

About the Occultation

- S98 Rev 268 Saturn rings and atmospheric ingress occultations
 - Telemetry OFF, Ranging OFF, 2-way/3-way mode
 - Covered by Canberra (uplink only), Madrid, Goldstone, New Norcia and Malargue
- From Essam Marouf:

The Rev 268 RSS observations include an ingress ring occultation followed by an ingress atmospheric occultation. The ingress ring occultation is the second in a sequence of three that sample different ring longitudes (Revs 266, 268, and 270) and about the same ring opening angle of 26.4 degrees. It probes the A- and B-Rings in full, and the C-Ring in part (the inner region of the C-Ring is mixed with Saturn's troposphere). The large opening angle allows profiling of ring features of large optical depth within the A- and B-Rings. The multiple longitudes allow characterization of the rings azimuthal asymmetry. Collectively, the group of RSS ring occultations, will provide information about dynamically driven ring structure, including sharp ring edges and narrow ringlets, gravitational wakes in the A- and B-Rings, and the host of density and bending waves populating the ring system. The ingress atmospheric occultation probes low southern latitude of -19° . The upper region of the troposphere and the stratosphere are observed mixed with the tenuous inner Ring C. Frequency measurements will yield high spatial resolution profiles of the thermal structure of the atmosphere. Comparison with other near-equatorial occultations early in the Cassini mission help characterize likely temporal/seasonal variations of the atmosphere. Signal power measurements yield profiles of the microwave gaseous absorptivity and constrain the abundance of responsible gaseous species.

DSN and ESA Antennas

- DSN Coverage

	Pre	BOT	EOT	Post								
17	095	2145	2230	0230	0245	DSS-74	CAS	RSS 268	RI/SAOCC	7133	0142	1A1
17	095	2215	2315	0125	0140	DSS-43	CAS	RSS268	RISAOC	L3 7132	1647	1A1
17	095	2340	0110	0855	0910	DSS-55	CAS	RSS268	RISAOC	L3 7132	N750	1A1
17	096	0010	0110	0905	0920	DSS-63	CAS	RSS268	RISAOC	L3 7132	1647	1A1
17	096	0415	0500	0920	0935	DSS-84	CAS	RSS 268	RI/SAOCC	7132	0142	1A1
17	096	0650	0820	0940	0955	DSS-26	CAS	RSS268	RISAOC	L3 7132	N750	1A1
17	096	0720	0820	1645	1700	DSS-14	CAS	TP RSS	RISAOC	L3 7132	1647	1A1

- DSS-14 track continues after the RSS observation for telemetry support
- DSS-43, DSS-74 and DSS-63 will be providing the uplink for the occultations
- DSS-84 and DSS-14 will be providing the uplink for the downlink period that follows

Receivers scheduled

- 2 closed-loop receivers per antenna
- Open-loop receivers (RSRs, WVSRs, VSRs, PRSRs)
- Open-loop data are prime. Closed-loop data are backup
 - Will need ramp info in closed-loop data for processing
- Only RCP will be recorded
 - 2-way/3-way and 1-way modes

S98 Rev 268 Open-Loop Assignment

BEING WORKED

S98 Rev 268 Open-Loop Assignment Cont'd

RSSG will be in Ops Room at 2:15 pm on Wednesday, April 5 (095/2130)

Aseel – VOCA

Elias – Ops Room Displays

Danny – Check WVSR/VSR availability & RSR/WVSR/VSR disk space

Receiver Status and Backup Receivers

Canberra:

- PRSR is red
- VSR is backup

Madrid

- RSR issues
- VSR is red
- PRSR is backup

Goldstone

- No PRSR
- VSR status?

