Timeline for Cassini Rev 236: 2-Way RSS Saturn's Ring Occultation

June 6, 2016 UTC (DOY-158)

Essam Marouf & Aseel Anabtawi 06/03/2016 (v3)

	ERT UTC OWLT = 01:15:01	SCET	PDT ERT-7hrs 07:00:00	Comments
Spacecraft is NOT Earth Pointed				
RSSG: Load 1-W, 2-W, and 3-W Frequency Predicts				
DSS-63: Beginning of Pre-Cal	01:00:00	23:44:59	18:00:00	
DSS-63: Beginning Of Track	02:00:00	00:44:59	19:00:00	
DSS-14: Beginning of Pre-Cal	02:10:00	00:54:59	19:10:00	
DSS-63 Transmitter ON, 18kW, LCP, RAMP, SWEEP	**02:40:00**	01:24:59	19:40:00	Start transmitter time = start of 2- & 3-way baseline - RTLT
DSS-25: Beginning of Pre-Cal	02:45:00	01:29:59	19:45:00	
DSS-14: Beginning Of Track	03:10:00	01:54:59	20:10:00	Spacecraft is not Earth pointed until 04:50:01 ERT
S-Band ON	03:19:51	02:04:50	20:19:51	Per PEF; No Detectable Downlink Signal
Ka-Band ON	03:24:47	02:09:46	20:24:47	Per PEF; No Detectable Downlink Signal
DSS-63 Transmitter OFF (Uplink Transfer to DSS-14)	**03:35:00**	02:19:59	20:35:00	
DSS-14 Transmitter ON, 18 kW, LCP, RAMP	**03:35:00**	02:19:59	20:35:00	
RSSG: Begin DSS-14 and DSS-25 Open-Loop Recordings				
DSS-63 End of Track	04:00:00	02:44:59	21:00:00	
DSS-63-End of Post-Cal	04:15:00	02:59:59	21:15:00	
DSS-25: Beginning of Track	04:15:00	02:59:59	21:15:00	
Begin Spacecraft Turn to Earth Point	04:40:01	03:25:00	21:40:01	
Spacecraft is Earth Pointed	04:50:01	03:35:00	21:50:01	Detectable X/S/Ka Downlink Signals shortly before 04:50:01
DSS-14: Begin X- and S-Band 1-Way Acquisition	04:50:01	03:35:00	21:50:01	PC/N0 (X-70m, S-70m, TLM ON) = 45 dB-Hz, 42 dB-Hz
DSS-25: Begin X- and Ka-Band 1-Way Acquisition	04:50:01	03:35:00	21:50:01	PC/N0 (X-34m, Ka-34m, TLM ON) = 39 dB-Hz, 48 dB-Hz
RNG OFF/TLM OFF	04:50:05	03:35:04	21:50:05	PC/N0 (X-70m, X34-m) = 54, 48 dB-Hz, repectively
Start of Rev 236 Observations	04:50:06	03:35:05	21:50:06	
Start ~20 min 1-Way Baseline	04:50:06	03:35:05	21:50:06	About 20 min long 1-way baseline
RSSG: Enter Open-Loop 1-way Frequency Offsets as Needed				
DSS-25: Enable Monopulse	04:55:00	03:39:59	21:55:00	Enable monopulse only when requested by RS Operations
DSS-25: Disable Monopulse Without Clearning the Offsets	05:08:00	03:52:59	22:08:00	Before switch to 3-way
RSSG: Clear Open-Loop 1-way Frequency Offsets	05:10:02	03:55:01	22:10:02	
DSS-14: Begin X- & S-Band 3-Way Acquisition (w/DSS-63)	05:10:02	03:55:01	22:10:02	PC/N0 (X-70m, S-70m, TLM OFF) = 54, 42 dB-Hz
DSS-25: Begin X- & Ka-Band 3-Way Acquisition (w/DSS-63)	05:10:02	03:55:01	22:10:02	PC/N0 (X-34m, Ka-34m, TLM OFF) = 48, 48 dB-Hz

