

Science Planning & Sequence Team

SATURN TARGET WORKING TEAM

Rev 44 Segment Legacy Package

Segment Boundary: May 10, 2007 – May 12, 2007 2007-130T05:14 – 2007-132T04:59 (SCET)

Integration Began 04/28/2003 Segment Delivered to S30 Sequence 01/05/2007 Lead Integrator was Scott Edgington

Legacy Package Assembled by Kyle Cloutier

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

Segment Overview and Final Products

• Saturn 44 was a 2 day periapse segment in the Prime Mission. The segment was executed during an inclined orbit phase of the mission.

 Saturn science focused mainly around the Saturn occultations. RSS observes both ingress and egress ionospheric/atmospheric Saturn occultations and an egress only ring occultation. UVIS and VIMS also observe. Surrounding the occultation, CIRS takes spectra in the vicinity of RSS occultation points to obtain a new He determination. A Live Movable Block (LMB) was utilized to adjust timing for the occultation observations.

• Other observations include CIRS and UVIS limb observations and VIMS cylindrical maps and a 0 phase scan. CDA observes ring plane crossing inside the E-ring, inbound to periapse.

• Solar viewing constraints impacted science placement, but no CMT constraint management was required during the occulted period since Radio Science and UVIS were prime at the time and pointed XBAND to Earth or UVIS solar occultation port to Sun.

Final Sequenced SPASS (1 of 2)

Request	Riders	Start (SCET)	Start (Epoch)	Duration	End	Primary	Secondary	Comments
SATURN rev 44 Segment		2007-130T05:14:00		001T23:45:00	2007-132T04:59:00	-		
SP_044SA_WAYPTTURN130_PRIME	С, М	2007-130T05:14:00				ISS_NAC to Saturn	NEG_Z to NSP	SP Turn to Waypoint
NEW WAYPOINT		2007-130T05:44:00		000T07:46:00	2007-130T13:30:00	ISS_NAC to Saturn	NEG_Z to NSP	
CIRS_044SA_NADIROCC004_PRIME	М	2007-130T05:44:00			2007-130T08:44:00	CIRS_FPB to Saturn	NEG_Z to NSP	
CIRS_044RI_SHADCAS001_PRIME	C, M, R, V	2007-130T08:44:00		000T04:26:00	2007-130T13:10:00	CIRS_FP1 to Rings	NEG_Z to NSP	
						XBAND to Earth (0.0,0.0,-5.0 deg.		
SP_044EA_WAYPTTURN530_PRIME	M, R	2007-130T13:10:00		000T00:20:00	2007-130T13:30:00	offset)	POS_X to NSP	SP Turn to Waypoint
						XBAND to Earth (0.0,0.0,-5.0 deg.		
NEW WAYPOINT		2007-130T13:30:00		000T05:38:00	2007-130T19:08:00	offset)	POS_X to NSP	
SP_044EA_DEADTIME130_PRIME	М	2007-130T13:30:00		000T00:15:00	2007-130T13:45:00	XBAND to Earth	POS_X to NSP	
			LMB_E044_SATURN_RSS_OCC					
RSS_044SA_OCC002_PRIME	м	2007-130T13:45:33	_1_ING-000T00:49:31	000T00:54:00	2007-130T14:39:33	XBAND to Earth	POS_X to NSP	
			LMB_E044_SATURN_RSS_OCC			ISS_NAC to Sun (-20.0,0.0,-0.109		
UVIS_044SU_USUNOCC001_PRIME	M, R, V	2007-130T14:39:33	_1_ING+000T00:04:29	000T01:30:00	2007-130T16:09:33	deg. offset)	POS_X to NSP	
			LMB_E044_SATURN_RSS_OCC					
RSS_044SA_OCC003_PRIME	М	2007-130T16:09:33	_1_ING+000T01:34:29	000T00:50:00	2007-130T16:59:33	XBAND to Earth	POS_X to NSP	
			LMB_E044_SATURN_RSS_OCC					
RSS_044RI_OCC002_PRIME	М	2007-130T16:59:33	_1_ING+000T02:24:29	000T01:23:00	2007-130T18:22:33	XBAND to Earth	POS_X to NSP	
SP_044EA_DEADTIME430_PRIME	М	2007-130T18:23:00		000T00:15:00	2007-130T18:38:00	XBAND to Earth	POS_X to NSP	
						XBAND to Earth (0.0,-20.0,30.0		SP Turn to Waypoint; Needed to split turn to avoid
SP_044SA_WAYPTTURN430_PRIME	С, М	2007-130T18:38:00		000T00:08:00	2007-130T18:46:00	deg. offset)	POS_X to NSP	FR violations.
SP_044SA_WAYPTTURN530_PRIME	С, М	2007-130T18:46:00		000T00:22:00	2007-130T19:08:00	ISS_NAC to Saturn	POS_Z to NSP	SP Turn to Waypoint
NEW WAYPOINT		2007-130T19:08:00		000T12:42:00	2007-131T07:50:00		POS_Z to NSP	
						POS_Y to Sun (0.0,-45.0,0.0 deg.		
CDA_044RE_ERNGRPX001_PRIME	М	2007-130T19:08:00			2007-130T20:43:00	offset)	POS_Z to NSP	CDA-CAPS-MIMI
CIRS_044SA_OCCLIMB001_PRIME	С, М	2007-130T20:43:00				CIRS_FPB to Saturn	POS_Z to NSP	
UVIS_044SA_LIMBSKIM001_PRIME	М	2007-130T21:13:00			2007-130T22:08:00		POS_X to Saturn	
CIRS_044SA_LIMBINT003_PRIME	C, M, R	2007-130T22:08:00			2007-131T00:20:00	CIRS_FPB to Saturn	POS_Z to NSP	point to left limb for CAPS
Periapse R = 4.3 Rs, lat =		2007-130T22:46:55		000T00:00:01	2007-130T22:46:56			
								SP Turn to Waypoint; the original secondary way
SP_044EA_DLTURN131_PRIME	C, M, R	2007-131T00:20:00		000T00:30:00	2007-131T00:50:00	XBAND to Earth	POS_X to 331.36/73.51	POS_X to NSP with an offset of (0,0,-5).
								May require a waiver of the CIRS thermal FRs. MAPS
								will have to provide justification for this waiver.
								Note that the original secondary way POS_X to NSP
SP_044EA_G70METNON130_PRIME	C, E, M, R	2007-131T00:50:00		000T06:00:00	2007-131T06:50:00	XBAND to Earth	3_Hr_Rolling	with an offset of (0,0,-5).
						ISS_NAC to Satellites		
NAV_044SK_OPNAV311_PRIME	M, R	2007-131T06:50:00		000T00:59:00	2007-131T07:49:00	(0.0,10.0,0.0 deg. offset)	NEG_X to Sun	Starts at Earth point, ends at NEW waypoint
						ISS_NAC to Saturn (0.0,10.0,0.0		
NAV_044SA_WAYPTTURN311_PRIME	М	2007-131T07:49:00		000T00:01:00	2007-131T07:50:00	deg. offset)	NEG_X to NEP	