New Norcia

- PRSR is green and working

Malargue

- PRSR is green and working

Predicts

- Last NAV OD delivery prior to occultation?
 - There's a special OD delivery today for the Live Update
- Three stations will be providing the uplink for the occultation, but only DSS-63 predicts will be modified by RSS to compensate for the Doppler shift due to Saturn's atmosphere
 - Cannot modify ESA predicts
 - DSS-55 backup for uplink at Madrid
- Elias and Danny will generate and verify the open-loop downlink predicts
- RSS usually uses three sets of downlink predicts in the open-loop receivers for
- Occultations:
 - #1: Coherent (2-way/3-way) with atmospheric compensation: generated using Nicole's PREDICTs software and SPS nominal (unmodified) ETX
 - #2: 1-way coherent: 1-way predicts offset in real-time to coherent downlink frequency
 - #3: 1-way (no offset): For 1-way baseline and the times when the DST loses lock

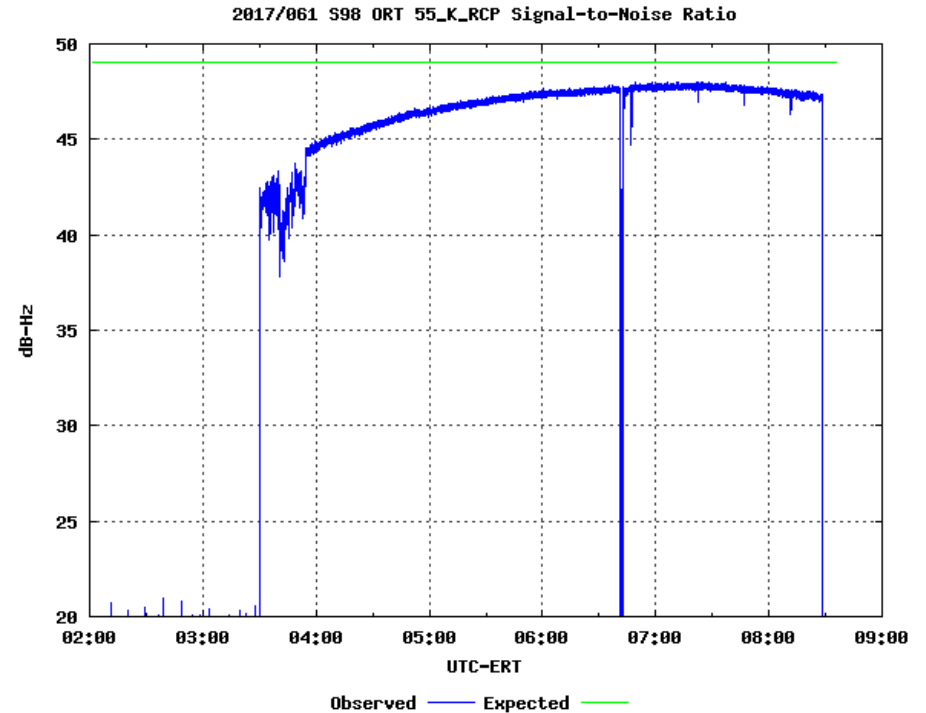
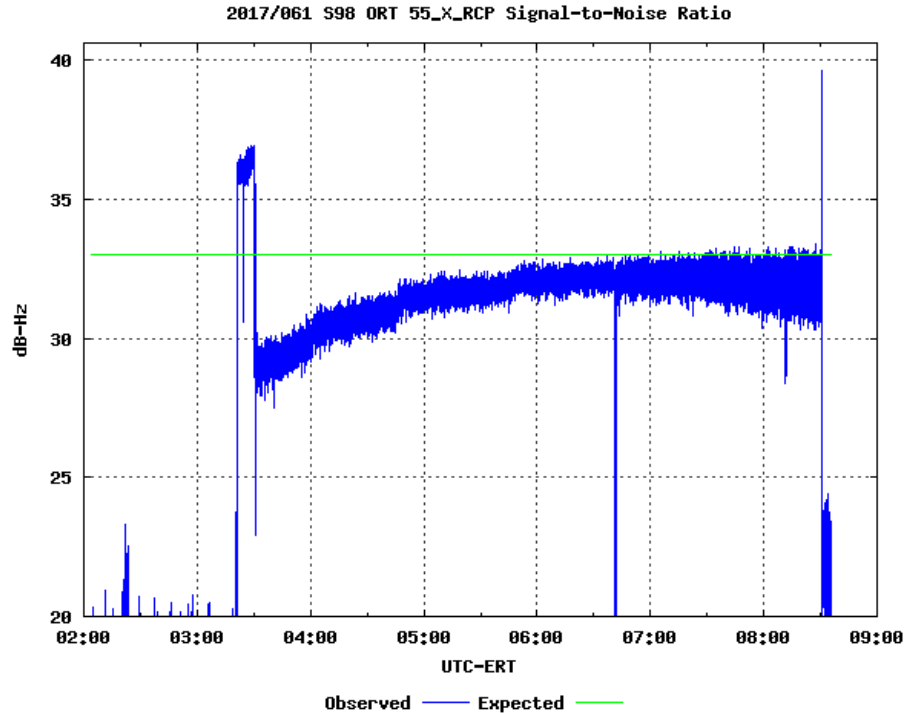
ORTs

