

# About the Occultation

- S30 Rev 44 Saturn Rings and Atmospheric occultation
  - Ingress: Atmospheric occ only
  - Egress: Rings and Atmospheric occ
  - Telemetry OFF, 1-way mode

- Science Highlights – From Essam Marouf

The [ingress occultation covers a Saturn northern latitude of about 71 degs, the highest latitude probed in both the Cassini nominal and extend missions, and hence is very special](#). Unfortunately, it covers only the ionosphere and stratosphere parts of the atmosphere, but not the deeper troposphere (due to competition for time by other observations). The [egress occultation is near-equatorial](#), adding to the wealth of information collected from earlier occultations. Collectively, the occultations provide important information about the atmosphere thermal structure, the microwave absorbing species, the hydrogen-to-helium ratio, and Saturn's puzzling winds.

The [rev 44 egress ring occultation is one of two occultations that were especially designed to view the rings at an intermediate opening angle  \$B\$  of ~15 degs](#) (the other on rev 46). Other RSS ring occultations during the nominal mission primarily sample the rings when they are either relatively open ( $B > \sim 20$  degs) or relatively closed ( $B < \sim 10$  degs). The spread in  $B$  allows investigation of ring extinction and forward scattering behavior over a broad observation geometry, important for characterization of both radial and vertical ring structure. [The geometry of both revs 44 and 46 occultations were optimized to provide excellent coverage of the full ring system.](#)

# DSN Antennas

- DSN Coverage

Station	Pre-cal	BOT	EOT	Post-Cal
DSS-55	130/1245	130/1430	130/2000	130/2015
DSS-63	130/1330	130/1430	130/2000	130/2015

- Receivers scheduled

- 2 closed-loop receivers per antenna
- All RSRs, VSRs and WVSRs at Madrid are scheduled
  - Total: 8 open-loop receivers
- Open-loop data are prime. Closed-loop data are backup

- Antennas Band and Polarization Capabilities

DSS-63

X-RCP  
X-LCP

S-RCP  
S-LCP

DSS-55

X-RCP  
X-LCP

K-RCP  
K-LCP

Either KLCP (switch 43 in B position)  
or monopulse (switch 43 in A position)

- LCP data are enhancement. Prime are RCP



# ORTs Completed

ORT#1, DOY 117 (April 27) over DSS-55, X- and Ka-band

07 117 1240 1410 2350 0005 DSS-55 CAS TP RSR43-OCCORT1 3491 N750

07 117 1310 1410 2350 0005 DSS-63 CAS T/P T29PB 3491 N003\*

- Collected DSS-55 pointing data (monopulse) to update the 4th-order blind pointing model
- Partly cloudy

ORT#2, DOY 121 (May 1) over DSS-55, X- and Ka-band

07 121 1230 1415 2315 2330 DSS-55 CAS TP RSR43-OCCORT2 3495 N750

07 121 1315 1415 2315 2330 DSS-63 CAS TP SEQ 3495 N003\*

- Collected DSS-55 pointing data (monopulse) to update the 4th-order blind pointing model
- Unexpected dip (~1427) and noisy data (~15:23 to 15:59 ERT). See plot next page. Observed at both stations. Cause still unknown. Possibly due to rain clouds? In process of checking NMC logs
- RWA Friction Test from ~17:45 to ~21:55 ERT. Noisy Data
- Partly cloudy

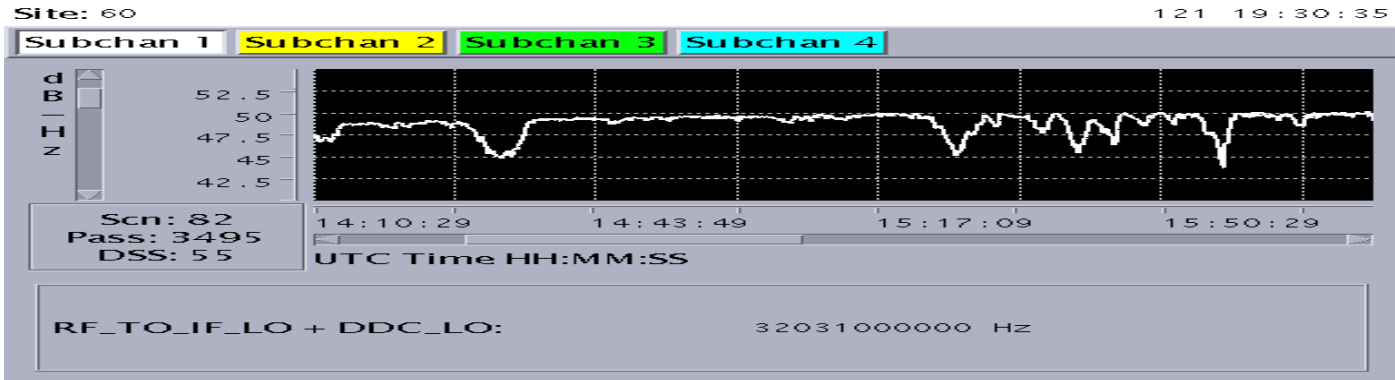
ORT#3, DOY 126 (May 6) over DSS-63, X- and S-band

