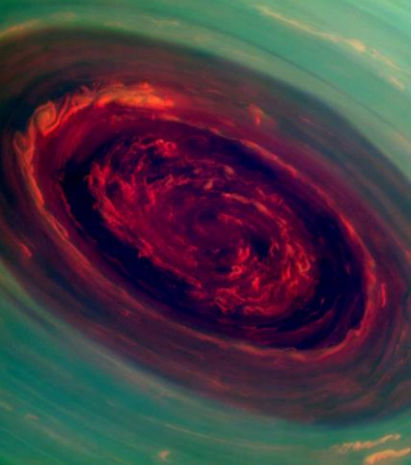
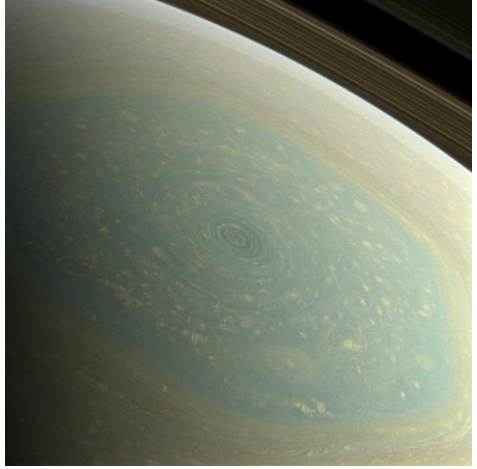
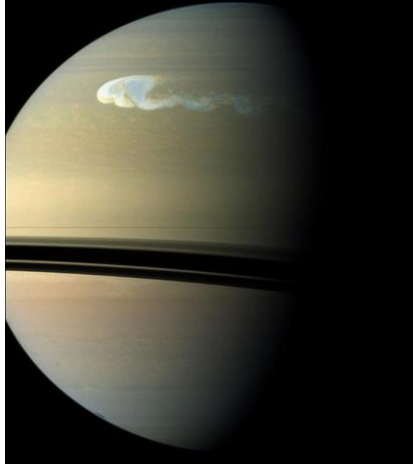


Science Planning & Sequence Team
CASSINI

# SATURN TARGET WORKING TEAM

**Rev 182 Segment Legacy Package**

**Segment Boundary: February 23 – February 28, 2013**
**2013-054T15:27:00 – 2013-059T21:13:00 (SCET)**

**Integration Began 04/30/2012**
**Segment Delivered to S77 Sequence 07/20/2012**
**Lead Integrator was Kathleen Kelleher**

**Legacy Package Assembled by Kathleen Kelleher**

# Table of Contents



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

# Segment Overview and Final Products

# Segment Summary

- Saturn 182 is 5+ days long periapse segment in the first inclined phase (IN-1) of the Solstice Mission.
- The timeline was filled primarily with typical periapse activities, such as UVIS Auroral slews and VIMS Auroral stares of the south pole, and CIRS-led composition and mapping. Other special periapse observations included VIMS dual poles movies, in addition to a VIMS solar port calibration. VIMS also performed a regional map of northern mid-latitudes and a stellar occultation.
- CIRS also completed a northern regional map for temperatures of the northern polar vortex and a helium abundance measurement at the RSS egress occultation point.
- RSS performed an occultation of Saturn's ionosphere and atmosphere to measure vertical profiles of electron density in the ionosphere, and of density, pressure, and temperature in the neutral atmosphere.
- A single waypoint was chosen for the entire segment except during the RSS occultation. In this case the RBOT (reaction wheel) friendly attitude was compatible with science.

