Rings Inside-Out image for project science.
- Spacecraft switched from RCS back to RWA control.
- UVIS performed its second to last set of Auroral slew and stare observations of Saturn's South Polar Auroral Zone at unusually close altitudes of 2.03 to 7.50 R_S

Daily Science Highlights (1/3)

8 Sept 2017 (DOY 251): The Saturn 292 was the final Saturn-segment of the Proximal Orbits. The segment began as Cassini approached periapse in less then a day with a CIRS Nadir Occultation (NADIROCC) observation at 9.79 -8.83 Saturn radii (R_S) for 2 hours. The CIRS NADIROCC, when combined with the VIMS Saturn Gamma Crucis Occultation PIE (GAMCRUOCC), helps to determine the He/H2 ratio in Saturn's lower stratosphere. First, the stellar occultation by VIMS was to yield the scale height, or T/mu. Next, the limb scan CIRS_292SA_GAMCRUOCC001_VIMS following the stellar occultation was to yield the temperature profile, T(Z)) at the same latitude (4.1 deg N). Finally, the CIRS NADIROCC PIE was strategically timed at a full Saturn rotation (~11hours) earlier measures the variation of temperature with longitude centered on the location of the Gamma Crucis stellar occultation point. This was the final CIRS NADIROCC and VIMS GAMCRUOCC collaboration of the mission.

After the CIRS NADIROCC was completed and before the GAMCRUOCCs, VIMS performed a North Pole Mapping (NPOLEMAP) for nearly 7 hours at altitudes between 7.86 and 3.93 R_S with six 3x2 mosaics of the north polar region (including Saturn's North Pole Hexagon) and a final mosaic of the North Polar Vortex. This was the last VIMS NPOLEMAP of the mission and one of the highest resolution observations of the North Pole region: 150 km/pixel in the near-IR and 50km/pixel in the visible. The repeated mosaics provide a spectacular movie of the motions of the cloud features in the vortex and hexagon, measuring winds to better than ± 10 m/s precision.

Next, the Rev 292 Periapse Custom Period began (also a Live Movable Block to better capture the science observations during the fast-paced dynamics) with the VIMS GAMCUROCCs. First, the VIMS Rings GAMCRUOCC was captured. Gamma Crucis is the third-brightest VIMS star and with its high inclination to Saturn's ring plane (63 deg) provided our best-quality stellar occultation profiles of dense regions such as the B ring. In the Prime mission we acquired 16 Gamma Crucis occultations, which have provided the key data to estimate the mass of the B ring, by identifying weak density waves, as well as several other significant investigations. With the greatly-extended time baseline, these occultations should provide an improvement of models for the B ring waves, as well as identify new features in the dense rings. Then, the planet began its transit across Gamma Crucis for the VIMS Saturn GAMCRUOCC PIE as described above for the coordinated measurement of Saturn's He/H_2 ratio in the lower stratosphere with the CIRS NADIROCC observation.

Throughout this approach period, the MAPS instruments were also continuously collecting unique and valuable data about this region of the Saturn environment. RPWS was able to observe the inner magnetosphere, followed by the auroral magnetosphere (e.g. the acceleration region) and SKR source regions as Cassini nears periapse over the North pole. INMS was able to better determine the atmospheric and ionosphere thermal structure of Saturn from these lower approach altitudes. **MAG yielded unique observations of Saturn's internal magnetic field throughout this unique orbit track in latitude and longitude space.**

Daily Science Highlights (2/3)

8 Sept 2017 (DOY 251) - Continued: Just before Cassini reached its periapse and lowest altitude above Saturn, the spacecraft switched its attitude control from Reaction Wheel Assembly (RWA) to Reaction Control System (RCS) thrusters in order to maintain control authority throughout the quickly changing geometry and dynamics, including drag from Saturn's upper atmosphere.

As Cassini skimmed over the cloud tops and within Saturn's upper atmosphere at about 1704 km altitude approaching Saturn's equator, INMS performed the second to last in-situ composition measurements of Saturn's upper atmosphere (SATAMOS PIE), which was of highest priority for this orbit. INMS measured densities of H_2, HD, and He in the neutral exospheres of Saturn and the rings, and perhaps oxygen-bearing species depending on their densities. INMS mapped the very important ion species, H_3^+, in Saturn's topside ionosphere with 100-km resolution along Cassini's trajectory. H_2^+ and other species are expected to have lower densities than H_3^+ (Nagy et al., 2009), and are characterized with coarser resolution. INMS also studied the ionosphere of Saturn and the ring atmosphere-ionosphere by measuring neutral densities and composition in the region linking Saturn's atmosphere with the rings (e.g., erosion of the rings through drag and chemical modification of the planetary atmosphere). In this region, INMS measured ions such as O_2^+ created on the surface of the rings and transported along field lines to other locations.

