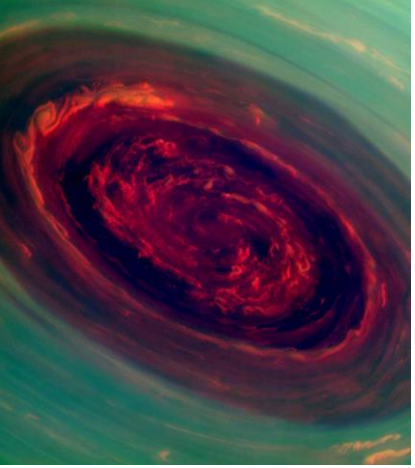

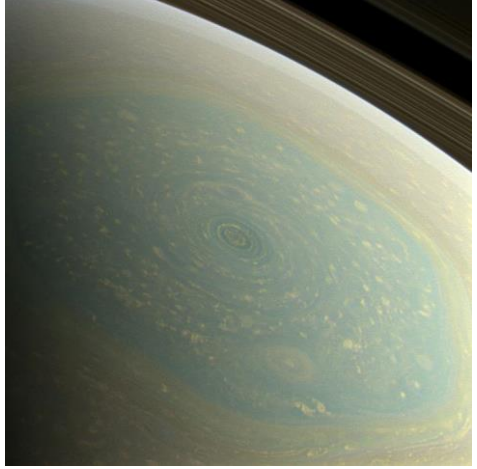
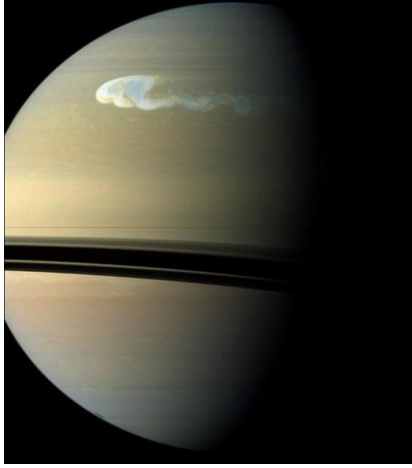

Science Planning & Sequence Team
CASSINI

SATURN TARGET WORKING TEAM

Rev 262_263 Segment Legacy Package

Segment Boundary: Feb 24, 2017 – Feb 28, 2017
2017-055T02:19:00 – 2017-058T19:23:00 (SCET)

Integration Began 03/14/2016
Segment Delivered to S98 Sequence 08/08/2016
Lead Integrator was Keven Uchida

Legacy Package Assembled by Keven Uchida

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

Segment Overview and Final Products

Segment Summary

- Cassini “F-Ring” phase apoapsis segment. The S/C is in an inclined orbit with Saturn distances ranging between ~15 and 21 R_s
- View begins at the equator, then progresses to higher northern latitudes (up to a sub-S/C latitude of 33 degrees). Relatively high phase angles (146 to 110 degrees) throughout segment.
- ISS Limb and UVIS auroral observations populate this segment, as well as CIRS and VIMS mapping.
- No ORS boresight to Sun issues/concerns
- Data volume was oversubscribed by 1400 Mbit after initial activity placement. Data volume cuts to activities were made by ORS and MAG, without notable issue/contention, to keep segment within its allocation.
- Downlink at 055T13:54 served as an OTM backup slot.

