

## Timeline for Cassini Rev 180: 2-Way RSS Ingress Ring Occultation & Egress Atmospheric Occultation

January 31, 2013 (DOY 031)

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|  | ERT UTC<br>OWLT =<br>01:21:02 | SCET            | PST<br>ERT-8hrs<br>08:00:00 | Comments   |
|--|-------------------------------|-----------------|-----------------------------|--|
| Spacecraft is Earth pointd                       |                               |                 |                             |  |
| RSSG: Load Frequency Predicts                    |                               |                 |                             |  |
| DSS-14: Begin Pre-Cal                            | 08:00:00                      | 06:38:58        | 00:00:00                    |  |
| DSS-14: Begin of Track                           | 09:00:00                      | 07:38:58        | 01:00:00                    | X-Band downlink signal detectble. 3-Way with DSS-65      |
| <b>DSS-65: Transmitter OFF</b>                   | <b>09:18:00</b>               | <b>07:56:58</b> | <b>01:18:00</b>             |  |
| <b>DSS-14: TXR ON, 18 kW, LCP, Ramp, Sweep</b>   | <b>09:29:00</b>               | 08:07:58        | 01:29:00                    |  |
| DSS-25: Begin Pre-Cal                            | 09:50:00                      | 08:28:58        | 01:50:00                    |  |
| Ka-Band ON                                       | 10:00:02                      | 08:39:00        | 02:00:02                    | RSSK op-mode if OTM 339 Executes in the Prime Window     |
| Ka-Band ON                                       | 10:44:02                      | 09:23:00        | 02:44:02                    | RSSK op-mode if Transition is in the Background Sequence |
| <b>DSS-65: End Of Track</b>                      | <b>10:45:00</b>               | <b>09:23:58</b> | <b>02:45:00</b>             |  |
| S-Band ON  | 10:45:44                      | 09:24:42        | 02:45:44                    | S-Band downlink signal detectable                        |
| DSS-25: Begin of Track                           | 11:20:00                      | 09:58:58        | 03:20:00                    | Begin X- and Ka-band acquisition. 3-Way with DSS-65      |
| Start of RSS Ring Occultation Experiment         | 12:00:02                      | 10:39:00        | 04:00:02                    | PC/N0 (X70, S70, X34, Ka34) = 54, 42, 48, and 48 dB-Hz   |
| Begin 1-Way Free-Space Baseline                  | 12:00:04                      | 10:39:02        | 04:00:04                    | ~11 m 1-way baseline is collected                        |
| DSS-14: Begin X- & S-band 1-Way Acquisition      | 12:00:04                      | 10:39:02        | 04:00:04                    | PC/N0 (X-70m, S-70m) = 54, 42 dB-Hz                      |
| DSS-25: Begin X- & Ka-band 1-Way Acquisition     | 12:00:04                      | 10:39:02        | 04:00:04                    | PC/N0 (X-34m, Ka-34m) = 48, 48 dB-Hz                     |
| DSS-25: Enable Monopulse                         | TBD                           |                 |                             | Enable monopulse only when requested by RS Operations    |
| RNG OFF/TLM OFF                                  | 12:00:07                      | 10:39:05        | 04:00:07                    |  |
| DSS-14: Begin X- & S-band 2-Way Acquisition      | 12:11:04                      | 10:50:02        | 04:11:04                    | PC/N0 (X-70m, S-70m) = 54, 42 dB-Hz                      |
| DSS-25: Begin X- & Ka-band 3-Way Acquisition     | 12:11:04                      | 10:50:02        | 04:11:04                    | PC/N0 (X-34m, Ka-34m) = 48, 48 dB-Hz                     |
| <b>DSS-34: Begin of Pre-Cal</b>                  | <b>12:30:00</b>               | <b>11:08:58</b> | <b>04:30:00</b>             |  |
| Start 2-Way & 3-Way Official Free-Space Baseline | 13:00:02                      | 11:39:00        | 05:00:02                    | PC/N0 (X70, S70, X34, Ka34) = 54, 42, 48, and 48 dB-Hz   |
| <b>DSS-45: Begin Pre-Cal</b>                     | <b>13:05:00</b>               | <b>11:43:58</b> | <b>05:05:00</b>             |  |
| Start of ingress ring occultation (Ring F)       | 13:30:14                      | 12:09:12        | 05:30:14                    | Ring F is usually not detectable in real-time            |
| Ring A In  | 13:33:08                      | 12:12:06        | 05:33:08                    | Detectable signals over most of Ring A                   |

