

About the Occultation

- S76 Rev 174 Saturn rings occultation

- Ingress only
- Telemetry OFF, Ranging OFF, 2-way/3-way mode
- Covered by Canberra

- From Essam Marouf:

The geometry of the Rev 174-I Cassini radio occultations complements the geometry of its sister occultations completed during the Primay and Equinox Missions. It will be the first in a small group of occultations to sample a new range of ring opening angle $B = 17\text{-}19$ degrees ($B = 17.2$ degs for Rev174). The occultation track is nearly radial, probing most of the ring system from outer ring A to about mid Ring C on the ingress side (inner Ring C will likely suffer from interference from Saturn's atmosphere). Measurements at three radio wavelengths (0.94, 3.6, and 13 cm; Ka-, X-, and S-bands) will be collected.

The occultations is expected to yield high resolution radial profiles of ring structure, shedding more light on variability of dynamical ring features (waves, wakes, edges, gaps, narrow ringlets,...) with B , ring longitude, and observation wavelength. In addition, measurements of the strength and shape of the collective forward scattering function of aggregates of ring particles are expected to shed more light on physical properties of multitude of ring features (particles sizes, aggregate of sizes or wakes, wake orientation, packing fraction, ring thickness, ...). A typical occultation distance of $\sim 14R_s$ is comparatively large compared to prior occultations, hence a larger antenna footprint may limit achievable spatial resolution of the scattered signal observations.

DSN Antennas

- DSN Coverage

	Pre	BOT	EOT	Post							
12 314	2250	2350	0635	0650	DSS-43	CAS	TP	RS174-RIOCC	5520	2656	1A1
12 315	0100	0230	0635	0650	DSS-34	CAS	TP	RS174-RIOCC	5520	N750	1A1

- Receivers scheduled

- 2 closed-loop receivers per antenna
- Open-loop receivers (RSRs, WVSRs, VSRs)
- Open-loop data are prime. Closed-loop data are backup
 - Will need ramp info in closed-loop data for processing

- Antennas Band and Polarization Capabilities

DSS-43	DSS-34*
X-RCP X-LCP	X-RCP X-LCP
S-RCP S-LCP	K-RCP

*KLCP capability exists, but cable not connected

- LCP data are enhancement. Prime are RCP
- Only RCP will be recorded
 - 2-way/3-way and 1-way modes

S76 Rev 174 Open-Loop Assignment

DSS Prdx Mode	Operator	Station	Open-loop Receiver	Channels	Subchannels	Bandwidths KHz
43 (2-way)	Gregory/ Danny	rsops1	RSR1	RSR1A -> XRCP RSR1B -> SRCP	1, 2, 3, 4 1, 2, 3, 4	1, 16, 50, 100 1, 16, 50, 100
43 (1-way)	Danny	rsops4	WVSR1	WVSR1A -> XRCP WVSR1B -> SRCP	1, 2, 3, 4 1, 2, 3, 4	1, 16, 50, 100 1, 16, 50, 100
34 (3-way)	Elias	rsops2	RSR2	RSR2A -> XRCP RSR2B -> KRCP	1, 2, 3, 4 1, 2, 3, 4	1, 16, 50, 100 1, 16, 50, 100
34 (1-way)	Danny	rsops4	WVSR2	WVSR2A -> XRCP WVSR2B -> KRCP	1, 2, 3, 4 1, 2, 3, 4	1, 16, 50, 100 1, 2, 16, 50

- Aseel - VOCA
- Elias - Ops Room Displays
- RSSG will be in Ops Room at 2:00 pm on Friday, November 9 (314/2200)
- At DSS-34, wait until GRAIL script is done to bring up RSR2

ORTs

ORT on DOY 313 (November 8) over DSS-34, X- and Ka-band

12 313 1740 1910 2255 2310 DSS-34 CAS RS174-OCCORT MC 5519 N750 1A1

- DSS-25 is prime
- Only ORT prior to experiment
 - Other ORTs had to be cancelled due to SCO's propellant gauging activity

Misc

Uplink: 18 kW – Ramped

Default uplink predicts (no need to modify by RSS since no atmospheric occ)

DKF – Does not have accurate AOS/LOS and uplink times. Use times in RSS timeline

Plan for Cassini Specific 4th Order Pointing Models?

- Danny to send data to David
- Does DSS-34 have the 1-sec delay anomaly? (Enter “AP TMO 000000”?)

