

Cassini T27: Titan Radio Occultation & Bistatic Scattering Observations
 March 25-26 (DOY084-085), 2007

Essam Marouf, March 15, 2007 (v3)

DRAFT

	ERT UTC OWLT = 1:10:28	SCET UTC	PDT ERT - 7 hrs 7:00:00	Comments
Start Precals DSS 14	20:35:00	19:24:32	13:35:00	
Start Precals DSS 55	20:45:00	19:34:32	13:45:00	
Start Precals DSS 25, 26, 63	20:50:00	19:39:32	13:50:00	See separate detailed Precals timeline
Load Free-Space Predicts	23:35:00	22:24:32	16:35:00	Need to Check with Elias all PREDICTS Switching Times
Begin-of-Track DSS 14	23:35:00	22:24:32	16:35:00	
Begin-of-Track DSS 25, 25, 55, 63	23:50:00	22:39:32	16:50:00	No Cassini downlink signals till about
Start Bistatic Minical 1	TBD			Exact times will be decided in real time
End Bistatic Minical 1	TBD			see separate Minical 1 timeline
Start turn to Earth point	0:35:57	23:25:29	17:35:57	
TLM OFF/TWNC ON/ RNG OFF	0:36:01	23:25:33	17:36:01	
Start 5 minutes free-space baseline	0:36:10	23:25:42	17:36:10	PC/N0 ~ 54, 48, & 41 dB-Hz for X-, Ka-, S-Band
Enable Monopulse: DSS 25, 26, 55 ?	TBD			
Disable Monopulse: DSS 25, 26, 55 ?	TBD			Keep or Clear the offsets decision
End free-space baseline	0:41:10	23:30:42	17:41:10	
Start turn to Titan surface	0:41:19	23:30:51	17:41:19	Quick loss of of the carrier signals
Load Bistatic Ingress Predicts (B41I)	0:42:19	23:31:51	17:42:19	
End Turn to Titan surface	0:45:18	23:34:50	17:45:18	HGA boresight is pointed to Titan's surface
Start Bistatic Observations	0:45:23	23:34:55	17:45:23	Potential weak RCP surface echo centered within the
End Bistatic Observations	1:07:55	23:57:27	18:07:55	observations bandwidth
Start turn to Earth point	1:07:59	23:57:31	18:07:59	Carrier signals should re-appear just beore 01:10:33
Load Occultation Ingress Predicts (T41I)	1:08:59	23:58:31	18:08:59	
End Turn to Earth Point	1:10:33	0:00:05	18:10:33	
Top of Ionosphere (~3000 km alt)	1:10:34	0:00:06	18:10:34	PC/N0 ~ 54, 48, & 41 dB-Hz for X-, Ka-, S-Band
Titan Ionosphere (~1500 km alt)	1:15:21	0:04:53	18:15:21	The ionosphere primarily affects the signal freq/phase
Titan Atmosphere (~200 km alt)	1:19:42	0:09:14	18:19:42	Signal strength drops in Titan's atmosphere
Titan Surface (~2575 km radius)	1:21:03	0:10:35	18:21:03	Hard-limb diffraction may cause the signals to continue
Behind Titan				to observed briefly after 01:21:03
End Limb-track for occ'n ingress	1:21:28	0:11:00	18:21:28	
Load Occultation Egress Predicts (T41E)	1:21:28	0:11:00	18:21:28	

Start Bistatic Minical 2	1:22:28	0:12:00	18:22:28	A XX minutes bistatic calibration; see separate timeline
End Bistatic Minical 2	1:31:28	0:21:00	18:31:28	
Start Limb-track for occ'n egress	1:32:28	0:22:00	18:32:28	LMB_E041_Titan27 epoch based on 060323 ref traj Signals may appear briefly before 01:35:08
Titan Closest Approach (C/A) Behind Titan	1:33:28	0:23:00	18:33:28	
Titan Surface (~2575 km radius)	1:35:08	0:24:40	18:35:08	Signal strength builds quickly to free-space values PC/N0 ~ 54, 48, & 41 dB-Hz for X-, Ka-, S-Band The ionosphere primarily affects the signal freq/phase
Titan Atmosphere (~200 km alt)	1:36:10	0:25:42	18:36:10	
Titan Ionosphere (~1500 km alt)	1:40:38	0:30:10	18:40:38	Quick loss of of carrier signals
Top of Ionosphere (~3000 km alt)	1:45:48	0:35:20	18:45:48	
End Occultation Observations	1:45:53	0:35:25	18:45:53	HGA boresight is pointed to Titan's surface Potential weak LCP surface echo centered within the observations bandwidth
Start turn to Titan surface	1:45:56	0:35:28	18:45:56	
Load Bistatic Egress Predicts (B41E)	1:46:56	0:36:28	18:46:56	Long 9.5 minutes turn!
End turn to Titan surface	1:52:50	0:42:22	18:52:50	
Start Bistatic Observations	1:52:53	0:42:25	18:52:53	PC/N0 ~ 54, 48, & 41 dB-Hz for X-, Ka-, S-Band
End Bistatic Observations	2:19:23	1:08:55	19:19:23	
Start turn to egress baseline	2:19:32	1:09:04	19:19:32	Long 9.5 minutes turn!
Load Free-space Predicts (FSP41)	2:22:32	1:12:04	19:22:32	
Start 4.5 minutes free-space baseline	2:28:55	1:18:27	19:28:55	PC/N0 ~ 54, 48, & 41 dB-Hz for X-, Ka-, S-Band
End of T27 RSS Observations Period	2:33:27	1:22:59	19:33:27	
TLM ON/TWNC OFF/RNG ON	2:33:27	1:22:59	19:33:27	Exact times will be decided in real time see separate Minical 3 timeline
Start Bistatic Minical 3	TBD			
End Bistatic Minical 3	TBD			See separate detailed Poscals timeline
End-of-Track DSS 55 & 63	3:10:00	1:59:32	20:10:00	
End-of-Track DSS 25, 26, 14	3:10:00	1:59:32	20:10:00	See separate detailed Poscals timeline
End-of-Postcals 55, 63	4:10:00	2:59:32	21:10:00	
End of Postcals DSS 25, 26, 14	4:10:00	2:59:32	21:10:00	

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Times are based on reference trajectory 060323

DSN Activities

FREQUENCY PREDICTS