Alongside the INMS periapse activities, RADAR executed its last proximal observation of Saturn's atmosphere. This RADAR pass was in the passive mode, and is nadir-pointed to obtain high spatial resolution of Saturn's 2-cm wavelength thermal emission in scans through latitude. The 2-cm thermal emission measures the variation in ammonia concentration in the atmosphere just below the ammonia cloud base. Previous measurements on Saturn of this thermal emission are at spatial resolution > 700 km; the proximal scans improve this by well over an order of magnitude. This enables studies of the small-scale structure of Saturn's atmosphere as opposed to regional averages, and potentially provides unique insights into the weather occurring in and below Saturn's ammonia clouds. In short, this was a unique opportunity to address an important question about outer planet atmospheres.

Also riding on the INMS periapse activity was the final ISS Rings Inside-Out observation of the mission. This set of images was slated to deliver a stunning and unique perspective of Saturn's ring system from within the rings looking outward as Cassini dives through Saturn's upper atmosphere.

The high value INMS and ring plane crossing (RPX) science data (RPX – 10 min to Periapse + 10 min) warranted performing a dual playback strategy on the next two downlink passes (DOY 252 split passes).

Daily Science Highlights (3/3)

8 Sept 2017 (DOY 251) - Continued: Throughout the proximal periapse activities, the MAPS instruments collected exceptionally valuable science data as well as engineering data to better inform the mission & science planning teams on ensuring a successful plunge into Saturn's atmosphere on the following encounter. RPWS determined the equatorial dust flux & scale height as a function of radial distance, obtaining high resolution data of plasma waves at the magnetic equator. These measurements help in understanding whether there is a dust population migrating from the rings to the atmosphere. RPWS also obtained wideband evidence of lightning whistlers. These were to verify the existence of lightning already suspected from Saturn Electrostatic Discharges (SED) and to provide information on the electron density along the field line to the source. Close to each periapse MAG collected unique measurements which together promise a better understanding of (1) the departure from axisymmetry for the planetary magnetic field, (2) the planetary rotation period, (3) the depth to dynamo region, (4) the size of the central core, and (5) the strength of field inside the planet (energy budget). In addition, measurements of field aligned currents provide a better understanding of auroral processes (in conjunction with other instruments). Away from periapse MAG continued the magnetospheric survey measurements in conjunction with the other MAPS instruments.

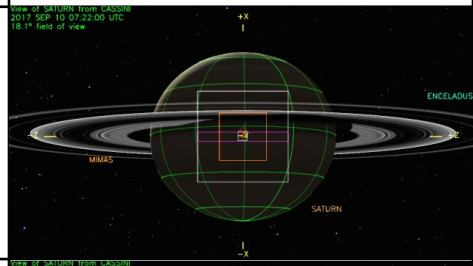
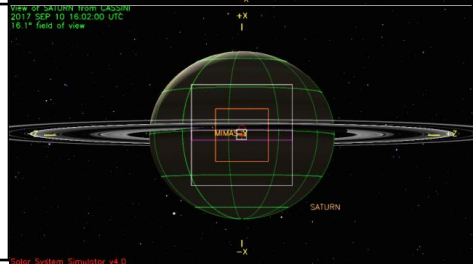
9 Sept 2017 (DOY 252): Upon exiting the proximal periapse activities, the spacecraft was switched back to RWA attitude control. UVIS performed its second to last set of Auroral slew and stare observations (AURSLEW and AURNSTARE) of Saturn's South Polar Auroral Zone for 4 hours each at unusually close altitudes of 2.03 to 7.50 R_S, providing enhanced capability for resolving auroral features with ISS riding along. Then the day ended with a very important split pass of Madrid and Goldstone's 70M antennas to downlink the high value periapse science data, including the dual playback of the INMS PIE and RPX data.

