

Cassini T52: Titan Radio Occultation & Bistatic Scattering Observations

April 3-4, 2008 (DOY 093-094)

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	ERT UTC OWLT = 1:10:46	SCET UTC	PDT ERT - 7 hrs 7:00:00	Comments
Start Pre-Cal DSS 14	21:45:00	20:34:14	14:45:00	Guided by Real-Time Instructions from RSS Ops-Room
Start Pre-Cals DSS 25	22:00:00	20:49:14	15:00:00	Guided by Real-Time Instructions from RSS Ops-Room
Start Precals DSS 55, 63	22:00:00	20:49:14	15:00:00	Guided by Real-Time Instructions from RSS Ops-Room
Load Free-Space Predicts	23:00:00	21:49:14	16:00:00	
RSS3RCS Op-Mode ON	23:38:31	22:27:45	16:38:31	
Begin-of-Track DSS 14	0:45:00	23:34:14	17:45:00	No S/X carrier signals detectable
Begin-of-Track DSS 25	1:00:00	23:49:14	18:00:00	No Ka/X carrier signals detectable
Begin-of-Track DSS 55, 63	1:00:00	23:49:14	18:00:00	No S /X/Ka carrier signals detectable
SNT Measurement (All Stations)	1:15:00	0:04:14	18:15:00	Allow for 5 min between SNT measurements & minical 1
Start Bistatic Minical 1 (All Stations)	1:20:00	0:09:14	18:20:00	Guided by Real-Time Instructions from RSS Ops-Room; must end by 01:38:00
TWNC ON	1:38:33	0:27:47	18:38:33	
Start turn to Earth point (T1)	1:38:36	0:27:50	18:38:36	
TLM OFF	1:38:38	0:27:52	18:38:38	
Start 5 minutes free-space baseline	1:43:44	0:32:58	18:43:44	PC/N0 ~ 54, 48, & 42 dB-Hz for X-, Ka-, S-Band
Enable Monopulse: DSS 25	1:44:00	0:33:14	18:44:00	Enable monopulse when asked to do so by Radio Science
Enable Monopulse: DSS 55	1:44:00	0:33:14	18:44:00	Enable monopulse when asked to do so by Radio Science
Disable Monopulse: DSS 25	1:48:00	0:37:14	18:48:00	Keep or Clear the offset decision before 01:48:00
Disable Monopulse: DSS 55	1:48:00	0:37:14	18:48:00	Keep or Clear the offset decision before 01:48:00
End free-space baseline	1:48:37	0:37:51	18:48:37	
Start turn to Titan surface (T2)	1:48:37	0:37:51	18:48:37	Quick loss of S/X/Ka signals
Load Bistatic Ingress Predicts	1:50:00	0:39:14	18:50:00	
End Turn to Titan surface	1:53:32	0:42:46	18:53:32	HGA boresight is pointed to Titan's surface
Start Bistatic Observations	1:53:32	0:42:46	18:53:32	Potential weak surface echoes centered within the
End Bistatic Observations	2:32:30	1:21:44	19:32:30	observations bandwidth
Start turn to Earth point (T3)	2:32:35	1:21:49	19:32:35	Carrier signals should re-appear shortly before 02:36:00