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Request	Riders	Start (SCET)	Start (Epoch)	Duration	End	Primary	Secondary	Comments
						ISS_NAC to Saturn (0.0,10.0,0.0		
NEW WAYPOINT		2007-131T07:50:00		000T21:39:00	2007-132T05:29:00	deg. offset)	NEG_X to NEP	
VIMS_044SA_CYLMAP001_PRIME	М	2007-131T07:50:00		000T06:30:00	2007-131T14:20:00	ISS_NAC to Saturn	NEG_X to NSP	
CIRS_044SA_NADIROCCB004_PRIME	М	2007-131T14:20:00		000T03:00:00	2007-131T17:20:00	CIRS_FPB to Saturn	NEG_Z to NSP	
VIMS_044SA_CYLMAP002_PRIME	М	2007-131T17:20:00		000T02:09:00	2007-131T19:29:00	ISS_NAC to Saturn	NEG_X to NSP	
VIMS_044RI_0PHASE001_PRIME	C, I, M	2007-131T19:29:00		000T03:00:00	2007-131T22:29:00	POS_Y to Sun	NEG_X to North_Pole_Dir	
								SP Turn to Waypoint; the original secondary way
SP_044EA_DLTURN431_PRIME	С, М	2007-131T22:29:00		000T00:30:00	2007-131T22:59:00	XBAND to Earth	POS_X to 330.86/74.52	POS_X to NSP with an offset of (0,0,-5).
								May require a waiver of the CIRS thermal FRs. MAPS
								will have to provide justification for this waiver.
								Note that the original secondary was POS_X to NSP
SP_044EA_G70METNON131_PRIME	С, М	2007-131T22:59:00		000T06:00:00	2007-132T04:59:00	XBAND to Earth	3_Hr_Rolling	with an offset of (0,0,-0.5).

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

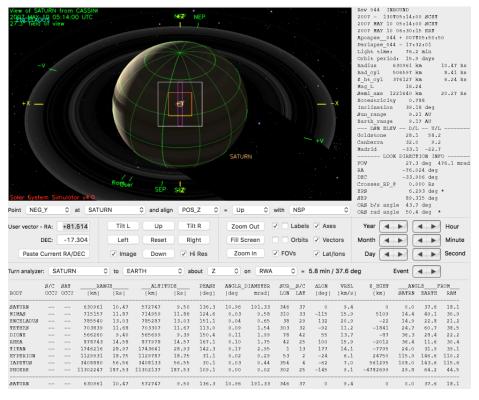
					OBS	ERVATI	ON_PERI	OD			DOWNLINK_PASS						
						P4			P5	RECO	 RECORDED PLAYBACK 						
DOWNLINK PASS NAME	Start doy <u>hh:mm</u>	End doy <u>hh:mm</u>	START (Mb)	SCI (Mb)	HK+E (Mb)	TOTAL (Mb)	CPACTY (Mb)	(MRGN (Mb)	OPNAV (Mb)	SCI (Mb)	ENGR (Mb)	TOTAL (Mb)	CPACTY (Mb)	MARGN (Mb)	NET_M (Mb)	ARGN (%)	CAROVR (Mb)
SP_044EA_G70METNON130_PRIME SP_044EA_G70METNON131_PRIME			0 250		67 68	1439 2058	3511 3511	2073 1454	0 18	1090 317	35 35	2564 2415	2314 2596	-250 181	104 104	1% 1%	250 0