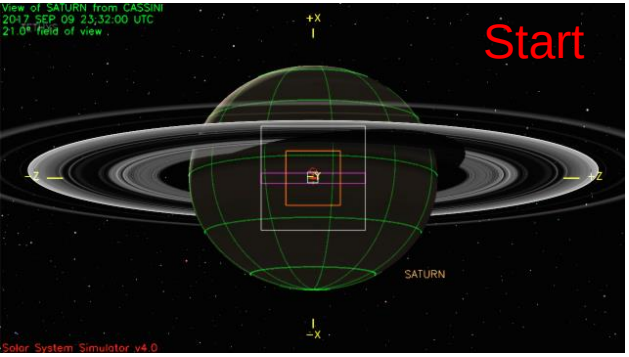
10 Sept 2017 (DOY 253): The final science observation period of the segment began with a 2 hour ISS haze observation of Titan's atmosphere as part of the Titan Monitoring Campaign, CIRS and VIMS rode along. CIRS then led a ~9 hour sit and stare observation studying the composition of Saturn's atmosphere (COMPSIT) in the southern hemisphere from 14.47 to 16.71 R_S with UVIS and VIMS riding. This was the last CIRS COMPSIT of the mission.

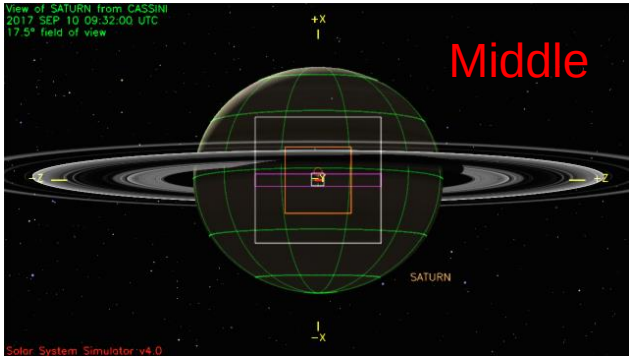
As the final observation planned by the Saturn Target Working Team (Saturn TWT), VIMS captured a mosaic image of the full Saturn disk (FULLDISK) for 9 hours at a distance of 16.71 to 18.47 R_S.

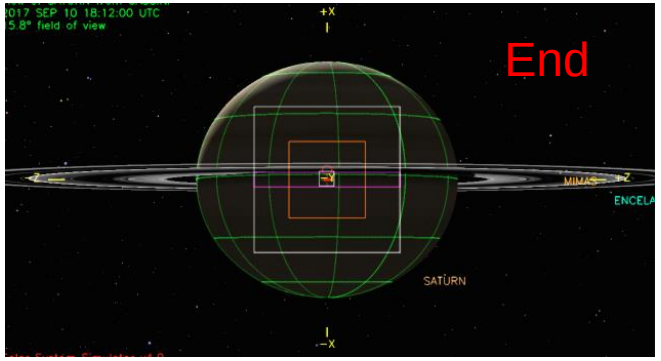
Segment Integration Planning

GAP Information

Gap	Start	End	Duration	Phase angle (range)	Rs range	Sub-S/C Lat.	Snapshot (mid-gap)
1 A	2017-253T02:22:00	2017-253T11:02:00	000T08:40:00	155.4 to 153.5	14.5 to 16.7	-8 to -5	
1 B	2017-253T11:02:00	2017-253T20:02:00	000T09:00:00	153.5 to 151.7	16.7 to 18.5	-5 to -2	







Initial SMT and Data Volume

Beginning of Integration:

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 (%)	CAROVR (Mb)	
SP_292EA_M70METNON252_PRIME	252 13:07	252 20:52	0	2821	129	2950	3322	372	0	184	46	3180	1906	-1274	1163	22%	1273
SP_292EA_G70METNON252_PRIME	252 20:52	252 23:52	1273	0	0	1273	3322	2049	0	179	18	1470	905	-565	1163	35%	564
SP_292EA_G70METNON253_PRIME	253 20:22	254 04:37	564	389	87	1040	3322	2282	0	197	49	1285	2448	1162	1163	48%	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	251 10:21	252 13:07	0.0	90.3	112.6	19.7	340.0	130.5	111.4	0.0	1240.3	274.4	476.0	0.0	128.1	2923.3
SP_292EA_M70METNON252_PRIME	252 13:07	252 20:52	0.0	14.6	72.9	2.8	0.0	27.6	23.7	0.0	36.3	4.3	0.0	0.0	0.0	182.1
SP_292EA_G70METNON252_PRIME	252 20:52	252 23:52	0.0	5.7	0.0	1.1	0.0	10.7	9.2	0.0	14.0	0.0	0.0	0.0	136.4	177.1
DAILY TOTAL SCIENCE	251 10:21	252 23:52	0.0	110.6	185.5	23.6	340.0	168.7	144.3	0.0	1290.6	278.7	476.0	0.0	264.5	
OBSERVATION_NOR	252 23:52	253 20:22	0.0	38.7	28.8	7.4	73.5	72.9	62.7	0.0	96.5	0.0	5.0	0.0	85.7	471.2
SP_292EA_G70METNON253_PRIME	253 20:22	254 04:37	0.0	15.6	78.3	3.0	0.0	29.3	25.2	0.0	38.9	4.5	0.0	0.0	0.0	194.9
DAILY TOTAL SCIENCE	252 23:52	254 04:37	0.0	54.2	107.1	10.4	73.5	102.3	88.0	0.0	135.4	4.5	5.0	0.0	85.7	

