

S77 Rev 183 Timeline for RSS Rhea (R4) Gravity Observation

and Gravity Science Enhancements

2013/067-069, Thu-Sun, March 7-10, 2013 PST

Rhea Closest Approach: 2013/068-19:34 ERT

OWLT = 01:16, RTLT = -02:32

Closed-loop Doppler is prime for gravity. Open-loop is backup

RSR = Radio Science Receiver (open-loop receiver) RSSG = Radio Science Systems Group GSE = Gravity Science Enhancement

RSSG: Note telemetry bit rate changes. Set RSR gain accordingly and do not change during observation

DOY	Time ERT	Date/Day PST	Time PST	Event	Comments
				X-TWTA ON	Has been ON for days
067	05:15:00	Thu, Mar 7	9:15 PM	DSS-25 Pre-cal	Pass# 0067. Cas specific 4th-order pointing model, TLC enabled Enter Operator Directive: AP TMO 000001
	05:15:00		9:15 PM	DSS-55 Pre-cal	Pass# 0067. Cas specific 4th-order pointing model, TLC enabled
	05:45:00		9:45 PM	DSS-14 Pre-cal	Pass# 0067
	06:45:00		10:45 PM	DSS-25 BOT	1-way
	06:45:00		10:45 PM	DSS-14 BOT	1-way
	06:45:00		10:45 PM	DSS-55 BOT	1-way
	06:45:00		10:45 PM	Begin Inbound GSE	
	06:45:00		10:45 PM	Ka-band ON (KEX & Ka-TWTA)	On for Inbound GSE only
	06:45:00		10:45 PM	DSS-25 Enable Monopulse	At Ka-band 1-way acquisition
	06:45:00		10:45 PM	DSS-55 Enable Monopulse	At Ka-band 1-way acquisition
	06:55:00		10:55 PM	DSS-14 Transmitter ON	Ramped uplink predicts
	08:20:00	Fri, Mar 8	12:20 AM	DSS-55 EOT	
				DSS-55 Disable Monopulse	At loss of Ka-band signal
	09:27:00		1:27 AM	DSS-25 Disable Monopulse	Before mode switch to 3-way
	09:27:50		1:27 AM	DSS-14 Tracking mode change to 2-way	
	09:27:50		1:27 AM	DSS-25 Tracking mode change to 3-way w/ 14	
				DSS-25 Re-enable Monopulse	At Ka-band 3-way acquisition
	13:12:36		5:12 AM	DSS-14 Transmitter OFF	
	15:43:29		7:43 AM	Ka-band OFF	
				DSS-25 Disable Monopulse	At loss of Ka-band signal
	15:45:00		7:45 AM	End Inbound GSE	
	15:45:00		7:45 AM	DSS-25 EOT	
	15:45:00		7:45 AM	DSS-14 EOT	
068	03:45:00	Fri, Mar 8	7:45 PM	DSS-55 Pre-Cal	Pass# 0068. Cas specific 4th-order pointing model, TLC enabled
	05:00:00		9:00 PM	DSS-25 Pre-cal	Pass# 0068. Cas specific 4th-order pointing model, TLC enabled Enter Operator Directive: AP TMO 000001
	05:15:00		9:15 PM	DSS-55 BOT	Uplink support only. No downlink
	05:49:41		9:49 PM	DSS-55 Transmitter ON	
	06:26:23		10:26 PM	Ka-band ON	On board s/c. Stays ON until end of outbound GSE
	06:30:00		10:30 PM	DSS-25 BOT	No signal until 082219
	06:50:00		10:50 PM	Uplink Transfer from 55 to 25	Ramped uplink predicts
	07:45:00		11:45 PM	RSSG: Begin DSS-25 RSR recordings (X & Ka), att auto	
	08:20:00	Sat, Mar 9	12:20 AM	DSS-55 EOT	
	08:22:19		12:22 AM	Begin 1st Segment - Begin Coherent Downlink	
	08:22:19		12:22 AM	DSS-25 Acquire 3-way signal w/ 55	
				DSS-25 Enable Monopulse	When requested by RSSG
	08:58:00		12:58 AM	DSS-25 Transmitter OFF	5 minutes after DKF time 085342
	09:22:37		1:22 AM	DSS-25 Tracking mode change to 2-way	
	11:26:18		3:26 AM	End 1st Segment	
				Begin s/c turn from Earth	
				DSS-25 Disable Monopulse	At loss of Ka-band signal
	11:40:00		3:40 AM	RSSG: End DSS-25 RSR recordings (X & Ka)	
	12:00:00		4:00 AM	DSS-25 EOT	
	13:20:00		5:20 AM	DSS-34 Pre-cal	Pass# 0068. Cas specific 4th-order pointing model Enter Operator Directive: AP TMO 000001
	14:50:00		6:50 AM	DSS-34 BOT	No signal until 180342
	15:31:11		7:31 AM	DSS-34 Transmitter ON	
	17:30:00		9:30 AM	RSSG: Begin DSS-34 RSR recordings (X & Ka), att auto	
	18:03:42		10:03 AM	Begin 2nd Segment - Begin Coherent Downlink	
	18:03:42		10:03 AM	DSS-34 Acquire 2-way signal	
				DSS-34 Enable Monopulse	When requested by RSSG