Begin 3-Way Free-Space Baseline (w/DSS-63)	05:12:02	03:57:01	22:12:02	
DSS-25: Enable Monopulse	05:13:00	03:57:59	22:13:00	Enable monopulse only when requested by RS Operations
DSS-35: Beginning of Pre-Cal	06:05:00	04:49:59	23:05:00	
Uplink Transfer from DSS-63 to DSS-14 Observed	06:05:02	04:50:01	23:05:02	
DSS-14: Begin X- & S-Band 2-Way Acquisition	06:05:03	04:50:02	23:05:03	PC/N0 (X-70m, S-70m) = 54, 42 dB-Hz
DSS-25: Begin X- & Ka-Band 3-Way Acquisition (w/DSS-14)	06:05:03	04:50:02	23:05:03	PC/N0 (X-34m, Ka-34m) = 48, 48 dB-Hz
Begin 2- & 3-Way Free-Space Baseline (w/DSS-14)	06:05:03	04:50:02	23:05:03	
Ring F	06:14:04	04:59:03	23:14:04	Approx. time; Ring F is usually not detectable in real-time
Ring A In	06:20:22	05:05:21	23:20:22	Approximate time
Middle of Encke Gap	06:26:19	05:11:18	23:26:19	Increase in signal levels for a short period
DSS-43: Beginning of Pre-Cal	06:30:00	05:14:59	23:30:00	
DSS-25: Disable Monopulse	06:42:00	05:26:59	23:42:00	Disable Monopulse before Ring B
Ring A Out	06:48:50	05:33:49	23:48:50	Approximate time
DSS-25: Enable Monopulse	06:49:00	05:33:59	23:49:00	Enable monopulse only when requested by RS Operations
DSS-25: Disable Monopulse	06:57:00	05:41:59	23:57:00	Disable Monopulse before Ring B
Ring B In	06:58:13	05:43:12	23:58:13	Signals will likely be blocked over parts of Ring B
RSSG: Begin DSS-43 and DSS-35 Open-Loop Recordings	07:00:00	05:44:59	00:00:00	
DSS-43 Beginning Of Track	07:30:00	06:14:59	00:30:00	Likely weak & fluctuating X/S downlink signals
DSS-43: Begin X- & S-Band 3-Way Acquisition (w/ DSS-14)	07:30:00	06:14:59	00:30:00	In the B-Ring
DSS-35 Beginning Of Track	07:35:00	06:19:59	00:35:00	Likely weak & fluctuating X/Ka downlink signals
DSS-35: Begin X- & Ka-Band 3-Way Acquisition (w/ DSS-14)	07:35:00	06:19:59	00:35:00	In the B-Ring
Ring C In	08:08:18	06:53:17	01:08:18	Approximate time
DSS-25: Enable Monopulse	08:09:00	06:53:59	01:09:00	Enable monopulse only when requested by RS Operations
DSS-35: Enable Monopulse	08:09:00	06:53:59	01:09:00	Enable monopulse only when requested by RS Operations
DSS-25: Disable Monopulse	09:31:00	08:15:59	02:31:00	Disable monopulse only when requested by RS Operations
DSS-35: Disable Monopulse	09:31:00	08:15:59	02:31:00	Disable monopulse only when requested by RS Operations
Ring B In	09:32:04	08:17:03	02:32:04	Signals will likely be blocked over parts of Ring B
DSS-14: Transmitter OFF	**09:35:00**	08:19:59	02:35:00	Start of 1-Way Baseline - RTLT
Start of Troposphere Interference with B3 & B4	10:06:33	08:51:32	03:06:33	Regions B3 & B4 are observed mixed with the troposphere
End of Troposphere Interference with B3 & B4	10:40:52	09:25:51	03:40:52	
Ring B Out	10:42:06	09:27:05	03:42:06	Approximate time; Strong signals in the Cassini Division
DSS-25: Enable Monopulse	10:43:00	09:27:59	03:43:00	Enable monopulse only when requested by RS Operations
DSS-35: Enable Monopulse	10:43:00	09:27:59	03:43:00	Enable monopulse only when requested by RS Operations
DSS-25: Disable Monopulse	10:50:30	09:35:29	03:50:30	Disable monopulse only when requested by RS Operations
DSS-35: Disable Monopulse	10:50:30	09:35:29	03:50:30	Disable monopulse only when requested by RS Operations
Ring A In	10:51:30	09:36:29	03:51:30	Detectable signals over most of Ring A
DSS-25: Enable Monopulse	11:00:00	09:44:59	04:00:00	Enable monopulse only when requested by RS Operations

DSS-35: Enable Monopulse	11:00:00	09:44:59	04:00:00	Enable monopulse only when requested by RS Operations
Middle of the Encke Gap	11:13:59	09:58:58	04:13:59	Strong signals over brief time period
Ring A Out	11:19:56	10:04:55	04:19:56	All signals back to full strength (free-space) levels
Ring F	11:26:13	10:11:12	04:26:13	Approx. time; Ring F is usually not detectable in real-time
DSS-25: Disable Monopulse	11:54:00	10:38:59	04:54:00	Disable monopulse only when requested by RS Operations
DSS-14 & DSS-25: End of Track	11:55:00	10:39:59	04:55:00	
DSS-35: Disable Monopulse	11:59:00	10:43:59	04:59:00	Disable monopulse only when requested by RS Operations
DSS-43: Begin X- & S-band 1-Way Acquisition	12:05:02	10:50:01	05:05:02	PC/N0 (X-70m, S-70m) = 54, 42 dB-Hz
DSS-35: Begin X- & Ka-band 1-Way Acquisition	12:05:02	10:50:01	05:05:02	PC/N0 (X-34m, Ka-34m) = 48, 48 dB-Hz
Begin Short 1-Way Baseline	12:05:02	10:50:01	05:05:02	About 10min long 1-way baseline
RSSG: Adjust Open-Loop 1-way Frequency Offsets as Needed				
DSS-14 & DSS-25: End of Post Cal	12:10:00	10:54:59	05:10:00	
RSSG: End DSS-14 & DSS-25 Open-Loop Recordings	12:10:00	10:54:59	05:10:00	
S-Band OFF	12:15:23	11:00:22	05:15:23	
Ka-Band OFF	12:15:29	11:00:28	05:15:29	
TLM ON/RNG ON	12:15:55	11:00:54	05:15:55	
End of Rev 236 Observations	12:16:01	11:01:00	05:16:01	
Spacecraft Off Earth Point	12:16:32	11:01:31	05:16:32	
RSSG: End DSS-43 & DSS-35 Open-Loop Recordings	12:40:00	11:24:59	05:40:00	
DSS-43 & DSS-35: End of Track	13:15:00	11:59:59	06:15:00	
DSS-43 & DSS-35: End of Post Cal	13:30:00	12:14:59	06:30:00	

Madrid DSS-63 related activities

Goldstone DSS-14 & DSS-25 related activities

Canberra DSS-43 & DSS-35 related activities

Predicted ring event times are approximate and are based on NAV OD on 06/03/2016 (160603BP_SCPSE_16141_16165.bsp)