Timeline for Cassini Rev 191: 2-Way RSS Saturn Rings and Ionosphere Occultations

May 31, 2013 UTC (DOY-151)

Essam Marouf & Aseel Anabtawi 05/26/2013 (v4)

	ERT UTC OWLT = 1:14:41	SCET	PDT ERT-7hrs 7:00:00	Comments
Spacecraft is NOT Earth Pointed				
RSSG: Load 1-W, 2-W, and 3-W Frequency Predicts	TBD			
DSS-14: Begin Pre-Cal	03:10:00	01:55:19	20:10:00	
DSS-14: Begin of Track	04:10:00	02:55:19	21:10:00	Spacecraft is not Earth pointed
DSS-14 Transmitter ON, 18 kW, LCP, RAMP, SWEEP	**04:34:00**	03:19:19	21:34:00	Start transmitter time = start of 2- & 3-way baseline - RTLT
Ka-Band ON	04:55:47	03:41:06	21:55:47	Spacecraft is not Earth pointed
DSS-34: Begin Pre-Cal	05:00:00	03:45:19	22:00:00	
DSS-45: Begin Pre-Cal	05:30:00	04:15:19	22:30:00	
RSSG: Begin DSS-14, 34 and 45 Open-Loop Recordings	06:20:00	05:05:19	23:20:00	
DSS-34 & DSS-45: Begin of Track	06:30:00	05:15:19	23:30:00	Spacecraft is not Earth pointed
Spacecraft is Earth Pointed; Start of Rev191 Observations	06:55:41	05:41:00	23:55:41	X- and Ka-band signals detectable shortly before 06:55:41
DSS-14: Begin X-band 1-Way Acquisition	06:55:41	05:41:00	23:55:41	PC/N0 (X-70m) = 54 dB-Hz
DSS-45: Begin X-band 1-Way Acquisition	06:55:41	05:41:00	23:55:41	PC/N0 (X-34m) = 48 dB-Hz
DSS-34: Begin X- & Ka-band 1-Way Acquisition	06:55:41	05:41:00	23:55:41	PC/N0 (X-34m, Ka-34m) = 48, 48 dB-Hz
RNG OFF/TLM OFF	06:55:45	05:41:04	23:55:45	X-band signal level increase
S-Band ON	06:55:53	05:41:12	23:55:53	S-band downlink is also detectable
DSS-14: Begin S-band 1-Way Acquisition	06:55:53	05:41:12	23:55:53	PC/N0 (S-70m) = 42 dB-Hz
DSS-45: Begin S-band 1-Way Acquisition	06:55:53	05:41:12	23:55:53	PC/N0 (S-34m) = 36 dB-Hz
Start 1-way baseline	06:55:53	05:41:12	23:55:53	About 10 m long 1-way baseline
DSS-34: Enable Monopulse	06:58:00	05:43:19	23:58:00	Enable monopulse only when requested by RS Operations
DSS-14: Begin X-& S-band 2-Way Acquisition	07:03:22	05:48:41	00:03:22	PC/N0 (X-70m, S-70m) = 54, 42 dB-Hz
DSS-45: Begin X-& S-band 3-Way Acquisition (w/ DSS-14)	07:03:22	05:48:41	00:03:22	PC/N0 (X-34m, S-34m) = 48, 36 dB-Hz
DSS-34: Begin X- & Ka-band 3-Way Acquisition (w/ DSS-14)	07:03:22	05:48:41	00:05:22	PC/N0 (X-34m, Ka-34m) = 48, 48 dB-Hz
Begin 2- & 3-Way Free-Space Baseline	07:05:22	05:50:41	00:05:22	
Top of the ionosphere (68,000 km) on the ingress side	07:19:41	06:05:00	00:19:41	No visible real-time effects
DSS-43: Begin Pre-Cal	07:35:00	06:20:19	00:35:00	RTS demo track, downlink only
RSSG: Begin DSS-43 Open-Loop Recordings	07:35:00	06:20:19	00:35:00	
DSS-43: Begin of Track	08:05:00	06:50:19	01:05:00	

