

# About the Occultation

- S62 Rev 137 Saturn rings occultation
  - Ingress and egress
  - Telemetry OFF, 1-way mode
  - Covered by Madrid (ingress) and Goldstone (egress). No overlapping coverage
- Science Highlights - From Essam Marouf:

The S62/Rev137 Radio Science rings occultation is the sole ring occultation in the sequence of Cassini orbits that bridges the Equinox and Solstice Missions. It will also be the last ring occultation for almost two years to come (the next one is not until June 2012, on Rev 167). The geometry of the Rev 137 occultation track was NOT optimized in any special way, hence the track does not capture the full ring system. On the ingress side, almost all main ring features are captured except for the innermost region of Ring C, expected to suffer from interference from Saturn's ionosphere and then atmosphere. On the egress side, Ring C and inner Ring B will be blocked by Saturn. Good egress data will be limited to the interesting dynamical structure of the Cassini Division as well as other subregions of Ring A. As was the case for the last three ring occultations, the rings are still nearly closed as seen from the Earth (ring opening angle = 4.9 degrees). The long path of the radio signals through the rings will enhance measurement sensitivity to tenuous Ring C, the Cassini Division, and the neighborhood of gap regions in Ring A. The signals are expected to be severely attenuated over most of the optically thick Ring B.

# DSN Antennas

- DSN Coverage

	Pre	BOT	EOT	Post							
10 245	1000	1130	1630	1645	DSS-55	CAS	TP	RS137-SARIOCC	4718	N750	1A1
10 245	1030	1130	1630	1645	DSS-63	CAS	TP	RS137-SARIOCC	4718	1639	1A1
10 245	1640	1810	2300	2315	DSS-25	CAS	TP	RS137-SARIOCC	4718	N748	1A1
10 245	1710	1810	2210	2225	DSS-15	CAS	TP	RS137-SARIOCC	4718	0624	1A1

Note: DSS-14 is down for maintenance. No 70-m coverage at Goldstone. Using DSS-15 for X & S

- Receivers scheduled

- 2 closed-loop receivers per antenna
- Open-loop receivers (RSRs, WVSRs, VSRs)
- Open-loop data are prime. Closed-loop data are backup

- Antennas Band and Polarization Capabilities

DSS-63	DSS-55*	DSS-15**	DSS-25
X-RCP X-LCP	X-RCP X-LCP	X-RCP X-LCP	X-RCP X-LCP
S-RCP S-LCP	K-RCP K-LCP	S-RCP S-LCP	K-RCP

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

\*\*Either RCP or LCP

- LCP data are enhancement. Prime are RCP
- Record RCP only at DSS-55 and DSS-25

# RSR/VSR/WVSR Assignment

VOCA: Aseel

Ops Room Displays: Danny & Elias

DSS	Operator	Station	Open-Loop Receiver	RSR Assignment
55	Danny	rsops1	RSR1	VSR1A -> XRCP
				VSR1B -> KRCP
63	John	rsops2	RSR2	RSR2A -> XRCP
				RSR2B -> SRCP
			WVSR1	WVSR1A -> XLCP
				WVSR1B -> SLCP
25	Elias	rsops1	RSR1	VSR1A -> XRCP
				VSR1B -> KRCP
15	Don	rsops2	RSR2	RSR2A -> XRCP
				RSR2B -> SRCP
			RSR3	RSR3A -> XLCP
				RSR3B -> SLCP

RSSG will be in the RS Ops Room at 2:45 am on Thursday, September 2nd (245/0945)

Shifts:

Danny and John: 2:45 am - 10:00 am

Don and Elias: 9:30 am - 3:30 pm

# ORTs

ORT on DOY 231 (Thu, August 19) over DSS-25 and DSS-55, X- and Ka-band

10 231 1600 1730 0230 0245 DSS-25 CAS CDS FSW UPDT/RSS 4704 N748 1A1

10 231 1600 1730 1950 2005 DSS-55 CAS TP RS136-OCCORT1 4704 N750 1A1

- DSS-25 prime pass
- Spacecraft on thrusters for FSW updates – Signal fluctuations
- Rainy weather at Madrid, then overcast
- Gave OK to NOPEs and Madrid to conduct as much testing as needed to troubleshoot the lower than expected Ka-band signal levels problem
- DSS-55 Conscan on Ka-band, then enabled monopulse
- DSS-55 sub-reflector was “adjusted” (moved to get to optimal position)
- DSS-25 conscaned on X-band soon after BOT, on-point cals at 1- and 2-way
  - 5 dB jump in power when monopulse was enabled
- DSS-25 TTC v10.1.1 PIT with Ka-band - nominal
  - X-band receiver on pervious delivered s/w

ORT on DOY 232 (Fri, August 20) over DSS-25 and DSS-55, X- and Ka-band

10 232 1600 1730 0230 0245 DSS-25 CAS CDS FSW UPDT/RSS 4705 N748 1A1

10 232 1600 1730 1945 2000 DSS-55 CAS TP RS136-OCCORT2 4705 N750 1A1

- DSS-25 prime pass
- Weather good at both complexes
- pointing data acquired
- Spacecraft on thrusters until 231/2315
  - DSS-55 support over by that time. DSS-25 continued. Signal stable and good monopulse data acquired
- DSS-25 4 dB jump in power when monopulse enabled
- DSS-25 TTC v10.1.1 PIT with Ka-band - nominal

Note: Above DSS-55 ORTs don't cover part of the sky covered during the experiment on DOY 245. Originally had ORT on DOY 243 BOT 0915 EOT 1815, but had to delete due to conflict with other missions. Checked on Monday if any time is available for another ORT, but all time is taken.

No DSS-63 ORT (less ORTs during XXM)

Inbound GSE planned on DOY 244 (9/1):

10 244 1515 1645 0145 0200 DSS-26 CAS TP RS137-KDWNORT 4717 N750 1A1

# Misc

## Plan for Cassini Specific 4th Order Pointing Models

- Jumps in power observed during ORTs at both stations when monopulse was enabled
  - Indication that 4<sup>th</sup> order pointing models need updating
- Don sent to David Rochblatt pointing data from the ORTs

## DSS-55 LQG

- Latest model installed and can be used? No AZ angles restrictions?

## DSS-55 lower than expected signal levels observed during previous supports (4-5 dBs lower)

- Hard to tell during ORTs if problem was fixed
  - Rainy
  - Spacecraft on thrusters
  - Station setting
- ON DOY 231, Don reported that at comparable elevations (28 vs. 25, respectively) DSS-25 Pc/No = 45, DSS-55 Pc/No = 44.6

## Which TTC software will be used?

- Assume the previously delivered version, but want to check

## DSS-63 Status

- Problems with S-band during recent MEX support
  - Maser required tuning
  - S-band signal levels unusually high

## SNT

- Enable X only at DSS-55 and DSS-25 throughout
- Conduct SNT measurements

## DSS-63 Microwave Configuration

- Configure SRCP low noise to the SP MASER to the 01 output
- Configure SLCP through the diplexer to the SB HEMT to the 02 output