Final Sequenced SPASS

Gap 1

Gap 2

Gap 3

Request	Riders	Start (SCET)	Start (Epoch)	Duration	End	Primary	Secondary	Comments
SATURN_262_263 Segment		2017-055T02:19:00		003T17:04:00	2017-058T19:23:00			
SP_262SA_WAYPTTURN055_PRIME		2017-055T02:19:00		000T00:40:00	2017-055T02:59:00	ISS_NAC to Saturn	POS_Z to NSP	
NEW WAYPOINT		2017-055T02:59:00		000T11:05:00	2017-055T14:04:00	ISS_NAC to Saturn	POS_Z to NSP	
ISS_262SA_LIMBINT001_PRIME	V	2017-055T02:59:00		000T02:00:00	2017-055T04:59:00	ISS_NAC to Saturn	POS_Z to NSP	
CIRS_262SA_COMPSIT001_PRIME	U, V	2017-055T04:59:00		000T08:25:00	2017-055T13:24:00	CIRS_FP1 to Saturn	POS_Z to NSP	
SP_262EA_DLTURN055_PRIME		2017-055T13:24:00		000T00:40:00	2017-055T14:04:00	XBAND to Earth	POS_X to 177.9/4.8	RA/DEC equiv of NegY to NSP
NEW WAYPOINT		2017-055T14:04:00		000T11:10:00	2017-056T01:14:00	XBAND to Earth	POS_X to 177.9/4.8	
SP_262EA_C34BWGOTB055_PRIME	C, E, N	2017-055T15:34:00		000T09:00:00	2017-056T00:34:00	XBAND to Earth	4_Hr_Rolling	
Apoapse Per = 7.2 d, inc =...		2017-056T00:27:37		000T00:00:01	2017-056T00:27:38			
SP_263SA_WAYPTTURN056_PRIME		2017-056T00:34:00		000T00:40:00	2017-056T01:14:00	ISS_NAC to Saturn	POS_Z to NSP	
NEW WAYPOINT		2017-056T01:14:00		001T06:50:00	2017-057T08:04:00	ISS_NAC to Saturn	POS_Z to NSP	
ISS_263SA_LIMBINT001_PRIME	V	2017-056T01:14:00		000T01:10:00	2017-056T02:24:00	ISS_NAC to Saturn	POS_Z to NSP	
CIRS_263SA_MIRMAP001_PRIME	V	2017-056T02:24:00		000T22:00:00	2017-057T00:24:00	CIRS_FP3 to Saturn	POS_Z to NSP	
UVIS_263SA_AURDSTARE001_PRIME	C, I, V	2017-057T00:24:00		000T03:30:00	2017-057T03:54:00	UVIS_FUV to Saturn	POS_Z to NSP	Collaborative Rider(s): VIMS
UVIS_263SA_AURSLEW002_PRIME	V	2017-057T03:54:00		000T03:30:00	2017-057T07:24:00	UVIS_FUV to Saturn	POS_Z to NSP	Collaborative Rider(s): VIMS
SP_263EA_DLTURN057_PRIME		2017-057T07:24:00		000T00:40:00	2017-057T08:04:00	XBAND to Earth	POS_X to 178.0/4.8	RA/DEC equiv of NegY to NSP
NEW WAYPOINT		2017-057T08:04:00		000T10:25:00	2017-057T18:29:00	XBAND to Earth	POS_X to 178.0/4.8	
SP_263EA_YGAP057_PRIME		2017-057T08:04:00		000T01:30:00	2017-057T09:34:00	XBAND to Earth	POS_X to 178.0/4.8	
SP_263EA_G34B26NON057_PRIME	C	2017-057T09:34:00		000T08:15:00	2017-057T17:49:00	XBAND to Earth	Rolling/SRU	SRU.
SP_263SA_WAYPTTURN057_PRIME		2017-057T17:49:00		000T00:40:00	2017-057T18:29:00	ISS_NAC to Saturn	POS_Z to NSP	
NEW WAYPOINT		2017-057T18:29:00		000T13:13:00	2017-058T07:42:00	ISS_NAC to Saturn	POS_Z to NSP	
VIMS_263SA_NPOLMAP001_PRIME	C, I, U	2017-057T18:29:00		000T08:00:00	2017-058T02:29:00	ISS_NAC to Saturn	POS_Z to NSP	
UVIS_263SA_AURDSTARE002_PRIME	C, I, V	2017-058T02:29:00		000T02:20:00	2017-058T04:49:00	UVIS_FUV to Saturn	POS_Z to NSP	Collaborative Rider(s): VIMS
UVIS_263SA_AURSLEW003_PRIME	V	2017-058T04:49:00		000T02:20:00	2017-058T07:09:00	UVIS_FUV to Saturn	POS_Z to NSP	Collaborative Rider(s): VIMS
SP_263EA_DLTURN058_PRIME		2017-058T07:09:00		000T00:33:00	2017-058T07:42:00	XBAND to Earth	NEG_Y to 158.481/-36.862	RA/DEC equiv of Neg-Y to Saturn (0,0,-20)
NEW WAYPOINT		2017-058T07:42:00		000T11:59:00	2017-058T19:41:00	XBAND to Earth	NEG_Y to 158.481/-36.862	
ENGR_263SC_KPTYBIAS058_PRIME		2017-058T07:42:00		000T01:30:00	2017-058T09:12:00	POS_Z to DELTA_H	NEG_X to Sun	
SP_263EA_G70METNON058_PRIME	C	2017-058T09:19:00		000T08:30:00	2017-058T17:49:00	XBAND to Earth	NEG_Y to 158.481/-36.862	SRU.
SP_263EA_C34BWGNON058_PRIME		2017-058T17:49:00		000T01:34:00	2017-058T19:23:00	XBAND to Earth	NEG_Y to 158.481/-36.862	

