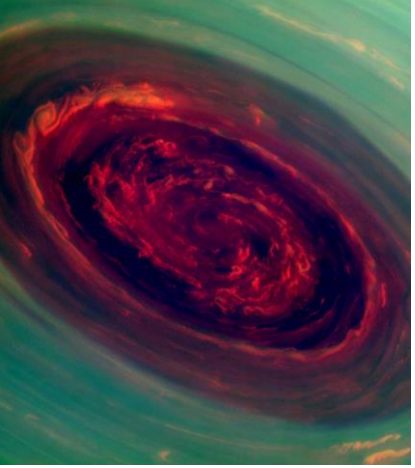
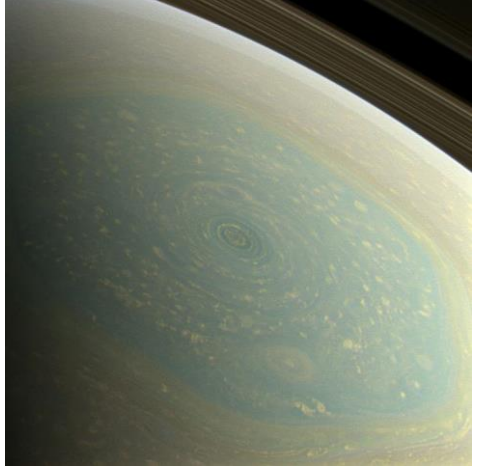
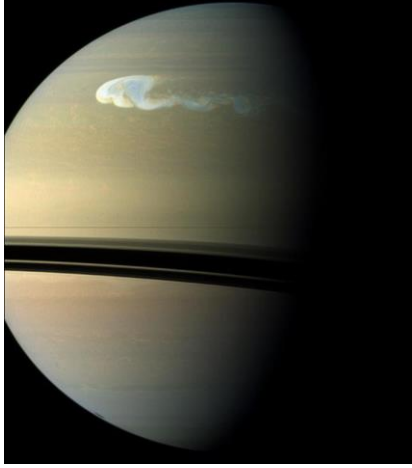


Science Planning & Sequence Team
CASSINI

SATURN TARGET WORKING TEAM

Rev 281 Segment Legacy Package

Segment Boundary: June 28, 2017 – July 02, 2017
2017-179T16:25:00 – 2017-183T16:07:00 (SCET)

Integration Began 11/19/2016
Segment Delivered to S100 Sequence 12/07/2016
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 281 was a periapse segment during Proximal Orbits with a periapse of 1.06 R_S , starting ~1 day before perikrone and ends 3 days after.

- The high inclination Proximal Orbit segment began on the night side, approaching the N. Pole, then passed through perikrone on the day side, where the POST science was planned from N. Pole to S. Pole, including an ISS WAC continuous swath ”noodle” observation similar to Saturn Rev 271.

- This low altitude Saturn segment provided extremely high resolution observations, including unprecedented resolutions rivaling that of the Saturn Rev 271 Segment. The most detailed VIMS full-frame images of Saturn’s cloud structures of the entire mission were obtained, with VIMS pixel sampling better than 20 km/pixel.

- A HGA to RAM turn was performed during ring-plane crossing in order to protect the spacecraft from particle impacts

- After integration, the southern hemisphere noodle was deemed “too dark” for ISS, so ISS data volume was zeroed-out

- The POST science warranted a large Dual Playback: 1457Mb from integration, but reduced to 1081Mb in SIP.

- Before integration Kickoff, 1.4 Gb of oversubscribed data was volunteered to be cut by RPWS, leaving only ~0.5 Gb of data cuts remaining (which RPWS and ISS volunteered later).

- The timing of the UVIS stellar occultation PIEs and CDA Titan PIEs had to be reworked with a safe waypoint that minimizes turn time

- A periapse downlink-to-downlink PDT/KPT/RBOT analysis was run on this periapse day; no changes required due to relaxed RBOT constraints

Final Sequenced SPASS (1/2)

Gap 1

Rev 281 Jumpstart

Request	Riders	Start (SCET)	Start	Duration	End	Primary	Secondary	Comments
Sequence 5100, length = 46 ...		2017-145T08:57:00		045T16:17:00	2017-191T01:14:00			
SATURN_281 Segment		2017-179T16:25:00		003T23:42:00	2017-183T16:07:00			
SP_281SA_WAYPTTURN179_PRIME		2017-179T16:25:00		000T00:40:00	2017-179T17:05:00	ISS_NAC to Saturn	POS_Z to NSP	
NEW WAYPOINT		2017-179T17:05:00		000T06:55:00	2017-180T00:00:00	ISS_NAC to Saturn	POS_Z to NSP	
VIMS_281SA_NPOLMOV001_PRIME	C,	2017-179T17:05:00		000T06:15:00	2017-179T23:20:00	ISS_NAC to Saturn	POS_Z to NSP	
SP_281EA_DLTURN179_PRIME		2017-179T23:20:00		000T00:40:00	2017-180T00:00:00	XBAND to Earth	POS_X to 7.75/-32.765	
NEW WAYPOINT		2017-180T00:00:00		000T10:25:00	2017-180T10:25:00	XBAND to Earth	POS_X to 7.75/-32.765	
ENGR_281SC_KPTYBIAS180_PRIME		2017-180T00:00:00		000T01:30:00	2017-180T01:30:00	NEG_Z to DELTA_H (0.0,0.0,-50.0 deg. offset)	NEG_X to Sun	
SP_281EA_G34BWGNON180_PRIME	C,R	2017-180T01:30:00		000T08:15:00	2017-180T09:45:00	XBAND to Earth	POS_X to 7.75/-32.765	MIMI.NEG_Y to Saturn (0,0,-9.5).
SP_281SA_WAYPTTURN180_PRIME		2017-180T09:45:00		000T00:40:00	2017-180T10:25:00	ISS_NAC to Saturn	POS_Z to NSP	
NEW WAYPOINT		2017-180T10:25:00		000T22:20:00	2017-181T08:45:00	ISS_NAC to Saturn	POS_Z to NSP	
UVIS_281SA_LIMBINT001_PRIME	C,	2017-180T10:25:00		000T03:51:00	2017-180T14:16:00	UVIS_EUV to Saturn	PIC	
Begin Custom		2017-180T14:16:00		000T00:00:01	2017-180T14:16:01	ISS_NAC to Saturn	POS_Z to NSP	
CIRS_281SA_REGMAP001_PIE	U,	2017-180T14:16:00		000T06:00:00	2017-180T20:16:00	CIRS_FPB to Saturn	POS_Z to NSP	Pick up at ISS_NAC to Saturn, POS_Z to NSP; Hand off at ISS_NAC to 183.786/-27.207, POS_X to NEP. Slow scans 88N to 90N
Begin Dual Playback Science		2017-180T20:16:00		000T00:00:01	2017-180T20:16:01			
ISS_281SA_HIRESWACS001_PIE	C, M, U, V	2017-180T20:16:00		000T01:46:00	2017-180T22:02:00	ISS_NAC to Saturn	POS_X to NEP	Pick up at ISS_NAC to 183.786/-27.207, POS_X to NEP; Hand off at NEG_Z to Dust_RAM, POS_Y to Sun. No Preference to Secondary pointing
SP_281DR_RAMAVOID180_PRIME	I, M, V	2017-180T22:02:00		000T00:20:00	2017-180T22:22:00	NEG_Z to Dust_RAM	POS_Y to Sun	Collaborative Rider(s): ISS. Pick up at NEG_Z to Dust_RAM, POS_Y to Sun; Hand off at NEG_Z to Dust_RAM, POS_Y to Sun.
Dust Hazard (HGA-to-Dust-Ra...		2017-180T22:07:30		000T00:06:05	2017-180T22:13:35	NEG_Z to Dust_RAM		
Periapse R = 1.060 Rs, lat ...		2017-180T22:14:23		000T00:00:01	2017-180T22:14:24			
ISS_281SA_HIRESWACS002_PIE	C, M, U, V	2017-180T22:22:00		000T01:54:00	2017-181T00:16:00	ISS_NAC to Saturn	NEG_X to NSP	Pick up at NEG_Z to Dust_RAM, POS_Y to Sun; Hand off at CIRS_FPB to 38.12/33.996, NEG_X to NSP. No Preference to Secondary pointing
End Dual Playback Science		2017-181T00:16:00		000T00:00:01	2017-181T00:16:01			
VIMS_281SA_SPOLMOV001_PIE	C, U	2017-181T00:16:00		000T08:00:00	2017-181T08:16:00	ISS_NAC to Saturn	NEG_Z to NSP	Pick up at CIRS_FPB to 38.12/33.996, NEG_X to NSP; Hand off at ISS_NAC to Saturn (-10.0,0.0,0.0 deg. offset), NEG_Z to NSP.
SP_281EA_DLTURN181_PRIME		2017-181T08:16:00		000T00:29:00	2017-181T08:45:00	XBAND to Earth	POS_X to NEP	Pick up at ISS_NAC to Saturn (-10.0,0.0,0.0 deg. offset), NEG_Z to NSP;
NEW WAYPOINT		2017-181T08:45:00		000T10:40:00	2017-181T19:25:00	XBAND to Earth	POS_X to NEP	
End Custom		2017-181T08:45:00		000T00:00:01	2017-181T08:45:01	XBAND to Earth	POS_X to NEP	