DATA VOLUME REPORT --- TRANSFER FRAME OVERHEAD NOT INCLUDED

Event	Start doy <u>hh:mm</u>	End doy <u>hh:mm</u>	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 OBSERVATION_SI SP_044EA_G70METNON130_PRIME DAILY TOTAL SCIENCE			228.1 0.0 21.6 249.7	72.0 0.0 7.1 79.2	167.5 12.0 75.6 255.1	7.3 0.0 1.1 8.4	0.0 0.0 0.0 0.0	56.8 0.0 13.0 69.7	76.1 0.0 25.9 102.0	0.0 0.0 0.0 0.0	502.3 0.0 933.8 1436.1	106.0 0.0 1.6 107.6	131.6 0.0 0.0 131.6	0.0 0.0 0.0 0.0	0.0	1347.7 12.0 1079.7
OBSERVATION_NOR OBSERVATION_OPN SP_044EA_G70METNON131_PRIME DAILY TOTAL SCIENCE	131 06:50 131 22:59	132 04:59	58.1 0.0 144.5 202.6	19.2 0.0 7.1 26.3	93.6 0.0 75.6 169.2	45.9 0.0 1.1 47.0	500.0 17.4 0.0 500.0	57.4 0.0 21.3 78.8	93.0 0.0 34.6 127.6	0.0 0.0 0.0 0.0	268.2 0.0 28.3 296.5	0.8 0.0 1.6 2.5	588.2 0.0 0.0 588.2	0.0 0.0 0.0 0.0	13.2 1 0.0 0.0	1737.7 17.4 314.1

Segment Geometry (1 of 2)

Saturn 44 Legacy



	Saturn Range	Phase Angle	Sub-S/C Lat.
Segment Start	10.47 Rs	136.3 deg	37
Periapse	4.29 Rs	113.4 deg	-24
Segment End	15.12 Rs	15.8 deg	-8