# Final Sequenced SPASS



Gap 1 → Gap 2 → Gap 3 → Gap 4 → Gap 5 → Gap 6

| Request | Riders | Start (SCET) | Start (Epoch) | Duration | End (SCET) | Primary | Secondary | Comments |
|---|---|---|---|---|---|---|---|---|
| Sequence S77, length = 72 days | | 2013-013T17:51:00 | | 071T19:24:00 | 2013-085T13:15:00 | | | |
| SATURN_182 Segment | | 2013-054T15:27:00 | | 005T05:46:00 | 2013-059T21:13:00 | | | |
| SP_182SA_WAYPTTURN054_PRIME | | 2013-054T15:27:00 | | 000T00:40:00 | 2013-054T16:07:00 | ISS_NAC to Saturn | POS_X to 136.9/33.9 | |
| **NEW WAYPOINT** | | **2013-054T16:07:00** | | **000T14:05:00** | **2013-055T06:12:00** | **ISS_NAC to Saturn** | **POS_X to 136.9/33.9** | |
| VIMS_182SA_AURSTARE001_PRIME | C, I | 2013-054T16:07:00 | | 000T07:00:00 | 2013-054T23:07:00 | ISS_NAC to Saturn | POS_X to 136.9/33.9 | |
| UVIS_182SA_AURSLEW002_PRIME | C, V | 2013-054T23:07:00 | | 000T06:25:00 | 2013-055T05:32:00 | UVIS_FUV to Saturn | POS_X to NSP | |
| SP_182EA_DLTURN055_PRIME | | 2013-055T05:32:00 | | 000T00:40:00 | 2013-055T06:12:00 | XBAND to Earth | NEG_Y to 298.0/42.9 | |
| **NEW WAYPOINT** | | **2013-055T06:12:00** | | **000T09:40:00** | **2013-055T15:52:00** | **XBAND to Earth** | **NEG_Y to 298.0/42.9** | |
| SP_182EA_G34BWGOTP055_PRIME | C, E, N | 2013-055T06:12:00 | | 000T09:00:00 | 2013-055T15:12:00 | XBAND to Earth | 4_Hr_Rolling | MIMI. NEG_Y to Saturn (0,0,-9.5). OTP. SID suspend. CIRS heating |
| SP_182SA_WAYPTTURN055_PRIME | | 2013-055T15:12:00 | | 000T00:40:00 | 2013-055T15:52:00 | ISS_NAC to Saturn | POS_X to 136.9/33.9 | |
| **NEW WAYPOINT** | | **2013-055T15:52:00** | | **000T06:50:00** | **2013-055T22:42:00** | **ISS_NAC to Saturn** | **POS_X to 136.9/33.9** | |
| VIMS_182SA_SPOLMOV001_PRIME | C | 2013-055T15:52:00 | | 000T06:00:00 | 2013-055T21:52:00 | ISS_NAC to Saturn | POS_X to 136.9/33.9 | |
| SP_182EA_DLTURN455_PRIME | | 2013-055T22:02:00 | | 000T00:40:00 | 2013-055T22:42:00 | XBAND to Earth | NEG_Y to 298.0/42.9 | |
| **NEW WAYPOINT** | | **2013-055T22:42:00** | | **000T09:40:00** | **2013-056T08:22:00** | **XBAND to Earth** | **NEG_Y to 298.0/42.9** | |
| SP_182EA_M70METOTB055_PRIME | C, N | 2013-055T22:42:00 | | 000T08:35:00 | 2013-056T07:17:00 | XBAND to Earth | Rolling | CAPS. same secondary as OTP pass. OTB. CIRS heating |
| SP_182SA_WAYPTTURN056_PRIME | | 2013-056T07:42:00 | | 000T00:40:00 | 2013-056T08:22:00 | XBAND to Earth | POS_X to NSP | |
| **NEW WAYPOINT** | | **2013-056T08:22:00** | | **000T08:52:00** | **2013-056T17:14:00** | **XBAND to Earth** | **POS_X to NSP** | |
| VIMS_182SU_SOLARPORT001_PRIME | | 2013-056T08:22:00 | | 000T02:03:00 | 2013-056T10:25:00 | VIMS_IR_SOL to Sun | POS_X to NSP | |
| ISS_182EN_PLMHPMR001_PIE | U, V | 2013-056T10:25:00 | | 000T02:00:00 | 2013-056T12:25:00 | ISS_NAC to Enceladus (0.0,-35.0,0.0 deg. offset) | POS_X to NSP | SOST PIE |
| **SP_182EA_DEADTIME056_PRIME** | | **2013-056T12:30:00** | | **000T00:20:00** | **2013-056T12:50:00** | **XBAND to Earth** | **POS_X to NSP** | |
| RSS_182SA_OCCOUT001_PIE | | 2013-056T12:50:00 | LMB_E182_Saturn_RSS_Occ_Egr -000T01:42:05 | 000T03:24:00 | 2013-056T16:14:00 | XBAND to Earth | POS_X to NSP | |
| **SP_182EA_DEADTIME456_PRIME** | | **2013-056T16:14:00** | **LMB_E182_Saturn_RSS_Occ_Egr +000T01:41:55** | **000T00:20:00** | **2013-056T16:34:00** | **XBAND to Earth** | **POS_X to NSP** | |
| SP_182SA_WAYPTTURN456_PRIME | | 2013-056T16:34:00 | | 000T00:30:20 | 2013-056T17:04:20 | ISS_NAC to Saturn (0.0,0.0,27.0 deg. offset) | POS_X to 136.9/33.9 | |
| SP_182SA_WAYPTTURN556_PRIME | | 2013-056T17:04:20 | | 000T00:09:40 | 2013-056T17:14:00 | ISS_NAC to Saturn | POS_X to 136.9/33.9 | |
| **NEW WAYPOINT** | | **2013-056T17:14:00** | | **000T11:31:00** | **2013-057T04:45:00** | **ISS_NAC to Saturn** | **POS_X to 136.9/33.9** | |
| VIMS_182SA_REGMAP001_PRIME | C, M | 2013-056T17:14:00 | | 000T01:36:00 | 2013-056T18:50:00 | VIMS_IR to Saturn | POS_Z to NSP | |
| VIMS_182SA_GAMERIOCC001_PRIME | C, M | 2013-056T18:50:00 | | 000T01:50:00 | 2013-056T20:40:00 | CIRS_FPB to Saturn | POS_X to 120.0/33.9 | Collaborative Rider(s): CIRS |
| CIRS_182SA_COMPSIT003_PRIME | U, V | 2013-056T20:40:00 | | 000T04:20:00 | 2013-057T01:00:00 | CIRS_FP3 to Saturn | POS_X to 136.9/33.9 | beacon 37N offset CML+60 (left side) |
| CIRS_182SA_NADIROCC001_PRIME | | 2013-057T01:00:00 | | 000T03:00:00 | 2013-057T04:00:00 | CIRS_FP1 to Saturn | POS_Z to NSP | |
| SP_182EA_DLTURN057_PRIME | | 2013-057T04:00:00 | | 000T00:40:00 | 2013-057T04:40:00 | XBAND to Earth | NEG_Y to NSP | |
| Periapse R = 8.040 Rs, lat ... | | 2013-057T04:26:43 | | 000T00:00:01 | 2013-057T04:26:44 | | | |
| SP_182EA_DLTURN457_PRIME | | 2013-057T04:40:00 | | 000T00:05:00 | 2013-057T04:45:00 | XBAND to Earth | NEG_Y to NEP | |
| **NEW WAYPOINT** | | **2013-057T04:45:00** | | **000T11:09:00** | **2013-057T15:54:00** | **XBAND to Earth** | **NEG_Y to NEP** | |
| ENGR_182SC_KPTYBIAS057_PRIME | | 2013-057T04:45:00 | | 000T01:27:00 | 2013-057T06:12:00 | POS_Z to DELTA_H (0.0,0.0,24.0 deg. offset) | NEG_X to Sun | |
| SP_182EA_G70METNON057_PRIME | C | 2013-057T06:12:00 | | 000T08:15:00 | 2013-057T14:27:00 | XBAND to Earth | NEG_Y to NEP | |
| SP_182SA_WAYPTTURN057_PRIME | | 2013-057T15:12:00 | | 000T00:42:00 | 2013-057T15:54:00 | ISS_NAC to Saturn | POS_X to 170.0/33.9 | |
| **NEW WAYPOINT** | | **2013-057T15:54:00** | | **000T19:04:00** | **2013-058T10:58:00** | **ISS_NAC to Saturn** | **POS_X to 170.0/33.9** | |
| CIRS_182SA_REGMAP001_PRIME | V | 2013-057T15:54:00 | | 000T05:24:00 | 2013-057T21:18:00 | CIRS_FPB to Saturn | POS_X to NSP | slow scans 70N to 90N |
| VIMS_182SA_NPOLMOV001_PRIME | C, I | 2013-057T21:18:00 | | 000T07:00:00 | 2013-058T04:18:00 | VIMS_IR to Saturn | POS_X to 170.0/33.9 | |
| UVIS_182SA_AURSLEW003_PRIME | C, V | 2013-058T04:18:00 | | 000T06:00:00 | 2013-058T10:18:00 | UVIS_FUV to Saturn | POS_X to NSP | |
| SP_182EA_DLTURN058_PRIME | | 2013-058T10:18:00 | | 000T00:40:00 | 2013-058T10:58:00 | XBAND to Earth | POS_X to NSP | |
| **NEW WAYPOINT** | | **2013-058T10:58:00** | | **000T11:10:00** | **2013-058T22:08:00** | **XBAND to Earth** | **POS_X to NSP** | |
| SP_182EA_YGAP058_PRIME | | 2013-058T10:58:00 | | 000T01:30:00 | 2013-058T12:28:00 | XBAND to Earth | POS_X to NSP | |
| SP_182EA_C34BWGNON058_PRIME | C | 2013-058T12:28:00 | | 000T09:00:00 | 2013-058T21:28:00 | XBAND to Earth | POS_X to NSP | CAPS. POS_X to NEP or NSP. CIRS heating |
| SP_182SA_WAYPTTURN058_PRIME | | 2013-058T21:28:00 | | 000T00:40:00 | 2013-058T22:08:00 | ISS_NAC to Saturn | POS_X to 136.9/33.9 | |
| **NEW WAYPOINT** | | **2013-058T22:08:00** | | **000T11:05:00** | **2013-059T09:13:00** | **ISS_NAC to Saturn** | **POS_X to 136.9/33.9** | |
| ISS_182SA_FEATRAK012_PRIME | C, V | 2013-058T22:08:00 | | 000T10:25:00 | 2013-059T08:33:00 | ISS_NAC to Saturn | POS_X to 136.9/33.9 | |
| SP_182EA_DLTURN059_PRIME | | 2013-059T08:33:00 | | 000T00:40:00 | 2013-059T09:13:00 | XBAND to Earth | NEG_Y to 291.5/52.4 | |
| **NEW WAYPOINT** | | **2013-059T09:13:00** | | **000T12:15:00** | **2013-059T21:28:00** | **XBAND to Earth** | **NEG_Y to 291.5/52.4** | |
| SP_182EA_G70METNON059_PRIME | | 2013-059T09:13:00 | | 000T02:45:00 | 2013-059T11:58:00 | XBAND to Earth | NEG_Y to 291.5/52.4 | MIMI. NEG_Y to Saturn (0,0,-9.5). CIRS heating |
| SP_182EA_C34HEFNON059_PRIME | C | 2013-059T11:58:00 | | 000T07:30:00 | 2013-059T19:28:00 | XBAND to Earth | NEG_X to 291.5/52.4 | MIMI. NEG_Y to Saturn (0,0,-9.5). CIRS heating |

