Preparations for Cassini RS S23 Occultations on DOY 258-260

RSS/DSN Meeting

September 12, 2006

1 pm, 230-260W, (818)354-5157

Aseel Anabtawi

- Enceladus Plume Occultation On DOY 258
  - Only on in Tour
  - Covered by Madrid
  - 258/0753 to 258/1023

- Rings/Saturn Occultation on DOY 258-260
  - Slowest and Longest in Tour
    - Over 40 hours long
  - Covered by all complexes
  - 258/1633 to 260/0453
    - Includes deadtime at beginning and end
    - Gap in observation from 258/2253 to 259/0023

- OWLT 01:23 (hh:mm), RTLT 02:46

- Telmetry OFF during the occultations
  - OFF 258/0753 (TWNC ON, RNG OFF)
  - ON 260/0453 (TWNC OFF, RNG ON)

- Spacecraft non-rolling

- RSS3A Opmode (S-, X- and Ka-band Downlink)
  - From 258/0753 till 260/0553
    - Unique Opmode between 258/1023 (end of Enceladus Occ) till 258/1903 (End of deadtime for Ri/Sa Occ) to allow CDA to articulate
  - Ka-band stays ON until 260/1530 for Gravity Science Enhancement (GSE) that follows the occultation

- No uplink during occultations
  - Switch to 3-way/2-way after occultation are over
    - DSS-43 transmitter ON 260/020700
    - Uplink transfer from DSS-43 to DSS-55 260/041000
    - DSS-55 3-way at 260/045304, 2-way at 260/065603
    - DSS-55 transmitter OFF at 260/124355

Monopulse On-Point Phase Cals

- Monopulse on-point (with s/c signal) phase cals were performed at DSS-25, DSS-55 and DSS-34 during ORTs
  - DSS-25 performed cals on DOY 243, 251 and 255 (today)
    - Reported that the cal on DOY 243 resulted in a phase offset of -50 degrees
    - Don't have results for DOY 251 and 255
  - DSS-55 performed cals on DOY 245 and 246
    - Reported that the cals resulted in -90 deg and -85 deg of phase offset
  - DSS-34 performed cals on DOY 252 and 255 (today)
    - Windy on DOY 252. Cal unsuccessful
    - Will await results from today's cal

- Recommendation for monopulse?

4th Order Blind Pointing Data

Pointing data (monopulse) from following passes provided to David Rochblatt:

DSS-25
DOY BOT EOT: 231 1430 2330, 232 1430 2330, 243 1400 2300 (windy?), 251 1200 2230
252 1240 2230 (no data until 1610)

DSS-55
DOY BOT EOT: 223 0730 1630, 224 1405 1525, 245 1400 2300, 246 0615 1515

DSS-34
DOY BOT EOT: 230 2130 2330, 252 1955 2230 (windy), 255 1950 2225 (ongoing pass)

Most recent are from ORTs

Some are from Cassini RS Solar Conjunction (DOY 203-233)

Very little data from DSS-34

DSS-65 Stability Tests
From John Klose

- Since DSS-63 is down, DSS-65 was scheduled instead to provide S-band support
  - Lower SNR
- DSS-65 Stability and Phase Noise Test
  - X-band completed on DOY 250
  - S-band is on DOY 255 (today)
- Test configuration includes, Exciter, Translator, UWV, LNA, and RSR

Allan Deviation	Required	Measured
1 Second	4.40X10-13	3.00X10-14
10 Second	6.10X10-14	5.44X10-15
1000 Second	5.20X10-15	1.91X10-15

Phase Noise	Required	Measured
1 Hz	-53.6 dBc	-62.6475 dBc
10 Hz	-64.5 dBc	-70.913 dBc
100 Hz	-73.9 dBc	-72.4507 dBc *

Summary:

- DSS-65 meets X-Band Radio Science Allen Deviation, but fails the 100Hz Phase Noise requirement

During the test noticed 60Hz spurs in the FFT.

DSN Coverage

Enceladus Plume Occultation
06 258 0600 0745 1030 1045 DSS-55 CAS TP RSR28-SARIOCC 3266 N750
06 258 0615 0745 1030 1045 DSS-65 CAS TP RSR28-SARIOCC 3266 0625

Saturn/Rings Occultation
06 258 1415 1600 2350 0005 DSS-25 CAS TP RSR28-SARIOCC 3266 N748
06 258 1500 1600 2350 0005 DSS-14 CAS TP RSR28-SARIOCC 3266 N655
06 258 1745 1930 0435 0450 DSS-34 CAS TP RSR28-SARIOCC 3267 N750
06 258 1825 1925 0435 0450 DSS-43 CAS TP RSR28-SARIOCC 3267 N655
06 259 0200 0345 1610 1625 DSS-55 CAS TP RSR28-SARIOCC 3267 N750
06 259 0215 0345 1610 1625 DSS-65 CAS TP RSR28-SARIOCC 3267 0624
06 259 0940 1125 2350 0005 DSS-25 CAS TP RSR28-SARIOCC 3267 N748
06 259 1025 1125 2350 0005 DSS-14 CAS TP RSR28-SARIOCC 3267 N655
06 259 1745 1930 0430 0445 DSS-34 CAS TP RSR28-SARIOCC 3268 N750
06 259 1820 1920 0430 0445 DSS-43 CAS TP RSR28-SARIOCC 3268 N655
06 260 0200 0345 1530 1545 DSS-55 CAS TP RSR28-SARIOCC 3268 N750
06 260 0215 0345 0600 0615 DSS-65 CAS TP RSR28-SARIOCC 3268 0625