DSS-43: Begin X-& S-band 3-Way Acquisition (w/ DSS-14)	08:05:00	06:50:19	01:05:00	PC/N0 (X-70m, S-70m) = 54, 42 dB-Hz
DSS-34: Disable Monopulse	08:32:00	07:17:19	01:32:00	Disable monopulse only when requested by RS Operations
Ring A In	08:35:25	07:20:44	01:35:25	Approximate time
Upper Troposphere (~0.02° BA) on the ingress side	08:36:52	07:22:11	01:36:52	Additional drop in signal levels
Cassini is behind Saturn's upper tropopshere				Downlink signals detectable through top of the troposphere
Middle of Encke Gap (through Saturn's troposphere)	08:38:09	07:23:28	01:38:09	Increase in signal levels for a short period
Ring A Out (through Saturn's troposphere)	08:48:15	07:33:34	01:48:15	Approximate time
Ring B In (through Saturn's troposphere)	08:52:19	07:37:38	01:52:19	Signals will likely be blocked over parts of Ring B
Ring B Out (through Saturn's troposphere)	09:17:07	08:02:26	02:17:07	Approximate time
Cassini is still behind Saturn's upper tropopshere				Downlink signals detectable through top of the troposphere
Upper troposphere on the egress side (~0.02° BA)	09:35:12	08:20:31	02:35:12	End of visible atmospheric/rings interference
Ring C Out	09:39:31	08:24:50	02:39:31	All signals back to full strength (free-space) levels
DSS-14: Transmitter OFF	**10:05:22**	08:50:41	03:05:22	End of 2-Way egress baseline - RTLT
Top of the ionosphere (~68,000 km) on the egress side	10:15:39	09:00:58	03:15:39	No visible real-time effects
DSS-34: Enable Monopulse	10:15:40	09:00:59	03:15:40	Enable monopulse only when requested by RS Operations
Start egress ring occultation baseline	10:15:41	09:01:00	03:15:41	PC/N0 (X34, S34, Ka34) = 48, 36, and 48 dB-Hz
DSS-14: End of Track	10:25:00	09:10:19	03:25:00	
Ring C In	10:28:55	09:14:14	03:28:55	Detectable signals over most of Ring C
DSS-14: End of Post Cal	10:40:00	09:25:19	03:40:00	
DSS-34: Disable Monopulse	10:50:00	09:35:19	03:50:00	Disable monopulse only when requested by RS Operations
RSSG: End DSS-14 Open-Loop Recordings	10:50:00	09:35:19	03:50:00	
Ring B In	10:52:19	09:37:38	03:52:19	Signals will likely be blocked over parts of Ring B
Ring B Out	11:17:07	10:02:26	04:17:07	Approximate time; Strong signals in the Cassini Division
DSS-34: Enable Monopulse	TBD			Enable monopulse only when requested by RS Operations
Ring A In	11:21:10	10:06:29	04:21:10	Detectable signals over most of Ring A
Middle of the Encke Gap	11:31:15	10:16:34	04:31:15	Strong signals over brief time period
Ring A out	11:34:00	10:19:19	04:34:00	All signals back to full strength (free-space) levels
Ring F	11:37:07	10:22:26	04:37:07	Approx. time; Ring F is usually not detectable in real-time
DSS-43: End of Track	12:05:00	10:50:19	05:05:00	
DSS-43: End of Post Cal	12:20:00	11:05:19	05:20:00	
DSS-45: End of Track	12:30:00	11:15:19	05:30:00	
RSSG: End DSS-43 Open-Loop Recordings	12:25:00	11:10:19	05:25:00	
End of 3-Way free-space baseline	12:34:44	11:20:03	05:34:44	
DSS-34: Begin X- & Ka-band 1-Way Acquisition	12:34:44	11:20:03	05:34:44	PC/N0 (X-34m, Ka-34m) = 48, 48 dB-Hz
Start 1-way baseline	12:34:44	11:20:03	05:34:44	

DSS-45: End of Post Cal		12:45:00		11:30:19	05:45:00	
RSSG: End DSS-45 Open-Loop Recordings		12:55:00		11:40:19	05:55:00	
S-Band and Ka-band OFF		13:06:04		11:51:23	06:06:04	End of RSS3 Op-Mode
TLM ON/RNG ON		13:06:31		11:51:50	06:06:31	End of Rev191 RSS Experiment
End of Rev191 RSS S/C Activities		13:06:37		11:51:56	06:06:37	Spacecraft turns away from Earth point
RSSG: End DSS-34 Open-Loop Recordings		13:30:00		12:15:19	06:30:00	
DSS-34: End of Track		13:40:00		12:25:19	06:40:00	
DSS-34: End of Post Cal		13:55:00		12:40:19	06:55:00	

Canberra DSS-43, DSS-34, & DSS-45 related activities

Goldstone DSS-14 related activities

Predicted atmospheric event times are approximate and are based on NAV OD on 25 May 2013

DSS-34 Monopulse strategy is preliminary at this time. Final strategy is decided in real-time