Final Sequenced SPASS (2/2)

Gap 2 / Gap 3 / Gap 4

ENGR_281SC_SSACHK181_AACS		2017-181T08:45:00		000T01:10:00	2017-181T09:55:00	XBAND to Earth	POS_X to NEP	
SP_281EA_C70METNON181_PRIME	C	2017-181T09:55:00		000T08:20:00	2017-181T18:15:00	XBAND to Earth	Rolling/Bias	Start After Earth DCC
Pointer Reset		2017-181T18:15:00		000T00:00:01	2017-181T18:15:01			
SP_281SA_WAYPTURN181_PRIME		2017-181T19:01:00		000T00:24:00	2017-181T19:25:00	ISS_NAC to Saturn	NEG_Z to NSP	
NEW WAYPOINT		2017-181T19:25:00		000T14:52:00	2017-182T10:17:00	ISS_NAC to Saturn	NEG_Z to NSP	
ISS_281TI_M180R2HZ181_PRIME	C, V	2017-181T19:25:00	E28	000T01:30:00	2017-181T20:55:00	ISS_NAC to Titan	NEG_Z to NSP	No Preference to Secondary pointing
CIRS_281SA_MIRTMAP001_PRIME	U, V	2017-181T20:55:00		000T09:15:00	2017-182T06:10:00	CIRS_FP3 to Saturn	NEG_Z to NSP	
UVIS_281ST_EPSORI001_PIE		2017-182T06:10:00		000T01:11:00	2017-182T07:21:00	UVIS_FUV to 84.054/-1.202 (0.258,0.0,0.0 deg. offset)	NEG_Z to NSP	
VIMS_281SA_POL2PLMAP001_PRIME		2017-182T07:21:00		000T01:19:00	2017-182T08:40:00	ISS_NAC to Saturn	NEG_Z to NSP	
UVIS_281ST_ZETAORI001_PIE		2017-182T08:40:00		000T01:11:00	2017-182T09:51:00	UVIS_FUV to 85.19/-1.943 (0.258,0.0,0.0 deg. offset)	NEG_Z to NSP	
SP_281EA_DLTURN182_PRIME		2017-182T09:51:00		000T00:26:00	2017-182T10:17:00	XBAND to Earth	POS_X to NSP	
NEW WAYPOINT		2017-182T10:17:00		000T09:38:00	2017-182T19:55:00	XBAND to Earth	POS_X to NSP	
SP_281EA_C34BWGSEQ182_PRIME	C, R	2017-182T10:17:00		000T07:28:00	2017-182T17:45:00	XBAND to Earth	Rolling	
ENGR_281SC_KPTYBIAS182_PRIME		2017-182T17:45:00		000T01:30:00	2017-182T19:15:00	POS_Z to DELTA_H (0.0,0.0,80.0 deg. offset)	NEG_X to Sun	
SP_281SA_WAYPTURN182_PRIME		2017-182T19:15:00		000T00:40:00	2017-182T19:55:00	ISS_NAC to Saturn	POS_Z to 174.9/-33.0	
NEW WAYPOINT		2017-182T19:55:00		000T11:12:00	2017-183T07:07:00	ISS_NAC to Saturn	POS_Z to 174.9/-33.0	
ISS_281SA_LIMBINT001_PRIME	V	2017-182T19:55:00		000T00:42:00	2017-182T20:37:00	ISS_NAC to Saturn	POS_Z to 174.9/-33.0	
UVIS_281ST_EPSORI002_PIE		2017-182T20:37:00		000T01:04:00	2017-182T21:41:00	UVIS_FUV to 84.054/-1.202 (0.258,0.0,0.0 deg. offset)	POS_Z to 174.9/-33.0	
CDA_281DR_STREAMTIT001_PIE		2017-182T21:41:00		000T03:03:00	2017-183T00:44:00	NEG_X to Saturn	XBAND to NEP	
UVIS_281ST_ZETAORI002_PIE		2017-183T00:44:00		000T01:10:00	2017-183T01:54:00	UVIS_FUV to 85.19/-1.943 (0.258,0.0,0.0 deg. offset)	POS_Z to 174.9/-33.0	
CDA_281DR_STREAMTIT002_PIE		2017-183T01:54:00		000T04:33:00	2017-183T06:27:00	NEG_X to Saturn	XBAND to NEP	
SP_281EA_DLTURN183_PRIME	M	2017-183T06:27:00		000T00:40:00	2017-183T07:07:00	XBAND to Earth	NEG_X to 178.8/15.3	Collaborative Rider(s): CDA. CDA Rider activity is a continuation of the CDA STREAMTIT002 PIE observation
NEW WAYPOINT		2017-183T07:07:00		000T14:08:00	2017-183T21:15:00	XBAND to Earth	NEG_X to 178.8/15.3	
SP_281EA_C70METSEQ183_PRIME	C, M	2017-183T07:07:00		000T09:00:00	2017-183T16:07:00	XBAND to Earth	NEG_X to 178.8/15.3	Collaborative Rider(s): CDA. CDA Rider activity is a continuation of the CDA STREAMTIT002 PIE observation.

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 (%)	CAROVR (Mb)
SP_281EA_G34BWGNON180_PRIME	180 01:30	180 09:45	28	404	38	470	3322	2852	0	182	49	700	584	-116	4	0%	116
SP_281EA_C70METNON181_PRIME	181 09:55	181 18:15	116	3093	109	3318	3322	4	0	183	49	3551	3220	-331	30	0%	330
SP_281EA_C34BWGSEQ182_PRIME	182 10:17	182 17:45	330	2047	68	2445	3322	877	0	161	44	2650	709	-1942	30	0%	1941
SP_281EA_C70METSEQ183_PRIME	183 07:07	183 16:07	1941	1294	56	3292	3322	30	0	319	53	3664	3862	197	534	3%	0

