

About the Occultation

- S74 Rev 170 Saturn rings and atmospheric occultation
 - Atmospheric Ingress and egress, rings egress only
 - Telemetry OFF, Ranging OFF, 2-way/3-way mode
 - Covered by Canberra and Madrid

- From Essam Marouf:

An ingress and egress atmospheric occultations, as well as an egress ring occultation, are to be completed on Cassini Rev 169. All three occultations will be implemented using the 2-way mode. The ingress atmospheric occultation probes a latitude of 60 degrees south, the highest value sampled so far, and the egress occultation probes almost exactly equatorial latitude of zero degrees. The egress occultation will be the first egress case attempted in 2-way and 3-way configurations using X-band uplink signal from DSS-43 first, followed by that from DSS-63, to provide a reference signal to replace the one usually provided by the Cassini UltraStable Oscillator (USO). The two atmospheric occultations will provide electron density profiles of the ionosphere, high spatial resolution profile of the thermal structure of the neutral atmosphere, and dispersive microwave absorptivity profiles of the neutral atmosphere. Comparison of results with those from other occultations completed earlier in the Cassini Mission will provide important information regarding temporal and/or seasonal variability of the atmosphere. The egress ring occultation will be the last in a group of 4 occultations designed to sample the new range of ring opening angle of ~12.5 to 13.5 degrees, while covering complementary range of ring longitudes. It's expected to yield high resolution radial profile of ring structure. In addition, measurements of the strength and shape of the collective forward scattering function are expected to shed more light on physical properties of resolved ring features. Measurements at three radio wavelengths (0.94, 3.6, and 13 cm; Ka-, X-, and S-bands) will be collected throughout the full observation period.

DSN Antennas

- DSN Coverage

	Pre	BOT	EOT	Post							
12 225	0425	0555	1205	1220	DSS-34	CAS	TP RS170-GSEOCC	5430	0681	1A1	
12 225	0715	0800	1205	1220	DSS-43	CAS	RS170-GSEOCC N/R	5430	2671	1A1	
12 225	0955	1125	1830	1845	DSS-55	CAS	RS170-SA/RIOCC	5430	N750	1A1	
12 225	1025	1125	1830	1845	DSS-63	CAS	RS170-SA/RIOCC	5430	1639	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*	DSS-63	DSS-55**
X-RCP X-LCP	X-RCP	X-RCP X-LCP	X-RCP X-LCP
S-RCP S-LCP	K-RCP	S-RCP S-LCP	K-RCP K-LCP

**KLCP capability exists, but cable not connected

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

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

S74 Rev 170 Open-Loop Assignment

DSS Prdx Mode	Operator	Station	Open-loop Receiver	Channels	Subchannels	Bandwidths KHz
43 (2-way)	Elias/ Don	rsops2	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 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)
34 (2-way)	Don/ Aseel	rsops1	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 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)
63 (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
63 (1-way)	Danny	rsops4	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)
55 (2-way)	Don/ Aseel	rsops1	RSR2	RSR2A -> XRCP RSR2B -> KRCP	1, 2, 3, 4 1, 2, 3, 4	1, 16, 50, 100 1, 16, 50, 100
55 (1-way)	Danny	rsops4	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)

S74 Rev 170 Open-Loop Assignment Cont'd

- VSR is backup
- Danny – Check WVSR/VSR availability
- Aseel - VOCA
- Don - Ops Room Displays
- RSSG will be in Ops Room at 9 pm on Saturday, August 11 (225/0400)
Two shifts: Don 9 pm - 3:30 am
Aseel/Danny/Elias 3:00 am – 12:00 pm

ORTs

ORT on DOY 215 (August 2) over DSS-34, X- and Ka-band

12 215 0045 0215 1115 1130 DSS-34 CAS TP RS170-ORT MC 5420 N750 1A1

- Nominal support
- Jump in power when monopulse was enabled (~1 dB)

DSS-55 ORTs originally planned on DOY 205 and 213 were deleted due to DSN scheduling conflicts

Predicts

- As with previous atmospheric occultation on DOY 204, Uplink (ETX) predicts should compensate for Doppler shift due to Saturn's atmosphere
 - SCO confirmed from s/c SPE that uplink predicts were very good
- RSS will apply the Doppler shifts to an ETX file provided by the DSN and send it back to SPS
 - They would then introduce the augmented file into the dataflow, so it goes to the station and is used in the uplink controller
- Paul Schinder, who did the work last time, is on travel. Dick French and Don Fleischman learned the process and are ready to modify the ETX for DOY 225. They will do independent runs and then compare results
- NAV delivered an OD on August 2 (DOY 215)
 - No more deliveries before OCC?
- SPS will generate predicts today (August 7) – Five days before support
- RSS to send predicts back to SPS by Thu morning
 - Dick and Don, OK?

Misc

Uplink: 18 kW

- Ingress at DSS-43
- Egress: DSS-43 then DSS-63
- Uplink gap between Canberra and Madrid due to transmitter limits
 - 1min52sec gap
 - Station turn transmitter off/on once the transmitter limits are reached
 - Would this have impact on DSS-63 uplink power?

Uplink Strategy

- On August 3, RSS had telecon with SCO to discuss options for egress atmospheric occ
- Plan is to uplink throughout
 - Don't stop uplink during occ
- No sweeps at egress or during occultation
 - If want to sweep at initial 2-way/3-way acquisition at 085352, that's ok

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

- Note changes to DSS-34 uplink times and no uplink transfer to DSS-43

Plan for Cassini Specific 4th Order Pointing Models

- Only DSS-34 pointing data were acquired recently
 - Don to send David Data
- DSS-55 last Ka-band support was on DOY 184 (July 2nd)
 - Send pointing data to David?

Misc cont'd

DSS-43 X-band Fluctuations

- Fluctuations observed during DOY 180 occ were also observed during DOY 204
- Request to investigate was sent to station
- On July 30, Canberra reported that they found a couple of things that they said may have been the cause of the problem
- No DSS-43 support since then, so wasn't able to check before occ

NOPEs - Equipment Status?

SNT

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

Open-loop Recording bandwidths

- All except Ka-band 1-way: 1, 16, 50, 100 KHz
- Ka-band 1-way: 1, 2, 16, 50 KHz

Closed-loop receiver lock-up - Will be intermittent during Ring B

OTM-330 completed successfully last night

12 220 0100 0200 1100 1115 DSS-45 CAS TP OTM-330 5425 N006 1A1