ORT on DOY 061 (March 2) over DSS-55, X- and Ka-band

Completed

17	061	0200	0330	0830	0845	DSS-55	CAS	RSS	OCCORT	MC	7097	N750	1A1
17	061	0230	0330	0830	0845	DSS-63	CAS	TKG	PASS		7097	N003	1A1

- Shadow DSS-63
- No opportunities closer to occultation
- Station reported problems with Ka-band downlink translator (DR# M109860)
 - Did not perform monopulse calibrations during pre-cal. Waited for s/c signal
- On-point phase calibrations conducted
- Excellent Ka-band track!
- Pointing data acquired and sent to David Rochblatt for assessment



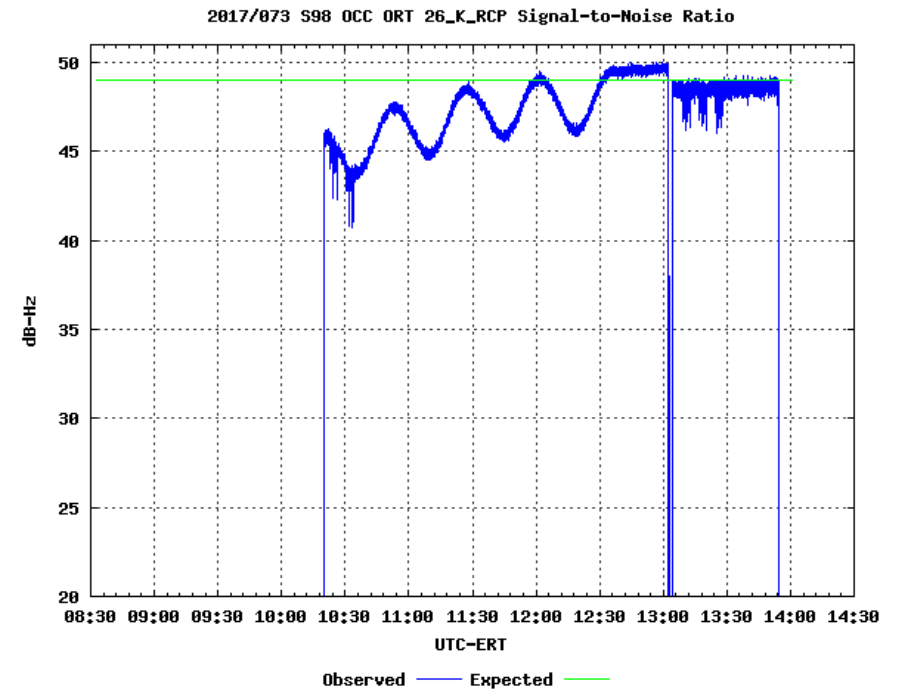
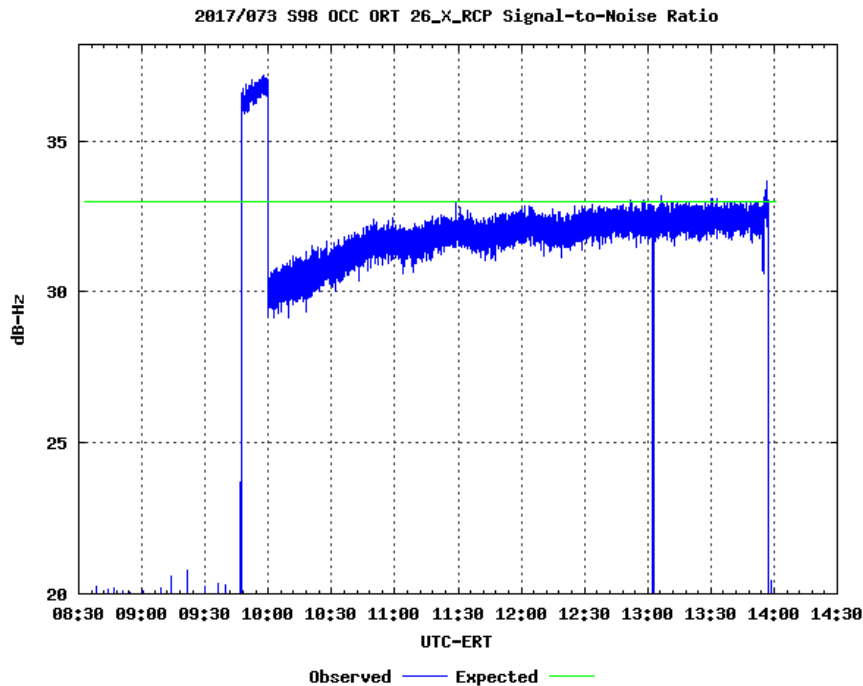
ORTs cont'd