Final Sequenced SMT and Data Volume

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

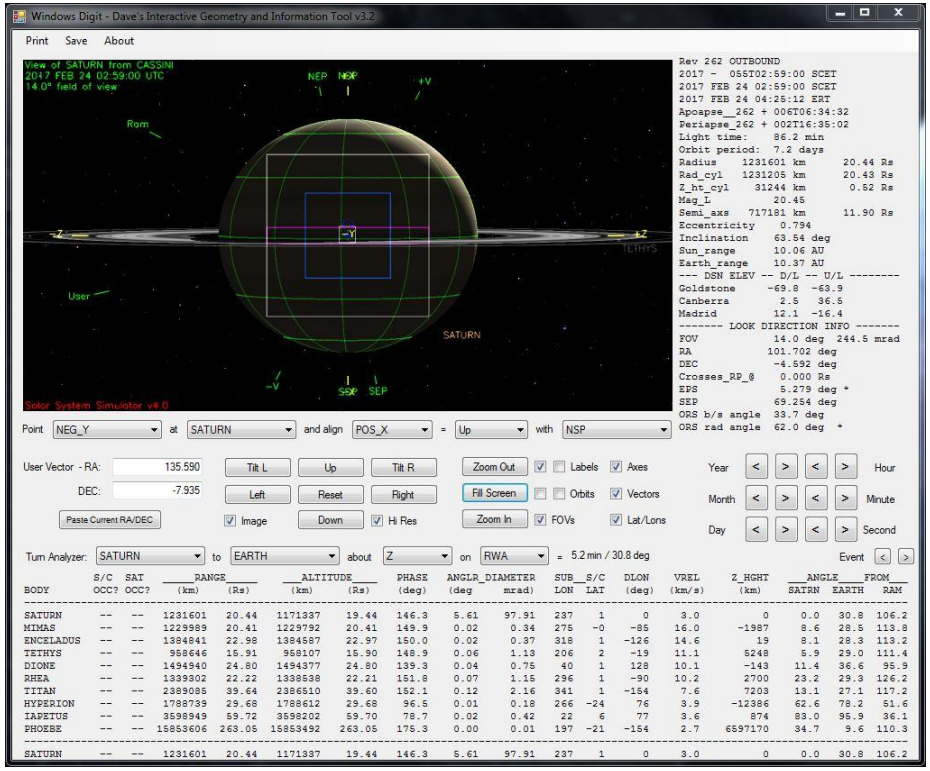
			OBSERVATION_PERIOD							DOWNLINK_PASS							
			P4						P5	RECORDED		PLAYBACK					
DOWNLINK PASS NAME	Start doy hh:mm	End doy hh:mm	START (Mb)	SCI (Mb)	HK+E (Mb)	TOTAL (Mb)	CPACTY (Mb)	MRGN (Mb)	OPNAV (Mb)	SCI (Mb)	ENGR (Mb)	TOTAL (Mb)	CPACTY (Mb)	MARGN (Mb)	NET_MARGN (Mb)	(%)	CAROVR (Mb)
SP_262EA_C34BWGOTB055_PRIME	055 15:34	056 00:34	181	683	62	926	3322	2396	0	156	53	1135	686	-450	-108	0%	450
SP_263EA_G34B26NON057_PRIME	057 09:34	057 17:49	450	1142	139	1731	3322	1591	0	156	49	1936	464	-1473	-108	0%	1472
SP_263EA_G70METNON058_PRIME	058 09:19	058 17:49	1472	775	65	2313	3322	1009	0	171	50	2534	2325	-210	-108	0%	209
SP_263EA_C34BWGNON058_PRIME	058 17:49	058 19:23	209	0	0	209	3322	3113	0	19	9	238	124	-115	-108	0%	114