Waypoints

Standard Waypoints

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_292NA_OBSERV251_NA	2017-251T10:21:00	2017-252T13:07:00	**BAD**	**BAD**	**BAD**	**BAD**	**BAD**	**BAD**	**BAD**	**BAD**	**BAD**	**BAD**
SP_292NA_OBSERV253_NA	2017-252T20:52:00	2017-253T20:22:00	**BAD**	**BAD**	OK	OK	**BAD**	**BAD**	OK	OK	OK	OK

GAP 1

RBOT Friendly Waypoints

GAP 1:

OBSERVATION PERIOD	START	END	POS_X	NEG_X	POS_Z	NEG_Z
SP_292NA_OBSERV251_NA	2017-251T10:21:00	2017-252T13:07:00	------	------	------	------
SP_292NA_OBSERV253_NA	2017-252T20:52:00	2017-253T20:22:00	------	62.9/ 31	62.9/ 31	------

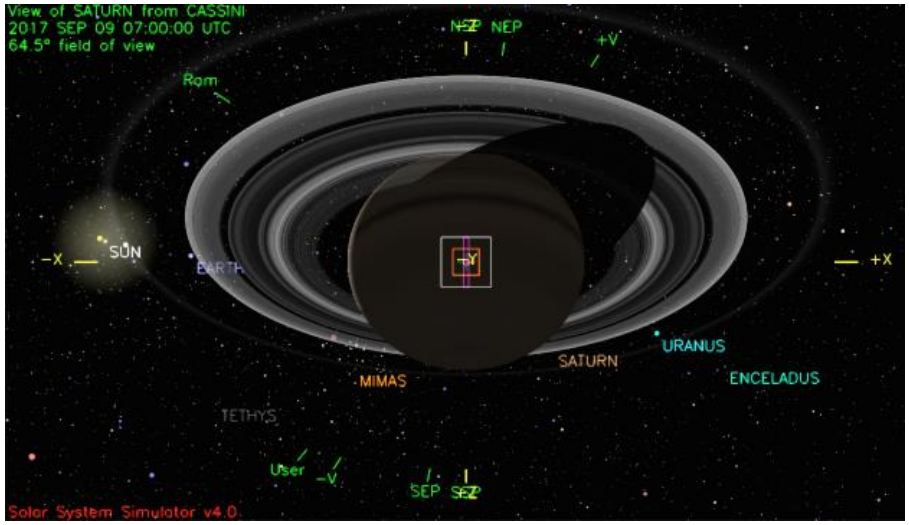
Good Downlinks

DOWNLINK	START	END	POS_X_2_NSP	POS_X_2_NEP	NEG_X_2_NSP	NEG_X_2_NEP	POS_Y_2_NSP	POS_Y_2_NEP	NEG_Y_2_NSP	NEG_Y_2_NEP	ROLL_FLAG
SP_292EA_M70METNON252_PRIME	2017-252T13:07:00	2017-252T20:52:00	OK	OK	OK	OK	OK	OK	**BAD**	**BAD**	OK
SP_292EA_G70METNON253_PRIME	2017-253T20:22:00	2017-254T04:37:00	OK	OK	OK	OK	OK	OK	**BAD**	**BAD**	OK