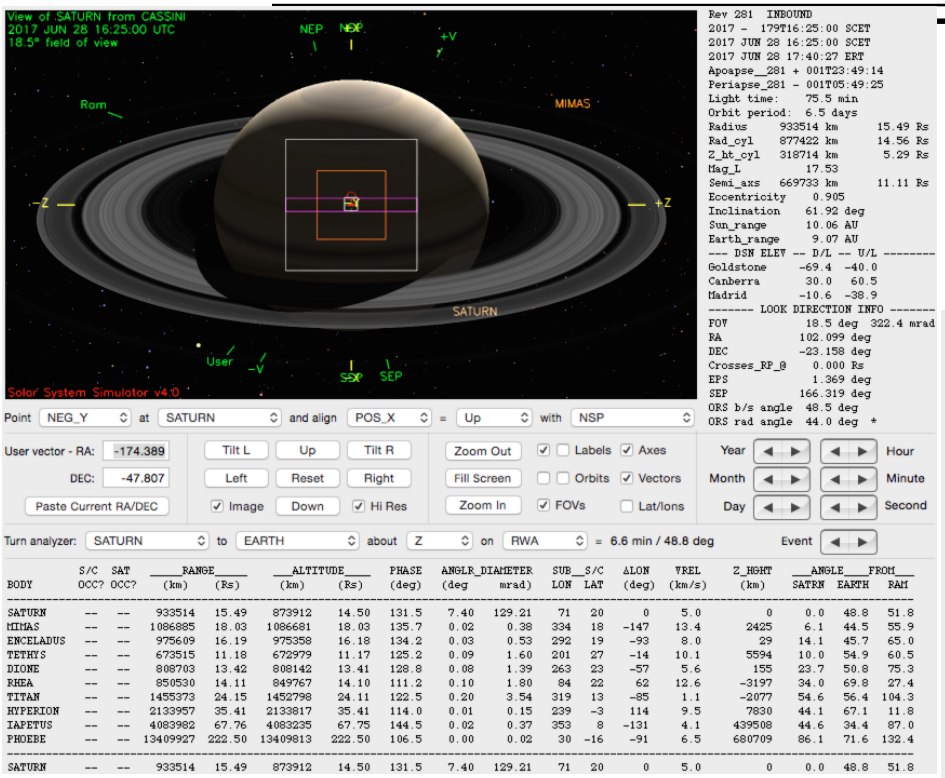
DATA VOLUME REPORT --- TRANSFER FRAME OVERHEAD NOT INCLUDED

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	179 16:25	180 01:30	0.0	17.1	45.0	3.3	58.0	16.2	27.8	0.0	42.6	0.0	190.0	0.0	38.0	437.9
SP_281EA_G34BWGNON180_PRIME	180 01:30	180 09:45	0.0	15.6	78.3	3.0	0.0	14.7	25.2	0.0	38.6	4.5	0.0	0.0	0.0	179.9
DAILY TOTAL SCIENCE	179 16:25	180 09:45	0.0	32.7	123.3	6.2	58.0	30.8	53.0	0.0	81.2	4.5	190.0	0.0	38.0	
OBSERVATION_NOR	180 09:45	181 09:55	0.0	92.3	309.8	18.8	208.8	95.9	103.5	0.0	1086.2	249.7	900.0	0.0	108.4	3173.3
SP_281EA_C70METNON181_PRIME	181 09:55	181 18:15	0.0	15.7	79.2	3.0	0.0	14.8	25.5	0.0	39.0	4.6	0.0	0.0	0.0	181.8
DAILY TOTAL SCIENCE	180 09:45	181 18:15	0.0	108.0	389.0	21.8	208.8	110.7	129.0	0.0	1125.2	254.3	900.0	0.0	108.4	
OBSERVATION_NOR	181 18:15	182 10:17	0.0	30.2	154.8	5.8	38.5	28.5	49.1	0.0	75.3	300.1	265.0	0.0	1147.6	2095.0
SP_281EA_C34BWGSEQ182_PRIME	182 10:17	182 17:45	0.0	14.1	67.5	2.7	0.0	13.3	22.8	0.0	35.2	4.0	0.0	0.0	0.0	159.6
DAILY TOTAL SCIENCE	181 18:15	182 17:45	0.0	44.3	222.3	8.5	38.5	41.8	71.9	0.0	110.5	304.1	265.0	0.0	1147.6	
OBSERVATION_NOR	182 17:45	183 07:07	0.0	134.4	0.0	4.8	100.0	23.8	40.9	0.0	696.6	251.9	30.0	0.0	55.9	1338.2
SP_281EA_C70METSEQ183_PRIME	183 07:07	183 16:07	0.0	135.8	86.4	3.2	0.0	16.0	27.5	0.0	42.4	4.9	0.0	0.0	0.0	316.4
DAILY TOTAL SCIENCE	182 17:45	183 16:07	0.0	270.2	86.4	8.1	100.0	39.8	68.4	0.0	739.0	256.8	30.0	0.0	55.9	

Segment Geometry

Seg 281 Start (Left)

Seg 281 End (below)




```
Rev 281  INBOUND
2017 -  179T16:25:00 SCET
2017 JUN 28 16:25:00 SCET
2017 JUN 28 17:40:27 ERT
Apoapse__281 + 001T23:49:14
Periapse_281 - 001T05:49:25
Light time:    75.5 min
Orbit period:  6.5 days
Radius     933514 km      15.49 Rs
Rad_cyl    877422 km      14.56 Rs
Z_ht_cyl   318714 km       5.29 Rs
Mag_L         17.53
Semi_axs   669733 km      11.11 Rs
Eccentricity    0.905
Inclination    61.92 deg
Sun_range      10.06 AU
Earth_range     9.07 AU
--- DSN ELEV -- D/L -- U/L --------
Goldstone     -69.4  -40.0
Canberra       30.0   60.5
Madrid        -10.6  -38.9
-------- LOOK DIRECTION INFO --------
FOV             18.5 deg  322.4 mrad
RA             102.099 deg
DEC            -23.158 deg
Crosses_RP_@     0.000 Rs
EPS              1.369 deg
SEP            166.319 deg
ORS b/s angle   48.5 deg
ORS rad angle   44.0 deg  *
```

Point NEG_Y at SATURN and align POS_X = Up with NSP

User vector - RA: -174.389 DEC: -47.807 Paste Current RA/DEC

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

Zoom Out Fill Screen Zoom In

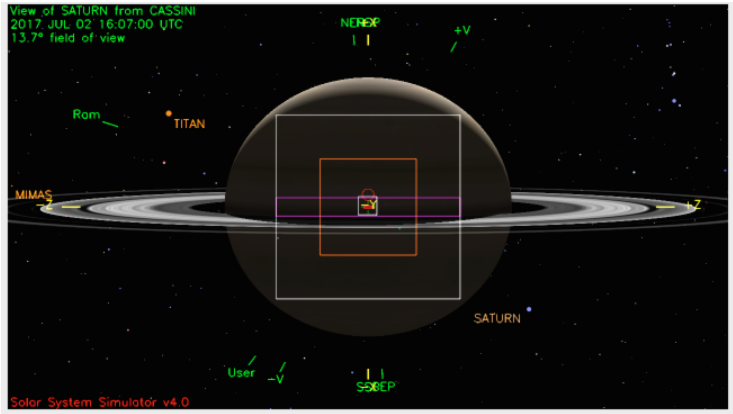
Labels Axes Orbits Vectors FOVs Lat/lons

