



Science Planning & Sequence Team
CASSINI

SATURN TARGET WORKING TEAM

Rev 35 Segment Legacy Package

**Segment Boundary: December 13, 2006 – December 14, 2006
2006-347T12:18:00 – 2006-348T06:28:00 (SCET)**

**Integration Began 01/06/2003
Segment Delivered to S26 Sequence 04/01/2003
Lead Integrator was Shawn Boll**

Legacy Package Assembled by Shawn Boll

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

Segment Overview and Final Products

- This was a very short segment (less than 1 day) in an inclined orbit of the Prime Mission, squeezed in between the T21 Titan flyby and a Rings TWT led periapse segment. Inbound to periapse, the views were of the southern hemisphere.
- The integrated plan included a CIRS Titan composition map and time for optical navigation images that were dropped from the plan by the end of sequencing. This left the segment with a single VIMS Saturn cylindrical map and an unusual Titan-based waypoint. The DSN strategy was altered in a way that would indicate that the original station requested was no longer available. The shift to a different station's viewperiod was the likely cause for the timeline shake-up.

Final Sequenced SPASS

Saturn 35 Legacy

| Request | Riders | Start (SCET) | Start (Epoch) | Duration | End (SCET) | Primary | Secondary | Comments |
|--------------------------------|---------|--------------------------|--------------------------------|---------------------|--------------------------|-------------------------|-------------------------|--|
| Sequence S026, length = 42 ... | | 2006-328T16:30:00 | E033_SEQUENCE_026+000T00:00:00 | 041T21:20:00 | 2007-005T13:50:00 | | | |
| SATURN rev 35 Segment | | 2006-347T12:18:00 | | 000T18:10:00 | 2006-348T06:28:00 | | | |
| SP_035SA_WAYPITURN347_PRIME | M | 2006-347T12:18:00 | | 000T00:30:00 | 2006-347T12:48:00 | ISS_NAC to Titan | NEG_Z to NSP | |
| NEW WAYPOINT | | 2006-347T12:48:00 | | 000T18:10:00 | 2006-348T06:58:00 | ISS_NAC to Titan | NEG_Z to NSP | |
| VIMS_035SA_CYLMAPO01_PRIME | I, M, U | 2006-347T12:48:00 | | 000T09:30:00 | 2006-347T22:18:00 | ISS_NAC to Saturn | POS_Z to North_Pole_Dir | |
| SP_035EA_DLTURN347_PRIME | M | 2006-347T22:18:00 | | 000T00:20:00 | 2006-347T22:38:00 | XBAND to Earth | NEG_X to 73.0/-46.4 | |
| SP_035EA_M34HEFNON367_PRIME | C, E, M | 2006-347T22:38:00 | | 000T06:26:00 | 2006-348T05:04:00 | XBAND to Earth | NEG_X to 73.0/-46.4 | Pointing is safe pending updated HGA shading model; for CDA/MIMI |
| SP_035EA_G70METNON348_PRIME | C, M | 2006-348T05:04:00 | | 000T01:24:00 | 2006-348T06:28:00 | XBAND to Earth | NEG_X to 73.0/-46.4 | |

Final Sequenced SMT and Data Volume

Saturn 35 Legacy

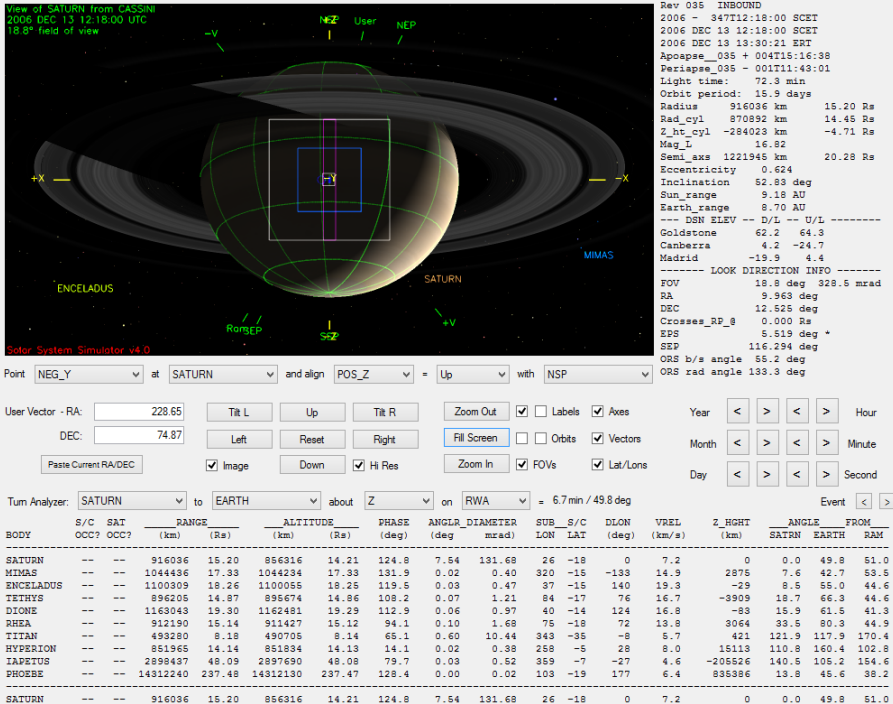
DATA VOLUME SUMMARY --- TRANSFER FRAME OVERHEAD INCLUDED (80 BITS PER 8800-BIT FRAME)