Segment Start: 2007-130T05:14

Periapse: 2007-130T22:46:55

65.6° field +x	10 22	2:46:5					NEF	SĂTURT				JETHYS	×	Rev 044 ot 2007 MAY 1 2007 MAY 1 Appapse	10722:46: 10 22:46: 10 22:46: 10 20:32: 44 + 007: 44 + 007: 44 + 007: 44 + 007: 44 + 007: 44 + 007: 44 + 007: 45 + 007: 44 + 007: 45 + 007: 45 + 007: 46 + 007: 46 + 007: 47 + 007: 47 + 007: 48 + 007: 48 + 007: 48 + 007: 48 + 007: 48 + 007: 48 + 007: 48 + 007: 48 + 007: 48 + 007: 48 + 007: 48 + 007: 48 + 007: 48 + 007: 48 + 007: 48 + 007: 48 + 007: 48 + 007:	55 SCET 14 ERT 723:23:: 00:54 3 min 0 days km km 11 12 dag 19 dag 19 dag 21 AU L U/1 9 27.' 4 -64.: 5 44 TION INI	4.29 Rs 3.93 Rs -1.72 Rs 20.31 Rs
Solar Syste	em Sij	mulato	or y4.0		SEP	55 2 ° R	am							EPS SEP ORS b/s ar	88.	294 deg 661 deg 6 deg	*
Solar Syste	m Si	mulate	at SATU	RN	≎ and al			= Up	\$	with	NSP		<u> </u>		88. Igle 66.	661 deg 6 deg	*
			at SATU	RN Tilt L	SEP and al Up		_z 🗘	= Up Zoon				✓ Axe	\$	SEP ORS b/s an	88. Igle 66.	661 deg 6 deg	*
Jser vector -		+81				ign POS	_Z ≎		n Out	2 🗆	Labels	✓ Axes	\$	SEP ORS b/s ar ORS rad ar	88. Igle 66.	661 deg 6 deg	
Jser vector -	RA: DEC:	+81	.514 .304	Tilt L	Up	ign POS Til t Rig	_Z ≎	Zoon	n Out	2 🗆	Labels Orbits		≎ s tors	SEP ORS b/s ar ORS rad ar Year	88. Igle 66.	661 deg 6 deg	Hour
Jser vector -	RA: DEC: Currer	+81 -17 nt RA/[.514 .304 DEC	Tilt L Left Imag	Up	ign POS Til t Rig	_Z ≎ t R ght i Res	Zoon Fill Se	n Out creen	✓ □ I	Labels Orbits /s	✓ Vec	≎ s tors lons	SEP ORS b/s ar ORS rad ar Year Month Day	88. Igle 66.	661 deg 6 deg	Hour
Jser vector -	RA: DEC: Curren	+81 -17 nt RA/[.514 .304 DEC	Tilt L Left ✓ Imag to E	Up Reset ge Dowr ARTH	ign POS Til t Rig n ✔ H	_Z ≎ tR ght iRes out Z	Zoon Fill Sc Zoo	n Out creen m In on RWA	✓ □ I	Labels Orbits /s © = i	✓ Vec ✓ Lat/ 8.4 min /	≎ s tors lons	SEP ORS b/s ar ORS rad ar Year Month Day g	88. ngle 66. ngle 145.	661 deg 6 deg 2 deg 4 b 4 b	Hour Minute Second
ser vector - Paste (urn analyzei	RA: DEC: Currer r: S/ s/c	+81 -17 nt RA/I ATURN	.514 .304 DEC	Tilt L Left ✓ Imag to E	Up Reset	ign POS Til t Rig n ✔ H	_Z ≎ t R ght i Res	Zoon Fill Sc Zoo	n Out creen	✓ □ I	Labels Orbits /s © = i	✓ Vect ✓ Lat/	tors lons 72.9 de	SEP ORS b/s ar ORS rad ar Year Month Day	88. ngle 66. ngle 145.	661 deg 6 deg 2 deg 4 b 4 b	Hour Minute
Iser vector - Paste (urn analyzer	RA: DEC: Currer r: S/ s/c	+81 -17 nt RA/[ATURN SAT	.514 .304 DEC	Tilt L Left Imag to E	Up Reset ge Dowr ARTH	ign POS Til t Rig n ✔ H ≎ at:	Z O t R ght i Res out Z PHASE	Zoon Fill Sc Zoo	n Out creen in m In in DIAMETER	✓ □ I ✓ FOV SUB_	Labels Orbits /s () = 3 _s/c	✓ Vec ✓ Lat/ B.4 min /	tors lons 72.9 de	SEP ORS b/s ar ORS rad ar Year Month Day g z_HGHT	BB. Igle 66. Igle 145. Event (SATRN	551 deg 6 deg 2 deg • • • • • • •	Hour Minute Second
Ser vector -	RA: DEC: Currer r: S/ s/c	+81 -17 nt RA/[ATURN SAT	.514 .304 DEC 	Tilt L Left ✓ Imag C to E (GE (RB) 4.29 4.10	Up Reset ge Dowr ARTH 	ign POS Till t Rig n ✔ H ¢ ab (Rs) 3.31 4.10	LZ t R jht i Res out Z PHASE [deg] 113.4 72.1	Zoon Fill Sc Zoo ANGLR 1 [deg 26.96 0.10	n Out creen m In DIAMETER mrad] 470.54 1.68	✓ □ □ ✓ FOV ✓ FOV SUB_ LON 121 69	Labels Orbits /s 	✓ Vec ✓ Lat/ 8.4 min / (deg) 0 63	↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓	SEP ORS b/s ar ORS rad ar Year Month Day g z_HGHT (km) 0 412	88. Igle 66. Igle 145. Event CAN(SATRN 0.0 42.5	661 deg 6 deg 2 deg 4 b 5LE F EARTH 72.9 114.1	Hour Minute Second RAM RAM 90.2 104.9
Ser vector -	RA: DEC: Currer r: S/ s/c	+81 -17 nt RA/[ATURN SAT OCC2	.514 .304 DEC 	Tilt L Left Imag to E (RB) 4.29 4.10 3.05	Up Reset ge Dowr ARTH <u></u>	ign POS Till t Rig 1 ✓ H C at FUDB [Ra] 3.31 4.10 3.04	Z t R pht i Res out Z PHASE [deg] 113.4 72.1 51.2	Zoon Fill Sc Zoo Coo Coo Coo Coo Coo Coo Coo Coo Coo	n Out creen m In DIAMETER mrad] 470.54 1.68 2.79	✓ I ✓ FOV ✓ FOV SUB_ LON 121 69 75	Labels Orbits /s 	✓ Vec ✓ Lat/ 8.4 min / (deg) 0 63 37	S tors lons 72.9 de VREL (km/8) 16.2 19.3 14.2	SEP ORS b/s ar ORS rad ar Year Month Day g z_HGHT (km) 0 412 233	88. Igle 66. Igle 145. Event C AN(SATRN 0.0 42.5	661 deg 6 deg 2 deg • • • • • • • • • • • • • • • • • • •	Hour Minute Second RAM 90.2 104.9 123.3
ser vector -	RA: DEC: Currer r: S/ s/c	+81 -17 nt RA/[ATURN SAT OCC2	.514 .304 DEC 	Tilt L Left ✓ Imag C to E [R8] 4.29 4.10 3.05 8.30	Up Reset ge Dowr ARTH <u>ALTI1</u> [km] 199219 247160 183424 499516	ign POS Til t Rig h ✔ H C at (Ra) 3.31 4.10 3.04 8.29	_Z ≎ t R jht i Res out Z [deg] 113.4 72.1 51.2 140.2	Zoon Fill Sc Zoon Coon Coon Coon Coon Coon Coon Coon	n Out creen m In DIAMETER mrad] 470.54 1.68 2.79 2.16	✓ I ✓ FOV SUB LON 121 69 75 340	Labels Orbits /s 	 ✓ Vec: ✓ Lat/ 3.4 min / (deg) 63 37 -133 	Constant </td <td>SEP ORS b/s an ORS rad ar Year Month Day g z_HGHT (km) 0 412 23 4325</td> <td>88. Igle 66. Igle 145. Event (SATRN 0.0 42.5 5.22 27.2</td> <td>661 deg 6 deg 2 deg • • • • • • • • • • • • • • • • • • •</td> <td>Hour Minute Second RAM 90.2 104.9 123.3 76.9</td>	SEP ORS b/s an ORS rad ar Year Month Day g z_HGHT (km) 0 412 23 4325	88. Igle 66. Igle 145. Event (SATRN 0.0 42.5 5.22 27.2	661 deg 6 deg 2 deg • • • • • • • • • • • • • • • • • • •	Hour Minute Second RAM 90.2 104.9 123.3 76.9
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Segment Geometry (2 of 2)