Year Month Day Hour Minute Second Event

Turn analyzer: SATURN to EARTH about Z on RWA = 6.6 min / 48.8 deg

BODY	S/C OCC?	SAT OCC?	RANGE (km)	RANGE (Rs)	ALTITUDE (km)	ALTITUDE (Rs)	PHASE (deg)	ANGLR_DIAMETER (deg	mrad)	SUB_S/C LON	SUB_S/C LAT	ALON (deg)	VREL (km/s)	Z_HGHT (km)	ANGLE FROM SATRN	ANGLE FROM EARTH	ANGLE FROM RAM
SATURN	--	--	933514	15.49	873912	14.50	131.5	7.40	129.21	71	20	0	5.0	0	0.0	48.8	51.8
MIMAS	--	--	1086885	18.03	1086681	18.03	135.7	0.02	0.38	334	18	-147	13.4	2425	6.1	44.5	55.9
ENCELADUS	--	--	975609	16.19	975358	16.18	134.2	0.03	0.53	292	19	-93	8.0	29	14.1	45.7	65.0
TETHYS	--	--	673515	11.18	672979	11.17	125.2	0.09	1.60	201	27	-14	10.1	5594	10.0	54.9	60.5
DIONE	--	--	808703	13.42	808142	13.41	128.8	0.08	1.39	263	23	-57	5.6	155	23.7	50.8	75.3
RHEA	--	--	850530	14.11	849767	14.10	111.2	0.10	1.80	84	22	62	12.6	-3197	34.0	69.8	27.4
TITAN	--	--	1455373	24.15	1452798	24.11	122.5	0.20	3.54	319	13	-85	1.1	-2077	54.6	56.4	104.3
HYPERION	--	--	2133957	35.41	2133817	35.41	114.0	0.01	0.15	239	-3	114	9.5	7830	44.1	67.1	11.8
IAPETUS	--	--	4083982	67.76	4083235	67.75	144.5	0.02	0.37	353	8	-131	4.1	439508	44.6	34.4	87.0
PHOEBE	--	--	13409927	222.50	13409813	222.50	106.5	0.00	0.02	30	-16	-91	6.5	680709	86.1	71.6	132.4
SATURN	--	--	933514	15.49	873912	14.50	131.5	7.40	129.21	71	20	0	5.0	0	0.0	48.8	51.8

	Saturn Range	Phase Angle	Sub-S/C Lat.
Segment Start	15.49	131.5	20
Periapse	1.06	33.2	-6
Segment End	20.85	149.9	3