| DOWNLINK PASS NAME | Start doy hh:mm | End doy hh:mm | OBSERVATION_PERIOD | | | | | | | DOWNLINK_PASS | | | | | | | |
|-----------------------------|--------------------|------------------|--------------------|-------------|--------------|---------------|----------------|--------------|---------------|---------------|--------------|---------------|----------------|---------------|-------------------|------------------|----------------|
| | | | P4 | | | P5 | | | | RECORDED | | | PLAYBACK | | | | |
| | | | 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_035EA_M34HEFNON367_PRIME | 347 22:38 | 348 05:04 | 85 | 843 | 35 | 963 | 3516 | 2553 | 0 | 164 | 38 | 1165 | 753 | -412 | 626 | 5% | 412 |
| SP_035EA_G70METNON348_PRIME | 348 05:04 | 348 06:28 | 412 | 0 | 0 | 412 | 3516 | 3104 | 0 | 37 | 8 | 457 | 505 | 47 | 626 | 5% | 0 |

DATA VOLUME REPORT --- TRANSFER FRAME OVERHEAD NOT INCLUDED

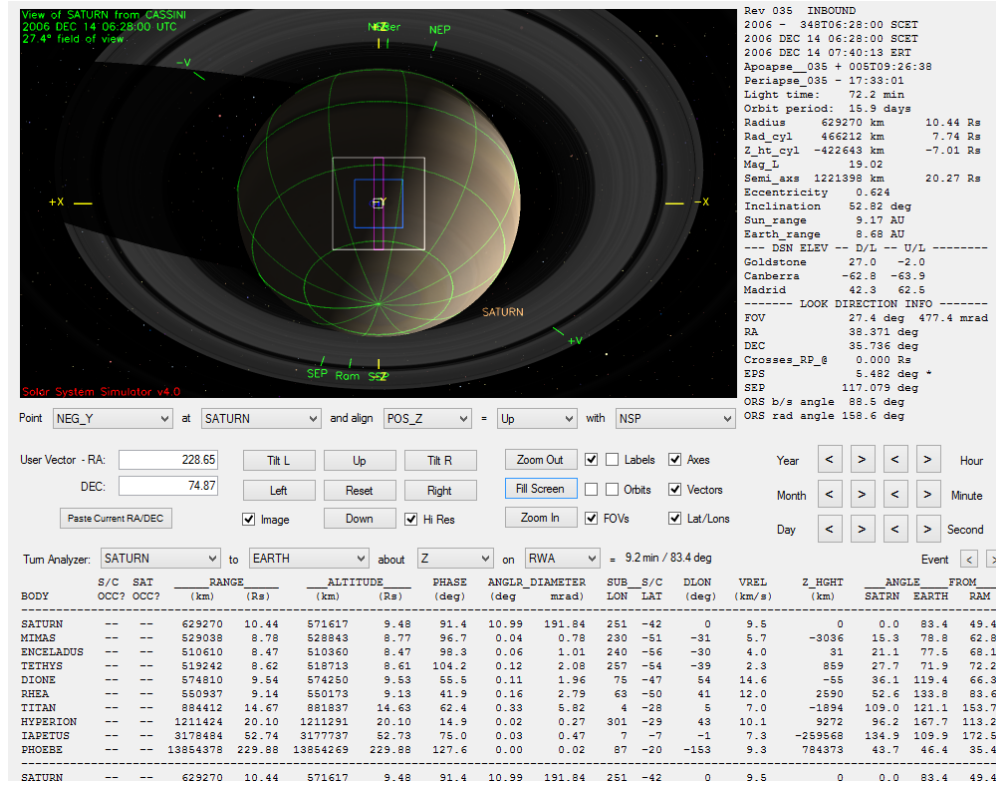
| Event | Start doy hh:mm | End doy hh:mm | CAPS (Mb) | CDA (Mb) | CIRS (Mb) | INMS (Mb) | ISS (Mb) | MAG (Mb) | MIMI (Mb) | RADAR (Mb) | RPWS (Mb) | UVIS (Mb) | VIMS (Mb) | PROBE (Mb) | ENGR (Mb) | TOTAL (Mb) |
|-----------------------------|--------------------|------------------|--------------|-------------|--------------|--------------|-------------|-------------|--------------|---------------|--------------|--------------|--------------|---------------|--------------|---------------|
| OBSERVATION_NOR | 347 12:18 | 347 22:38 | 37.2 | 11.1 | 0.0 | 1.9 | 340.2 | 22.3 | 39.1 | 0.0 | 48.7 | 34.4 | 300.0 | 0.0 | 0.0 | 834.9 |
| SP_035EA_M34HEFNON367_PRIME | 347 22:38 | 348 05:04 | 23.2 | 6.9 | 60.7 | 1.2 | 0.0 | 13.9 | 24.3 | 0.0 | 30.3 | 1.8 | 0.0 | 0.0 | 0.0 | 162.2 |
| SP_035EA_G70METNON348_PRIME | 348 05:04 | 348 06:28 | 5.0 | 1.5 | 14.9 | 0.3 | 0.0 | 3.0 | 5.3 | 0.0 | 6.6 | 0.3 | 0.0 | 0.0 | 0.0 | 36.9 |
| DAILY TOTAL SCIENCE | 347 12:18 | 348 06:28 | 65.4 | 19.5 | 75.6 | 3.3 | 340.2 | 39.2 | 68.7 | 0.0 | 85.7 | 36.5 | 300.0 | 0.0 | | |