|  |                 |          |          |   |
|--|-----------------|----------|----------|---|
| In Mid Encke Gap                               | 13:35:40        | 12:14:38 | 05:35:40 | Signals are briefly back to full strength                     |
| Ring A Out                                     | 13:44:50        | 12:23:48 | 05:44:50 | Relatively strong signals in the Cassini Division             |
| Ring B In                                      | 13:48:27        | 12:27:25 | 05:48:27 | Signals will be small or absent over Ring B                   |
| Ionosphere In (~68,000 km)                     | 13:49:11        | 12:28:09 | 05:49:11 | Ionosphere primarily affects signal frequency                 |
| DSS-34: Begin of Track                         | 14:00:00        | 12:38:58 | 06:00:00 | In Ring B: Ka- & X band 1-Way or 3-Way/14                     |
| DSS-45: Begin of Track                         | 14:05:00        | 12:43:58 | 06:05:00 | In Ring B: S- and X band 1-Way or 3-Way/14                    |
| Upper Troposphere                              | 14:06:59        | 12:45:57 | 06:06:59 | Weak or absent scintillating signals                          |
| Ring B then C (?) Mixed with Troposphere       |                 |          |          | Unpredictable signal behavior                                 |
| Likely loss of all signals                     | 14:36:02        | 13:15:00 | 06:36:02 | Approximate time  |
| Cassini is Behind Saturn as Seen From Earth    |                 |          |          |   |
| <b>DSS-14: TXR OFF</b>                         | <b>15:59:00</b> | 14:37:58 | 07:59:00 | End of uplink period  |
| Cassini is Behind Saturn as Seen From Earth    |                 |          |          |   |
| Start Egress Atmospheric Limb Tracking         | 16:34:03        | 15:13:01 | 08:34:03 | Likely no downlink signals detectable                         |
| Weak S-band signal (~1.55° BA) at DSS-14 & 45  | 16:45:36        | 15:24:34 | 08:45:36 | Approx. time; 1-Way until X-band uplink lock, then 2/3-Way/14 |
| Weak X-band signal (~1.35° BA) at DSS-14 & 45  | 16:50:18        | 15:29:16 | 08:50:18 | Approx. time; 1-Way until X-band uplink lock, then 2/3-Way/14 |
| Weak X-band signal (~1.35° BA) at DSS-25 & 34  | 16:50:18        | 15:29:16 | 08:50:18 | Approx. time; 1-Way until X-band uplink lock, then 3-Way/14   |
| Weak Ka-band signal (~1.15° BA) at DSS-25 & 34 | 16:54:52        | 15:33:50 | 08:54:52 | Approx. time; 1-Way until X-band uplink lock, then 3-Way/14   |
| Upper Troposphere (~0.1° BA)                   | 17:17:36        | 15:56:34 | 09:17:36 | PC/N0 (X70, S70, X34, Ka34) = 54, 42, 48, and 48 dB-Hz        |
| Top of the ionosphere (~68,000 km)             | 17:45:20        | 16:24:18 | 09:45:20 | Ionosphere primarily affects signals frequency/phase          |
| DSS-45: End of Track                           | 18:15:00        | 16:53:58 | 10:15:00 |   |
| End of official 2-way baseline                 | 18:16:02        | 16:55:00 | 10:16:02 |   |
| DSS-25: Enable Monopulse                       | 18:28:00        | 17:06:58 | 10:28:00 | Enable monopulse only when requested by RS Operations         |
| DSS-45: End of Post Cal                        | 18:30:00        | 17:08:58 | 10:30:00 |   |
| DSS-25 & DSS-14: End of Track                  | 18:30:00        | 17:08:58 | 10:30:00 |   |
| DSS-34: Enable Monopulse                       | 18:38:00        | 17:16:58 | 10:38:00 | Enable monopulse only when requested by RS Operations         |
| Ka-Band and S-Band OFF                         | 18:40:22        | 17:19:20 | 10:40:22 | Loss of S- and Ka-band signals                                |
| TLM ON/RNG ON                                  | 18:41:00        | 17:19:58 | 10:41:00 |   |
| End of Rev 180 RSS S/C Activities              | 18:41:01        | 17:19:59 | 10:41:01 |   |
| Start Spacecraft Turn Away from Earth Point    | 18:41:01        | 17:19:59 | 10:41:01 | Quick loss of X-band signal                                   |
| DSS-25 & DSS-14: End of Post Cal               | 18:45:00        | 17:23:58 | 10:45:00 |   |
| DSS-34: End of Track                           | 19:10:00        | 17:48:58 | 11:10:00 |   |
| DSS-34: End of Post Cal                        | 19:25:00        | 18:03:58 | 11:25:00 |   |

DSS-65 related activities

Goldstone DSS-25 & DSS-14 related activities

Canberra DSS-34 and DSS-45 related activities

Predicted ring occultation times are approximate and are based on [Live Update OD on 01/23/2013](#)