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Rev 281 OUTBOUND
2017 -  183T16:07:00 SCET
2017 JUL 02 16:07:00 SCET
2017 JUL 02 17:22:38 ERT
Apoapse__281 + 005T23:31:14
Periapse_281 + 002T17:52:36
Light time:    75.6 min
Orbit period:  6.5 days
Radius    1256830 km      20.85 Rs
Rad_cyl   1254832 km      20.82 Rs
Z_ht_cyl    70844 km       1.18 Rs
Mag_L         20.92
Semi_axs   669807 km      11.11 Rs
Eccentricity    0.905
Inclination    61.93 deg
Sun_range      10.07 AU
Earth_range     9.09 AU
--- DSN ELEV -- D/L -- U/L --------
Goldstone     -69.2  -39.7
Canberra       30.2   60.7
Madrid        -10.7  -39.1
-------- LOOK DIRECTION INFO --------
FOV             13.7 deg  239.6 mrad
RA             89.877 deg
DEC            -7.468 deg
Crosses_RP_@     0.000 Rs
EPS              1.764 deg
SEP            162.251 deg
ORS b/s angle   30.1 deg
ORS rad angle   60.1 deg  *
```

Point NEG_Y at SATURN and align POS_X = Up with NSP

User vector - RA: -174.389 DEC: -47.807 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 = 5.2 min / 30.3 deg

BODY	S/C OCC?	SAT OCC?	RANGE (km)	RANGE (Rs)	ALTITUDE (km)	ALTITUDE (Rs)	PHASE (deg)	ANGLR_DIAMETER (deg	mrad)	SUB_S/C LON	SUB_S/C LAT	ALON (deg)	VREL (km/s)	Z_HGHT (km)	ANGLE FROM SATRN	ANGLE FROM EARTH	ANGLE FROM RAM
SATURN	--	--	1256830	20.85	1196580	19.85	149.9	5.50	95.94	74	3	0	1.9	0	0.0	30.3	100.4
MIMAS	--	--	1354103	22.47	1353903	22.46	149.0	0.02	0.31	55	4	119	14.3	4505	6.8	31.6	93.8
ENCELADUS	--	--	1201719	19.94	1201467	19.94	149.0	0.02	0.43	266	3	-71	13.3	19	10.8	30.5	110.7
TETHYS	--	--	1163892	19.31	1163361	19.30	148.4	0.05	0.93	259	3	-65	11.9	4370	13.3	31.0	113.0
DIONE	--	--	1517987	25.19	1517424	25.18	147.5	0.04	0.74	41	3	128	10.1	-134	11.3	33.3	89.5
RHEA	--	--	1398093	23.20	1397329	23.19	141.6	0.06	1.10	66	3	94	7.9	-2235	22.1	39.5	79.3
TITAN	--	--	2484956	41.23	2482381	41.19	151.1	0.12	2.07	359	1	172	6.5	8610	4.2	29.3	96.2
HYPERION	--	--	1254564	20.82	1254416	20.81	92.1	0.01	0.26	154	-29	49	3.7	-19409	82.3	89.6	28.1
IAPETUS	--	--	4675770	77.58	4675022	77.57	157.8	0.02	0.32	356	5	-160	4.4	690374	18.2	21.2	110.5
PHOEBE	--	--	13552014	224.86	13551901	224.86	105.8	0.00	0.02	146	-16	-99	2.5	415123	75.6	72.0	159.9
SATURN	--	--	1256830	20.85	1196580	19.85	149.9	5.50	95.94	74	3	0	1.9	0	0.0	30.3	100.4

Solar Geometry – ORS Boresight Concerns

NEG_Y to Saturn not safe: 2017-181T05:00:15 to 181T19:18:11 (ORS to Sun < 15 deg.)
ORS to SUN < 12 deg: 2017-181T07:11:14 to 181T13:04:14
Minimum ORS to SUN angle is 11.1 deg

ORS Boresight concerns during end of Jumpstart period and did not interfere with science plans

Periapse Quicklooks

Rev 281

UVIS_281SA_LIMBINT001_PRIME
Begin Custom
CIRS_281SA_REGMAP001_PIE
Begin Dual Playback Science
ISS_281SA_HIRESWACS001_PIE
SP_281DR_RAMAVOID180_PRIME
Dust Hazard (HGA-to-Dust-Ra...
Periapse R = 1.060 Rs, lat ...
ISS_281SA_HIRESWACS002_PIE
End Dual Playback Science
VIMS_281SA_SPOLMOV001_PIE
SP_281EA_DLTURN181_PRIME
NEW WAYPOINT
End Custom
ENGR_281SC_SSACHK181_AACS

- UVIS did a Saturn limb integration for 4 hours within 9-7 R_S, which provides excellent spatial resolution for vertical and horizontal profiles of airglow, aurora, and hydrocarbons. At such close distances, Cassini could measure the vertical distribution of hydrocarbons, which is needed to test and improve photochemical models of Saturn's high atmosphere.
- CIRS created a regional map of the North Polar Region, obtaining the temperature and composition of the Northern Vortex as UVIS and VIMS rode along. This observation occurred at altitudes of 6.0-1.7 R_S, observing between 87N and 90N. **This was the best spatial resolution (up to 50 km) thus far obtained during the Cassini mission.**
- ISS took high resolution WAC images of the upper atmosphere as its field of view traversed across the Northern polar region toward the equator, outlining what was affectionately called "the noodle." The noodle's main target was the north equatorial region between 61 and 13 deg N lat.
- The spacecraft was required to divert to a safe attitude during the Ring-plane crossing, using its high gain antenna as a shield against any ring particles for 20 minutes. **During this maneuver, ISS continued its high resolution WAC image "noodle" with the best resolution of about 200 m/pixel from 16 deg N. to 15 S. Latitudes, looking for small convective clouds and clouds revealing the waves in Saturn's atmosphere, perhaps indicative of deep thunderstorms in the atmosphere. VIMS also rode, obtaining a very high resolution single pixel scan at about 3.6 km/pixel effective resolution.**
- ISS continued the high resolution WAC noodle observation of the Southern pole region between 18 and 55 deg S latitude.
- VIMS captured a movie of the South Pole Region with 3x3 mosaics. This was the closest and sharpest VIMS near-infrared South Pole movie to date of the intricate structure and complex movements of features in and around the south polar vortex, with altitudes ranging from 1.7-7.1 R_S. **The first frame of the mosaic has better than 55-km/pixel resolution, the sharpest VIMS 64x64 image of Saturn's south polar region taken during the mission. For the movie, the first two mosaics were taken with better than 125-km-per-pixel resolution (the sharpest near-infrared movie sequence yet acquired of the south polar region), allowing unprecedented analysis of the windfield structure in the near-infrared.**
- **The spacecraft completed an engineering checkout of the Sun Sensor Assembly to be sure no damage was incurred from the HGA shielded ring plane crossing.**

Daily Science Highlights (1/4)

28 June 2017 (DOY 179): Saturn 281 was the fourth Saturn-segment of the Proximal Orbits. The segment began as Cassini approached periapse in just over a day with VIMS creating a North Pole mosaic movie (NPOLMOV) at distances of about 15.3 -13.5 Saturn radii (R_S) for 6 hours with CIRS and ISS riding along.

29 June 2017 (DOY 180): The densely packed periapse science period began with a UVIS Saturn limb integration (LIMBINT) for 4 hours at distances within 9-7 R_S, which provided excellent spatial resolution for vertical and horizontal profiles of airglow, aurora, and hydrocarbons (CIRS and VIMS ride). At such close distances, Cassini could measure the vertical distribution of the hydrocarbons, which is needed to test and improve photochemical models of Saturn's high atmosphere.

