

About the Occultation

- S97 Rev 250 Saturn rings occultation
 - Telemetry OFF, Ranging OFF, 2-way/3-way mode
 - Covered by Canberra, Madrid, and New Norcia
- From Essam Marouf:

The Rev 250 RSS ring occultation is the third 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 250 chord, in particular, captures the full A-Ring and Cassini Division and the outer ~60% of the B-Ring. 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 250, 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 and ESA Antennas

- DSN Coverage

	Pre	BOT	EOT	Post								
16 332	1945	2045	0020	0035	DSS-14 CAS	OTMBU RS RIOCC L3	7002	1647	1A1			OTM BU
16 332	2305	0005	0910	0925	DSS-43 CAS	OTMBU RS RIOCC L3	7003	1647	1A1			OTM BU + RSS
16 333	0140	0310	0910	0925	DSS-34 CAS	RSS RIOCC L3		7003 0681	1A1			
16 333	0805	0835	0935	0935	DSS-74 CAS	RSS RIOCC		7004 0142	1A1			
16 333	0720	0850	1330	1345	DSS-55 CAS	RSS RIOCC L3		7003 N750	1A1			
16 333	0805	0905	1330	1345	DSS-63 CAS	RSS RIOCC L3		7003 1647	1A1			

- Occultation experiment is immediately preceded by OTM backup passes
 - OTM-466 will very likely be cancelled
 - To be confirmed at 1:30 pm today
- Using DSS-34 at Canberra instead of DSS-35
 - DSS-35 down for maintenance
- New Norcia, DSS-74, was deleted due to ExoMars critical support, but was reinstated last week
 - Track is now only 1hr in duration, 30min pre-cal, 0min post-cal
 - Long enough to close the uplink gap between Canberra and Madrid
 - Track is not in DKF and not in 7-day schedule

DSN and ESA Antennas Cont'd

- 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
- DSS-74 PRSR is installed and working, but still having issues with remote connection
- PRSR at Canberra is red
- Status of PRSR at Madrid?

S97 Rev 250 Open-Loop Assignment

DSS Prdx Mode	Operator	Station	Open-loop Receiver	Channels	Subchannels	Bandwidths KHz
43 3-way	Elias	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 3-way	Elias	rsops2	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 3-way	Carlyn/ Aseel	rsops1	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 3-way	Carlyn/ 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)

S97 Rev 250 Open-Loop Assignment cont'd

RSSG will be in Ops Room at 2:50 pm PST on Sunday, November 28 (332/2250)

Aseel – VOCA

Elias – Ops Room Displays

Danny – Check WVSR/VSR availability and disk space

Backup Receivers

- VSR at Canberra
- VSR and PRSR? at Madrid

Predicts

- Will use the NAV OD that will be delivered today to generate predicts
 - There will be an OD delivery on Saturday, but too late to use for RSS predicts generation
- Uplink (ETX) predicts will **not** be modified by RSS
- 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)
 - #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

Limited opportunities during this period. Only one ORT planned, but antennas were used recently to support Rev 248 occultation and T124 bistatic observation

Upcoming

ORT on DOY 329 (November 24) over DSS-34, X- and Ka-band

16 329 2050 2220 0715 0730 DSS-34 CAS TP RSS OCCORT MC 7000 N750

- Also prime TP
- To verify Monopulse, acquire pointing data, and conduct on-point phase cals as needed

There's a DSS-43 solar conjunction track on DOY 331 (November 26, 25 PST) that will be an opportunity to check X- and S-band

16 330 2315 0015 0715 0730 DSS-43 CAS TP RSS SCE13 7001 1647 1A1

Misc

Uplink Strategy

- DSS-43, 18 kW, ramped, sweep
- DSS-74, 18 kW, ramped, no sweep
- DSS-63, 18 kW, ramped, no sweep

Uplink times may be modified. Will confirm by EOD today

- Current plan has DSS-14 (OTMBU pass) turning transmitter off earlier for RSS to acquire 1-way baseline
- May impact NAV (coherent data) and SP (playback)
- We'll either reduce 1-way baseline or move to RSS official time

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

DSS-43 spurs were observed during T124

Plan for updating DSS-34 and DSS-55 Cassini Specific 4th Order Pointing Model?

- Will check with David
- Only one new data set from DSS-34

Misc Cont'd

Because observation is preceded by OTMBU pass, S- and Ka-band will be powered ON using real-time commands, assuming OTMBU pass will not be used

- Commands were approved this morning
- They will be uplinked later this afternoon after NAV confirms that OTM-466 will be cancelled
- Redundant commands that will execute 2-hrs later are in the background sequence

NOPEs - Equipment Status?

Jay Gao will be on vacation. Engineering team will be one person short