DATA VOLUME REPORT --- TRANSFER FRAME OVERHEAD NOT INCLUDED

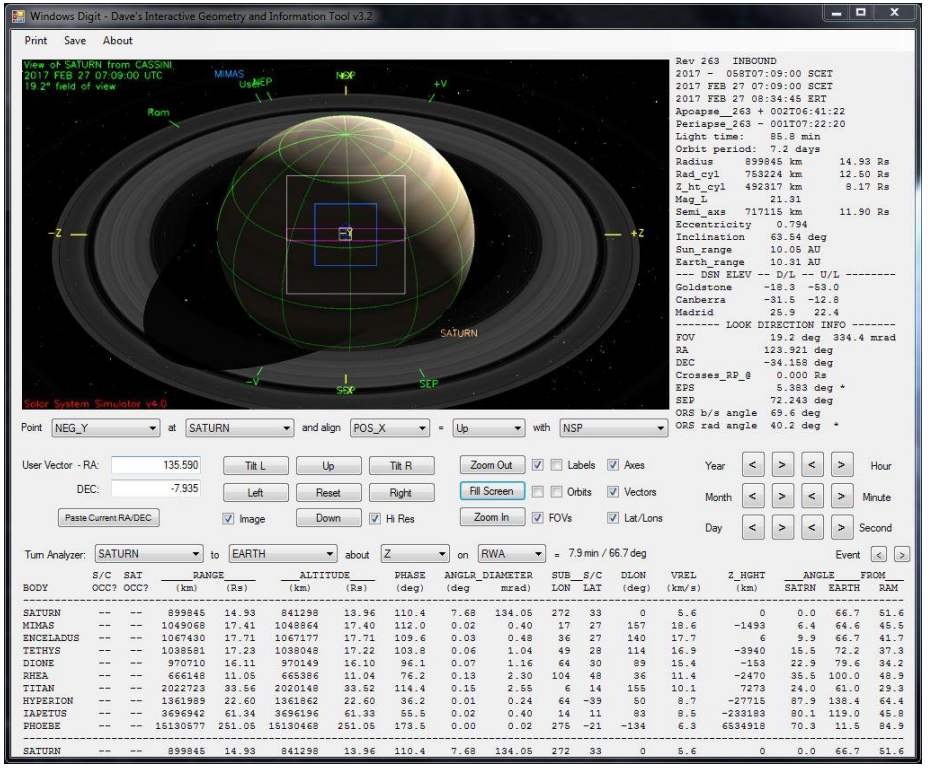
Event	Start doy hh:mm	End doy hh:mm	CAPS (Mb)	CDA (Mb)	CIRS (Mb)	INMS (Mb)	ISS (Mb)	MAG (Mb)	MIMI (Mb)	RADAR (Mb)	RPWS (Mb)	UVIS (Mb)	VIMS (Mb)	PROBE (Mb)	ENGR (Mb)	TOTAL (Mb)
OBSERVATION_NOR	055 00:54	055 15:34	0.0	13.8	60.6	5.3	300.0	24.6	43.6	0.0	48.0	31.3	150.0	0.0	61.3	738.5
SP_262EA_C34BWGOTB055_PRIME	055 15:34	056 00:34	0.0	8.5	64.8	3.2	0.0	16.0	27.5	0.0	29.5	4.9	0.0	0.0	0.0	154.5
DAILY TOTAL SCIENCE	055 00:54	056 00:34	0.0	22.4	125.4	8.5	300.0	40.6	71.2	0.0	77.5	36.2	150.0	0.0	61.3	
OBSERVATION_NOR	056 00:34	057 09:34	0.0	62.3	183.6	11.9	209.3	58.7	101.0	0.0	108.1	76.1	321.0	0.0	137.9	1269.8
SP_263EA_G34B26NON057_PRIME	057 09:34	057 17:49	0.0	15.6	64.8	3.0	0.0	14.7	25.2	0.0	27.0	4.5	0.0	0.0	0.0	154.8
DAILY TOTAL SCIENCE	056 00:34	057 17:49	0.0	77.8	248.4	14.9	209.3	73.4	126.2	0.0	135.1	80.6	321.0	0.0	137.9	
OBSERVATION_NOR	057 17:49	058 09:19	0.0	29.2	74.4	5.6	52.0	27.6	47.4	0.0	54.3	79.7	398.0	0.0	64.8	833.0
SP_263EA_G70METNON058_PRIME	058 09:19	058 17:49	0.0	16.0	64.8	3.1	0.0	15.1	26.0	0.0	39.8	4.7	0.0	0.0	0.0	169.5
SP_263EA_C34BWGNON058_PRIME	058 17:49	058 19:23	0.0	3.0	0.0	0.6	0.0	2.8	4.8	0.0	7.3	0.9	0.0	0.0	0.0	19.3
DAILY TOTAL SCIENCE	057 17:49	058 19:23	0.0	48.2	139.2	9.2	52.0	45.5	78.2	0.0	101.4	85.2	398.0	0.0		