With periapse less than 10 hours away, all of the PIE activities surrounding periapse were of highest priority science for the orbit. CIRS created a regional map of the North Polar Region (REGMAP), obtaining the temperature and composition of the Northern Vortex as UVIS and VIMS rode along. This observation occurred at altitudes from 6.0-1.7 R_S, observing between 87N and 90N. **This would have the best spatial resolution (up to 50 km) thus far during the Cassini mission.** Just before reaching the proximal periapse, Cassini passed over Saturn's North Pole at altitudes of 2.6 down to 0.1 R_S, providing ISS (and the CIRS, UVIS, and VIMS riders) high resolution observation of the Northern pole region, similar to that in the Saturn 271 segment. This series of ISS activities surrounding periapse and the ring plane crossing were very important, **warranting a dual playback plan to better guarantee that this high value data was preserved and downlinked.** ISS captured the high resolution WAC images of the upper atmosphere (HIRESWACS001) as its field of view traverses across the Northern polar region toward the equator, outlining what was affectionately called "the noodle." The main target of the noodle was the north hemisphere between 61 and 13 deg N latitudes, when the **ISS WAC instrument reached around 500m/pix resolution. Such proximity also provided the riding instruments with unprecedented high resolution observations compared to activities prior to the proximal orbits. The far-infrared focal plane of CIRS obtained the temperature and composition of the upper troposphere with spatial resolutions ranging from 400 to 25 km. VIMS got several high-resolution full-frame images about 20x better pixel resolution than obtained on pre-proximal orbits, the best obtained during then mission.**

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

Science Highlights (2/4)

29 June 2017 (DOY 180) - Continued: As Cassini skimmed over the cloud tops at about 3740 km altitude approaching Saturn's equator, the spacecraft was required to divert to a safe attitude during the Ring-plane crossing, using its high gain antenna as a shield against any ring particles (RAMAVOID) for 20 minutes. During this maneuver, ISS continued its high resolution WAC image "noodle" with the best resolution of about 200 m/pixel from 16 deg N. to 15 S. Latitudes, looking for small convective clouds, including those that reveal waves in Saturn's atmosphere, perhaps indicative of deep thunderstorms. VIMS also rode, obtaining a very high resolution single pixel scan, with an intrinsic resolution of 1.9 km/pixel. Given the very fast relative velocity of the spacecraft (~34 km/s) the actual resolution is degraded to about 3.6 km/pixel, providing the highest resolution view of Saturn clouds from VIMS (together with the Saturn 271 observation).

Similar to the approach science, Cassini ascended from the proximal orbit periapse as the spacecraft passed over Saturn's South Pole within altitudes of 0.1 and 1.7 R_S, where ISS and riders continued the high resolution noodle observation (HIRESWACS002) of the Southern pole region between 18 deg S to 55 deg S Latitudes, along with the CIRS, UVIS, and VIMS riders.

30 June 2017 (DOY 181): The periapse period ended with an 8 hour high resolution VIMS movie of the South Pole Region with 3x3 mosaics (SPOLMOV). This was the closest and sharpest VIMS near-infrared South Pole movie to date of the intricate structure and complex movements of features in and around the south polar vortex, with altitudes ranging from 103,000 to 430,000 km above the cloud tops (1.7-7.1 R_S). **The first frame of the first 3x3 mosaic has better than 55-km/pixel resolution, the sharpest VIMS 64x64 image of the south polar region taken during the mission. For the movie, the first two mosaics were taken with better than 125-km-per-pixel resolution, allowing unprecedented analysis of the windfield structure in the near-infrared.** The last mosaic is obtained at better than 225 km/pixel resolution. Over the 8 hours, the mean winds should be determinable to better than +/- 9 m/s for discrete clouds observed both in the first and last mosaics.

Alongside the ORS instruments, the MAPS instruments collected exceptionally valuable science data as well as engineering data during the periapse period to better inform the mission & science planning teams how to protect Cassini during subsequent ring-plan crossings. 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.

Science Highlights (3/4)

30 June 2017 (DOY 181) – Continued: After the important downlink pass for most of the valuable periapse science (including the first of the dual playback passes), the remaining science period began with an 1.5 hour ISS haze observation of Titan's atmosphere as part of the Titan Monitoring Campaign; CIRS and VIMS rode.

CIRS then began a 9-hour temperature mapping observation in the mid-IR (MIRTMAP) of the southern hemisphere to determine upper troposphere and tropopause temperatures with spatial resolution of about 2 deg of latitude over multiple latitudes acquired at about 13 R_S. CIRS observed the Central Meridian Longitude as Saturn rotated for 1.5-2 hours, then moved to another latitude and repeats. This was repeated for 4 or so latitudes. CIRS could average over longitudes to yield spectra to retrieve temperature and compositions at these different latitudes.

1 July 2017 (DOY 182): UVIS performed a series of stellar occultations of Epsilon and Zeta Orionis (EPSORI & ZETAORI), capturing both ingress and egress behind Saturn's atmosphere. The stellar occultation PIEs were designed as an ensemble to capture a picture of temperature and some chemical maps of Saturn's thermosphere. This is the region of the atmosphere that is higher than CIRS and RSS are able to probe, and is the last accessible region of Saturn's atmosphere that was open to initial exploration. A 'picture' of the thermosphere requires measurements of temperature and chemical constituents (CH_4, C_2H_2, C_2H_4, C_2H_6, C_6H_6) sampled in both latitude and altitude. The PIE occultations were designed to take advantage of the slow motion of the star through the atmosphere as seen from Cassini. The slower the occultation the higher the signal/noise ratio and the better-resolved are features in the profiles. The opportunities in the Proximal revs were especially good in this regard.