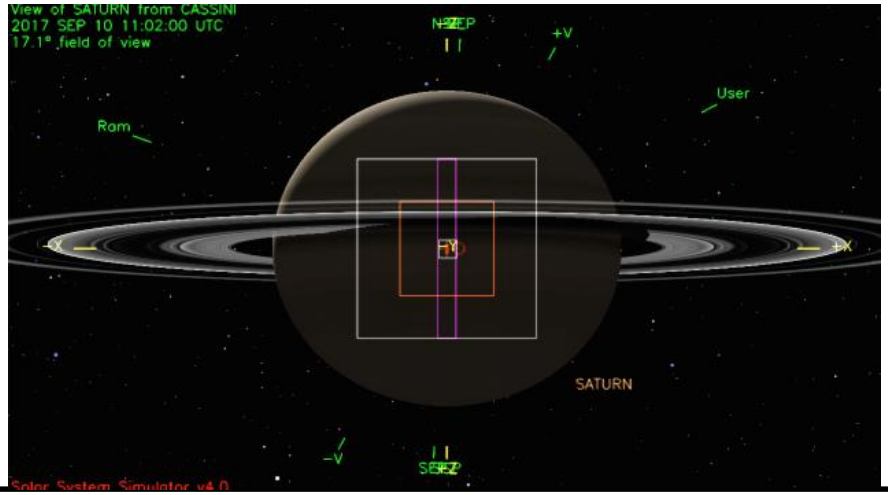
Waypoints Chosen

Waypoint 1 (2017-251T10:58:00 – 2017-252T02:19:59): No acceptable valid waypoint, custom period used.

Waypoint 2 (2017-252T02:19:59 – 2017-252T11:37:00): ISS_NAC to Saturn, NEG_Z to NSP



Waypoint 3 (2017-253T00:22:00 – 2017-253T20:22:00): ISS_NAC to Saturn, NEG_Z to NSP



Notes (1/3)

- Pointing:
  - Waypoints:
    - RBOT friendly waypoints used when compatible with science
    - No Valid Waypoint for Periapse Period (2017-251T10:58 –252T02:19:59 SCET, Duration 000T15:21:59): Use Custom Period
  - Custom Period (2017-251T20:09:59 –252T02:19:59 SCET) – Used to minimize turn times among instruments and avoid Waypoint issues
  - YGAPS:
    - Earth-pointed Z-bias during G70METNON253: Approval from SCO per email (Chuck Kirby 11/10)
  - Collaborative PRIME/RIDER activities:
    - VIMS_292SA_GAMCRUOCC001_PIE: Collaborative w/ CIRS
    - INMS_292CO_SATAMOS001_PIE: Collaborative w/ RADAR
  - CIRS and VIMS Temperature/Boresite Violations:
    - CIRS Max Temp = 91.18K (ΔT = 16.58K) at 252T00:47 (During INMS_292CO_SATAMOS001_PIE), >1.6K: 251T23:36 - 252T09:17 , >5K: 252T00:05 - 05:03, >10K: 252T00:21 - 02:35, >16K: 252T00:45 - 00:57
      - CIRS provided approval via email (Mike Flasar 01/03)
      - **Consumable FR Wavier will be required (See SPLAT item)**
    - CIRS Rolling Downlink Heating:
      - During M70METNON252: CIRS Max Temp = 76.91K (ΔT = 2.31K), **Operational FR Waiver will be required**
      - During G70METNON253: CIRS Max Temp = 76.71K (ΔT = 2.21K), **Operational FR Waiver will be required**
      - CIRS provided approval via email (Mike Flasar 01/03)
    - VIMS Max Temp = 67.93K (ΔT = 8.27K) at 252T00:58 (During INMS_292CO_SATAMOS001_PIE), >1.0K: 251T23:31 - >2017-252T20:52, >2K: 252T00:01 - 252T20:16
      - VIMS provided approval via email (Ed Audi 01/03)
      - **Consumable FR waiver will be required (See SPLAT item)**
- **CMT Management required for the following violation (see SPLAT item):**
  - PDT Results: POS_X to SUN angle < 83° at 2017-251T23:52:20 - 2017-252T00:47:20 (Min angle of 38.98 deg at 2017-252T00:42:10), during INMS_292CO_SATAMOS001_PIE (KPT concurs)
  - KPT Only Results: POS_X to SUN angle < 83° at 2017-251T22:21:00 (Min angle of 80.02 deg at 2017-251T22:18:39), during VIMS_292SA_GAMCRUOCC001_PIE (Waiver may be required, PDT does NOT show error)

Notes (2/3)