# Final Sequenced SMT and Data Volume



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

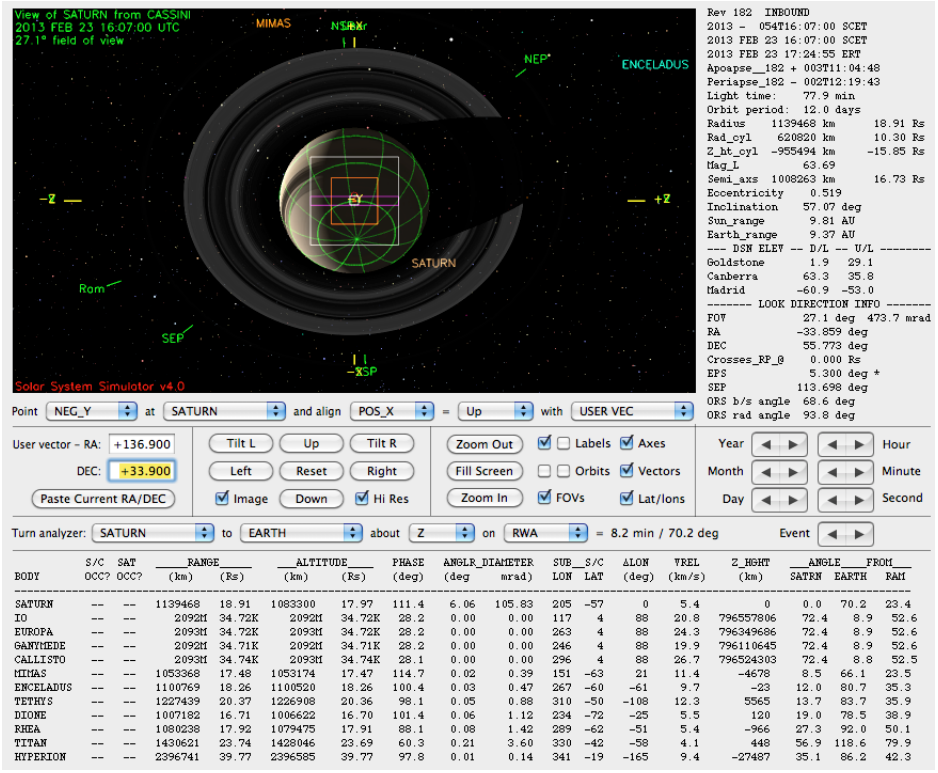
| | | | OBSERVATION_PERIOD | | | | | | | DOWNLINK_PASS | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | P4 | | | | | | P5 | RECORDED | | PLAYBACK | | | | | |
| DOWNLINK PASS NAME | Start doy hh:mm | End doy hh:mm | START (Mb) | SCI (Mb) | HK+E (Mb) | TOTAL (Mb) | CPACTY (Mb) | MRGN (Mb) | OPNAV (Mb) | SCI (Mb) | ENGR (Mb) | TOTAL (Mb) | CPACTY (Mb) | MARGN (Mb) | NET_MARGN (Mb) | CAROVR (%) | CAROVR (Mb) |
| SP_182EA_G34BWGOTP055_PRIME | 055 06:12 | 055 15:12 | 275 | 763 | 62 | 1101 | 3322 | 2221 | 0 | 232 | 53 | 1386 | 545 | -841 | 1591 | 13% | 840 |
| SP_182EA_M70METOTB055_PRIME | 055 22:42 | 056 07:17 | 840 | 859 | 32 | 1732 | 3322 | 1591 | 0 | 220 | 51 | 2003 | 2714 | 711 | 2040 | 16% | 0 |
| SP_182EA_G70METNON057_PRIME | 057 06:12 | 057 14:27 | 0 | 1897 | 97 | 1994 | 3322 | 1328 | 0 | 303 | 49 | 2346 | 3181 | 835 | 2023 | 18% | 0 |
| SP_182EA_C34BWGNON058_PRIME | 058 12:28 | 058 21:28 | 0 | 1444 | 93 | 1537 | 3322 | 1785 | 0 | 232 | 53 | 1822 | 852 | -970 | 1188 | 14% | 969 |
| SP_182EA_G70METNON059_PRIME | 059 09:13 | 059 11:58 | 969 | 1115 | 50 | 2134 | 3322 | 1188 | 0 | 43 | 16 | 2193 | 1170 | -1024 | 1712 | 20% | 1023 |
| SP_182EA_C34HEFNON059_PRIME | 059 11:58 | 059 19:28 | 1023 | 0 | 0 | 1023 | 3322 | 2299 | 0 | 189 | 44 | 1256 | 754 | -502 | 1712 | 21% | 502 |

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 | 054 15:27 | 055 06:12 | 53.1 | 27.8 | 142.8 | 5.3 | 140.0 | 26.2 | 45.1 | 0.0 | 69.6 | 116.2 | 130.0 | 0.0 | 61.6 | 817.8 |
| SP_182EA_G34BWGOTP055_PRIME | 055 06:12 | 055 15:12 | 32.4 | 17.0 | 86.4 | 3.2 | 0.0 | 16.0 | 27.5 | 0.0 | 42.4 | 4.9 | 0.0 | 0.0 | 0.0 | 229.9 |
| DAILY TOTAL SCIENCE | 054 15:27 | 055 15:12 | 85.5 | 44.8 | 229.2 | 8.6 | 140.0 | 42.2 | 72.7 | 0.0 | 111.9 | 121.2 | 130.0 | 0.0 | 61.6 | |
| OBSERVATION_NOR | 055 15:12 | 055 22:42 | 27.0 | 14.1 | 86.4 | 2.7 | 0.0 | 13.3 | 22.9 | 0.0 | 35.1 | 0.0 | 650.0 | 0.0 | 31.3 | 883.0 |
| SP_182EA_M70METOTB055_PRIME | 055 22:42 | 056 07:17 | 30.9 | 16.2 | 81.9 | 3.1 | 0.0 | 15.3 | 26.3 | 0.0 | 40.2 | 4.7 | 0.0 | 0.0 | 0.0 | 218.5 |
| DAILY TOTAL SCIENCE | 055 15:12 | 056 07:17 | 57.9 | 30.3 | 168.3 | 5.8 | 0.0 | 28.6 | 49.2 | 0.0 | 75.3 | 4.7 | 650.0 | 0.0 | 31.3 | |
| OBSERVATION_NOR | 056 07:17 | 057 06:12 | 82.5 | 78.4 | 157.1 | 18.3 | 200.0 | 40.8 | 70.1 | 0.0 | 745.0 | 46.7 | 441.0 | 0.0 | 95.8 | 1975.8 |
| SP_182EA_G70METNON057_PRIME | 057 06:12 | 057 14:27 | 29.7 | 15.6 | 78.3 | 3.0 | 0.0 | 14.7 | 25.2 | 0.0 | 129.1 | 4.5 | 0.0 | 0.0 | 0.0 | 300.1 |
| DAILY TOTAL SCIENCE | 056 07:17 | 057 14:27 | 112.2 | 94.0 | 235.4 | 21.3 | 200.0 | 55.4 | 95.4 | 0.0 | 874.1 | 51.3 | 441.0 | 0.0 | 95.8 | |
| OBSERVATION_NOR | 057 14:27 | 058 12:28 | 79.3 | 41.5 | 229.9 | 7.9 | 138.8 | 39.2 | 67.4 | 0.0 | 207.8 | 109.1 | 510.0 | 0.0 | 92.0 | 1522.7 |
| SP_182EA_C34BWGNON058_PRIME | 058 12:28 | 058 21:28 | 32.4 | 17.0 | 86.4 | 3.2 | 0.0 | 16.0 | 27.5 | 0.0 | 42.2 | 4.9 | 0.0 | 0.0 | 0.0 | 229.7 |
| DAILY TOTAL SCIENCE | 057 14:27 | 058 21:28 | 111.7 | 58.5 | 316.3 | 11.2 | 138.8 | 55.2 | 94.9 | 0.0 | 250.0 | 114.0 | 510.0 | 0.0 | 92.0 | |
| OBSERVATION_NOR | 058 21:28 | 059 09:13 | 42.3 | 22.2 | 75.0 | 4.2 | 549.0 | 20.9 | 36.0 | 0.0 | 55.4 | 0.0 | 300.0 | 0.0 | 49.1 | 1154.1 |
| SP_182EA_G70METNON059_PRIME | 059 09:13 | 059 11:58 | 9.9 | 5.2 | 0.0 | 1.0 | 0.0 | 4.9 | 8.4 | 0.0 | 13.0 | 0.0 | 0.0 | 0.0 | 0.0 | 42.4 |
| SP_182EA_C34HEFNON059_PRIME | 059 11:58 | 059 19:28 | 27.0 | 14.1 | 67.5 | 2.7 | 0.0 | 13.3 | 22.9 | 0.0 | 35.4 | 4.0 | 0.0 | 0.0 | 0.0 | 187.0 |
| DAILY TOTAL SCIENCE | 058 21:28 | 059 19:28 | 79.2 | 41.5 | 142.5 | 7.9 | 549.0 | 39.1 | 67.3 | 0.0 | 103.8 | 4.0 | 300.0 | 0.0 | 49.1 | |