Saturn 44 Legacy

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Point NEG_Y C at SATURN C and align POS_Z = Up C with NSP C OR8 rad angle 75.1 dag + User vector - RA: +B1.514 Tilt L Up Tilt R Zoom Out Labels Axes Year Image Hour DEC: -17.304 Left Reset Right Till Screen Orbits Vectors Month Image Minute Paste Current RA/DEC // Image Down // H Res Zoom In FOVs Lat/ions Day Image Second Turn analyzer: SATURN to EARTH C about Z on RWA C = 14.8 min / 157.9 deg Event Image Second BODY OCC2 CCC2 CCC2 CCC2 RAB [Km] [Re] PHASE ANGLE DIAMETER NUB_S/C LON VEEL Z NO 0.0 0.0.1 1.5.02 2.7.3 0.0.3 0.48 37	Solur Syste	31		or ve.o																	
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DEC: -17.304 Left Reset Right Fill Screen Orbits Vectors Month Month Month Paste Current RA/DEC Image Down HiRes Zoom In FOVs Lat/Ions Day Second Turn analyzer: SATURN to EARTH C about Z on RWA C = 14.8 min / 157.9 deg Event Second BODY OCC2 CCC2 RANEE ALTITUE FEAME AMCLE DIAMETER MIB S/C ALOS VELL Z DOW VELL Z O RWA C = 14.8 min / 157.9 deg Event Extreme BODY OCC2 CCC2 RANEE ALTITUE FEAME AMCLE DIAMETER MIB S/C ALOS VELL Z DO 0.0 15.12 BS0813 14.12 15.8 7.59 132.40 CAS = 0 7.2 0 0.0 15.71 134469 144.0 RIMAN - 1	User vector -	RA:	+81	.514	Tilt L	Up	Ті	t R	Zoor	n Out		Labels	Axe	s	Year 🖪		• •	Hour			
Paste Current RA/DEC Image Down Iter Zoom In FOVs Lat/Ions Day Second Turn analyzer: SATURN to EARTH about Z on RWA = 14.8 min / 157.9 deg Event Event BODY OCC2 OCC2 RANCE ALTITUER PEARE ANGLE DIAMETER SUB C Lat/Ions VELL Z HIM Event		DEC:	-17	304	Left	Reset		abt	Fill S	creen		Orbite	Vec	tors	Month			Minute			
SATURN Construction SATURN Construction Construction <thconstruction< th=""></thconstruction<>																					
S/C SAT RANCE ALTITUDE PHASE ANGLE DIMETER SUB_S/C ALON VELL Z HIGH ANGLE FROM BODY OCC2 OCC2 Ical [Re] [Km] [Re] [deg] [deg] Index ALON VELL Z HIGH ANGLE FROM SATUEN 911050 15.12 85081 14.12 15.8 7.59 132.40 283 -8 0 7.2 0 0.0 157.9 144.0 MINAS - 905318 15.02 203121 15.02 27.3 0.03 0.46 35 -5 15.3 13.1 143.5 ENCELADUS - 112575 18.73 112845 18.33 28.3 0.06 0.98 43 -7 125 10.8 59 12.7 145.6 135.0 DIONK - 613060 10.17 614248 10.61 </th <th>Paste C</th> <th>urren</th> <th>t RA/I</th> <th>DEC</th> <th>✓ Imag</th> <th>ge Down</th> <th></th> <th>li Res</th> <th>200</th> <th>min</th> <th>V FOV</th> <th>/s</th> <th>✓ Lat/</th> <th>lons</th> <th>Day 🧧</th> <th></th> <th>• •</th> <th>Second</th>	Paste C	urren	t RA/I	DEC	✓ Imag	ge Down		li Res	200	min	V FOV	/s	✓ Lat/	lons	Day 🧧		• •	Second			
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	TITAN HYPERION IAPETUS			4546510	75.44	4545762					-						146.9	135.5			
SATURN 911050 15.12 850881 14.12 15.8 7.59 132.40 283 -8 0 7.2 0 0.0 157.9 144.0	TITAN HYPERION			4546510 10798230	75.44 179.17	4545762 10798117	75.43	27.0	0.02	0.33	6 4	25	93	8.9	-4726833	11.6 85.5	146.9 72.5	135.5 82.9			

	Saturn Range	Phase Angle	Sub-S/C Lat.
Segment Start	10.47 Rs	136.3 deg	37
Periapse	4.29 Rs	113.4 deg	-24
Segment End	15.12 Rs	15.8 deg	-8

Segment End: 2007-132T04:59

Solar Geometry – ORS Boresight Concerns

- ISS_NAC to Saturn, NEG_X to NSP
 - Safe from ~130T05:14:00 to ~130T16:00:00 and ~131T04:00:00 to ~131T16:00:00
 - Except during Solar Occultation Period where CMT boresight violations occur. Waypoint cannot have FR violations!
- ISS_NAC to Saturn, POS_X to NSP
 - Safe from ~130T16:00:00 to ~131T04:00:00 (periapse)
 - Except during Solar Occultation Period where CMT boresight violations occur. Waypoint cannot have FR violations!
- ISS_NAC to Saturn, NEG_X to NSP
 - Safe for most of the segment
 - Except during Solar Occultation Period where CMT boresight violations occur. Waypoint cannot have FR violations!