Segment Geometry

Start: 2017-055T02:50



End: 2017-058T07:09



	Saturn Range	Phase Angle	Sub-S/C Lat.
Segment Start	20.44	146.3	1
Apoapse	21.35	137.6	9
Segment End	14.93	110.4	33

Solar Geometry – ORS Boresight Concerns

No ORS Boresight Solar Constraints on Science Pointing

Daily Science Highlights

24 Feb 2017 (DOY 055): The Saturn 262_263 apoapsis segment began on this day at 02:59 UT, with an ISS stare observation, at relatively high phase angle (146 degrees), along the illuminated limb of Saturn (LIMBINT). CIRS then took the lead with an 8.5 hour compositional sit-and-stare (COMPSIT), with UVIS and VIMS riding along. The day ended with a 9 hr downlink over Canberra, during which UVIS and CIRS conducted their regular interplanetary hydrogen survey (IPH) and a deep space calibration activities, respectively. The MAPS instruments performed various magnetospheric/atmospheric surveys throughout this segment.

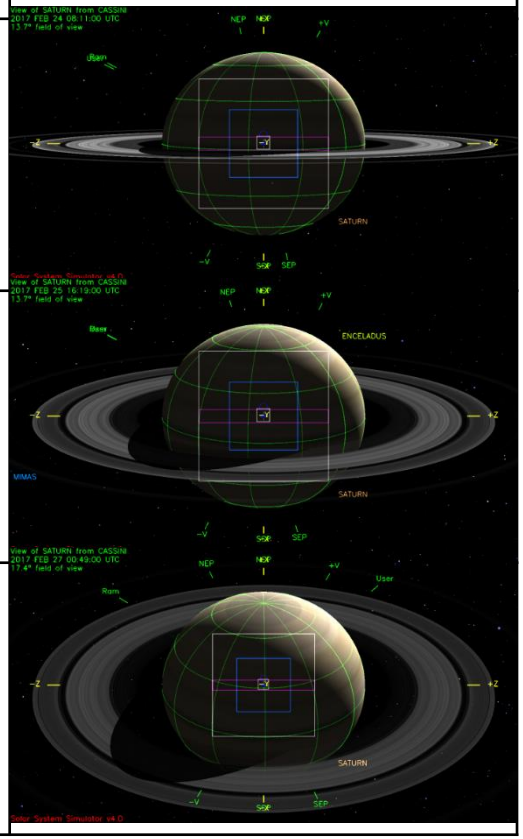
Feb 2017 (DOY 056):
Following a nearly simultaneous end of downlink and apoapse passage, ISS performed another short (1.5 hr) integration along the bright limb of Saturn (VIMS rider), at lower phase angle. CIRS followed with mid-IR mapping (MIRMAP) of the northern hemisphere, over two complete Saturn rotations (22 hrs), to measure upper troposphere and tropopause temperatures (VIMS rider)