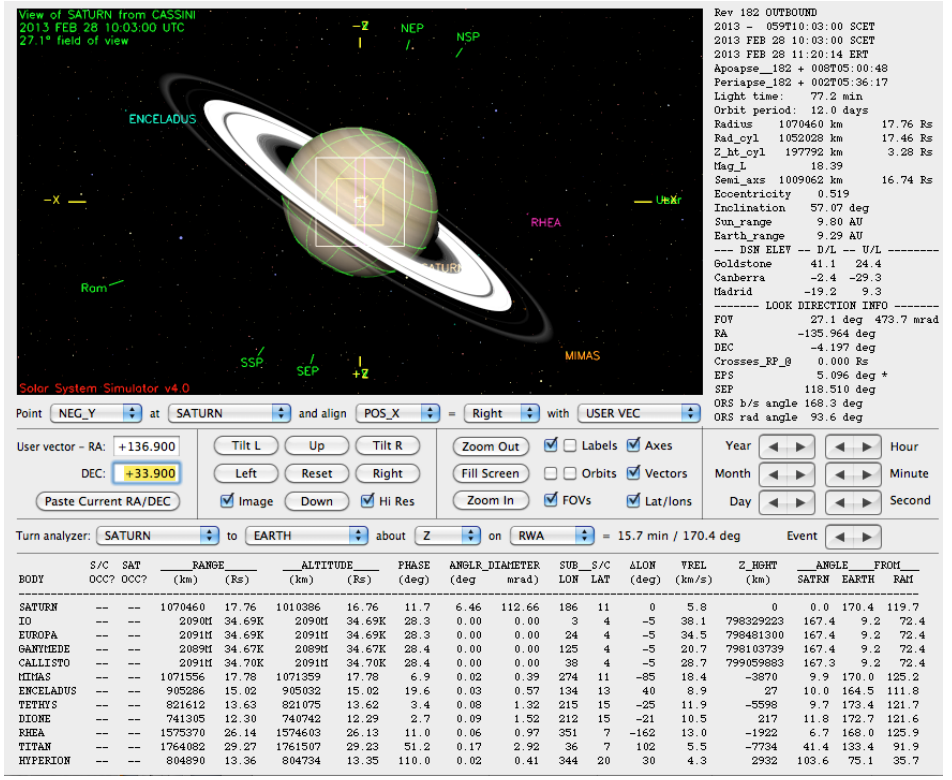
# Segment Geometry (1 of 2)






| 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 | -- | -- | 1139468 | 18.91 | 1083300 | 17.97 | 111.4 | 6.06 | 105.83 | 205 | -57 | 0 | 5.4 | 0 | 0.0 | 70.2 | 23.4 |
| IO | -- | -- | 2092M | 34.72K | 2092M | 34.72K | 28.2 | 0.00 | 0.00 | 117 | 4 | 88 | 20.8 | 796557806 | 72.4 | 8.9 | 52.6 |
| EUROPA | -- | -- | 2093M | 34.72K | 2093M | 34.72K | 28.2 | 0.00 | 0.00 | 263 | 4 | 88 | 24.3 | 796349686 | 72.4 | 8.9 | 52.6 |
| GANYMEDE | -- | -- | 2092M | 34.71K | 2092M | 34.71K | 28.2 | 0.00 | 0.00 | 246 | 4 | 88 | 19.9 | 796110645 | 72.4 | 8.9 | 52.6 |
| CALLISTO | -- | -- | 2093M | 34.74K | 2093M | 34.74K | 28.1 | 0.00 | 0.00 | 296 | 4 | 88 | 26.7 | 796524303 | 72.4 | 8.8 | 52.5 |
| MIMAS | -- | -- | 1053368 | 17.48 | 1053174 | 17.47 | 114.7 | 0.02 | 0.39 | 151 | -63 | 21 | 11.4 | -4678 | 8.5 | 66.1 | 23.5 |
| ENCELADUS | -- | -- | 1100769 | 18.26 | 1100520 | 18.26 | 100.4 | 0.03 | 0.47 | 267 | -60 | -61 | 9.7 | -23 | 12.0 | 80.7 | 35.3 |
| TETHYS | -- | -- | 1227439 | 20.37 | 1226908 | 20.36 | 98.1 | 0.05 | 0.88 | 310 | -50 | -108 | 12.3 | 5565 | 13.7 | 83.7 | 35.9 |
| DIONE | -- | -- | 1007182 | 16.71 | 1006622 | 16.70 | 101.4 | 0.06 | 1.12 | 234 | -72 | -25 | 5.5 | 120 | 19.0 | 78.5 | 38.9 |
| RHEA | -- | -- | 1080238 | 17.92 | 1079475 | 17.91 | 88.1 | 0.08 | 1.42 | 289 | -62 | -51 | 5.4 | -966 | 27.3 | 92.0 | 50.1 |
| TITAN | -- | -- | 1430621 | 23.74 | 1428046 | 23.69 | 60.3 | 0.21 | 3.60 | 330 | -42 | -58 | 4.1 | 448 | 56.9 | 118.6 | 79.9 |
| HYPERION | -- | -- | 2396741 | 39.77 | 2396585 | 39.77 | 97.8 | 0.01 | 0.14 | 341 | -19 | -165 | 9.4 | -27487 | 35.1 | 86.2 | 42.3 |

2013-054T16:07:00



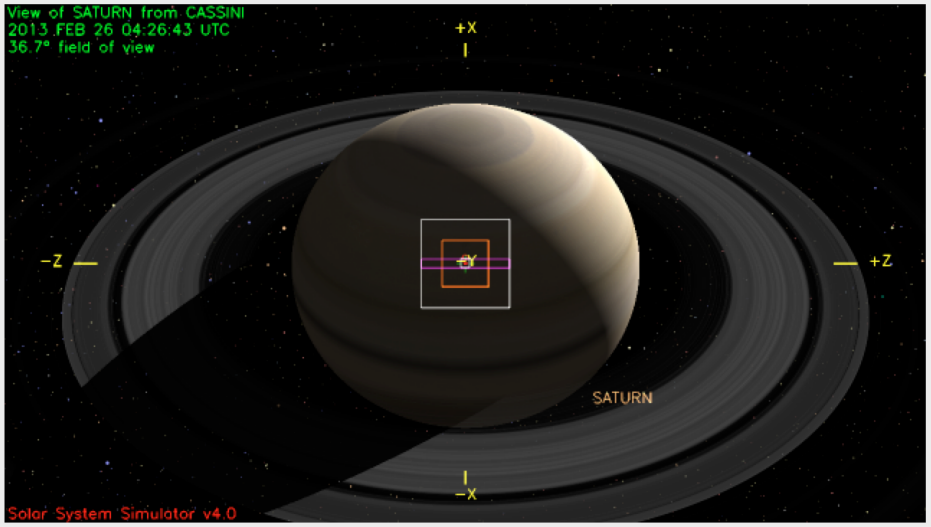

| BODY | S/C OCC? | SAT OCC? | RANGE (km) | RANGE (Rs) | ALTITUDE (km) | ALTITUDE (Rs) | PHASE (deg) | ANGLR_DIAMETER (deg | ANGLR_DIAMETER mrad) | SUB_S/C LON | SUB_S/C LAT | ALON (deg) | VREL (km/s) | Z_HGHT (km) | ANGLE_FROM SATRN | ANGLE_FROM EARTH | ANGLE_FROM RAM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SATURN | -- | -- | 1070460 | 17.76 | 1010386 | 16.76 | 11.7 | 6.46 | 112.66 | 186 | 11 | 0 | 5.8 | 0 | 0.0 | 170.4 | 119.7 |
| IO | -- | -- | 2090M | 34.69K | 2090M | 34.69K | 28.3 | 0.00 | 0.00 | 3 | 4 | -5 | 38.1 | 798329223 | 167.4 | 9.2 | 72.4 |
| EUROPA | -- | -- | 2091M | 34.69K | 2091M | 34.69K | 28.3 | 0.00 | 0.00 | 24 | 4 | -5 | 34.5 | 798481300 | 167.4 | 9.2 | 72.4 |
| GANYMEDE | -- | -- | 2089M | 34.67K | 2089M | 34.67K | 28.4 | 0.00 | 0.00 | 125 | 4 | -5 | 20.7 | 798103739 | 167.4 | 9.2 | 72.4 |
| CALLISTO | -- | -- | 2091M | 34.70K | 2091M | 34.70K | 28.4 | 0.00 | 0.00 | 38 | 4 | -5 | 28.7 | 799059883 | 167.3 | 9.2 | 72.4 |
| MIMAS | -- | -- | 1071556 | 17.78 | 1071359 | 17.78 | 6.9 | 0.02 | 0.39 | 274 | 11 | -85 | 18.4 | -3870 | 9.9 | 170.0 | 125.2 |
| ENCELADUS | -- | -- | 905286 | 15.02 | 905032 | 15.02 | 19.6 | 0.03 | 0.57 | 134 | 13 | 40 | 8.9 | 27 | 10.0 | 164.5 | 111.8 |
| TETHYS | -- | -- | 821612 | 13.63 | 821075 | 13.62 | 3.4 | 0.08 | 1.32 | 215 | 15 | -25 | 11.9 | -5598 | 9.7 | 173.4 | 121.7 |
| DIONE | -- | -- | 741305 | 12.30 | 740742 | 12.29 | 2.7 | 0.09 | 1.52 | 212 | 15 | -21 | 10.5 | 217 | 11.8 | 172.7 | 121.6 |
| RHEA | -- | -- | 1575370 | 26.14 | 1574603 | 26.13 | 11.0 | 0.06 | 0.97 | 351 | 7 | -162 | 13.0 | -1922 | 6.7 | 168.0 | 125.9 |
| TITAN | -- | -- | 1764082 | 29.27 | 1761507 | 29.23 | 51.2 | 0.17 | 2.92 | 36 | 7 | 102 | 5.5 | -7734 | 41.4 | 133.4 | 91.9 |
| HYPERION | -- | -- | 804890 | 13.36 | 804734 | 13.35 | 110.0 | 0.02 | 0.41 | 344 | 20 | 30 | 4.3 | 2932 | 103.6 | 75.1 | 35.7 |

