

# S60 Rev131 T68 Titan Gravity

- S60 Rev131 T68 Titan Gravity Observation
  - Telemetry ON, Coherent mode (2-way and 3-way)
  - Covered by all complexes
    - Madrid -> Goldstone -> Canberra
- From Nicole Rappaport:

T68 is the fifth flyby of the Cassini mission devoted to Titan gravity science. The goal is to measure the fluid and dynamic Love number of Titan and determine Titan's geoid. The determination of the fluid Love number is the only way to find out with confidence whether Titan has a liquid ocean. However, more flybys than T68 are needed. The determination of the geoid is crucial to understanding the internal structure of Titan through correlative analysis of the gravity and RADAR planetary radii data.

# DSN Antennas

- DSN Coverage

|        | Pre  | BOT  | EOT  | Post |        |     |     |               |      |      |     |              |  |
|--------|------|------|------|------|--------|-----|-----|---------------|------|------|-----|--------------|--|
| 10 138 | 2325 | 0055 | 0830 | 0845 | DSS-25 | CAS | T/P | RS131-KDWN    | 4611 | N748 | 1A1 | GSE Ramped   |  |
| 10 139 | 1500 | 1630 | 0145 | 0200 | DSS-55 | CAS | TP  | T68 RS131-GRV | 4612 | N750 | 1A1 | Unramped     |  |
| 10 139 | 2045 | 2215 | 0930 | 0945 | DSS-25 | CAS | TP  | T68 RS131-GRV | 4612 | N748 | 1A1 | Unramped     |  |
| 10 140 | 0335 | 0505 | 1410 | 1425 | DSS-34 | CAS | TP  | T68 RS131-GRV | 4613 | N750 | 1A1 | Unramped     |  |
| 10 140 | 2145 | 2315 | 0815 | 0830 | DSS-25 | CAS | T68 | PB/RS131KADN  | 4613 | N748 | 1A1 | GSE Unramped |  |
| 10 140 | 2215 | 2315 | 0145 | 0200 | DSS-63 | CAS | TP  | T68 PB        | 4613 | N003 | 1A1 | GSE          |  |

If Planet-C launch slips to May 19th, Cassini Canberra coverage will be as follows:

DSS-34: BOT 1045 instead of 0505

DSS-43: Pre-cal 140/0800, BOT 140/0900, EOT 140/1100, Post-cal 140/1115

- Receivers scheduled

- 2 closed-loop receivers per BWG antenna
- Open-loop receivers
- Closed-loop data are prime. Open-loop data are backup
- LCP not required. Only RCP

# ORTs

## All completed

ORT on DOY 125-126 (May 6) over DSS-25 and DSS-34, X- and Ka-band

10 125 2245 0015 0915 0930 DSS-25 CAS TP RS130-GRVORT1 4598 N748 1A1

10 126 0435 0605 0915 0930 DSS-34 CAS TP RS130-GRVORT1 4599 N750 1A1

- DSS-25 prime
- Verified monopulse, acquired pointing data
- DSS-25 windy 38-48mph. Fluctuating Ka-band
- DSS-34 nominal. Support at low elevation angles

ORT on DOY 127 (May 7) over DSS-34, X- and Ka-band

10 127 0500 0630 1530 1545 DSS-34 CAS TP RS130-GRVORT2 4600 N750 1A1

10 127 0530 0630 1530 1545 DSS-43 CAS TKG PASS 4600 N003 1A1

- DSS-43 prime
- Verified monopulse, acquired pointing data
- RSR1 down. Fixed day after prior to MEX support
- Nominal 34 support. Good weather. Good Ka-band pointing (low monopulse corrections values)

ORT on DOY 128 (May 8) over DSS-55, X- and Ka-band

10 128 1455 1625 0130 0145 DSS-55 CAS TP RS131-GRVORT1 4601 N750 1A1

10 128 1525 1625 0130 0145 DSS-63 CAS TKG PASS 4601 N003 1A1

- DSS-63 prime
- DSS-55 performed monopulse on-point phase cals
- Verified monopulse, acquired pointing data
- Heavy rains. Fluctuations in Ka-band power

ORT on DOY 129-130 (May 10) over DSS-25, X- and Ka-band

10 129 2230 0000 0900 0915 DSS-25 CAS TP RS131-GRVORT2 4602 N748 1A1

- Verified monopulse, acquired pointing data
- Winds gusting to 50 kph. Fluctuations in Ka-band power. Monopulse improved

# Misc

DSS-55 LQG – Will not use

Pointing Plan

- Enable throughout gravity observation. If problematic, stay with blind pointing
  - Are 4<sup>th</sup>-order pointing models good?
  - Data to David Rochblatt from recent ORTs
- Watch for monopulse enables at low Elevation angles. Wait till ~10 degrees

SNT - Enable at all throughout

Receivers during closest approach (high dynamics)

Power drops at switch from 3-way to 2-way?

- Observed during last gravity observation (Enceladus E9 on DOY 117-118)
- I checked with Telecom, and they said that nothing was done differently on their side

SPS Predicts – Unramped except for inbound GSE over DSS-25 on DOY 138 since we'll be doing an uplink transfer from DSS-63 (default ramped predicts) to DSS-25

Equipment status?

RSSG: Ensure AWVR units at Goldstone and Madrid are ready

- Was told today that Goldstone AWVR is having problems

RSS will be in Ops room at 7:30 am on Wed May 19<sup>th</sup>