ORT on DOY 073 (Mar 14) over DSS-26, X- and Ka-band

Completed

17 073 0830 1000 1355 1410 DSS-26 CAS TP RSS OCCORT MC 7109 N750 1A1

- Also prime TP
- Monopulse on-point phase calibrations performed
- Pointing data acquired



ORTs cont'd

Upcoming

ORT on DOY 087 (Mar 28) over DSS-26, X- and Ka-band

17 087 0730 0900 1320 1335 DSS-26 CAS TP RSS OCCORT MC 7123 N750 1A1

- Also prime TP
- Verify Monopulse
- Acquire pointing data

Note: The DSS-26 ORTs are also in preparation for the Rev 270 occultations on April 20 (DOY 110)

Misc

Uplink Strategy

- DSS-43, 18 kW, ramped, sweep
 - DSS-43 used for uplink only
- DSS-74, 18 kW, ramped, no sweep
 - DSS-74 used to primarily close the uplink gap between Canberra and Madrid
- DSS-63, 18 kW, ramped, no sweep
- DSS-84, 18 kW, ramped, sweep (per DKF)
- DSS-84, 18 kW, ramped, sweep (per DKF)
- Four uplink transfers during this activity!
 - Two are observed during the RSS observation
- Uplink transfers times fall in specific ring locations
 - Keep on/off times accurate to the second

Asked ESA to BOT DSS-84 15mins earlier to collect viable atmospheric occultation data set

- Cannot change the time in the schedule, but will use post-cal of the preceding track to start Cassini pre-cal
- Will be on point by 0445

DKF – Does not have the correct uplink or AOS/LOS times. Use times in RSS timeline

Follow DKF after RSS observation is complete

Misc Cont'd

Plan for updating DSS-55 Cassini Specific 4th Order Pointing Model?

- Pointing data sent to David
- Only one set

NOPEs - Equipment Status?