2013-059T10:03:00

| | Time (SCET) | Saturn Range | Phase Angle | Sub_Spacecraft Lattitude |
|---|---|---|---|---|
| Segment Start | 2013-054T15:27:00 | 19.0 $R_{Sat}$ | 110.8° | 57°S |
| Ring Plane Crossing | 2013-056T19:12:30 | 8.8 $R_{Sat}$ | 155.8° | 0° |
| Periapse | 2013-057T04:26:43 | 8.0 $R_{Sat}$ | 115.7° | 33°N |
| Segment End | 2013-059T21:13:00 | 17.7 $R_{Sat}$ | 11.7° | 11°N |

# Segment Geometry (1 of 2)

## Periapse




```
Rev 182 OUTBOUND
2013 -  057T04:26:43 SCET
2013 FEB 26 04:26:43 SCET
2013 FEB 26 05:44:18 ERT
Apoapse__182 + 005T23:24:50
Periapse_182 + 00:00:46
Light time:    77.6 min
Orbit period:  12.0 days
Radius      484972 km       8.05 Rs
Rad_cyl     406711 km       6.75 Rs
Z_ht_cyl    264166 km       4.38 Rs
Mag_L          11.44
Semi_axs   1009065 km      16.74 Rs
Eccentricity    0.519
Inclination    57.07 deg
Sun_range       9.81 AU
Earth_range     9.33 AU
--- DSN ELEV -- D/L -- U/L --------
Goldstone     -11.0  -42.4
Canberra      -41.1  -24.1
Madrid         34.1   33.4
------- LOOK DIRECTION INFO -------
FOV            36.7 deg  639.7 mrad
RA             78.752 deg
DEC           -38.184 deg
Crosses_RP_8    0.000 Rs
EPS             5.196 deg *
SEP           116.230 deg
ORS b/s angle  64.4 deg
ORS rad angle  50.0 deg  *
```

Point [NEG_Y] at [SATURN] and align [POS_X] = [Up] with [NSP]

User vector - RA: [+78.694]  DEC: [-9.319]  [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

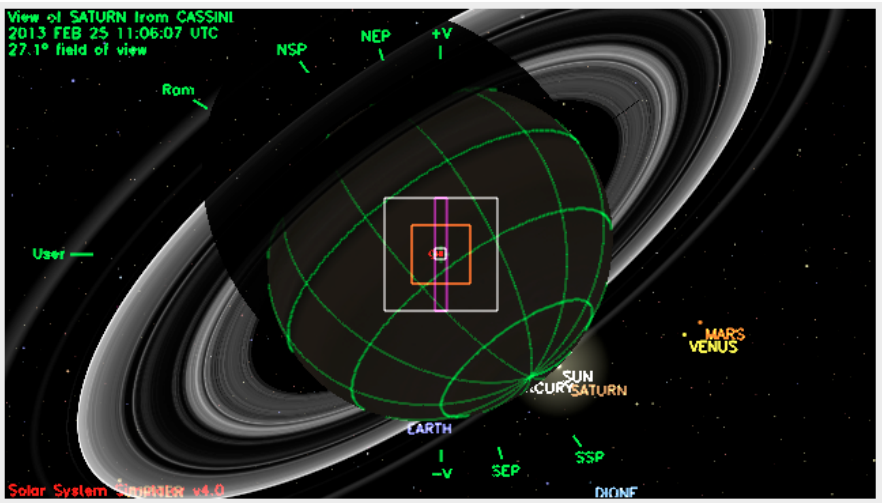
Year ◀ ▶ ◀ ▶ Hour
Month ◀ ▶ ◀ ▶ Minute
Day ◀ ▶ ◀ ▶ Second

Turn analyzer: [SATURN] to [EARTH] about [Z] on [RWA] = 7.6 min / 62.7 deg  Event ◀ ▶

| 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 | -- | -- | 484972 | 8.05 | 426422 | 7.08 | 115.6 | 14.28 | 249.19 | 324 | 33 | 0 | 10.9 | 0 | 0.0 | 62.7 | 90.0 |
| MIMAS | -- | -- | 532731 | 8.84 | 532533 | 8.84 | 129.5 | 0.04 | 0.78 | 301 | 29 | -96 | 15.1 | 828 | 20.0 | 50.5 | 93.0 |
| ENCELADUS | -- | -- | 618911 | 10.27 | 618658 | 10.27 | 104.8 | 0.05 | 0.83 | 43 | 25 | 118 | 21.6 | -30 | 20.6 | 72.0 | 80.4 |
| TETHYS | -- | -- | 629041 | 10.44 | 628506 | 10.43 | 135.7 | 0.10 | 1.72 | 317 | 25 | -108 | 14.2 | -2256 | 26.9 | 44.8 | 91.2 |
| DIONE | -- | -- | 741840 | 12.31 | 741277 | 12.30 | 102.7 | 0.09 | 1.52 | 29 | 21 | 124 | 19.3 | 216 | 26.7 | 73.6 | 76.1 |
| RHEA | -- | -- | 894951 | 14.85 | 894184 | 14.84 | 142.4 | 0.10 | 1.71 | 342 | 17 | -132 | 14.7 | 2017 | 29.1 | 37.4 | 83.0 |
| TITAN | -- | -- | 861759 | 14.30 | 859184 | 14.26 | 31.1 | 0.34 | 5.98 | 4 | 18 | 6 | 8.7 | -6439 | 128.0 | 153.9 | 136.6 |
| HYPERION | -- | -- | 1581690 | 26.24 | 1581546 | 26.24 | 130.7 | 0.01 | 0.21 | 168 | 38 | -82 | 9.6 | -14362 | 78.4 | 54.4 | 106.4 |
| IAPETUS | -- | -- | 3856972 | 64.00 | 3856225 | 63.98 | 146.3 | 0.02 | 0.39 | 1 | 5 | -169 | 12.7 | 637922 | 39.6 | 29.5 | 55.4 |
| PHOEBE | -- | -- | 11592552 | 192.35 | 11592442 | 192.35 | 107.4 | 0.00 | 0.02 | 106 | 2 | -73 | 12.6 | -3470725 | 91.7 | 77.3 | 125.8 |
| SATURN | -- | -- | 484972 | 8.05 | 426422 | 7.08 | 115.6 | 14.28 | 249.19 | 324 | 33 | 0 | 10.9 | 0 | 0.0 | 62.7 | 90.0 |

# Solar Geometry – ORS Boresight Concerns






Rev 182 INBOUND
2013 - 056T11:06:07 SCET
2013 FEB 25 11:06:07 SCET
2013 FEB 25 12:23:49 ERT
Apoapse__182 + 005T06:03:55
Periapse_182 - 17:20:36
Light time: 77.7 min
Orbit period: 12.0 days

| | | |
|---|---|---|
| Radius | 616113 km | 10.22 Rs |
| Rad_cyl | 568248 km | 9.43 Rs |
| Z_ht_cyl | -238095 km | -3.95 Rs |
| Mag_L | 12.02 | |
| Semi_axs | 1009197 km | 16.75 Rs |
| Eccentricity | 0.519 | |
| Inclination | 57.07 deg | |
| Sun_range | 9.81 AU | |
| Earth_range | 9.34 AU | |

--- DSN ELEV -- D/L -- U/L --------

| | | |
|---|---|---|
| Goldstone | 41.5 | 31.8 |
| Canberra | 7.8 | -21.4 |
| Madrid | -29.0 | 0.3 |

