

About the Occultation

- S96 Rev 248 Saturn rings occultation
 - Telemetry OFF, Ranging OFF, 2-way/3-way mode
 - Covered by Canberra (uplink only), Madrid and ESA
 - Also had Goldstone coverage but removed since it only covered baseline at end of observation
 - DSS-14 deleted. DSS-25 converted to engineering support

- From Essam Marouf:

The Rev 248 RSS ring occultation is the second in a sequence of five chord occultations that sample different ring longitudes (Revs 247, 248, 250, 251, and 253). They capture in full or in part the A- and B-Rings, as well as the Cassini Division. The Rev 248 chord, in particular, captures the full A-Ring and Cassini Division and the outermost region of the B-Ring (region B4). The sequence of occultations occurs near the end of the the IN-2 orbits and the start of the F-Ring Orbits when the ring opening angle is 26 to 27 degrees, close to its maximum value as seen from Earth. The large opening angle allows profiling of ring features of large optical depth within the A- and B-Rings. The chord geometry allows characterization of the rings azimuthal asymmetry, both virtual (due to gravitational wakes) and actual (due to dynamical interactions with the satellites). Collectively, the group of 5 RSS chord ring occultations, including the one on Rev 248, will provide valuable information about gravitational wakes in the A- and B-Rings and the host of density waves populating the A-Ring. Measurements at three radio wavelengths (0.94, 3.6, and 13 cm; Ka-, X-, and S-bands) will be collected throughout the observation period and will help provide information about physical properties of profiled ring structure.

DSN Antennas

- DSN Coverage

	Pre	BOT	EOT	Post									
16 317	0610	0710	1005	1020	DSS-43	CAS	RSS 248	RIOCC L3	6987	N003	1A1		
16 317	0615	0715	1020	1035	DSS-74	CAS	RSS 248	RI OCC	6988	0142	1A1		
16 317	0830	1000	1740	1755	DSS-55	CAS	RSS 248	RIOCC L3	6987	N750	1A1		
16 317	0855	0955	1740	1755	DSS-63	CAS	RSS 248	RIOCC L3	6987	2659	1A1		
16 317	1310	1410	1810	1825	DSS-84	CAS	RSS 248	RI OCC	6987	0142	1A1		
16 317	1525	1655	1830	1845	DSS-25	CAS	DTT PIT		6987	N748	2C3		

- ESA tracks pre-cal is actually 45mins. Schedule shows 1hr, but will not change at this time
- Current timeline has DSS-74 starting the uplink and then transferring to DSS-63
 - Keeping DSS-43 as backup

- DSN 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
- Only RCP will be recorded
 - 2-way/3-way and 1-way modes

- If things go well with PRSR installation at New Norcia, it should be ready for this support

S96 Rev 248 Open-Loop Assignment

DSS Prdx Mode	Operator	Station	Open-loop Receiver	Channels	Subchannels	Bandwidths KHz
15 2-way	Elias	rsops2	RSR1	RSR1A -> XRCP RSR1B -> SRCP	1, 2, 3, 4 1, 2, 3, 4	1, 16, 50, 100 1, 16, 50, 100
15 1-way	Danny	rsops3	WVSR1	WVSR1A -> XRCP WVSR1B -> SRCP	1, 2, 3, 4 5, 6, 7, 8 1, 2, 3, 4 5, 6, 7, 8	1, 16, 50, 100 1, 16, 50, 100 (with offset) 1, 16, 50, 100 1, 16, 50, 100 (with offset)
26 3-way	Elias	rsops2	RSR3	RSR3A -> XRCP RSR3B -> KRCP	1, 2, 3, 4 1, 2, 3, 4	1, 16, 50, 100 1, 16, 50, 100
26 1-way	Danny	rsops3	WVSR2	WVSR2A -> XRCP WVSR2B -> KRCP	1, 2, 3, 4 5, 6, 7, 8 1, 2, 3, 4 5, 6, 7, 8	1, 16, 50, 100 1, 16, 50, 100 (with offset) 1, 2, 16, 50 1, 2, 16, 50 (with offset)
45 3-way	Carlyn	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	rsops5	WVSR1	WVSR1A -> XRCP WVSR1B -> SRCP	1, 2, 3, 4 5, 6, 7, 8 1, 2, 3, 4 5, 6, 7, 8	1, 16, 50, 100 1, 16, 50, 100 (with offset) 1, 16, 50, 100 1, 16, 50, 100 (with offset)
35 3-way	Jay	rsops1	RSR2	RSR2A -> XRCP RSR2B -> KRCP	1, 2, 3, 4 1, 2, 3, 4	1, 16, 50, 100 1, 16, 50, 100
35 1-way	Danny	rsops5	WVSR2	WVSR2A -> XRCP WVSR2B -> KRCP	1, 2, 3, 4 5, 6, 7, 8 1, 2, 3, 4 5, 6, 7, 8	1, 16, 50, 100 1, 16, 50, 100 (with offset) 1, 2, 16, 50 1, 2, 16, 50 (with offset)