Load Occultation Predicts	2:33:00			
End Turn to Earth Point	2:36:00	1:25:14	19:36:00	PC/N0 ~ 54, 48, & 42 dB-Hz for X-, Ka-, S-Band
Start Earth Tracking	2:36:34	1:25:48	19:36:34	
Enable Monopulse: DSS 25	2:36:50	1:26:04	19:36:50	Enable monopulse when asked to do so by Radio Science
Enable Monopulse: DSS 55	2:36:50	1:26:04	19:36:50	Enable monopulse when asked to do so by Radio Science
Top of Ionosphere (~3000 km alt)	2:37:01	1:26:15	19:37:01	
Titan's Ionosphere (~1500 km alt)	2:42:13	1:31:27	19:42:13	The ionosphere primarily affects the signal freq/phase
Top of Atmosphere (~200 km alt)	2:47:37	1:36:51	19:47:37	The atmosphere affects signal intensity/frequency/phase
Near tropopause (0.01° BA))	2:48:13	1:37:27	19:48:13	Signal intensity drops quickly in Titan's troposphere
Ka-band absorbed (~10 km alt)	2:49:53	1:39:07	19:49:53	Ka-band is absorbed before the signal reaches the surface
At Titan's Surface (~2575 km rad)	2:50:46	1:40:00	19:50:46	Loss of S- & X-band signals
Behind Titan				
End Limb-track for occ'n ingress				
Monopulse Offsets Decision				Keep/clear the monopulse offsets for egress occultation?
Start Limb-track for occ'n egress				
Behind Titan				S/X signals may appear briefly just before 02:54:29
At Titan's Surface (~2575 km rad)	2:54:29	1:43:43	19:54:29	S/X signal intensity builds up quickly
Ka-band reappears (~10 km alt)	2:55:19	1:44:33	19:55:19	Ka-band signal intensity builds up quickly
Near tropopause (0.01° BA)	2:56:52	1:46:06	19:56:52	Signals are back to near full strength
Top of Atmosphere (~200 km alt)	2:57:28	1:46:42	19:57:28	PC/N0 ~ 54, 48, & 42 dB-Hz for X-, Ka-, S-Band
Titan Closest Approach (C/A)	2:58:33	1:47:47	19:58:33	Titan52 Live-update (LUB) OD epoch
Titan's Ionosphere (~1500 km alt)	3:02:53	1:52:07	20:02:53	The ionosphere primarily affects the signal freq/phase
Top of Ionosphere (~3000 km alt)	3:08:06	1:57:20	20:08:06	
End Earth Tracking	3:10:34	1:59:48	20:10:34	short free-space baseline
Start Titan Targetting Turn (T4a)	3:10:36	1:59:50	20:10:36	
SNT Measurement	3:11:00	2:00:14	20:11:00	SNT measurements have to end by 03:15:00
Load Bistatic Egress Predicts	3:12:00	2:01:14	20:12:00	
End Titan Targetting Turn	3:15:05	2:04:19	20:15:05	
Start Turn to Specular Point (T4b)	3:15:38	2:04:52	20:15:38	Quick loss of of the Ka-X/S carrier signals
End turn to Specular Point	3:15:45	2:04:59	20:15:45	HGA boresight is pointed to Titan's surface
Start Bistatic Observations	3:15:45	2:04:59	20:15:45	Potential weak surface echoes centered within the
End Bistatic Observations	4:01:41	2:50:55	21:01:41	observations bandwidth
Start turn to egress baseline (T5)	4:01:41	2:50:55	21:01:41	

Load Free-Space Predicts	4:02:30	2:51:44	21:02:30	
SNT Measurement	4:02:30	2:51:44	21:02:30	SNT measurements have to end by 04:07:00
End turn to egress baseline	4:08:21	2:57:35	21:08:21	
Start 5 minutes free-space baseline	4:08:21	2:57:35	21:08:21	PC/N0 ~ 54, 48, & 42 dB-Hz for X-, Ka-, S-Band
Enable Monopulse: DSS 55	4:13:00	3:02:14	21:13:00	Allows assessment of Ka-band pointing quality
Enable Monopulse: DSS 25	4:13:00	3:02:14	21:13:00	Allows assessment of Ka-band pointing quality
End of T52 RSS Observations Period	4:14:09	3:03:23	21:14:09	
Start Turn to Waypoint	4:14:11	3:03:25	21:14:11	Quick loss of Ka-, then X-, then S-band signals
DSS 55 Bistatic Minical 2	4:17:00	3:06:14	21:17:00	Guided by Real-Time Instructions from RSS Ops-Room
DSS 63 Bistatic Minical 2	4:17:00	3:06:14	21:17:00	Guided by Real-Time Instructions from RSS Ops-Room
End-of-Track DSS 55	4:20:00	3:09:14	21:20:00	
End Turn to Waypoint	4:26:02	3:15:16	21:26:02	
TLM ON	4:26:27	3:15:41	21:26:27	HGA is not Earth pointed
TWNC OFF	4:26:31	3:15:45	21:26:31	
RSS3RCS Op-Mode OFF	4:26:33	3:15:47	21:26:33	
End-of-Track DSS 63	4:30:00	3:19:14	21:30:00	
Start of Post-Cal DSS 55 & 63	4:30:00	3:19:14	21:30:00	
DSS 25 & 14 Bistatic Minical 2	4:30:00	3:19:14	21:30:00	Guided by Real-Time Instructions from RSS Ops-Room
DSS 25 & 14 SNT Measurement	4:45:00	3:34:14	21:45:00	Allow for 5 min between minical 2 & SNT measurements
End-of-Track DSS 25 & 14	5:00:00	3:49:14	22:00:00	
Start of Post-Cal DSS 25 & 14	5:00:00	3:49:14	22:00:00	
End of Post-Cal DSS 55	5:20:00	4:09:14	22:20:00	Guided by Real-Time Instructions from RSS Ops-Room
End of Post-Cal DSS 63	5:30:00	4:19:14	22:30:00	
End of Post-Cal DSS 25 & 14	6:00:00	4:49:14	23:00:00	Guided by Real-Time Instructions from RSS Ops-Room

Times are based on the T52 Live Update Block (LUB) OD on 3/28/09 (with OTM-186)

Goldstone Activities

Madrid Activities

Switching of Frequency Predicts

Behind Titan

Mini Calibration; SNT Measurements