------- LOOK DIRECTION INFO -------

| | |
|---|---|
| FOV | 27.1 deg 473.7 mrad |
| RA | 35.562 deg |
| DEC | 16.296 deg |
| Crosses_RP_@ | 0.000 Rs |
| EPS | 5.226 deg * |
| SEP | 115.503 deg |
| ORS b/s angle | 5.1 deg * |
| ORS rad angle | 93.7 deg |

Point NEG_Y at SATURN and align POS_X = Left with USER VEC

User vector - RA: +136.900 DEC: +33.900 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

Turn analyzer: SATURN to EARTH about Z on RWA = 2.2 min / 5.3 deg Event

| 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 | -E | -- | 616113 | 10.22 | 556703 | 9.24 | 174.9 | 11.23 | 195.95 | 138 | -23 | 0 | 9.2 | 0 | 0.0 | 5.3 | 65.2 |
| IO | -- | -- | 2092M | 34.72K | 2092M | 34.72K | 28.3 | 0.00 | 0.00 | 122 | 4 | 167 | 26.8 | 797141517 | 12.3 | 9.0 | 61.0 |
| EUROPA | -- | -- | 2093M | 34.72K | 2093M | 34.72K | 28.3 | 0.00 | 0.00 | 85 | 4 | 167 | 33.3 | 797360125 | 12.3 | 9.0 | 61.0 |
| GANYMEDE | -- | -- | 2093M | 34.73K | 2093M | 34.73K | 28.2 | 0.00 | 0.00 | 336 | 4 | 167 | 34.7 | 797464624 | 12.3 | 9.0 | 61.0 |
| CALLISTO | -- | -- | 2094M | 34.75K | 2094M | 34.75K | 28.2 | 0.00 | 0.00 | 335 | 4 | 167 | 32.6 | 797721584 | 12.3 | 9.0 | 61.0 |
| MIMAS | -- | -- | 748820 | 12.42 | 748617 | 12.42 | 169.4 | 0.03 | 0.55 | 33 | -19 | 136 | 20.4 | -4856 | 10.6 | 5.7 | 66.0 |
| ENCELADUS | -- | -- | 668890 | 11.10 | 668638 | 11.09 | 159.5 | 0.04 | 0.77 | 299 | -21 | -92 | 15.4 | 28 | 20.9 | 25.2 | 74.6 |
| TETHYS | -- | -- | 373510 | 6.20 | 372976 | 6.19 | 155.5 | 0.17 | 2.89 | 203 | -41 | -10 | 9.9 | 5105 | 20.1 | 25.0 | 52.5 |
| DIONE | -- | -- | 974320 | 16.17 | 973756 | 16.16 | 176.2 | 0.07 | 1.16 | 1 | -14 | 179 | 17.0 | 121 | 8.6 | 6.3 | 73.1 |
| RHEA | -- | -- | 955752 | 15.86 | 954986 | 15.85 | 151.0 | 0.09 | 1.61 | 329 | -14 | -115 | 13.6 | -1155 | 30.4 | 34.0 | 83.4 |
| TITAN | -- | -- | 753229 | 12.50 | 750654 | 12.46 | 49.0 | 0.39 | 6.84 | 347 | -18 | -19 | 7.9 | -4832 | 127.9 | 133.1 | 86.2 |
| HYPERION | -- | -- | 1878921 | 31.18 | 1878791 | 31.17 | 129.4 | 0.01 | 0.17 | 106 | 21 | -112 | 11.1 | -19100 | 52.1 | 55.6 | 96.7 |

Saturn-Sun angle < 15° : 2013-056T06:57:07 – 056T16:44:00

Saturn-Sun angle < 12° : 2013-056T08:11:07 – 056T15:51:00

Solar ingress/solar egress: 2013-056T11:06:07 – 056T13:46:50

RSS ingress/RSS egress: 2013-056T11:04:23 – 056T14:32:05

# Daily Science Highlights

**DOY 054 (23 February 2013)**: The Saturn_182 segment opened with VIMS and UVIS pointing at the southern polar regions of Saturn, which was then under the darkness of a Saturnian winter, to study the planet's aurorae.

**DOY 055 (24 February 2013)**: After the subsequent downlink, VIMS began a series of mosaics of the southern pole region of Saturn before turning to another downlink.

**DOY 056 (25 February 2013)**: VIMS began a busy day with a solar port calibration before ISS turned to capture the plume of Enceladus during a PIE. With the Sun safely behind Saturn, RSS began their observation of the occultation of Saturn's ionosphere and atmosphere, to measure vertical profiles of electron density in the ionosphere, and of density, pressure, and temperature in the neutral atmosphere. X, S, and Ka bands were used. After turning back to Saturn, VIMS then conducted a Saturn Regional Map centered at 35 deg south latitude (planetocentric), followed by a VIMS stellar atmospheric occultation of gamEri. CIRS then targeted the northern storm region at 37° N latitude with its array of mid-infrared detectors to round out this day.

**DOY 057 (26 February 2013)**: The first science activity of the day was a CIRS measurement of the helium abundance at the RSS egress occultation point. Following a downlink, CIRS then conducted regional mapping of northern polar region with the goal of measuring the temperature of this feature. VIMS followed the CIRS activity by taking mosaics of this same region.

**DOY 058 (27 February 2013)**: UVIS focussed again on the Saturnian aurorae, this time observing the northern auroral zones for a total of 6 hours. Following this, ISS performed a feature track of Saturn, taking pictures first at a low emission angle, then at medium and high emission angles as the planet rotated, then moved to other latitudes as time and data volume permitted, which is collaborative with VIMS. Then Cassini turned its antenna back towards the Earth to relay the bounty of scientific data recorded during the past two days.

# Segment Integration Planning

# Timeline Gaps and Suggested Observations



| Gap | Start | End | Duration | Phase angle | Range ($R_{Saturn}$) | SSC latitude | Suggested observations/activities |
|---|---|---|---|---|---|---|---|
| 1 | 2013-054T16:07:00 | 055T05:32:00 | 000T13:25:00 | 111.4° – 124.2° | 18.9 – 16.5 | 57° S – 56° S | dark south pole, VIMS auroral and map |
| 2 | 2013-055T15:52:00 | 055T22:02:00 | 000T06:10:00 | 137.1° – 146.9° | 14.4 – 13.1 | 50° S – 45° S | VIMS/CIRS mapping |
| 3 | 2013-056T08:22:00 | 056T10:25:00 | 000T02:03:00 | 168.4° – 173.4° | 10.8 – 10.4 | 29° S – 24° S | CMT issues nearing occ; need to look toward NSP or sat |
| 4 | 2013-056T17:14:00 | 057T04:02:00 | 000T10:48:00 | 163.2° – 117.6° | 9.1 – 8.0 | 6° S – 31° N | CIRS nadar occ, VIMS movie |
| 5 | 2013-057T15:52:00 | 058T10:18:00 | 000T18:26:00 | 67.2° – 19.8° | 9.1 – 13.0 | 57° N – 35° N | VIMS movie, auoral obs., CIRS map |
| 6 | 2013-058T22:08:00 | 059T08:33:00 | 000T10:25:00 | 4.1° – 10.3° | 15.5 – 17.5 | 21° N – 12° N | VIMS reg map |

# Initial SMT and Data Volume (1 of 2)

## 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_182EA_G34BWGOTP055_PRIME | 055 06:12 | 055 15:12 | 0 | 665 | 62 | 727 | 3322 | 2595 | 0 | 283 | 53 | 1063 | 545 | -518 | 2656 | 27% | 518 |
| SP_182EA_M70METOTB055_PRIME | 055 22:42 | 056 07:42 | 518 | 116 | 32 | 666 | 3322 | 2656 | 0 | 232 | 53 | 950 | 2798 | 1847 | 3733 | 41% | 0 |
| SP_182EA_G70METNON057_PRIME | 057 06:12 | 057 15:12 | 0 | 1342 | 95 | 1437 | 3322 | 1885 | 0 | 331 | 53 | 1821 | 3330 | 1508 | 2958 | 47% | 0 |
| SP_182EA_C34BWGNON058_PRIME | 058 12:28 | 058 21:28 | 0 | 582 | 90 | 672 | 3322 | 2650 | 0 | 232 | 53 | 957 | 852 | -105 | 1449 | 49% | 105 |
| SP_182EA_G70METNON059_PRIME | 059 09:13 | 059 12:13 | 105 | 183 | 50 | 337 | 3322 | 2985 | 0 | 47 | 18 | 401 | 1280 | 878 | 1449 | 68% | 0 |
| SP_182EA_C34BWGNON059_PRIME | 059 12:13 | 059 21:13 | 0 | 0 | 0 | 0 | 3322 | 3322 | 0 | 232 | 53 | 285 | 856 | 570 | 571 | 67% | 0 |

