About the Occultation

- S30 T31 Rev 45 Titan Atmospheric occultation
 - Ingress and Egress
 - Telemetry OFF, 1-way mode
- Science Highlights From Essam Marouf

The T31 RSS atmospheric occultation is the last of four Titan occultations planned for the Cassini nominal mission. It's distinguished by being the only one that uses reaction-wheels for pointing control (the T12, T14, and T27 occultation used RCS control) The exceptional expected pointing performance will be critical for accurate measurement of the intensity extinction profiles (X-, S-, and Ka-band) in the neutral atmosphere. This is particularly important for the highly pointing sensitive Ka-band observations. The observations should provide the large and small structure of Titan's neutral atmosphere in exquisite detail. They should also provide "ground-truth" measurements for comparison with the T12/T14/T27 observations. The T31 occultation covers both the ingress and egress sides, probing latitudes of 75 degs South and 73 degs North, respectively, the highest achieved in the nominal mission. Together with T27 (also a North-South occultation), the T31 observations will be critical for characterization of atmospheric dynamics close to Titan's polar regions, in particular Titan's polar vortex.

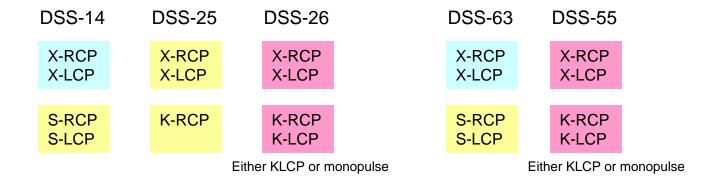
DSN Antennas Supporting T31

DSN Coverage							
Station	Pre-cal	BOT	EOT	Post-Cal			
DSS-55	148/1615	148/1800	148/2135	148/2150			
DSS-25	148/1651	148/1836	148/2135	148/2150			
DSS-63	148/1700	148/1800	148/2135	148/2150			
DSS-26	148/1706	148/1851	148/2135	148/2150			
DSS-14	148/1736	148/1836	148/2135	148/2150			

All pass# 3522

- Receivers scheduled
 - 2 closed-loop receivers per antenna
 - All RSRs, VSRs and WVSRs at Goldstone Madrid are scheduled
 - Total: 18 open-loop receivers
 - Open-loop data are prime. Closed-loop data are backup
- RCP required. LCP enhancement.

Antennas Capabilities Simultaneous Band and Polarization



All-Band Dependent Polarizations		Ambient Load or Cold Sky changes will impact both polarizations/both bands		
	Same-Band Dependent Polarizations	Ambient Load or Cold Sky changes will impact both polarizations/same band		
	Independent Polarizations	Ambient Load or Cold Sky changes will only impact polarization being changed		

RSR/VSR/WVSR Assignment

Operator	Station	Open-Loop Receiver	DSS	RSR Assignment
Gene	rsops1	RSR1 and RSR3	25	RSR1A -> XRCP
				RSR1B -> KRCP
			14	RSR3A -> XRCP
				RSR3B -> SRCP
Danny	PC via rsops2	RSR2 and VSR1	26	RSR2A -> XRCP
				RSR2B -> KRCP
	PC via rsops3	VSR1 and WVSR1	14	VSR1A -> XLCP
				VSR1B -> SLCP
			26	WVSR1A -> XLCP
				WVSR1B -> KLCP
Elias	rsops2	RSR1 and RSR2	55	RSR1A -> XRCP
				RSR1B -> KRCP
			63	RSR1B -> XRCP
				RSR2B -> SRCP
Don	rsops3	VSR1 and WVSR1	63	VSR1A -> XLCP
				VSR1B -> SLCP
			55	WVSR1A -> XLCP
				WVSR1B -> KLCP

T31 ORTs

ORT#1, DOY 133 (May 13) over DSS-55, X- and Ka-band 07 133 1115 1330 2230 2245 DSS-55 CAS RSBIORT1 ARRAY-R 3507 N650 07 133 1230 1330 2230 2245 DSS-63 CAS TP T30PB ARRAY-S 3507 N003

- Collected DSS-55 pointing data (monopulse) to update the 4th-order blind pointing model
- Windy

ORT#2, DOY 138 (May 18) over DSS-25, DSS-26 and DSS-55, X- and Ka-band 07 138 1900 2045 0545 0600 DSS-25 CAS TP RSR44-OCCORT2 3512 N748 * 07 138 1900 2045 0545 0600 DSS-26 CAS TP RSR44-OCCORT2 3512 N750 07 138 1900 2045 0000 0015 DSS-55 CAS TP RSR44-OCCORT2 3512 N750

- Collected DSS-25, DSS-26 and DSS-55 pointing data (monopulse) to update the 4thorder blind pointing model
- Goldstone clear and calm. Madrid partly cloudy.
- DSS-26 monopulse miscalibrated (DR# G107750). Calibrated in LCP mode instead of RCP. Good monopulse data starting at 138/2305.
 - Updated CAD issued. NOPEs to clarify more in future Briefing Messages
- DSS-55 SPS DLF predicts missing 3-way with DSS-25 mode. No impact to monopulse data, only to RSR data acquisition.

ORT#3, DOY 143 (May 23) over DSS-14 and DSS-63, X- and S-band 07 143 1930 2030 0530 0545 DSS-14 CAS TP RSR45-OCCORT3 3517 1639 * 07 143 1930 2030 2355 0010 DSS-63 CAS TP RSR45-OCCORT3 3517 1639

- Verify X- and S-band (RCP and LCP)