

Timeline for Cassini Rev 170: 2-Way RSS Ring & Atmospheric Occultations

August 12, 2012 (DOY 225)

Essam Marouf & Aseel Anabtawi 08/08/2012 (v4)

	ERT UTC OWLT = 1:24:26	SCET	PDT ERT-7hrs 7:00:00	Comments
Spacecraft is Earth Pointed				
Ka-Band ON	1:45:26	0:21:00	18:45:26	Spacecraft transition to RSSK op-mode is completed
RSSG: Load 1-W, 2-W, and 3-W Frequency Predicts				May have to use separate predicts for rings & atmosphere
DSS-34: Begin Pre-Cal	4:25:00	3:00:34	21:25:00	
DSS-34: Begin of Track, 1-way	5:55:00	4:30:34	22:55:00	X-band and Ka-band downlink signals are detectable
DSS-34: Transmitter ON, sweep	6:05:00	4:40:34	23:05:00	
DSS-34: Transmitter OFF	7:46:40	6:22:14	0:46:40	
DSS-43: Begin Pre-Cal	7:15:00	5:50:34	0:15:00	
DSS-43: Begin of Track, 1-way	8:00:00	6:35:34	1:00:00	X-band and Ka-band downlink signals are detectable
DSS-43: Transmitter ON, 18 kW, LCP, sweep	8:07:00	6:42:34	1:07:00	Ramped uplink predicts are used
DSS-34: Switch to 2-way, X- & Ka-band	8:53:52	7:29:26	1:53:52	
DSS-43: Switch to 3-way with DSS-34, X-band	8:53:52	7:29:26	1:53:52	
S-Band ON	9:21:08	7:56:42	2:21:08	S-band downlink signal is also detectable
DSS-55: Begin Pre-Cal	9:55:00	8:30:34	2:55:00	
DSS-63: Begin Pre-Cal	10:25:00	9:00:34	3:25:00	
DSS-43 and DSS-34: Switch to 1-way	10:35:32	9:11:06	3:35:32	
DSS-34: Enable Monopulse	TBD			Enable monopulse only when requested by RS Operations
Start of ingress atmospheric occultation	10:45:26	9:21:00	3:45:26	X-, S-, and Ka-band signals detectable
RNG OFF/TLM OFF	10:45:31	9:21:05	3:45:31	X-band signal level increase
Begin 1-Way Free-Space Baseline	10:45:32	9:21:06	3:45:32	PC/N0 (X70, S70, X34, Ka34) = 54, 42, 48, and 48 dB-Hz
DSS-43: Begin X- & S-band 2-Way Acquisition	10:55:52	9:31:26	3:55:52	PC/N0 (X-70m, S-70m) = 54, 42 dB-Hz
DSS-34: Begin X- & Ka-band 3-Way Acquisition	10:55:52	9:31:26	3:55:52	PC/N0 (X-34m, Ka-34m) = 48, 48 dB-Hz
Start 2-Way & 3-Way Free-Space Baseline	11:00:00	9:35:34	4:00:00	
Top of the ionosphere (68,000 km)	11:11:42	9:47:16	4:11:42	Ionosphere primarily affects signals frequency/phase
DSS-55 & DSS-63: Begin of Track	11:25:00	10:00:34	4:25:00	

