

# Cassini T31: Titan Radio Occultation May 28, 2007 (DOY 148 )

Essam Marouf, May 22, 2007 (v3)

|                                       | ERT UTC<br>OWLT =<br>1:18:41 | SCET UTC | PDT<br>ERT - 7 hrs<br>7:00:00 | Comments   |
|---------------------------------------|------------------------------|----------|-------------------------------|--|
| Start Precal DSS-55                   | 16:15:00                     | 14:56:19 | 9:15:00                       |  |
| Start Precal DSS-25                   | 16:51:00                     | 15:32:19 | 9:51:00                       |  |
| Start Precal DSS-63                   | 17:00:00                     | 15:41:19 | 10:00:00                      |  |
| Start Precal DSS-26                   | 17:06:00                     | 15:47:19 | 10:06:00                      |  |
| Start Precal DSS 14                   | 17:36:00                     | 16:17:19 | 10:36:00                      |  |
| <b>Load Predicts</b>                  |                              |          |                               |  |
| Begin-of-Track DSS-55, 63             | 18:00:00                     | 16:41:19 | 11:00:00                      |  |
| Begin-of-Track DSS-14, 25             | 18:36:00                     | 17:17:19 | 11:36:00                      |  |
| Begin-of-Track DSS-26                 | 18:51:00                     | 17:32:19 | 11:51:00                      | No Cassini downlink signals till shortly before 18:55:36   |
| Start turn to Earth point             | 18:25:36                     | 17:06:55 | 11:25:36                      |  |
| End turn to Earth point               | 18:55:36                     | 17:36:55 | 11:55:36                      |  |
| TLM OFF/TWNC ON/ RNG OFF              | 18:55:36                     | 17:36:55 | 11:55:36                      |  |
| Start free-space baseline             | 18:58:10                     | 17:39:29 | 11:58:10                      | PC/N0 ~ 54, 48, & 41 dB-Hz for X-, Ka-, S-Band             |
| Enable Monopulse: DSS 25, 26, 55      | 18:58:30                     | 17:39:49 | 11:58:30                      | start/end times are provided to the operators in real-time |
| Disable Monopulse: DSS 25, 26, 55     | 19:00:30                     | 17:41:49 | 12:00:30                      | Keep or Clear the offsets decision                         |
| Top of Ionosphere (~3000 km alt)      | 19:12:55                     | 17:54:14 | 12:12:55                      | PC/N0 ~ 54, 48, & 41 dB-Hz for X-, Ka-, S-Band             |
| Titan Ionosphere (~1500 km alt)       | 19:21:36                     | 18:02:55 | 12:21:36                      | The ionosphere primarily affects the signal freq/phase     |
| Titan Atmosphere (~200 km alt)        | 19:29:06                     | 18:10:25 | 12:29:06                      | Signal strength drops quickly in Titan's atmosphere        |
| Titan Surface (~2575 km radius)       | 19:33:15                     | 18:14:34 | 12:33:15                      | Hard-limb diffraction may cause the signals to continue    |
| Behind Titan                          |                              |          |                               | to observed briefly after 19:33:15                         |
| End Limb-track for occ'n ingress      | 19:34:07                     | 18:15:26 | 12:34:07                      |  |
| Start Limb-track for occ'n egress     | 19:55:25                     | 18:36:44 | 12:55:25                      |  |
| Behind Titan                          |                              |          |                               | Signals may appear briefly before 19:58:40                 |
| Titan Surface (~2575 km radius)       | 19:58:40                     | 18:39:59 | 12:58:40                      | Signal strength builds quickly up to free-space values     |
| Titan Atmosphere (~200 km alt)        | 20:01:07                     | 18:42:26 | 13:01:07                      | PC/N0 ~ 54, 48, & 41 dB-Hz for X-, Ka-, S-Band             |
| Titan Ionosphere (~1500 km alt)       | 20:08:49                     | 18:50:08 | 13:08:49                      | The ionosphere primarily affects the signal freq/phase     |
| Titan Closest Approach (C/A)          | 20:10:36                     | 18:51:55 | 13:10:36                      |  |
| Top of Ionosphere (~3000 km alt)      | 20:18:13                     | 18:59:32 | 13:18:13                      |  |
| End of Egress Occultation             | 20:32:56                     | 19:14:15 | 13:32:56                      |  |
| Start of Baseline                     | 20:33:15                     | 19:14:34 | 13:33:15                      |  |
| Enable Monopulse: DSS 25, 26, 55      | 20:47:00                     | 19:28:19 | 13:47:00                      | start/end times are provided to the operators in real-time |
| Disable Monopulse: DSS 25, 26, 55     | 20:49:30                     | 19:30:49 | 13:49:30                      |  |
| End of T31 RSS Observations           | 20:49:35                     | 19:30:54 | 13:49:35                      |  |
| Start Turn to new wapoint             | 20:50:36                     | 19:31:55 | 13:50:36                      | Quick loss of of carrier signals                           |
| TLM ON/TWNC OFF/RNG ON                | 20:50:36                     | 19:31:55 | 13:50:36                      |  |
| End-of-Track DSS-14, 25, 26, 55, 63   | 21:35:00                     | 20:16:19 | 14:35:00                      |  |
| End of Postcal DSS-14, 25, 26, 55, 63 | 21:50:00                     | 20:31:19 | 14:50:00                      |  |

Titan limb ingress & egress times are based on OTM-111 OD and could change a little because of trajectory uncertainties

DSN Activities