STILL BEING WORKED

S96 Rev 247 Open-Loop Assignment cont'd

RSSG will be in Ops Room at 10:00 pm on Friday, November 11 (317/0600)

Aseel – Will be supporting from Canberra

Elias – Ops Room Displays

Danny – Check WVSR/VSR availability and disk space

Backup Receivers

- TBD

Predicts

- NAV's last OD prior to occultation will be on?
- Uplink predicts will **not** be modified by RSS
- Cannot generate 3-way predicts with ESA since they don't provide uplink file
 - OK using 2-way predicts instead of 3-way?
- RSS usually uses three sets of downlink predicts in the open-loop receivers for occultations:
 - #1: Coherent (2-way)
 - #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

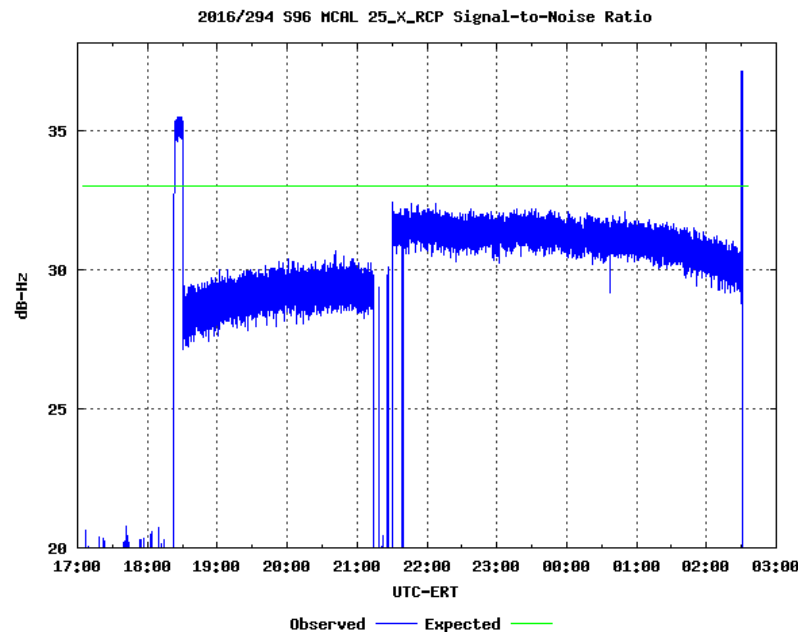
ORT on DOY 294 (October 20) over DSS-25, X- and Ka-band

Completed

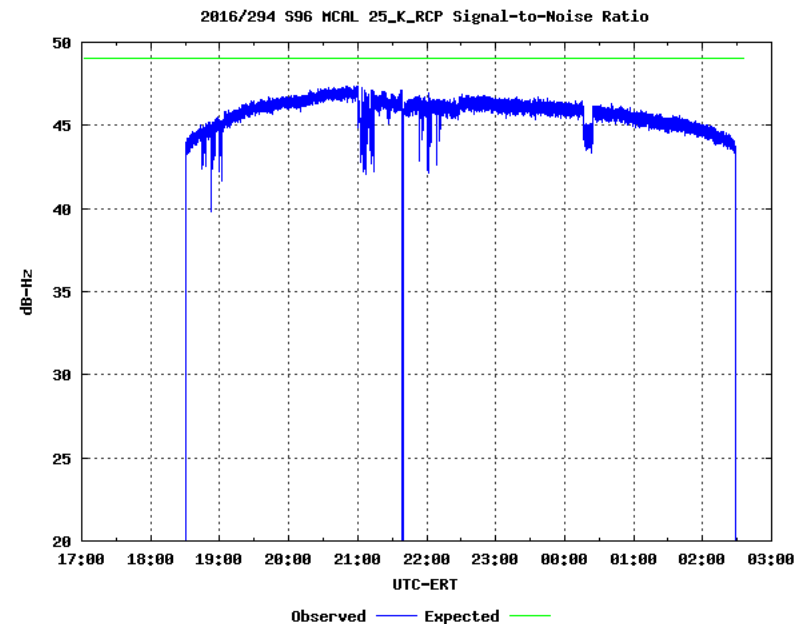
16 294 1700 1830 0230 0245 DSS-25 CAS TP RSS MONCAL MC 6964 N748 1A1