# Initial SMT and Data Volume (2 of 2)

## Beginning of Integration:

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 | 054 15:27 | 055 06:12 | 53.1 | 27.8 | 0.0 | 5.3 | 0.0 | 26.2 | 45.1 | 0.0 | 69.6 | 261.2 | 170.6 | 0.0 | 61.6 | 720.6 |
| SP_182EA_G34BWGOTP055_PRIME | 055 06:12 | 055 15:12 | 32.4 | 17.0 | 86.4 | 3.2 | 0.0 | 16.0 | 27.5 | 0.0 | 42.4 | 55.2 | 0.0 | 0.0 | 0.0 | 280.1 |
| DAILY TOTAL SCIENCE | 054 15:27 | 055 15:12 | 85.5 | 44.8 | 86.4 | 8.6 | 0.0 | 42.2 | 72.7 | 0.0 | 111.9 | 316.4 | 170.6 | 0.0 | 61.6 | |
| OBSERVATION_NOR | 055 15:12 | 055 22:42 | 27.0 | 14.1 | 0.0 | 2.7 | 0.0 | 13.3 | 22.9 | 0.0 | 35.1 | 0.0 | 0.0 | 0.0 | 31.3 | 146.6 |
| SP_182EA_M70METOTB055_PRIME | 055 22:42 | 056 07:42 | 32.4 | 17.0 | 86.4 | 3.2 | 0.0 | 16.0 | 27.5 | 0.0 | 42.1 | 4.9 | 0.0 | 0.0 | 0.0 | 229.6 |
| DAILY TOTAL SCIENCE | 055 15:12 | 056 07:42 | 59.4 | 31.1 | 86.4 | 5.9 | 0.0 | 29.3 | 50.5 | 0.0 | 77.2 | 4.9 | 0.0 | 0.0 | 31.3 | |
| OBSERVATION_NOR | 056 07:42 | 057 06:12 | 81.0 | 77.7 | 28.8 | 18.2 | 200.0 | 40.0 | 68.8 | 0.0 | 743.1 | 30.8 | 41.0 | 0.0 | 94.0 | 1423.4 |
| SP_182EA_G70METNON057_PRIME | 057 06:12 | 057 15:12 | 32.4 | 17.0 | 86.4 | 3.2 | 0.0 | 16.0 | 27.5 | 0.0 | 140.8 | 4.9 | 0.0 | 0.0 | 0.0 | 328.3 |
| DAILY TOTAL SCIENCE | 056 07:42 | 057 15:12 | 113.4 | 94.6 | 115.2 | 21.4 | 200.0 | 56.0 | 96.4 | 0.0 | 883.9 | 35.7 | 41.0 | 0.0 | 94.0 | |
| OBSERVATION_NOR | 057 15:12 | 058 12:28 | 76.6 | 40.1 | 0.0 | 7.7 | 0.0 | 37.8 | 65.1 | 0.0 | 196.0 | 153.8 | 0.0 | 0.0 | 88.9 | 666.0 |
| SP_182EA_C34BWGNON058_PRIME | 058 12:28 | 058 21:28 | 32.4 | 17.0 | 86.4 | 3.2 | 0.0 | 16.0 | 27.5 | 0.0 | 42.2 | 4.9 | 0.0 | 0.0 | 0.0 | 229.7 |
| DAILY TOTAL SCIENCE | 057 15:12 | 058 21:28 | 109.0 | 57.1 | 86.4 | 10.9 | 0.0 | 53.8 | 92.6 | 0.0 | 238.2 | 158.8 | 0.0 | 0.0 | 88.9 | |
| OBSERVATION_NOR | 058 21:28 | 059 09:13 | 42.3 | 22.2 | 0.0 | 4.2 | 0.0 | 20.9 | 36.0 | 0.0 | 55.4 | 0.0 | 0.0 | 0.0 | 49.1 | 230.1 |
| SP_182EA_G70METNON059_PRIME | 059 09:13 | 059 12:13 | 10.8 | 5.7 | 0.0 | 1.1 | 0.0 | 5.3 | 9.2 | 0.0 | 14.1 | 0.0 | 0.0 | 0.0 | 0.0 | 46.2 |
| SP_182EA_C34BWGNON059_PRIME | 059 12:13 | 059 21:13 | 32.4 | 17.0 | 86.4 | 3.2 | 0.0 | 16.0 | 27.5 | 0.0 | 42.4 | 4.9 | 0.0 | 0.0 | 0.0 | 229.9 |
| DAILY TOTAL SCIENCE | 058 21:28 | 059 21:13 | 85.5 | 44.8 | 86.4 | 8.6 | 0.0 | 42.2 | 72.7 | 0.0 | 112.0 | 4.9 | 0.0 | 0.0 | 49.1 | |

| | CAPS (Mb) | CDA (Mb) | CIRS (Mb) | INMS (Mb) | ISS (Mb) | MAG (Mb) | MIMI (Mb) | RADAR (Mb) | RPWS (Mb) | UVIS (Mb) | VIMS (Mb) | PROBE (Mb) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTAL RECORDED (OPNAV data not included) | 452.8 | 272.5 | 460.8 | 55.3 | 200.0 | 223.7 | 384.8 | 0.0 | 1423.3 | 520.7 | 211.6 | 0.0 |