Daily Science Highlights

Saturn 44 Legacy

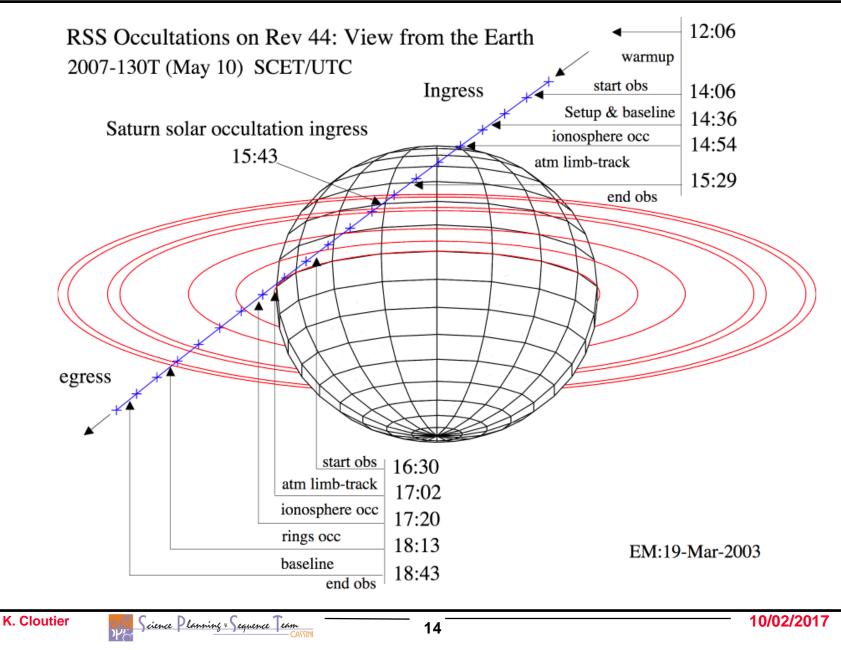
Just prior to periapse, on May 10th, the Radio Science team performed ring occultation measurements. The ingress occultation covered a Saturn northern latitude of about 71 degs, the highest latitude probed in both the Cassini nominal and extended missions. Collectively, the occultations provided important information about the atmosphere thermal structure, the microwave absorbing species, the hydrogen-to-helium ratio, and Saturn's puzzling winds. The egress ring occultation is one of two occultations that were especially designed to view the rings at an intermediate opening angle B of ~15 degs (the other on rev 46). Other RSS ring occultations during the nominal mission primarily sampled the rings when they were either relatively open (B > ~20 degs) or relatively closed (B < ~10 degs). The spread in B allows investigation of ring extinction and forward scattering behavior over broad observation geometry, important for characterization of both radial and vertical ring structure. The RSS occultations were followed by CIRS and UVIS Saturn limb observations and VIMS cylindrical mapping.

Segment Integration Planning

Timeline Gaps and Suggested Observations (1 of 3)

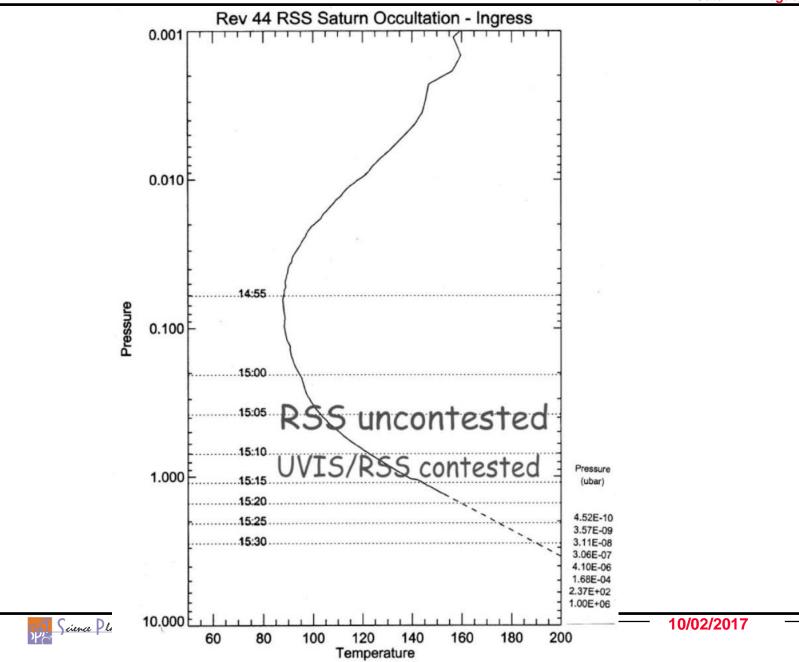
Request		Start Time	Epoch Relative Start Time	Duration	EndTime
SP_044NA_SATURNSEG130_NA		2007-130T05:14:00		001T23:45:00	2007-132T04:59:00
SP Turn		2007-130T05:14:00		000T00:30:00	2007-130T05:44:00
CIRS_044SA_NADIROCC004_PRIME		2007-130T05:44:00		000T03:00:00	2007-130T08:44:00
CIRS_044RI_SHADCAS001_PRIME		2007-130T08:44:00		000T05:00:00	2007-130T13:44:00
OCC Period Start		2007-130T14:06:00			
RSS_044SA_OCC002_PRIME		2007-130T14:06:00		000T01:23:00	2007-130T15:29:00
Contested time - begin					
UVIS_044SU_USUNOCC001_PRIME		2007-130T14:49:00		000T01:30:00	2007-130T16:19:00
MP_044EA_OCCSATURN044_NA		2007-130T14:55:30		000T02:05:49	2007-130T17:01:19
VIMS_044SA_SOLOCC001_PRIME		2007-130T15:15:00		000T00:45:00	2007-130T16:00:00
ISS_044RI_DIFFVHIPH001_PRIME		2007-130T15:30:00		000T03:00:00	2007-130T18:30:00
MP_044EA_OCCRING044_NA		2007-130T15:39:32		000T00:59:45	2007-130T16:39:17
MP_044SU_OCCSATURN044_NA		2007-130T15:43:04		000T02:15:36	2007-130T17:58:40
ISS_044SA_SOLNGRESS001_PRIME		2007-130T15:49:00		000T00:30:00	2007-130T16:19:00
VIMS_044RG_HIPHASE001_PRIME		2007-130T16:00:00		000T01:00:00	2007-130T17:00:00
Contested time - end					
RSS_044SA_OCC003_PRIME		2007-130T16:30:00		000T00:50:00	2007-130T17:20:00
VIMS_044DI_DIONE001_PRIME		2007-130T16:30:00		000T03:12:00	2007-130T19:42:00
MP_044SU_OCCRING044_NA		2007-130T16:33:07		000T00:39:58	2007-130T17:13:05
CIRS_044DI_FP1FAZ0P5026_PRIME		2007-130T17:00:00		000T01:30:00	2007-130T18:30:00
RSS_044RI_OCC002_PRIME		2007-130T17:20:00		000T01:23:00	2007-130T18:43:00
ISS_044SA_SOLEGRESS001_PRIME		2007-130T17:44:00		000T00:20:00	2007-130T18:04:00
OCC Period End		2007-130T18:43:00			
	?????	2007-130T19:00:00		000T02:00:00	2007-130T21:00:00
SP Turn RAM		2007-130T19:04:01			2007-130T19:34:01
RAM_AVOID		2007-130T19:34:01			2007-130T20:07:57
SP Turn RAM		2007-130T20:07:57			2007-130T20:38:00
MP_044SA_RPXDESCEN044_NA		2007-130T19:46:56		000T00:00:01	
CIRS_044SA_OCCLIMB001_PRIME		2007-130T20:38:00		000T00:30:00	2007-130T21:08:00
UVIS_044SA_LIMBSKIM001_PRIME		2007-130T21:08:00	E044_Peri-000T02:20:00	000T00:40:00	2007-130T21:48:00
CIRS_044SA_LIMBINT003_PRIME		2007-130T21:48:00		000T02:12:00	2007-131T00:00:00
MP_044SA_PERIAPSE044_NA		2007-130T22:55:50		000T00:00:01	2007-130T22:55:51
SP Turn		2007-131T00:00:00		000T00:30:00	2007-131T00:30:00
SP_044EA_G34BWGOTB130_PRIME		2007-131T00:30:00		000T06:00:00	2007-131T06:30:00
NAV_044SK_OPNAV311_PRIME		2007-131T06:30:00		000T00:30:00	2007-131T07:30:00
VIMS_044SA_CYLMAP001_PRIME		2007-131T07:30:00		000T06:50:00	2007-131T14:20:00
CIRS_044SA_NADIROCCB004_PRIME		2007-131T14:20:00		000T03:00:00	2007-131T17:20:00
GAP		2007-131T17:20:00		000T02:09:00	2007-131T19:29:00
SP Turn		2007-131T19:29:00		000T00:30:00	
SP_044EA_G34HEFNON131_PRIME		2007-131T19:59:00		000T09:00:00	2007-132T04:59:00