27 Feb 2017 (DOY 057):
Upon completion of the MIRMAP, UVIS stared for 3.5 hr at the illuminated northern auroral oval (AURDSTARE), at 18 deg sub-S/C lat, with ISS, CIRS and VIMS riding along UVIS then performed repeated slews (AURDSLEW) across the illuminated auroral oval for another 3.5 hrs – VIMS served as a collaborative rider on this activity. Following downlink to Goldstone, VIMS then took the lead to map Saturn's northern hemisphere, covering the north polar limb down to mid-latitudes (NPOLMAP).

28 Feb 2017 (DOY 058):
The Saturn_262_263 segment concluded with a second UVIS auroral daytime slew/stare observation pair, taken at higher sub-S/C latitude (30 deg) than with those performed earlier on DOY 057.

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	2017-055T02:59:00	2017-055T13:24:00	000T10:25:00	146.3 – 141.9	20.4 – 21.1	1 - 5	
	Suggested Activities: *ISS Limb Observation:* *CIR Compsit or VIMS Global Map*		*02h00m* *08h25m*				
2	2017-056T01:14:00	2017-057T07:24:00	001T06:10:00	137.3 – 124.6	21.4 – 19.4	10 - 21	
	Suggested Activities: *ISS Limb Observation:* *CIRS Map* *UVIS auroral Observation*		*02h00m* *22h00m* *(03:30m staring, 02h40m slewing)*				
3	2017-057T18:29:00	2017-058T07:09:00	000T12:40:00	118.9 – 110.4	17.7 – 14.9	26 - 33	
	Suggested Activities: *VIMS Polar Map:* *UVIS auroral Observation*		*08h00m* *(02:40m staring, 02h00m slewing)*				

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)	(%)	CAROVR (Mb)
SP_262EA_C34BWGNON055_PRIME	055 15:34	056 00:34	0	145	56	201	3322	3121	0	191	53	445	686	241	1355	38%	0
SP_263EA_G34B24NON057_PRIME	057 09:34	057 17:49	0	393	139	532	3322	2790	0	182	49	763	400	-363	1114	39%	363
SP_263EA_G70METNON058_PRIME	058 09:19	058 17:49	363	275	65	703	3322	2619	0	496	50	1249	2325	1075	1114	45%	0
SP_263EA_C34BWGNON058_PRIME	058 17:49	058 19:23	0	0	0	0	3322	3322	0	76	9	86	124	38	38	31%	0