- Pointing (continued):
  - RADRCS Thruster Control 2017-251T23:09:04 – 252T01:42:09, Deadband = (2, 2, 20)
  - Tracking Saturn center is not quiescent enough to enable the transition back to RWA from RCS control. To address this, a small SP turn (SP_292SA_WAYPTTURN452_PRIME) is used to turn from Saturn center to the RA/Dec of Saturn center, as defined at the end of the POST activity.
  - SP_292SA_WAYPTTURN452_PRIME: Use RCS Thruster Rates during LMB **(See SPLAT Item)**
    - **Requires SIP Lead Hand Edits to SP_SASF: must be modeled on RCS and use appropriate RCS Rates /Accels**
    - **Using RWA Rates & Accels will result in turn margin errors.**
  - Periapse Jumpstart of Merged PDT & AACS analysis for teams early PDT deliveries during 2017-251T10:21 – 252T20:52 **(See SPLAT Items)**
- Data Volume:
  - Dual Playback **(See SPLAT item)**:
    - Hi-value data at 252T00:03:04 – 00:28:04, Peri -15 min (RPX-10 min) to Peri +10 min: RPX and INMS_292CO_SATAMOS001_PIE
    - Dual Playback/Hi-value data volume: 129.2Mb
    - 1909Mb of data recorded on SSRs (Full SSRB and 250Mb on SSRA) before Hi-value Period begins
    - Note: AACSDUAL001 & 002 for RWA to RCS Thruster Transition recorded to P6
      - CDS to track that A4/B4 playback strategy isn't altered when adding P6 playback commanding for AACSDUAL
  - SMT Warnings:
    - RADAR_292SA_WARMUP001_RIDER: Found an activity whose data are NOT recorded in this telemetry mode "S_N_ER_3" commanded at 2017-251T19:50:00.000. Volume of 0.5686138 Mb not given data policing space : OKAY – Transition from SNER5A for RADAR Warm-Up
    - RADAR_292SA_WARMUP001_RIDER: Found an activity whose data are NOT recorded in this telemetry mode "S_N_ER_3" commanded at 2017-251T20:09:59.000. Volume of 5.124163 Mb not given data policing space: OK – Transition to LMB SNER3
    - SP_292EA_M70METNON252_PRIME: Priority List conflicts with selected SSR. (SSRAP4,SSRBP4): OKAY b/c Dual Playback (1st playback)
    - SP_292EA_G70METNON252_PRIME: Priority List conflicts with selected SSR. (SSRAP4,SSRBP4): OKAY b/c Dual Playback (2nd playback)
- DSN: No Level 3 requests identified
  - AP_Downlink report check warnings dispositions (except %70M stations & # SEQ passes, ignore):
    - SP_292EA_M70METNON252_PRIME has an unusual priority playback: OKAY b/c Dual Playback (1st playback)
    - SP_292EA_G70METNON252_PRIME has an unusual priority playback: OKAY b/c Dual Playback (2nd playback)
  - Difference from original DSN strawman allocation:
    - Added SP_292EA_G70METNON252_PRIME 3hr split-pass following periapse period for dual playback and data volume issues.

Notes (3/3)

- Resource checker dispositions:
  - ENGR_292SC_DFPWBIAS252_PPS: Prior to the LMB S/C in RADWU, After the LMB S/C in DFPW_normal: OK – OpMode Strategy verified for INMS/RADAR LMB Observation
  - SP_292SA_WAYPTTURN452_PRIME: Request Name and Pointing indicate this request should have SPASS type of New Waypoint: OK – In a custom period, this is not a new waypoint. This is a turn to a quiescent attitude for RWA transition.
  - SP_292NA_OBSMOV251_NA: Request name does not match SP naming convention: OK – Verified Movable Observation Block
  - SP_292EA_M70METNON252_PRIME: First Part value of SSRAP4 does not match default… : OKAY b/c Dual Playback (1st playback)
  - SP_292EA_G70METNON252_PRIME First Part value of SSRAP4 does not match default… : OKAY b/c Dual Playback (2nd playback)
  - Gap in Prime SPASS requests between VIMS_292SA_NPOLEMAP001_PRIME and SP_292SA_DEADTIME251_PRIME. Gap of 000T00:15:00 is greater than or equal to 60 seconds: OK – Gap intentional for SNER5A RADAR Warm-Up activity
- LMB
  - OBSMOV block overlay spans the LMB (2017-251T20:09:59 – 252T02T19:59), containing epoch relative telemetry mode changes for RADAR.
  - RADAR will need to update their triggers and IEB as part of the LMB process **(See SPLAT Item)**
- Opmodes:
  - No RWA-Slow and no unique opmodes
  - RADWU for RADAR Warm-Up at 2017-251T19:35:00
  - RADRCS for INMS/RADAR observation on RCS at 2017-251T23:09:04 (LMB_E292_Peri-000T01:09:00), Deadband = (2, 2, 20)
  - Return to RWA Start (DPFW_Normal) at 2017-252T01:21:04 (LMB_E292_Peri+000T01:03:00)
- Telemetry Modes:
  - SNER5A: 2017-251T19:35 -19:50 for RADAR Warm-Up activity
  - SNER5A: 2017-251T23:10:04 - 252T01:18:04 (ObsMov: LMB_E292_Peri-000T01:08:00 – Peri+000T01:00:00) for INMS/RADAR Periapse LMB activities
  - SNER3 elsewhere
- Hydrazine: **Yes**
- Special Activities:
  - VIMS_292SA_GAMCRUOCC001_PIE
  - CIRS_292SA_NADIROCC001_PRIME
  - INMS_292CO_SATAMOS001_PIE
  - RADAR_292SA_2CMMAP001_RIDER
  - ISS_292SA_2CMMAP001_RADAR