DSS-63: Begin X- & S-band 3-Way Acquisition	11:25:00	10:00:34	4:25:00	
DSS-55: Begin X- & Ka-band 3-Way Acquisition	11:25:00	10:00:34	4:25:00	
DSS-55: Enable Monopulse	TBD			
DSS-43: Transmitter OFF	11:44:28	10:20:02	4:44:28	End of DSS-43 uplink period
DSS-63: Tansmitter ON, no sweep	11:46:20	10:21:54	4:46:20	Start of DSS-63 uplink period; 1 m and 52 s gap
Upper Troposphere (~0.1° BA)	11:51:35	10:27:09	4:51:35	S/X/Ka signal intensities quickly drop and scintillate
DSS-34 & DSS-43: End of Track	12:05:00	10:40:34	5:05:00	
Loss of 3-Way Ka-band signal (~1.15° BA)	12:19:17	10:54:51	5:19:17	Approximate time; Ka-band downlink signal absorbed
DSS-34 & DSS-43: End of Pspot Cal	12:20:00	10:55:34	5:20:00	
Loss of 2-Way & 3-Way X-band signal (~1.35° BA)	12:25:06	11:00:40	5:25:06	Approximate time; X-band downlink signal absorbed
Loss of 2-Way S-band signal	12:26:06	11:01:40	5:26:06	Approximate time
DSS-43: S-band 1-Way Signal Acquisition	12:26:06	11:01:40	5:26:06	Approximate time; S/C AUX-OSC kicks in
Loss of 1-Way S-band signal (~1.55° BA)	12:31:13	11:06:47	5:31:13	Approximate time; loss of all downlink signals
Cassini is behind Saturn as seen from Earth				No downlink signals detectable
Weak S-band signal (~1.55° BA)	14:17:52	12:53:26	7:17:52	Approx. time; 1-Way until X-band uplink lock, then 3-Way/43
Weak X-band signal (~1.35° BA)	14:23:01	12:58:35	7:23:01	Approx. time; 1-Way until X-band uplink lock, then 3-Way/43
Weak Ka-band signal (~1.15° BA)	14:27:54	13:03:28	7:27:54	Approx. time; 1-Way until X-band uplink lock, then 3-Way/43
DSS-63: Begin X- & S-band 1-Way acquisition	14:33:20	13:08:54	7:33:20	Start of 1 m and 53 s 2-way gap
DSS-55: Begin X- & Ka-band 1-Way acquisition	14:33:20	13:08:54	7:33:20	Start of 1 m and 53 s 2-way gap
DSS-63: Begin X- & S-band 2-Way acquisition	14:35:12	13:10:46	7:35:12	DSS-63 X-band uplink reaches the S/C
DSS-55: Begin X- & Ka-band 3-Way acquisition	14:35:12	13:10:46	7:35:12	DSS-63 X-band uplink reaches the S/C
Upper Troposphere (~0.1° BA)	14:50:49	13:26:23	7:50:49	PC/N0 (X70, S70, X34, Ka34) = 54, 42, 48, and 48 dB-Hz
DSS-55 : Enable Monopulse	TBD			
DSS-63: Transmitter OFF	15:08:33	13:44:07	8:08:33	
Top of the ionosphere (~68,000 km)	15:09:28	13:45:02	8:09:28	Ionosphere primarily affects signals frequency/phase
Ring C In	15:17:32	13:53:06	8:17:32	Detectable signals over most of Ring C
Ring C out/Ring B In	15:37:59	14:13:33	8:37:59	Signals will be small or absent over most of Ring B
Ring B Out	16:03:11	14:38:45	9:03:11	Relatively strong signals in the Cassini Division
Ring A In	16:07:25	14:42:59	9:07:25	Detectable signals over most of Ring A
In Mid Encke Gap	16:18:02	14:53:36	9:18:02	Signals are briefly back to full strength

Ring A out	16:20:56	14:56:30	9:20:56	PC/N0 (X70, S70, X34, Ka34) = 54, 42, 48, and 48 dB-Hz
Ring F	16:24:14	14:59:48	9:24:14	Ring F is usually not detectable in real-time
End of official 2-way baseline	16:54:14	15:29:48	9:54:14	
Ka-Band and S-Band OFF	17:56:47	16:32:21	10:56:47	End of RSS3 Op-Mode
TLM ON/RNG ON	17:57:24	16:32:58	10:57:24	End of Rev 170 RSS Experiments
End of Rev 170 RSS S/C Activities	17:57:25	16:32:59	10:57:25	
DSS-55 & DSS-63: End of Track	18:30:00	17:05:34	11:30:00	
DSS-55 & DSS-63: Post Cal	18:45:00	17:20:34	11:45:00	

Canberra DSS-34 & DSS-43 related activities

Madrid DSS-55 & DSS-63 related activities

Predicted ring occultation & atmospheric event times are approximate and are based on [LUD trajectory on 7/27/2012](#)

Monopulse strategy is preliminary at this time and is finalized during real-time operations