Split Pass

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	055 02:19	055 15:34	0.0	12.5	0.0	4.8	0.0	23.3	40.4	0.0	62.5	0.0	0.0	0.0	55.4	198.8
SP_262EA_C34BWGNON055_PRIME	055 15:34	056 00:34	0.0	8.5	86.4	3.2	0.0	16.0	27.5	0.0	42.4	4.9	0.0	0.0	0.0	189.1
DAILY TOTAL SCIENCE	055 02:19	056 00:34	0.0	21.0	86.4	8.0	0.0	39.3	67.9	0.0	104.9	4.9	0.0	0.0	55.4	
OBSERVATION_NOR	056 00:34	057 09:34	0.0	62.3	0.0	11.9	0.0	58.7	101.0	0.0	155.6	0.0	0.0	0.0	137.9	527.3
SP_263EA_G34B24NON057_PRIME	057 09:34	057 17:49	0.0	15.6	78.3	3.0	0.0	14.7	25.2	0.0	38.9	4.5	0.0	0.0	0.0	180.2
DAILY TOTAL SCIENCE	056 00:34	057 17:49	0.0	77.8	78.3	14.9	0.0	73.4	126.2	0.0	194.5	4.5	0.0	0.0	137.9	
OBSERVATION_NOR	057 17:49	058 09:19	0.0	29.2	0.0	5.6	0.0	27.6	47.4	0.0	162.4	0.0	0.0	0.0	64.8	337.0
SP_263EA_G70METNON058_PRIME	058 09:19	058 17:49	0.0	16.0	81.0	3.1	0.0	15.1	26.0	0.0	345.8	4.7	0.0	0.0	0.0	491.7
SP_263EA_C34BWGNON058_PRIME	058 17:49	058 19:23	0.0	3.0	0.0	0.6	0.0	2.8	4.8	0.0	63.7	0.9	0.0	0.0	0.0	75.7
DAILY TOTAL SCIENCE	057 17:49	058 19:23	0.0	48.2	81.0	9.2	0.0	45.5	78.2	0.0	571.9	5.5	0.0	0.0	64.8	

	CAPS (Mb)	CDA (Mb)	CIRS (Mb)	INMS (Mb)	ISS (Mb)	MAG (Mb)	MIMI (Mb)	RADAR (Mb)	RPWS (Mb)	UVIS (Mb)	VIMS (Mb)	PROBE (Mb)
TOTAL RECORDED (OPNAV data not included)	0.0	147.1	245.7	32.1	0.0	158.2	272.4	0.0	871.4	15.0	0.0	0.0

Waypoint Selection

Safe 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_262NA_OBSERV055_NA	2017-055T02:34:00	2017-055T15:34:00	**BAD**	**BAD**	OK	OK	OK	OK	**BAD**	**BAD**	OK	**BAD**
SP_263NA_OBSERV056_NA	2017-056T00:34:00	2017-057T09:34:00	**BAD**	**BAD**	OK	OK	OK	OK	**BAD**	**BAD**	OK	**BAD**
SP_263NA_OBSERV057_NA	2017-057T17:49:00	2017-058T09:19:00	**BAD**	**BAD**	OK	OK	OK	OK	**BAD**	**BAD**	OK	**BAD**

RBOT Friendly

OBSERVATION PERIOD	START	END	POS_X	NEG_X	POS_Z	NEG_Z
SP_262NA_OBSERV055_NA	2017-055T02:34:00	2017-055T15:34:00	188.8/ 32.0	------	188.8/ 32.0	------
SP_263NA_OBSERV056_NA	2017-056T00:34:00	2017-057T09:34:00	188.8/ 32.0	------	188.8/ 32.0	------
SP_263NA_OBSERV057_NA	2017-057T17:49:00	2017-058T09:19:00	188.8/ 32.0	------	188.8/ 32.0	------