Timeline Gaps and Suggested Observations (2 of 3)



Timeline Gaps and Suggested Observations (3 of 3)

Saturn 44 Legacy



K. Cloutier

Beginning of Integration:

DATA VOLUME SUMMARY

DOWNLINK PASS NAME dog hh:mm dog hi:mm	K. Cloutier	6	D		¥ Sequen	Τ	_			16								10/	02/20 [,]
Start End START SCI HK-E TOTAL CPACTY MARGIN OPNAV SCI ENGR TOTAL CPACTY MARGIN CARC DOWNLINK PASS NAME doy hh:mm doy hh:mm doy hh:mm (Mb) (Mb) <th>OTAL RECORDED (OPNAV data no</th> <th>t inclu</th> <th>uded)</th> <th></th> <th>329</th> <th>.4 !</th> <th>57.0</th> <th>434.6</th> <th>9.1</th> <th>579.1</th> <th>117.6</th> <th>187.2</th> <th>2 6</th> <th>).0 (</th> <th>577.3</th> <th>106.0</th> <th>788.5</th> <th>0.0</th> <th></th>	OTAL RECORDED (OPNAV data no	t inclu	uded)		329	.4 !	57.0	434.6	9.1	579.1	117.6	187.2	2 6).0 (577.3	106.0	788.5	0.0	
Start End START SCI HK+E TOTAL CPACTY MARGIN OPNAV SCI ENGR TOTAL CPACTY MARGIN CARC DOWNLINK PASS NAME doy hh:mm doy hh:mm doy hh:mm (Mb) (M																			
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Start End START SCI HK+E TOTAL CPACTY MARGIN OPNAV SCI ENGR TOTAL CPACTY MARGIN CARC DOWNLINK PASS NAME dog hh:mm dog hh:mm (Mb) (M																			
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Start End START SCI HK+E TOTAL CPACTY MARGIN OPNAV SCI ENGR TOTAL CPACTY MARGIN CARG	P_044EA_G34BWGNON131_PRIME	131 00	9:50	131	06:50	0	1321	68 138	39 356	7 2178	61%	8	217	35	1641	500	-1142	-228%	1142
	DOWNLINK PASS NAME		-																(Mb)
P4 P5 RECORDED PLAYBACK					I										 -				
					1				P4			P5	RECO	RDED	1	PL	AYBACK		
OBSERVATION_PERIOD DOWNLINK_PASS					i			UDJEK	VALION_P	EKIUU						MACINK_P			