- Also prime TP
- Monopulse enabled
- High SNT on X-band signal. Conscan enabled for about 13 minutes. Station asked to re-configure receiver. Signal not visible in RSR. Station routed to output 2 and signal present in RSR

X-band



Ka-band



ORTs

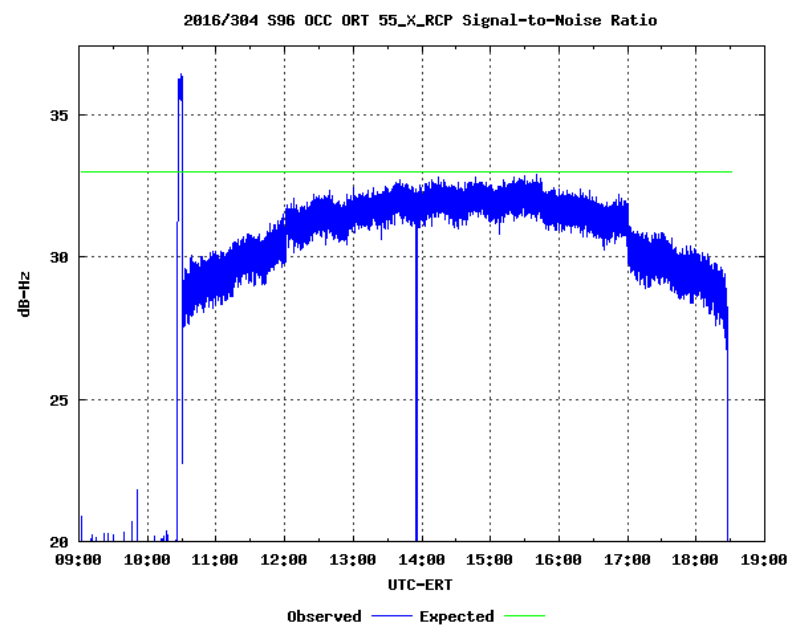
ORT on DOY 304 (October 30) over DSS-55, X- and Ka-band

16 304 0900 1030 1825 1840 DSS-55 CAS RS OCCORT MC
16 304 0930 1030 1830 1845 DSS-63 CAS TKG PASS

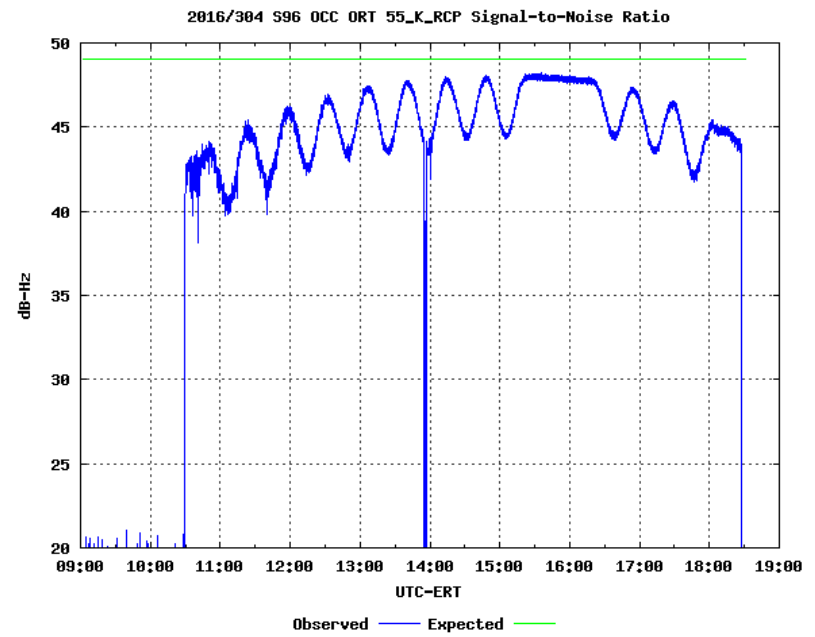
Completed
6974 0681 1A1
6974 N003 1A1

- Shadowed DSS-63 track (prime TP)
- Monopulse on-point phase calcs conducted
- Monopulse enabled and pointing data acquired

