

About the T57 Titan Occultation

- S51 Rev113 T57 Titan Occultation Experiment
 - Telemetry OFF, 1-way mode
 - Covered by Madrid and partially by Goldstone
- About the science – From Essam Marouf

T57 implements the last Titan ionospheric and atmospheric occultation in the Cassini Equinox (Extended) Mission. It is an ingress only occultation. It probes the highest northern latitude in Cassini lifetime, including the Nominal, Equinox, and potential Extended-Extended Missions (about 79 degrees North). T57 is therefore a unique opportunity. The measurements will provide a profile of the electron number density of the ionosphere and will help characterize variability of atmospheric conditions (temperature, pressure, extinction, turbulence, gravity waves, ...) as a function of latitude, in particular in the region of the polar vortex. The characterization is a prime science objective of these Radio Science occultations.

Antennas Supporting T57

Yr	DOY	Pre-	BOT	EOT	Post-	DSS								
09	173	1630	1800	2015	2030	DSS-55	CAS	RSS	T57	TI	OCC	4280	N750	1A1
09	173	1800	1830	2015	2030	DSS-65	CAS	RST57	TIOCC	D/L		4280	0688	1A1
09	173	1805	1905	2015	2030	DSS-14	CAS	RSS	T57	TI	OCC	4280	1639	1A1

- Original plan was to request DSS-63, but it's down for upgrades and maintenance
 - Requested DSS-65 and DSS-14 instead
 - No 70-m data until 14 comes up around 25 minutes into the 50 minute observation
 - NOPEs checking about getting DSS-63 to support on best-efforts-basis
 - RTS demos start on DOY 178
- DSS-65 is D/L only. Pre-cal was reduced to resolve conflict with another project
- Potential change to DSS-14 pre-cal. May be reduced to 30 minutes (D/L only) to resolve conflicts

Equipment Scheduled

- Two close-loop receivers per antenna
- All RSRs, and some WWSRs/VSR
- Open-loop data are prime. Closed-loop are backup

RSR/VSR/WVSR Assignment

DSS	Operator	Station	Open-loop Receiver	RSR Assignment
55	John	rsops1	RSR1	RSR1A -> XRCP RSR1B -> KRCP
65	Elias	rsops2	RSR2	RSR2A -> XRCP RSR2B -> SRCP
14	Don	rsops3	RSR1 and RSR2*	RSR1A -> XRCP RSR1B -> SRCP RSR2A -> XLCP RSR2B -> SLCP

-Danny on VOCA (Aseel on travel)

-Will update to add DSS-63 if station agrees to support on best-efforts-basis. If so, use VSR for X&S RCP.
John to operate

-WVSRs and VSRs available as backup

-RSSG will be in Ops room at 8:00 am on Monday June 22 (DOY 173/1600)

ORTs

ORT/USO on DOY 153 (Tue, June 2) over DSS-55, X- and Ka-band:

09 153 1245 1415 2315 2330 DSS-55 CAS TP RS112-USOPIM1 4260 N750 1A1

- Also prime pass
- Station did on-point phase cal before track started (signal was present early)
- Collected pointing data (monopulse) to update the 4th order pointing model
- No sign of spikes that were reported during last DSS-55 support
- Checked for oscillations – None visible
- RS operator was told by station personnel that the on-point phase cal was not completed properly, and there's more work to be done on that – Did not impact monopulse operations

ORT on DOY 159 (Mon, June 8) over DSS-55, X- and Ka-band:

09 159 1945 2115 0000 0015 DSS-55 CAS TP RS112-OCCORT3 4266 N750 1A1

09 159 2015 2115 0615 0630 DSS-25 CAS TKG PASS 4266 N006 1A1

- DSS-25 prime – No Ka-band support over 25
- Collected pointing data (monopulse) to update the 4th order pointing model
- Checked for oscillations – None visible
- Used last 10 minutes to check KLCP (switch 43 in B position) – looked good

ORT on DOY 163 (Fri, June 12) over DSS-14 and DSS-65, X- and S-band:

09 163 2000 2100 2345 0000 DSS-65 CAS TP RS112-OCCORT4 4270 0624 1A1

09 163 2205 2305 0600 0615 DSS-14 CAS TP RS112-OCCORT4 4270 1639 1A1

- DSS-14 prime
- Verified X- and S-band signals – Only RCP at 65, RCP and LCP at 14

ORT on DOY 164 (Sat, June 13) over DSS-55, X- and Ka-band:

09 164 1930 2100 0600 0615 DSS-25 CAS TP RS112-OCCORT2 4271 N748 1A1

09 164 1930 2100 2340 2355 DSS-55 CAS TP RS112-OCCORT2 4271 N750 1A1

- DSS-25 prime – Not part of T57, but Ka-band support included. Compare to DSS-55
- Stormy weather at 55
 - Very high Ka SNT
 - Degraded Ka-band (drops and oscillations) – Signal power 3-5 dBs less than that at DSS-25
- Monopulse worked nominally at both stations

Misc

- Plans to update 4th order pointing models at DSS-55
 - Data from DOY 153 and 159 ORTs were sent to David. Data from DOY 164 ORT will be sent soon, though weather on that day was stormy
- Azimuth angles at DSS-55 range from ~196 to ~241 degrees
 - Don't exceed 260 degrees. Can use LQG Coefficients if needed
- DSS-55 looks good!
 - No visible oscillations
 - No spikes
 - Good KLCP signal

- Follow-up on RSR2 at Goldstone

- T57 GSEs:

Inbound

09 172 1900 2030 0530 0545 DSS-25 CAS TP RS113-KDWN1 4279 N748 1A1

09 172 2030 2100 0530 0545 DSS-14 CAS TKG PASS D/L 4279 N008 1A1

Outbound

09 174 1800 1900 0505 0520 DSS-14 CAS TKG PASS 4281 N003 1A1

09 174 2215 2315 0505 0520 DSS-25 CAS RS113-KDWN2 D/L 4281 N71L 1A1