07 126 2030 2130 0630 0645 DSS-15 CAS TKG PASS 3500 N006\*

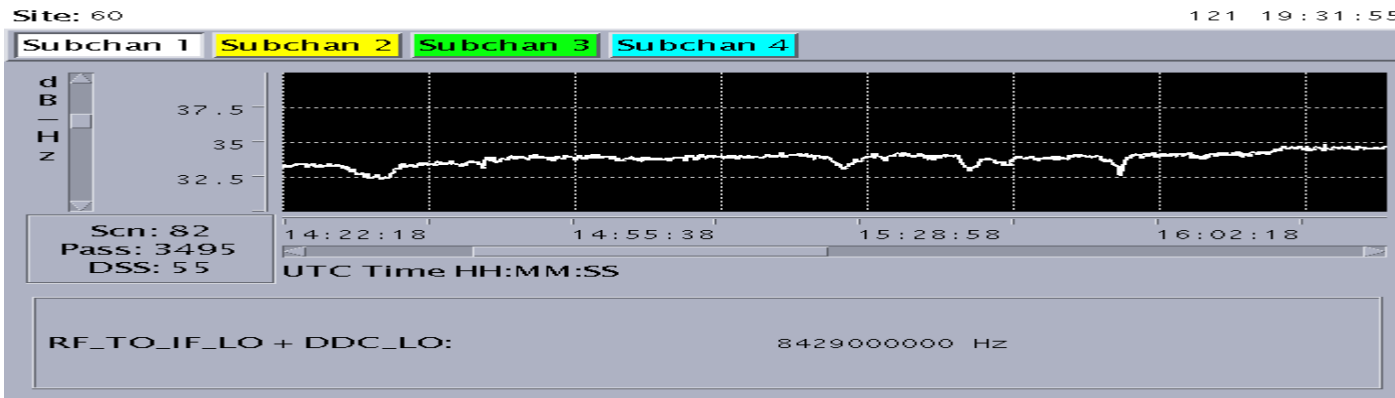
07 126 2030 2130 0100 0115 DSS-63 CAS TP RSR44-OCCORT3 3500 N654

- Verify S-band at DSS-63
- Verify X- and S-band RCP and LCP signals
- Party cloudy

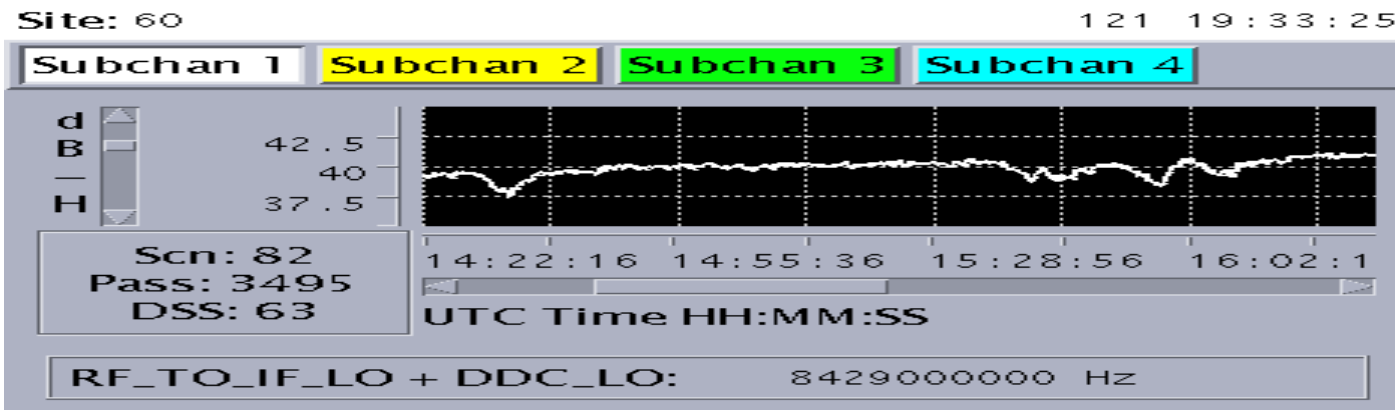
# ORT#2, DOY 121



DSS-55  
Ka-band



DSS-55  
X-band



DSS-63  
X-band

## To Discuss ...

- 4<sup>th</sup>-order pointing models
- Closed-loop during Ring B, Ringlets