X-band



Ka-band

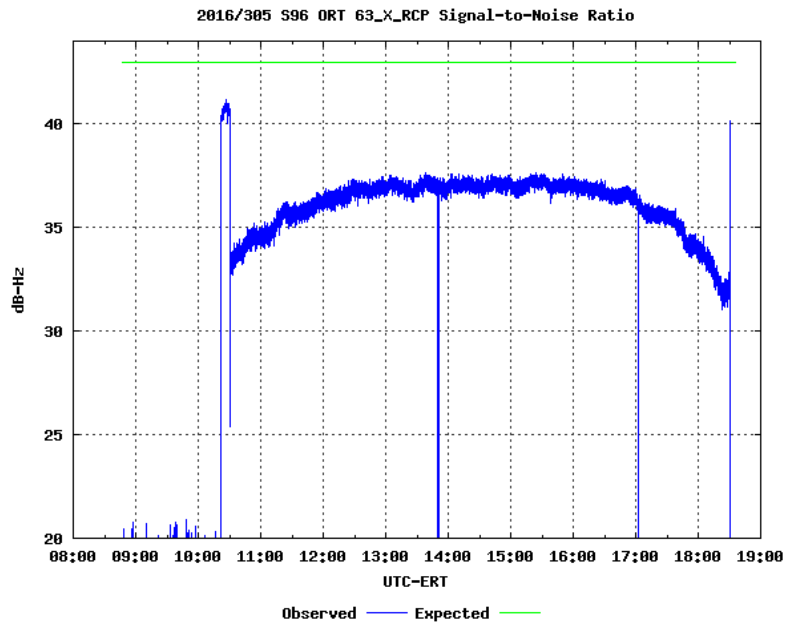


ORTs

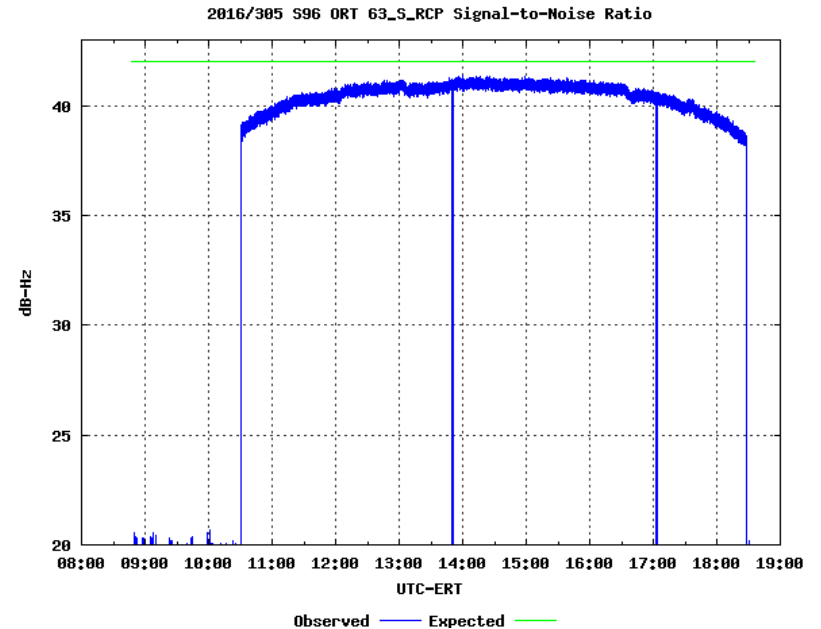
ORT on DOY 305 (October 31) over DSS-63, X- and S-band Completed
16 305 0930 1030 1830 1845 DSS-63 CAS TP RSS OCCORT 6975 1645 1A1

- Also prime TP
- X- and S-band signals verified

X-band



S-band



ORTs cont'd

Upcoming

ORT on DOY 313 (Nov 8) over DSS-25, X- and Ka-band

16 313 1600 1730 0130 0145 DSS-25 CAS TP RS OCCORT MC 6983 N748 1A1

- Also prime TP
- Verify Monopulse
- Acquire pointing data

Misc

Uplink Strategy

- DSS-15, 18 kW, ramped, sweep
- DSS-35, 18 kW, ramped, no sweep?
 - Still discussing with SP
 - This uplink is for the period following RSS observations
 - Telecom sent email just prior to meeting and recommended a sweep
 - Will update timeline

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

Plan for updating DSS-25 and DSS-55 Cassini Specific 4th Order Pointing Model?

- Pointing data sent to David
- More will be sent after last DSS-25 ORT

NOPEs - Equipment Status?