Waypoint Selection

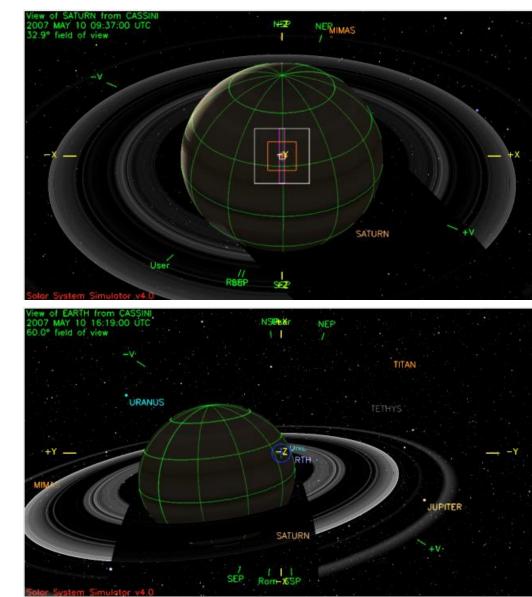
- UVIS Occ Port to Sun????, Secondary???
 - In theory, this should be violation free
- ISS_NAC to Saturn, NEG_X to NSP
 - Safe from ~130T05:14:00 to ~130T16:00:00 and ~131T04:00:00 to ~131T16:00:00
 - Except during Solar Occultation Period where CMT boresight violations occur. Waypoint cannot have FR violations!
- ISS_NAC to Saturn, POS_X to NSP
 - Safe from ~130T16:00:00 to ~131T04:00:00 (periapse)
 - Except during Solar Occultation Period where CMT boresight violations occur. Waypoint cannot have FR violations!
- ISS_NAC to Saturn, NEG_X to NSP
 - Safe for most of the segment
 - Except during Solar Occultation Period where CMT boresight violations occur. Waypoint cannot have FR violations!
- XBAND to Earth, POS_X to NSP
 - Safe from ~130T16:00:00 to ~131T04:00:00; CIRS delta T = 4.8K (Saturn heating)
- XBAND to Earth, NEG_X to NSP
 - Safe for entire period; CIRS delta T = 0.9K (Saturn heating)
- XBAND to Earth, POS_X to NEP
 - Safe from for entire period; CIRS delta T = 1.4 K (Saturn heating)
- XBAND to Earth, NEG_X to Saturn
 - Safe from 130T14:30:00 to 131T18:00:00; CIRS delta T = 4.8K (Saturn heating)
- XBAND to Earth, POS_Y to NSP
 - Safe from 130T13:30:00 to 131T19:00:00; CIRS delta T = 0.9K (Saturn heating)
- XBAND to Earth, POS_Y to NEP
 - Safe from 130T13:30:00 to 131T19:00:00; CIRS delta T = 1.2K (Saturn heating)

Waypoints Chosen (1 of 2)

Saturn 44 Legacy

Waypoint 1 (2007-130T05:44 – 130T13:30): NAC to Saturn, NEG_Z to NSP

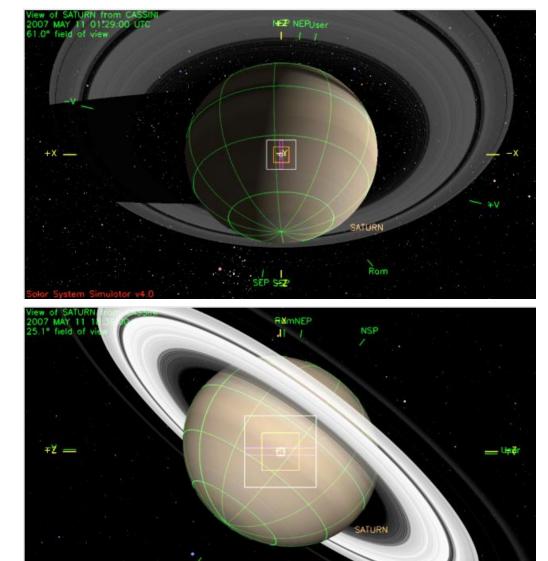
Waypoint 2 (2007-130T13:30 – 130T19:08): XBAND to Earth (0, 0, -5 deg offset), POS_X to NSP



Waypoints Chosen (2 of 2)

Waypoint 3 (2007-130T19:08 – 131T07:50): NAC to Saturn, POS_Z to NSP

Waypoint 4 (2007-131T07:50 – 132T05:29): NAC to Saturn (0, 10, 0 deg offset), NEG_X to NEP



SEP +X

K. Cloutier

Saturn 44 Legacy

HYPERION

SSÉ

Pointing Issues

 Several Saturn observations on DOY 130 do not meet the '004 Pointing Requirements. A Live IVP Update is required to improve the pointing. RSS is most sensitive to this.

Data Volume Issues

- None
- Telemetry Mode Issues
 - None
- CIMS Issues
 - None
- Power/OPMODE Issues
 - INMS will be asleep during the RSS Occultation periods
 - Update: INMS no longer needs to be in sleep mode during the RSS Occultation

Flight Rule/Mission Planning Guideline and Constraint Issues

- Not checked
- DSN Issues
 - DSS 63 on DOY 130 is overlaps with maintenance by 1.7 hours. We wish to waive this for the occultation.
 - DSS 14 on DOY 131 overlaps with maintenance by 0.5 hours. Nav needs 6 hours of two way. We wish to waive the overlap
 period.
- Other Issues
 - The RSS needs to coordinate with the SP/MP/DSN for the proper station configuration and coverage. Per MP advice, the DSN Pass Blocks remain in their standard ap_downlink configuration.
 - Update: RPWS would like to obtain a whistler activity over one of the two downlinks on DOY 131. A SPLAT item is open since the full approval requires analysis during SOPU and/or SSUP.