# Waypoint Selection (1 of 2)

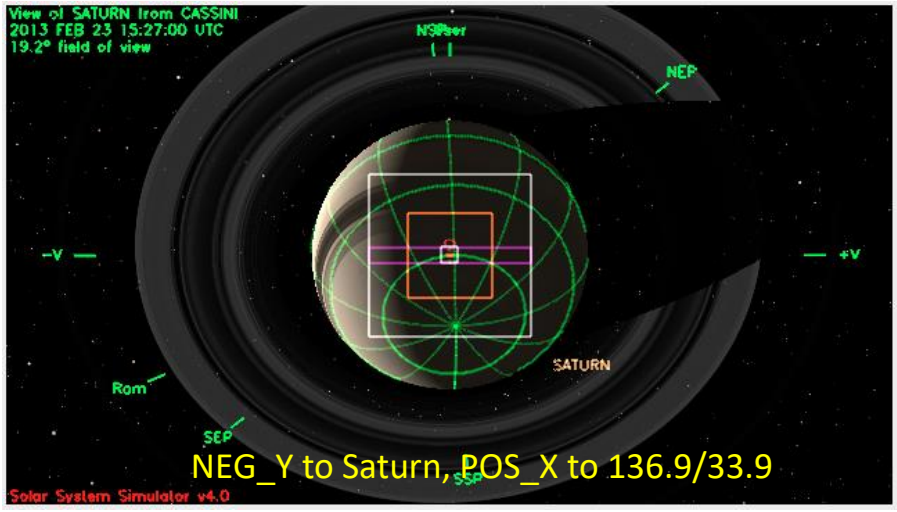


RBOT - Friendly

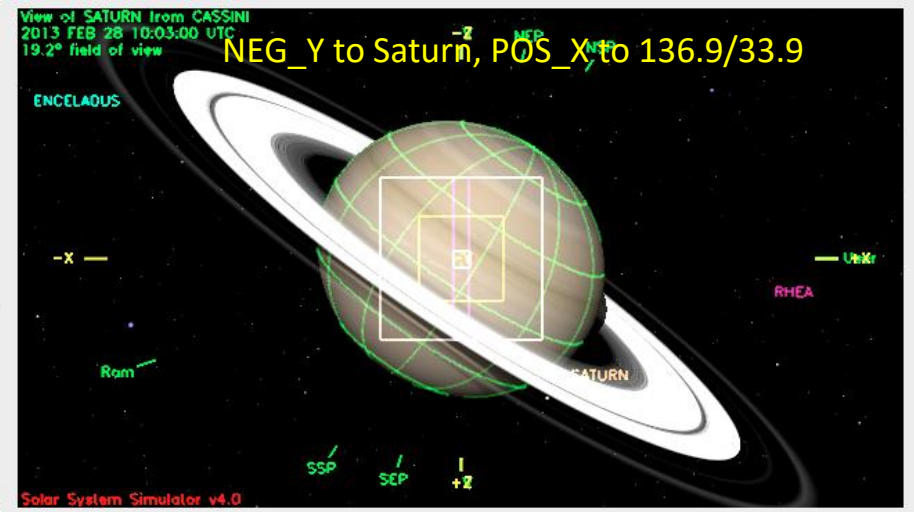
| | | | POS_X | NEG_X | POS_Z | NEG_Z |
|---|---|---|---|---|---|---|
| SP_182NA_OBSERV054_NA | 2013-054T15:27:00 | 2013-055T06:12:00 | NSP | ------ | ------ | NSP |
| SP_182NA_OBSERV055_NA | 2013-055T15:12:00 | 2013-055T22:42:00 | NSP | ------ | ------ | NSP |
| SP_182NA_OBSERV056_NA | 2013-056T07:42:00 | 2013-057T06:12:00 | ------ | ------ | ------ | ------ |
| SP_182NA_OBSERV057_NA | 2013-057T15:12:00 | 2013-058T12:28:00 | 136.9/ 33.9 or NSP | ------ | 136.9/ 33.9 | ------ |
| SP_182NA_OBSERV058_NA | 2013-058T21:28:00 | 2013-059T12:13:00 | 136.9/ 33.9 | ------ | ------ | ------ |

# Waypoint Selection (2 of 2)






Beginning of observation period: 2013-054T15:27:00

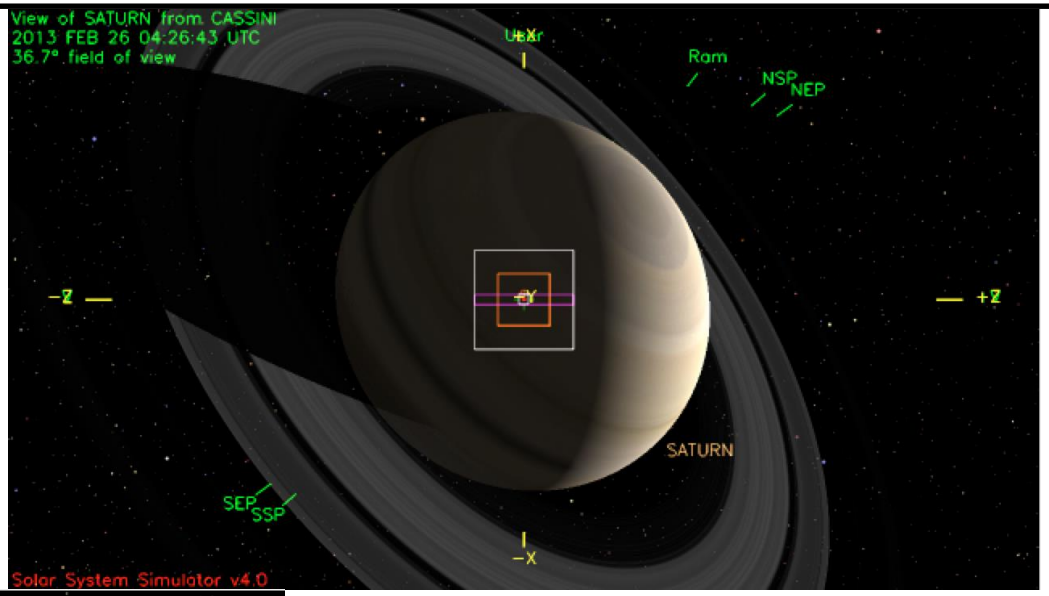


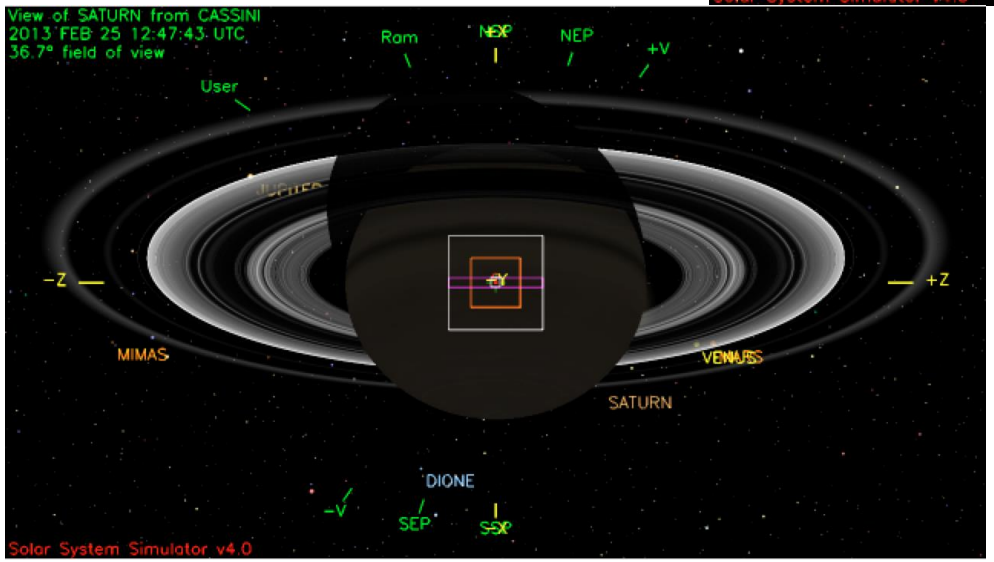

End of observation period: 2013-059T10:03:00

# Waypoints Chosen



**Waypoint 1** (entire segment):
ISS_NAC to Saturn;
POS_X to 136.9/33.9




**Waypoint 2** (during occulation):
ISS_NAC to Saturn;
POS_X to NSP

# Notes & Liens (1 of 2)

- Pointing:
  - Any SP turns that will violate turn margin policy and/or require hand edit to spturn script output
    - None
  - Any YGAP window issues (approved deviations from guidelines) esp. if segment ENDS with YGAP
    - The YGAPs on DOY 059 has been placed overlapping **the end** of the prime downlink. SCO has agreed to this.
  - RBOT: exceptions to guidelines, waypoints
    - No RBOT-friendly waypoint secondary was identified or used between 2013-056T07:42:00 and 2013-057T06:12:00. The safety of the waypoints used during this period has been verified with waypt_widget and PDT.
    - Due to geometric constraints, some waypoints were tweaked to comply.
    - All downlink offsets have been changed to equivalent RA/DECs using ctv and PDT.

- DSN:

  Rev 182 Saturn Atmospheric Occultation Experiment:
  Level 3 request from 2013-056/1210 to 2013-056/1825
  Stations: DSS-14, DSS-25, DSS-34, DSS-45

The downlink on DOY 059 has been split between DSS-14 (4-hours) and DSS-34 (8-hours) for SSR clearing purposes.

- `ap_downlink` has no errors, but complains about:

```
Warning: 70m usage for sequence exceeds project commitment of <= 35%; is at 40%
Warning: number of sequence upload passes is 0; should be 5 or more
```

both of which can be ignored. The former is familiar for the Saturn TWT and actually not so bad. Per the latter, this segment is in the middle of the sequence. The sequence uploads are contained in the other segments.

# Notes & Liens (2 of 2)



- Resource checker:
  - CIMS_RESOURCE_CHECK_064-065 –A unique opmode is required to transition from RSS2RWAF to RSS3RWAS, as a direct transition between the two is not allowed. See note in CIMS request ENGR_182SC_URSS3RWAS056_PPS.
  - CIMS_RESOURCE_CHECK_066 – CIRS DSCAL occurs within the first 45 minutes of a Downlink Pass. This is actually the second part of a handover pass and therefore, 4 hours into the downlink. The first 4 hours are not rolling.
- Opmodes:
  - transition to RSS2RWAF @ 2013-056T10:25:00– allows for warm-up of RSS' S- and X- bands in preparation for the impending RSS occultation experiment; RWA full
  - transition to RSS3RWAS @ 2013-056T12:25:00 – allows for warm-up of RSS' Ka-band; RWA slow; ISS and VIMS sleep; CDA no articulation
  - The transition between RSS2RWAF and RSS3RWAS must be done as a unique opmode, although neither opmode itself is unique.
- Data Volume:
  - No SMT warnings
- Hydrazine:
  - N/A
- Special Activities:
  - None
- Liens:
  - None