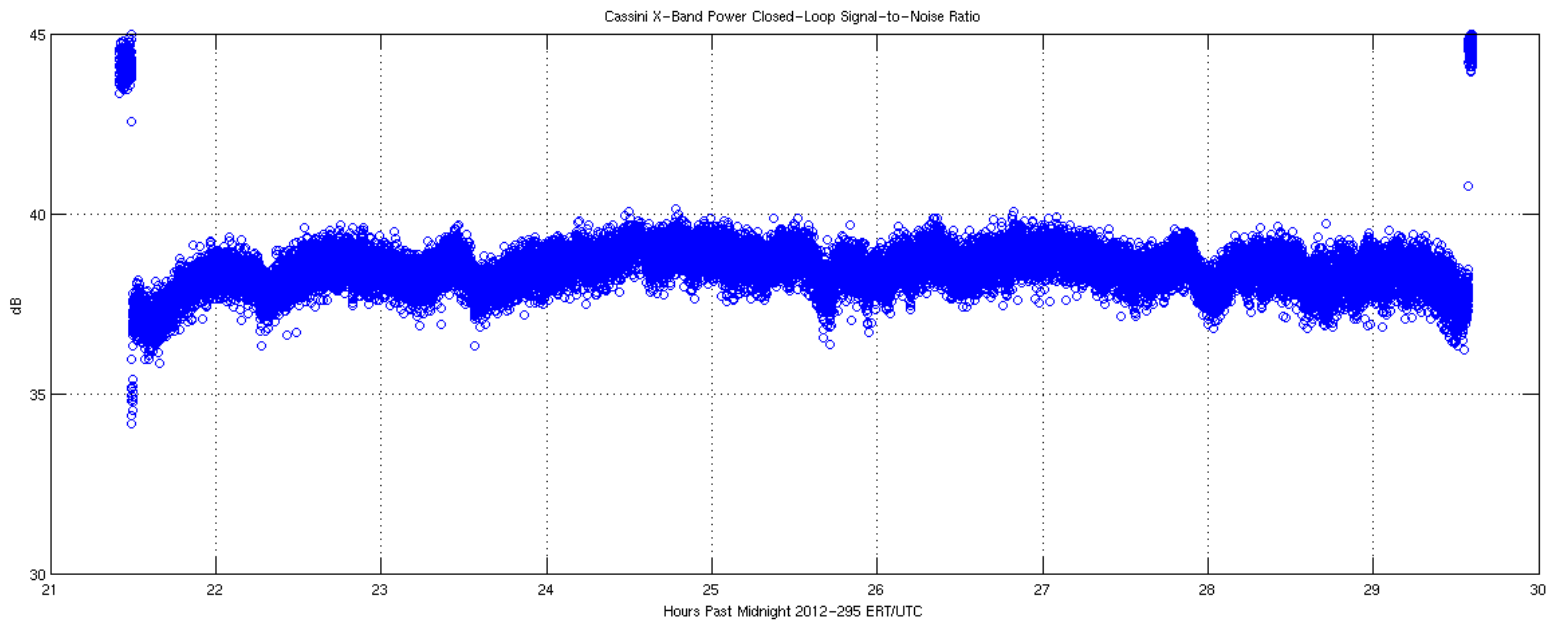
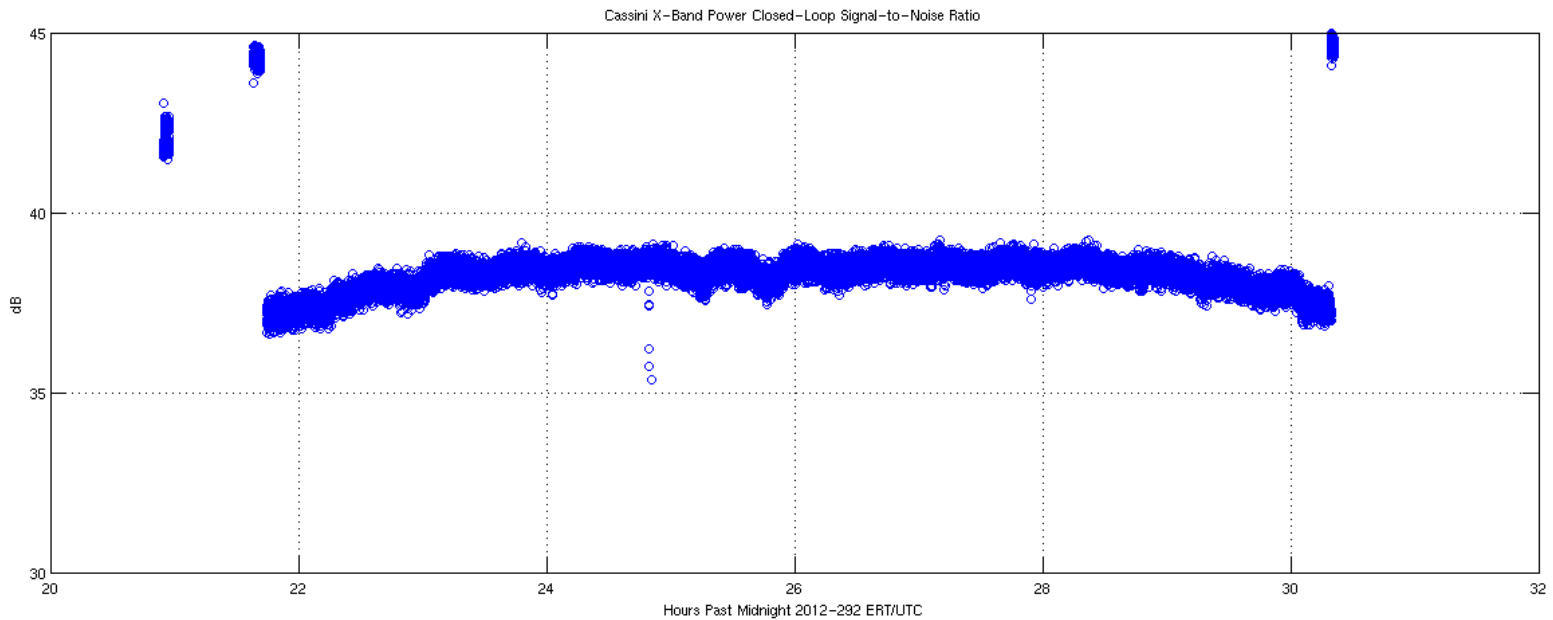
DSS-43 X-band fluctuations

- First observed during DOY 180 occ
- Also during DOY 204 occ
- Problem was then reported to the station and was investigated
- Observed during occultation on DOY 225 even though XRCP was set to Downlink Channel 2 (as suggested by station)
- Plotted recent closed-loop data (see next two pages). Possible fluctuations.

SNT

- Enable X only at DSS-34 throughout
- Conduct SNT measurements

DSS-43 DOY 292 & 295 Closed-Loop Data



DSS-43 DOY 297 & 301 Closed-Loop Data