Liens

Sequence Liens (should all be SPLAT items):

- (**S101000385**) Dual Playback: "During DSN negotiations ensure that SSR-A is emptied before the pointers are reset. This item cannot be closed until the DSN negotiations are complete for both downlink passes, or the dual playback is deleted."
- (**S101000004**) SP_292SA_WAYPTTURN252_PRIME: This waypoint turn is in an LMB. If the LMB fails to execute, the S/C will be left in an un-safe attitude and opmode strategy will not work. The LMB is tied to the epoch LMB_E292_Peri. Can be closed following the successful execution of the LMB mini-sequence.
- (**S101000387**) RADAR_292SA_2CMMAP001_RIDER: Radar activity within the Saturn 292 LMB. OBSMOV block spanning the LMB contains epoch relative telemetry mode changes for radar. Radar will need to update their IEB and trigger as part of the LMB process. Close once IEB/trigger update has been completed.
- CMT Management waiver required for the following CMT violations:
  - (**S101000388**) POS_X to SUN angle < 83 deg violation during INMS_292CO_SATAMOS001_PIE at at 2017-251T23:52:20 - 252T00:47:20. Minimum POS_X to Sun angle = 38.98 deg at 2017-252T00:42:10
  - (**S101000389**) POS_X to SUN angle < 83 deg violation during VIMS_292SA_GAMCRUOCC001_PIE at 2017-251T22:21:00. Minimum POS_X to Sun angle = of 80.02 deg at 2017-251T22:18:39 (**Wavier may be required, PDT does NOT show error)**
- (**S101000390**) CIRS heating violation Consumable FR waiver required during INMS_292CO_SATAMOS001_PIE
  - CIRS Max Temp = 91.18K (ΔT = 16.58K) at 252T00:47, >1.6K: 251T23:36 - 252T09:17 , >5K: 252T00:05 - 05:03, >10K: 252T00:21 - 02:35, >16K: 252T00:45 - 00:57
  - **Consumable FR waiver will be required**: **CIRS provided approval via email (Mike Flasar 01/03)**
- (**S101000391**) VIMS heating violation Consumable FR waiver required during INMS_292CO_SATAMOS001_PIE
  - VIMS Max Temp = 67.93K (ΔT = 8.27K) at 252T00:58, >1.0K: 251T23:31 - >2017-252T20:52, >2K: 252T00:01 - 252T20:16
  - **Consumable FR waiver will be required: VIMS provided approval via email (Ed Audi 01/03)**
- (**S101000392**) The following science requests from 2017-251T10:58 to 2017-252T10:57 in Saturn 292 have been designed in PDT during integration. Teams identified shall deliver these designs as part of the Port 1 delivery; SIP Leads to monitor.