DOY	Time ERT	Date/Day PST	Time PST	Event	Comments
	18:36:00		10:36 AM	DSS-34 Transmitter OFF	5 minutes after DKF time 183112
	19:34:00		11:34 AM	R4 Rhea Closest Approach	Altitude 997 km
	21:03:41		1:03 PM	End 2nd Segment	
				Begin s/c turn from Earth	
				DSS-34 Disable Monopulse	At loss of Ka-band signal
	21:15:00		1:15 PM	RSSG: End DSS-34 RSR recordings (X & Ka)	
	21:35:00		1:35 PM	DSS-55 Pre-cal	Pass# 0068. Cas specific 4th-order pointing model, TLC enabled
	22:01:13		2:01 PM	DSS-34 Transmitter ON	
	23:05:00		3:05 PM	DSS-55 BOT	No signal until 003340
	23:15:45		3:15 PM	DSS-34 Transmitter OFF	
	23:30:00		3:30 PM	DSS-55 Transmitter ON	
	23:35:00		3:35 PM	DSS-34 EOT	
069	00:00:00		4:00 PM	RSSG: Begin DSS-55 RSR recordings (X & Ka), att auto	
	00:33:40		4:33 PM	Begin 3rd Segment - Begin Coherent Downlink	
	00:33:40		4:33 PM	DSS-55 Acquire 3-way signal w/ 34	
				DSS-55 Enable Monopulse	When requested by RSSG
	01:06:00		5:06 PM	DSS-55 Transmitter OFF	5 minutes after DKF time 010114
	01:48:11		5:48 PM	DSS-55 Tracking mode change to 1-way	
				DSS-55 Re-enable Monopulse	When requested by RSSG
	02:02:26		6:02 PM	DSS-55 Tracking mode change to 2-way	
				DSS-55 Re-enable Monopulse	When requested by RSSG
	03:33:39		7:33 PM	End 3rd Segment	
				Begin s/c turn from Earth	
				DSS-55 Disable Monopulse	At loss of Ka-band signal
	03:45:00		7:45 PM	RSSG: End DSS-55 RSR recordings (X & Ka)	
	04:00:00		8:00 PM	DSS-34 EOT	
069	05:15:00	Sat, Mar 9	9:15 PM	DSS-25 Pre-cal	Pass# 0069. Cas specific 4th-order pointing model Enter Operator Directive: AP TMO 000001
	05:45:00		9:45 PM	DSS-14 Pre-cal	Pass# 0069
	06:45:00		10:45 PM	DSS-25 BOT	1-way
	06:45:00		10:45 PM	DSS-14 BOT	1-way
				Begin Outbound GSE	
				DSS-25 Enable Monopulse	At Ka-band 1-way acquisition
	06:55:00		10:55 PM	DSS-14 Transmitter ON	
	09:27:20	Sun, Mar 10	1:27 AM	DSS-14 Tracking mode change to 2-way	
	09:27:20		1:27 AM	DSS-25 Tracking mode change to 3-way w/ 14	
	13:12:52		5:12 AM	DSS-14 Transmitter OFF	
	15:43:14		7:43 AM	Ka-band OFF	
	15:45:00		7:45 AM	End Inbound GSE	
				DSS-25 Disable Monopulse	At loss of Ka-band signal
	15:45:00		7:45 AM	DSS-14 EOT	
	15:45:00		7:45 AM	DSS-25 EOT	

R4 Gravity passes:

13 068 0345 0515 0820 0835 DSS-55 CAS TP RS183-R4 GRAV 5639 N750 1A1
13 068 0500 0630 1200 1215 DSS-25 CAS TP RS183-R4 GRAV 5639 N748 1A1
13 068 1320 1450 2335 2350 DSS-34 CAS TP RS183-R4 GRAV 5640 N750 1A1
13 068 2135 2305 0400 0415 DSS-55 CAS TP RS183-R4 GRAV 5640 N750 1A1

Gravity Science Enhancement (GSE) passes around R4:

Inbound

13 067 0515 0645 1545 1600 DSS-25 CAS RS183-GSEORT MC 5638 N748 1A1
13 067 0515 0645 0820 0835 DSS-55 CAS RS183-GRVORT MC 5638 N750 1A1
13 067 0545 0645 1545 1600 DSS-14 CAS TKG PASS 5638 N003 1A1

Outbound

13 069 0515 0645 1545 1600 DSS-25 CAS TP RS183-RH GSE 5640 N748 1A1
13 069 0545 0645 1545 1600 DSS-14 CAS T/P R4PB 5640 N003 1A1