VIMS captured a Pole-to-Pole Saturn nighttime 2x4 mosaic (POL2PLMAP) oriented with 2 East-West frames and 4 North-South frames at a distance of about 16 R_S.

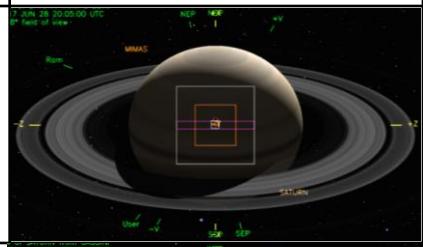
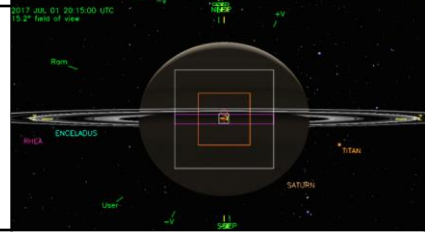
Science Highlights (4/4)

1 July 2017 (DOY 182) - Continued: The last observation period of the Saturn 281 segment started with ISS performing a Saturn bright limb integration (LIMBINT), studying the composition of the upper atmosphere.

Finally the segment ended with a CDA series of PIE observations (STREAMTIT) of highest importance for this orbit, where CDA was taking Saturn Stream measurements to investigate their chemical composition and its distribution in space around Saturn's ring plane in the vicinity of Titan's orbit.

Segment Integration Planning

Timeline Gaps and Suggested Observations

Gap	Start	End	Duration	Phase angle (range)	Rs range	Sub-S/C Lat.	Snapshot (mid-gap)
1	2017-179T17:05:00	2017-179T23:20:00	000T06:15:00	131.2 to 127.6	15.3 to 13.5	20 to 23	
	VIMS N. Pole Mapping						
2	2017-181T20:55:00	2017-182T06:10:00	000T09:15:00	164.2 to 160.2	13.4 to 16.0	-12 to -7	
	CIRS Compsit						
3	2017-182T07:21:00	2017-182T08:40:00	000T01:19:00	159.8 to 159.3	16.3 to 16.6	-7 to -6	
	ISS N. Limb Hi-Phase						
4	2017-182T19:55:00	2017-182T20:37:00	000T00:42:00	155.5 to 155.3	18.8 to 18.9	-2 to -2	
	VIMS S. Hemisphere Mapping						

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 (Mb)	NET_MARGN (%)	CAROVR (Mb)
SP_281EA_G34HEFNON180_PRIME	180 01:30	180 09:45	0	105	38	143	3322	3179	0	179	49	370	706	335	-122	0%	0
SP_281EA_C70METNON181_PRIME	181 09:55	181 18:15	0	3671	109	3780	3322	-457	0	180	49	3552	3220	-332	1374	18%	331
SP_281EA_C34BWGSEQ182_PRIME	182 10:17	182 17:45	331	1335	68	1734	3322	1588	0	158	44	1936	709	-1228	1374	30%	1228
SP_281EA_C70METSEQ183_PRIME	183 07:07	183 16:07	1228	664	56	1948	3322	1374	0	316	53	2317	3862	1544	1544	40%	0

Science data allocation > SSR Capacity

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	179 16:25	180 01:30	0.0	17.1	0.0	0.0	0.0	16.2	27.8	0.0	42.6	0.0	0.0	0.0	38.0	141.6
SP_281EA_G34HEFNON180_PRIME	180 01:30	180 09:45	0.0	15.6	78.3	0.0	0.0	14.7	25.2	0.0	38.6	4.5	0.0	0.0	0.0	176.9
DAILY TOTAL SCIENCE	179 16:25	180 09:45	0.0	32.7	78.3	0.0	0.0	30.8	53.0	0.0	81.2	4.5	0.0	0.0	38.0	
OBSERVATION_NOR	180 09:45	181 09:55	0.0	86.3	198.1	0.0	782.1	95.9	103.5	0.0	1222.1	249.7	900.0	0.0	108.4	3746.0
SP_281EA_C70METNON181_PRIME	181 09:55	181 18:15	0.0	15.7	79.2	0.0	0.0	14.8	25.5	0.0	39.0	4.6	0.0	0.0	0.0	178.8
DAILY TOTAL SCIENCE	180 09:45	181 18:15	0.0	102.0	277.3	0.0	782.1	110.7	129.0	0.0	1261.1	254.3	900.0	0.0	108.4	
OBSERVATION_NOR	181 18:15	182 10:17	0.0	30.2	21.6	0.0	38.5	28.5	49.1	0.0	75.3	266.6	5.0	0.0	875.0	1389.9
SP_281EA_C34BWGSEQ182_PRIME	182 10:17	182 17:45	0.0	14.1	67.5	0.0	0.0	13.3	22.8	0.0	35.2	4.0	0.0	0.0	0.0	156.9
DAILY TOTAL SCIENCE	181 18:15	182 17:45	0.0	44.3	89.1	0.0	38.5	41.8	71.9	0.0	110.5	270.6	5.0	0.0	875.0	
OBSERVATION_NOR	182 17:45	183 07:07	0.0	134.4	0.0	0.0	0.0	23.8	40.9	0.0	207.0	251.9	0.0	0.0	55.9	713.8
SP_281EA_C70METSEQ183_PRIME	183 07:07	183 16:07	0.0	135.8	86.4	0.0	0.0	16.0	27.5	0.0	42.4	4.9	0.0	0.0	0.0	313.2
DAILY TOTAL SCIENCE	182 17:45	183 16:07	0.0	270.2	86.4	0.0	0.0	39.8	68.4	0.0	249.5	256.8	0.0	0.0	55.9	

Waypoint Selection

Standard Waypoints

GAP 1

GAP 2 & 3

GAP 4

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_281NA_OBSERV179_NA	2017-179T16:25:00	2017-180T01:30:00	**BAD**	**BAD**	OK	OK	OK	OK	**BAD**	**BAD**	OK	OK
SP_281NA_OBSERV180_NA	2017-180T09:45:00	2017-181T10:15:00	**BAD**	**BAD**	**BAD**	**BAD**	**BAD**	**BAD**	**BAD**	**BAD**	**BAD**	**BAD**
SP_281NA_OBSERV181_NA	2017-181T21:15:00	2017-182T10:30:00	**BAD**	**BAD**	OK	OK	**BAD**	**BAD**	OK	OK	OK	OK
SP_281NA_OBSERV182_NA	2017-182T17:45:00	2017-183T07:07:00	**BAD**	**BAD**	OK	OK	OK	OK	**BAD**	**BAD**	OK	OK

RBOT Friendly Waypoints

	OBSERVATION PERIOD	START	END	POS_X	NEG_X	POS_Z	NEG_Z
GAP 1:	SP_281NA_OBSERV179_NA	2017-179T16:25:00	2017-180T01:30:00	------	176.1/ 32.8	176.1/ 32.8	------
	SP_281NA_OBSERV180_NA	2017-180T09:45:00	2017-181T10:15:00	------	------	------	------
GAP 2 & 3:	SP_281NA_OBSERV181_NA	2017-181T21:15:00	2017-182T10:30:00	------	175.0/ 32.7	175.0/ 32.7	------
GAP 4:	SP_281NA_OBSERV182_NA	2017-182T17:45:00	2017-183T07:07:00	------	175.0/ 32.7	175.0/ 32.7	------

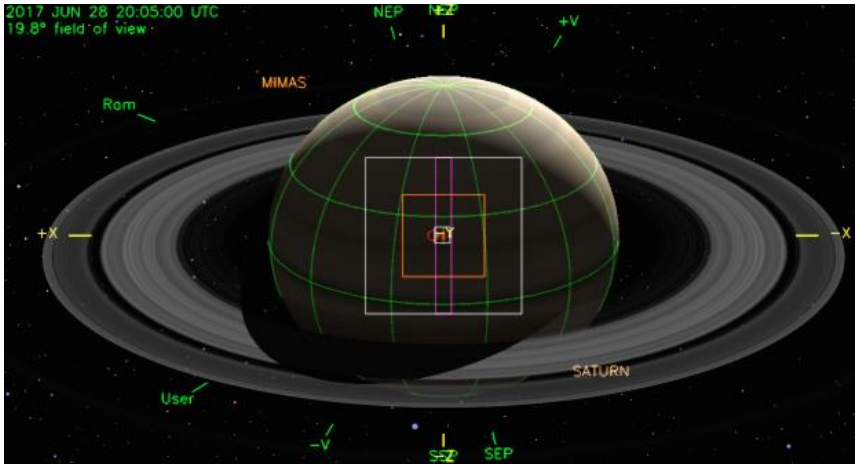
Good Downlinks

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_281EA_G34BWGNON180_PRIME	2017-180T01:30:00	2017-180T09:45:00	OK	OK	**BAD**	**BAD**	OK	OK	OK	OK	0
SP_281EA_C70METNON181_PRIME	2017-181T10:15:00	2017-181T18:15:00	OK	OK	OK	OK	OK	OK	OK	OK	OK
SP_281EA_M70METNON181_PRIME	2017-181T18:15:00	2017-181T21:15:00	OK	OK	OK	OK	OK	OK	OK	OK	OK
SP_281EA_C34BWGSEQ182_PRIME	2017-182T10:30:00	2017-182T17:45:00	OK	OK	OK	OK	OK	OK	OK	OK	OK
SP_281EA_C70METSEQ183_PRIME	2017-183T07:07:00	2017-183T16:07:00	OK	OK	OK	OK	OK	OK	OK	OK	OK

- **NEG_Y to Saturn not safe: 2017-181T05:00:15 to 181T19:18:11 (ORS to Sun < 15 deg.)**
  - **ORS to SUN < 12 deg: 2017-181T07:11:14 to 181T13:04:14**
    - **Minimum ORS to SUN angle is 11.1 deg**

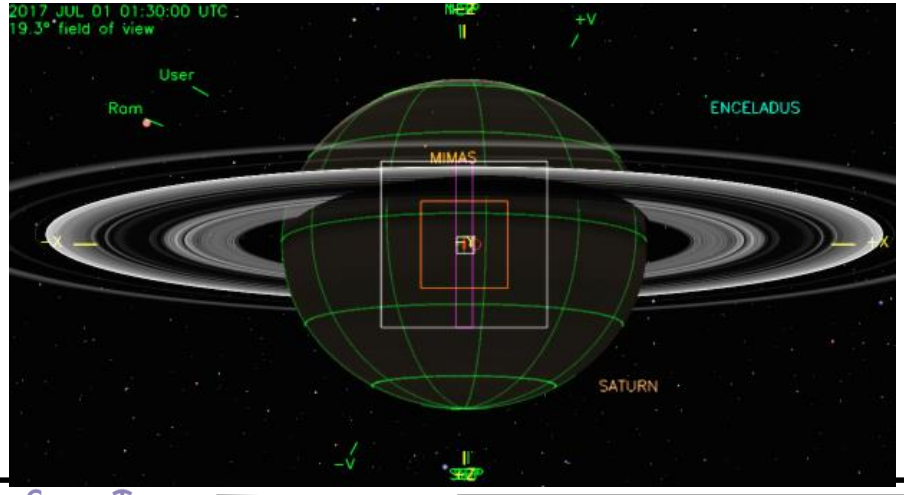
Waypoints Chosen (1/2)

Waypoint 1 (2017-179T17:05:00 - 2017-180T00:00:00): NEG_Y to Saturn, POS_Z to NSP



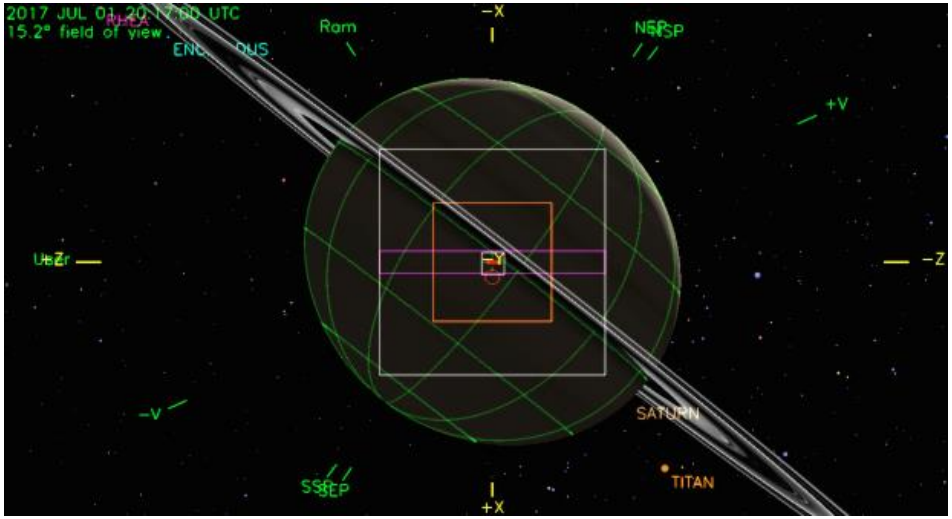
Waypoint 2 (2017-180T10:25:00 - 2017-181T08:45:00): No acceptable valid waypoint, custom period used.

Waypoint 3 (2017-181T19:25:00 - 2017-182T10:17:00): NEG_Y to Saturn, NEG_Z to NSP



Waypoints Chosen (2/2)

Waypoint 4 (2017-182T19:55:00 - 2017-183T07:07:00): NEG_Y to Saturn, POS_Z to 174.9/-33.0



Notes (1/2)

- Pointing:
  - Waypoints:
    - RBOT friendly waypoints used when compatible with science
    - No Valid Waypoint for Periapse Period (2017-180T10:25 –181T08:45 SCET, Duration 000T22:20:00): Use Custom Period
  - Custom Period (2017-180T14:16 –181T08:45 SCET) – Used to minimize turn times among instruments and avoid Waypoint issues
  - SP RAMAVOID used for RPX as static pointing within custom period at same pickup and handoff attitude (dummy turn)
  - YGAPS & Quiescent Gaps:
    - Earth-pointed Z-bias during C70METNON181: Approval from SCO per email (Chuck Kirby 9/06)
    - Earth-pointed Z-bias during C70METSEQ183: Approval from SCO per email (Chuck Kirby 9/06)