Segment Geometry



← Seg Start (Left)

↓ Seg End (below)



| | Saturn Range | Phase Angle | Sub-S/C Lat. |
|---------------|--------------|-------------|--------------|
| Segment Start | 15.2 | 124.8 | -18 |
| Segment End | 10.44 | 91.4 | -42 |

No ORS Boresight Solar Constraints on Science Pointing.

Science Highlights for these days were not available.

Segment Integration Planning

Rev 35 - Proposed TOL

| Activity | Start | Duration | Pointing | Notes |
|--------------------------------|-------------------|----------|---------------------------------|-------------------|
| Segment Start/Turn to Waypoint | 2006-347T07:48:00 | 00:30:00 | | |
| CIRS/VIMS Titan Comp Map | 347T08:18:00 | 03:00:00 | NAC to Titan; +/-X to POLE_DIR | |
| VIMS Thermal Cylindrical Map | 347T11:18:00 | 11:00:00 | NAC to Saturn; +/-Z to POLE_DIR | |
| Turn to Downlink | 347T22:18:00 | 00:30:00 | | |
| Downlink | 347T22:48:00 | 09:00:00 | | No 70 m available |

Initial SMT and Data Volume

Beginning of Integration:

DATA VOLUME SUMMARY

| DOWNLINK PASS NAME | OBSERVATION_PERIOD | | | | | | | | | | DOWNLINK_PASS | | | | | | |
|-----------------------------|--------------------|------------------|---------------|-------------|--------------|---------------|----------------|---------------|---------------|-------------|---------------|---------------|----------------|---------------|----------------|------|-----|
| | Start doy hh:mm | End doy hh:mm | P4 | | | | | P5 | RECORDED | PLAYBACK | | | | | | | |
| | | | START (Mb) | SCI (Mb) | HK+E (Mb) | TOTAL (Mb) | CPACTY (Mb) | MARGIN (%) | OPNAV (Mb) | SCI (Mb) | ENGR (Mb) | TOTAL (Mb) | CPACTY (Mb) | MARGIN (%) | CAROVR (Mb) | | |
| SP_035EA_M34HEFNON347_PRIME | 347 23:18 | 348 07:48 | 0 | 1219 | 52 | 1271 | 3534 | 2263 | 64% | 17 | 213 | 50 | 1551 | 993 | -558 | -56% | 558 |