  CIRS_292SA_NADIROCC001_PRIME

  VIMS_292SA_NPOLEMAP001_PRIME

  VIMS_292RI_GAMCRUOCC001_PRIME

  VIMS_292SA_GAMCRUOCC001_PIE

  INMS_292CO_SATAMOS001_PIE (POST)

  SP_292SA_WAYPTTURN452_PRIME

  SP_292SA_WAYPTTURN252_PRIME

  UVIS_292SA_AURSLEW001_PRIME

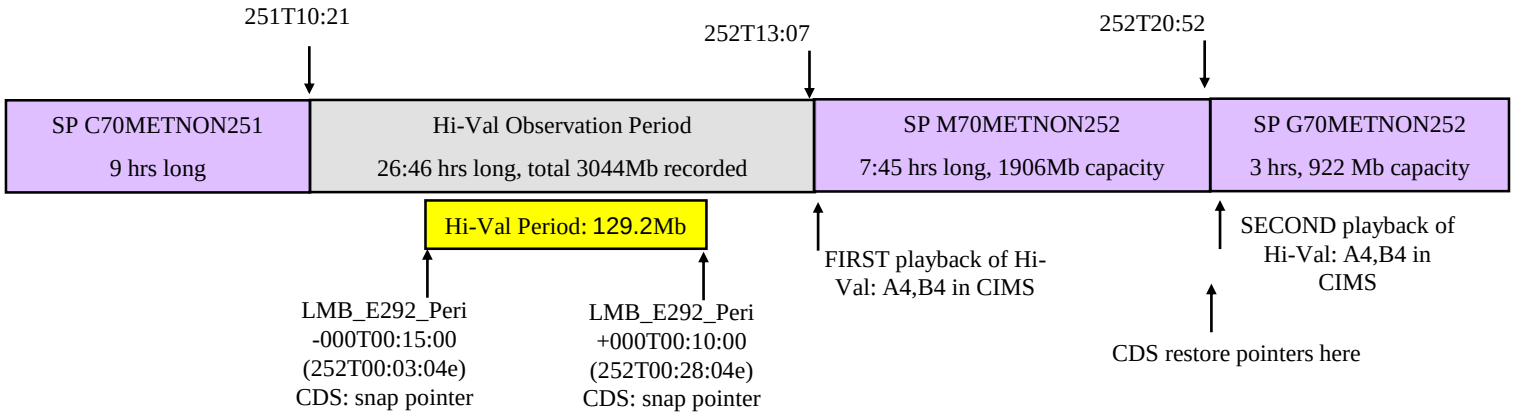
  UVIS_292SA_AURNSTARE001_PRIME
- (**S101000393**) SIP Leads to check that the POST science requests from 2017-251T23:10:04 to 252T01:18:04 in Saturn 292 are the same as what has been approved in integration: https://cassini.jpl.nasa.gov/tools/index.php?q=file_exchange/dl/sip_xxm/s101/integration/sasf/Saturn_292_161229.sasf

Dual Playback Saturn 292

Saturn292	BEGHIVAL	ENDHIVAL	P4 Dual Playback Data Volume	SSR empty before hi-val observation period? (if not verify any carryover on A fits with Hi-Val data)	SSR-A empty after first playback?	PPL set to A4,B4 for first AND second playbacks?	SSRs empty after second playback? (if not does any Hi-Val data carry over?)
INMS RPX	LMB Peri-15min (RPX-10 min)	LMB Peri+10 min	129.2Mb	No, 80Mb on SSR-A	Yes	Yes	**No**, but no Hi-Val data carryover.

Playbacks contiguous:

Negotiated!



Reminder - ALL instruments' data is played back twice during P4 dual playback periods

CDS to track that A4/B4 playback strategy isn't altered when adding P6 playback commanding for AACSDUAL

RBOT Summary

AACS evaluation of Saturn 292 Jumpstart executed by David Bates (01/04/17)

- Rev 292 solution is acceptable AS-IS without requiring any tweaks, due to use of relaxed RBOT constraints for proximal orbits
- The associated RBOT analysis results for the Jumpstart is provided on the next slide

- KPT:
  - 2017-251T22:18:39.300 VIMS_292SA_GAMCRUOCC001_PIE CMT Violation POS_X_SUN Min Angle: 8.016587e+01 deg at 2017-251T22:21:25.300
  - 2017-251T23:52:47.200 INMS_292CO_SATAMOS001_PIE CMT Violation POS_X_SUN Min Angle: 4.221152e+01 deg at 2017-252T00:42:39.000
  - 2017-251T23:59:08.200 INMS_292CO_SATAMOS001_PIE FR37B16-1.2: VIMS Temperature Rise is above 2 deg
  - 2017-252T00:08:28.200 INMS_292CO_SATAMOS001_PIE FR89B20-1.2: CIRS Temperature Rise is above 5 deg
  - 2017-252T00:23:54.200 INMS_292CO_SATAMOS001_PIE FR89B20-1.2: CIRS Temperature Rise is above 10 deg