Safe DLs

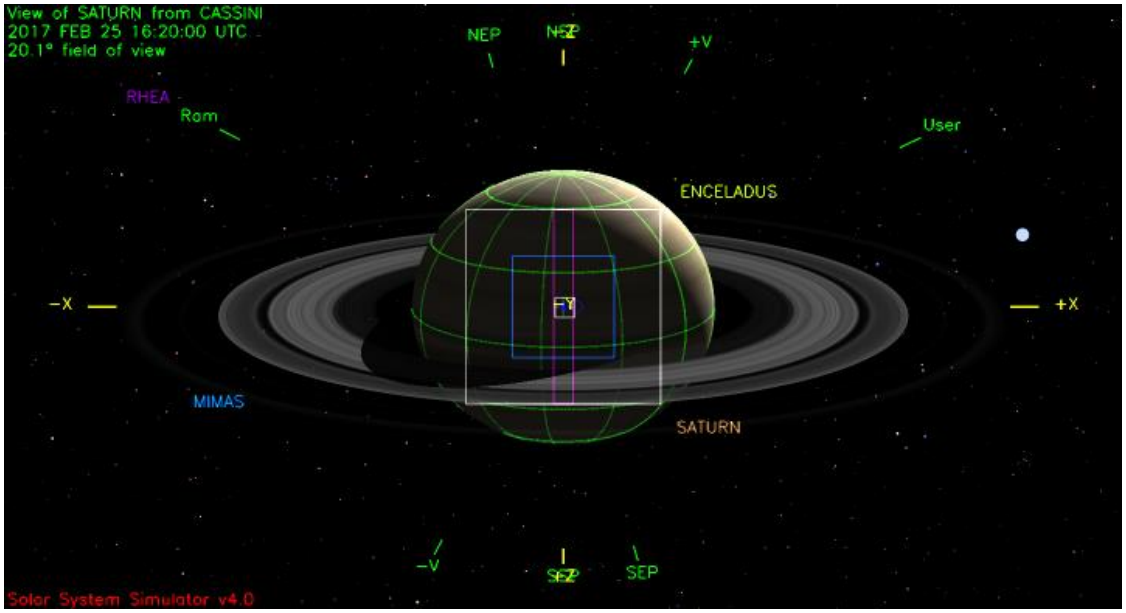
DOWNLINK	START	END	POS_X_2_NSP	POS_X_2_NEP	NEG_X_2_NSP	NEG_X_2_NEP	POS_Y_2_NSP	POS_Y_2_NEP	NEG_Y_2_NSP	NEG_Y_2_NEP	ROLL_FLAG
SP_262EA_C34BWGNON055_PRIME	2017-055T15:34:00	2017-056T00:34:00	OK	OK	OK	OK	**BAD**	**BAD**	OK	OK	OK
SP_263EA_G34B24NON057_PRIME	2017-057T09:34:00	2017-057T17:49:00	OK	OK	OK	OK	**BAD**	**BAD**	OK	OK	0
SP_263EA_G70METNON058_PRIME	2017-058T09:19:00	2017-058T17:49:00	OK	OK	**BAD**	**BAD**	**BAD**	**BAD**	OK	OK	0

Waypoints Chosen

The same waypoint was used for the entire segment:

Waypoint 1 (2017-055T02:55 – 058T17:42:00): ISS_NAC to Saturn, NEG_Z to NSP.

Below is the chosen waypoint at mid segment: 056T16:20:00



Notes and Liens

- **Pointing**:
  - No issues.
- **Data Volume**:
  - No SMT warnings. No carryover.
- **Resource Checker Disopsitions:**
  - 2017-057T09:34:00 (SP_263NA_G34B24NON057_SP) DSN_PASS is using station id DSS-24 SP should replace BWG in the DSN and Downlink request names with B24, and then run ap_downlink to get correct predicts
    - OK. It is a reminder that always appears when using DSS 24. We use the correct name specification as it instructs.
  - 2017-055T13:24:00 (SP_262EA_DLTURN055_PRIME) Gap in Prime SPASS requests between SP_262EA_DLTURN055_PRIME and SP_262EA_C34BWGOTB055_PRIME.
    - SP_262EA_C34BWGNON055_PRIME converted to OTB pass per June 08 Vandermay e-mail. Preceding Y-BIAS placeholder removed.
  - 2017-055T15:34:00 (SP_262EA_C34BWGOTB055_PRIME) Manually verify identical inertial pointing, the primary OTM may exist in the previous segment/sequence
    - Inertial pointing POS_X to 177.9/4.8 (RA/Dec equivalent of NegY to NSP) confirmed used by preceding SOST_262 for OTP
- **Opmodes**:
  - No unique opmodes
- **Intentional Gaps**
  - 1h30m gap (2017-055T14:04). See “Resource Checker Dispositions” second sub-bullet above.
- **Hydrazine:**
  - N/A
- **Special Activities:**
  - None
- **Liens**
  - None