DATA VOLUME REPORT

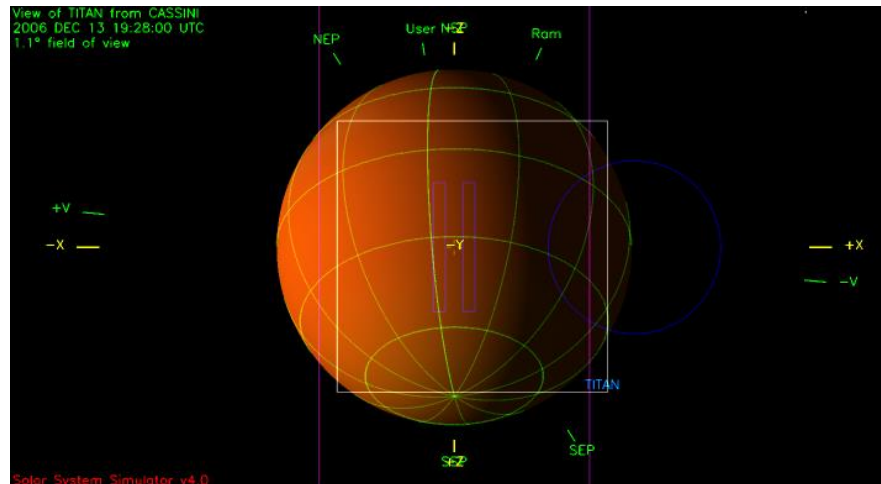
| Event | Start doy hh:mm | End doy hh:mm | CAPS (Mb) | CDA (Mb) | CIRS (Mb) | INMS (Mb) | ISS (Mb) | MAG (Mb) | MIMI (Mb) | RADAR (Mb) | RPWS (Mb) | UVIS (Mb) | VIMS (Mb) | PROBE (Mb) | ENGR (Mb) | TOTAL (Mb) |
|-----------------------------|--------------------|------------------|--------------|-------------|--------------|--------------|-------------|-------------|--------------|---------------|--------------|--------------|--------------|---------------|--------------|---------------|
| OBSERVATION_NOR | 347 07:48 | 347 23:18 | 55.8 | 10.9 | 43.2 | 2.8 | 0.0 | 33.5 | 74.1 | 0.0 | 73.1 | 0.0 | 925.7 | 0.0 | 0.0 | 1219.0 |
| OBSERVATION_OPN | 347 07:48 | 347 23:18 | 0.0 | 0.0 | 0.0 | 0.0 | 17.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 17.4 |
| SP_035EA_M34HEFNON347_PRIME | 347 23:18 | 348 07:48 | 30.6 | 6.1 | 75.6 | 1.5 | 0.0 | 18.4 | 36.7 | 0.0 | 40.1 | 0.0 | 3.6 | 0.0 | 0.0 | 212.6 |

Waypoint Selection

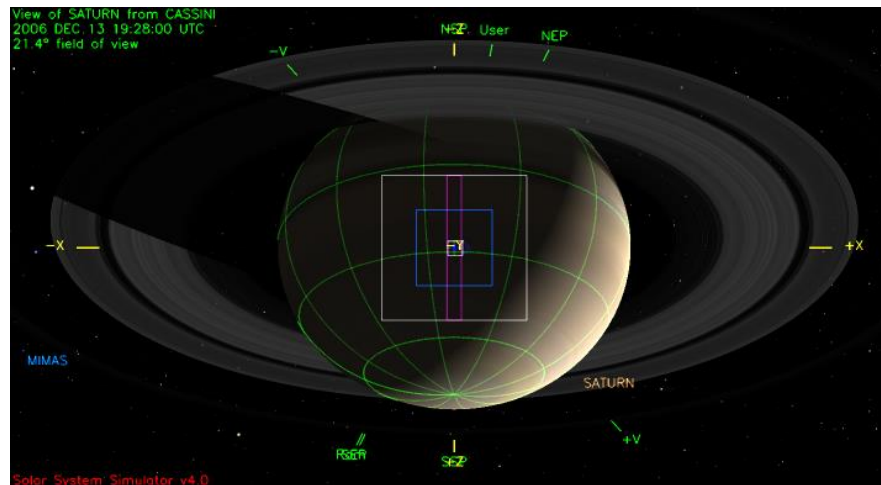
| Activity | Start | Duration | Pointing | Notes | TLM |
|--------------------------------|-------------------|----------|---------------------------------|-------------------|---------|
| Segment Start/Turn to Waypoint | 2006-347T07:48:00 | 00:30:00 | | | |
| Waypoint | | | NAC to Saturn; +Z to POLE_DIR | Safe | |
| CIRS/VIMS Titan Comp Map | 347T08:18:00 | 03:00:00 | NAC to Titan; +/-X to POLE_DIR | | S&ER3 |
| VIMS Thermal Cylindrical Map | 347T11:18:00 | 11:00:00 | NAC to Saturn; +/-Z to POLE_DIR | | S&ER3 |
| Turn to Downlink | 347T22:18:00 | 00:30:00 | | | |
| Downlink | 347T22:48:00 | 09:00:00 | Rolling? | No 70 m available | RTE&SBx |

Waypoints Chosen

Waypoint 1 (Whole Segment): ISS_NAC to Titan; NEG_Z to NSP



View of Saturn at the same time.



Saturn Rev 35 Outbound Open Issues

- **Pointing Issues**
 - Pointing for the downlink is safe pending updated HGA shading model; for CDA/MIMI.
- **Data Volume Issues**
 - None
- **Telemetry Mode Issues**
 - None
- **CIMS Issues**
 - None
- **Power/OPMODE Issues**
 - None
- **Flight Rule/Mission Planning Guideline and Constraint Issues**
 - None
- **Other Issues**
 - The DSN Station request may be 5-10 minutes earlier than necessary.