    - Earth-pointed 46 minute quiescent gap: 181T18:15 – 19:01 (See SPLAT item)
  - Collaborative PRIME/RIDER activities:
    - SP_281DR_RAMAVOID180_PRIME: Collaborative w/ ISS
    - SP_281EA_DLTURN183_PRIME: Collaborative w/ CDA
    - SP_281EA_C70METSEQ183_PRIME: Collaborative w/ CDA
  - CIRS and VIMS Temperature/Boresite Violations:
    - CIRS Max Temp = 81.76K (ΔT = 7.16K) at 180T22:31, >1.6K: 180T21:34 - 181T05:25 , >5K: 180T22:11 - 181T00:56 (During ISS HIRESWACS002 PIE)
      - CIRS Max Temp increased by 0.43K compared to original POST design due to ISS HIRESWACS001 redesign (SCR 119044)
      - CIRS provided approval via email (Mike Flasar 10/31)
      - **Consumable FR Wavier will be required (See SPLAT item)**
    - VIMS Max Temp = 65.28K (ΔT = 5.62K) at 180T23:38:30 , >1K: 180T20:46 – 181T18:15, >2K: 180T22:02 - 181T13:47 (During ISS HIRESWACS002 PIE)
      - VIMS provided approval via email (Ed Audi 10/18)
      - **Consumable FR waiver will be required (See SPLAT item)**
    - CIRS Boresite to Sun < 15° during DOY 181 (During VIMS SPOLMOV PIE 181T04:39:55 - 181T08:14:00)
      - CIRS provided approval via email (Mike Flasar 10/31)
      - **Operational FR Wavier will be required (See SPLAT item)**
  - **CMT Management required for the following violation (see SPLAT item):**
    - POS_X to SUN angle < 83° at 2017-180T21:28:15 - 41:35 (Min angle of 71.55 deg), during ISS HIRESWACS001 PIE

Notes (2/2)

- Pointing (continued):
  - PDT Violation: ISS HIRESWACS001 & 002 Excessive Turn Rates – OKAY b/c ± 3 hours of periapse
  - Periapse Jumpstart of Merged PDT & AACS analysis for teams early PDT deliveries during 2017-180T01:30 – 181T18:15 (see SPLAT item)
- Data Volume:
  - Dual Playback (See SPLAT item):
    - Hi-value data (180T20:16:00 – 181T00:16:00): ISS HIRESWACS001, SP RAMAVOID (RPX), ISS HIRESWACS002
    - Dual Playback/Hi-value data volume: 1457Mb
    - 930Mb of data recorded on SSRB before Hi-value Period begins
    - Note: AACSDUAL001 & 002 for ENGR_281SC_SSACHK181_AACS recorded to P6
      - CDS to track that A4/B4 playback strategy isn't altered when adding P6 playback commanding for AACSDUAL
  - SMT Warnings:
    - SP_281EA_C70METNON181_PRIME Priority List conflicts with selected SSR. (SSRAP4,SSRBP4): OKAY b/c Dual Playback (1st playback)
    - SP_281EA_C70METSEQ183_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_281EA_C70METNON181_PRIME has an unusual priority playback list: OKAY b/c Dual Playback (1st playback)
    - SP_281EA_C70METSEQ183_PRIMEhas an unusual priority playback list: OKAY b/c Dual Playback (2nd playback)
    - SP_281EA_C34BWGSEQ182_PRIME is a SEQ upload pass and should be at least 9 hours in duration: OK – Track in DSN Negotiations
  - Difference from original DSN strawman allocation:
    - SP_281EA_C70METNON181_PRIME BOT extended by 20 min
    - SP_281EA_C34BWGSEQ182_PRIME BOT extended by 13 min
- Resource checker dispositions:
  - C70METNON181: First_Part value of SSRAP4 does not match default… : OKAY b/c Dual Playback (1st playback)
  - C70METSEQ183: First_Part value of SSRAP4 does not match default… : OKAY b/c Dual Playback (2nd playback)
  - Gap in Prime SPASS requests between SP_281EA_C70METNON181_PRIME and SP_281SA_WAYPTTURN181_PRIME. Gap of 46 min is greater than or equal to 60 seconds: OK – Gap intentional to avoid –Y to Sun < 15 deg
- Opmodes:
  - RSSK (RWA-Fast) for DOY 180 RSS OCC ORT
  - RSSK (RWA-Fast) for DOY 182 RSS OCC ORT
- Hydrazine: N/A
- Special Activities:
  - PIES: CIRS_281SA_REGMAP001_PIE, ISS_281SA_HIRESWACS001_PIE, SP_281DR_RAMAVOID180_PRIME, ISS_281SA_HIRESWACS002_PIE, VIMS_281SA_SPOLMOV001_PIE, UVIS_281ST_EPSORI002_PIE, CDA_281DR_STREAMTIT001_PIE, UVIS_281ST_ZETAORI002_PIE, CDA_281DR_STREAMTIT002_PIE, CDA_281DR_TITAN002_PIE

Liens

Sequence Liens (should all be SPLAT items):

- 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."
- Quiescent Earth-pointed gap of 46 minutes at 2017-181T18:15 – 19:01 is due to a waypoint turn being delayed in order to avoid NEG_Y to Sun issues. This gap can also be used for an Bias if needed
- CMT Management waiver required for the following CMT violations:
  - POS_X to SUN angle < 83 deg violation during ISS_281SA_HIRESWACS001_PIE at 2017-180T21:28:15 - 41:35. Minimum POS_X to Sun angle = 71.55° at 2017-180T21:36:10
- CIRS Boresite to Sun < 15° Operational FR waiver required during VIMS_281SA_SPOLMOV001_PIE between 181T04:39:55 - 181T08:14:00: **CIRS provided approval via email (Mike Flasar 10/31)**
- CIRS heating violation Consumable FR waiver required during ISS_281SA_HIRESWACS002_PIE
  - CIRS Max Temp = 81.76K (ΔT = 6.16K) at 180T22:31, >1.6K: 180T21:34 - 181T05:25 , >5K: 180T22:11 - 181T00:56
  - **Consumable FR waiver will be required**: **CIRS provided approval via email (Mike Flasar 10/31)**
- VIMS heating violation Consumable FR waiver required during ISS_281SA_HIRESWACS002_PIE
  - VIMS Max Temp = 65.28K (ΔT = 5.62K) at 180T23:38:30, >1K: 180T20:46 - 181T18:15 , >2K: 180T22:02 - 181T13:47
  - **Consumable FR waiver will be required: VIMS provided approval via email (Ed Audi 10/18)**
- The following science requests from 2017-180T10:25 to 2017-181T09:55 in Saturn 281 have been designed in PDT during integration. Teams identified shall deliver these designs as part of the Port 1 delivery; SIP Leads to monitor.

  UVIS_281SA_LIMBINT001_PRIME

  CIRS_281SA_REGMAP001_PIE **(POST)**

  ISS_281SA_HIRESWACS001_PIE **(POST)**

  SP_281DR_RAMAVOID180_PRIME **(POST)**

  ISS_281SA_HIRESWACS002_PIE **(POST)**

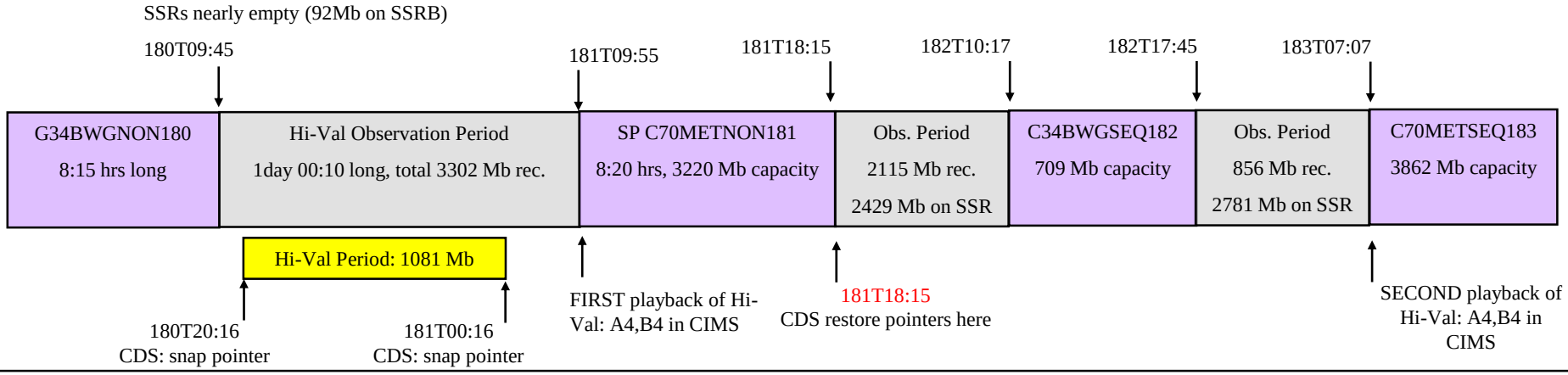
  VIMS_281SA_SPOLMOV001_PIE

  ENGR_281SC_SSACHK181_AACS
- SIP Leads to check that the POST science requests from 2017-180T14:16 to 181T00:16 in Saturn 281 are the same as what has been approved in integration: https://cassini.jpl.nasa.gov/tools/index.php?q=file_exchange/dl/sip_xxm/s100/integration/sasf/Saturn_281_161025.sasf

Dual Playback (CIRS/ISS PIES & RPX)

Saturn 281	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?)
CIRS/ISS PIES & RPX	180T20:16	181T00:16	1081 Mb	**No**, but only 92Mb on **SSRB**	Yes	Yes	**Yes**

Playbacks NOT contiguous:



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 281 Jumpstart executed by David Bates (11/09/16)

- Rev 281 solution is acceptable AS-IS without requiring any tweaks, due to use of relaxed RBOT constraints for proximal orbits