

## S59 Rev 130 Timeline for RSS Enceladus E9 Gravity Observation and Gravity Science Enhancements

2010/117-119, Mon-Wed April 26-28, 2010  
Enceladus Closest Approach: 2010/118-01:22 ERT

OWLT = 01:12, RTLT = ~02:24

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. Playback during GSEs only. Set RSR fgain accordingly and do not change during observation

DOY	Time ERT	Date/Day PDT	Time PDT	Event	Comments
				X-TWTA ON	Has been ON for days
116	22:30	Mon 4/26	3:30 PM	DSS-25 Pre-cal	Pass# 4589. Cas specific 4th-order pointing model, TLC enabled
	23:55		4:55 PM	DSS-63 Pre-cal	This pass to support Inbound GSE and occultation experiment
117	00:00		5:00 PM	DSS-25 BOT	Pass# 4589. This pass is for Telemetry support
				Begin Inbound GSE	1-way
				DSS-25 Enable Monopulse	At 1-way acquisition
	00:15		5:15 PM	DSS-25 Transmitter ON	DKF time 001500
	00:55		5:55 PM	DSS-63 BOT	1-way
	01:02		6:02 PM	Ka-band ON (KEX & Ka-TWTA)	ON for GSE. Stays ON until end of outbound GSE on DOY 119 DKF time 010231 S-band ON from ~117/06:57-15:12 for Saturn Occ
	02:39		7:39 PM	DSS-25 Tracking Mode Change	1-way to 2-way. DKF time 023944
				DSS-63 Tracking Mode Change	1-way to 3-way. DKF time 023944
	03:30		8:30 PM	DSS-63 EOT	
	06:30		11:30 PM	DSS-34 Pre-cal	Pass# 4590. Cassini specific 4th-order pointing model
	06:35		11:35 PM	DSS-25 Transmitter OFF	DKF time 063500
	06:57		11:57 PM	S-band ON	For occultation experiment
	07:00	Tue 4/27	12:00 AM	DSS-43 Pre-cal	Mainly occultation support (just first 48mins of gravity)
	07:00		12:00 AM	DSS-15 Pre-cal	Occultation support only
	08:00		1:00 AM	DSS-34 BOT	3-way with DSS-25. Occultation support then gravity
	08:00		1:00 AM	DSS-43 BOT	3-way with DSS-25
				DSS-15 BOT	3-way with DSS-25
	08:59		1:59 AM	End Inbound GSE	
				Start Saturn occultation experiment	Refer to Essam's timeline for events during occultation
				Note: TLM OFF	DKF time 085923
				All stations Tracking Mode Change	1-way
	11:00		4:00 AM	DSS-25 EOT	
	11:00		4:00 AM	DSS-15 EOT	
	12:48		5:48 AM	DSS-34 Transmitter ON	DKF time 124800
	14:50		7:50 AM	DSS-55 Pre-cal	Pass# 4590. Cas specific 4th-order pointing model, TLC enabled LQG coefficients?

DOY	Time ERT	Date/Day PDT	Time PDT	Event	Comments
	15:12		8:12 AM	End Saturn occultation experiment	
				Note: TLM ON	DKF time 151218
				Note: Bit Rate Change	Bit Rate 1896
				S-band OFF	DKF time 151224
	15:12		8:12 AM	Begin Enceladus Gravity - Begin Coherent Downlink	DKF time 151247
				DSS-34 Tracking Mode Change	1-way to 2-way. DKF time 151247
				DSS-34 Enable Monopulse	As requested by RSSG
				DSS-43 Tracking Mode Change	1-way to 3-way with DSS-34. DKF time 151247
	15:50		8:50 AM	RSSG: Begin RSR recordings (X & Ka) at DSS-55	
	16:00		9:00 AM	DSS-43 EOT	
	16:20		9:20 AM	DSS-55 BOT	3-way with DSS-34
				DSS-55 Enable Monopulse	As requested by RSSG. Wait till 10 degrees elevation angle
	16:40		9:40 AM	Uplink Transfer from 34 to 55	DKF time 164000
	17:00		10:00 AM	DSS-34 EOT	
				DSS-34 Disable Monopulse	At loss of Ka-band signal
	19:04		12:04 PM	DSS-55 Tracking Mode Change	3-way to 2-way. DKF time 190448
	22:15		3:15 PM	DSS-25 Pre-cal	Pass# 4590. Cas specific 4th-order pointing model, TLC enabled
	23:15		4:15 PM	RSSG: Begin RSR recordings (X & Ka) at DSS-25	
	23:45		4:45 PM	DSS-25 BOT	3-way with DSS-55
				DSS-25 Enable Monopulse	As requested by RSSG. Wait till 10 degrees elevation angle
118	01:22		6:22 PM	E9 Enceladus Closest Approach	00:10 SCET. Altitude 100 km
	02:55		7:55 PM	Uplink Transfer from 55 to 25	DKF time 025500
	03:10		8:10 PM	DSS-55 EOT	
				DSS-55 Disable Monopulse	At loss of Ka-band signal
	05:05		10:05 PM	DSS-34 Pre-cal	Pass# 4591. Cassini specific 4th-order pointing model
	05:19		10:19 PM	DSS-25 Tracking Mode Change	3-way to 2-way. DKF time 051950
	06:05		11:05 PM	RSSG: Begin RSR recordings (X & Ka) at DSS-34	
	06:35		11:35 PM	DSS-34 BOT	3-way with DSS-25
				DSS-34 Enable Monopulse	As requested by RSSG. Wait till 10 degrees elevation angle
	10:30	Wed 4/28	3:30 AM	Uplink Transfer from 25 to 34	DKF time 103000
	11:00		4:00 AM	DSS-25 EOT	
				DSS-25 Disable Monopulse	At loss of Ka-band signal
	12:54		5:54 AM	DSS-34 Tracking Mode Change	3-way to 2-way. DKF time 125452
	14:45		7:45 AM	DSS-55 Pre-cal	Pass# 4591. Cas specific 4th-order pointing model, TLC enabled LQG coefficients?
	15:45		8:45 AM	RSSG: Begin RSR recordings (X & Ka) at DSS-55	
	16:15		9:15 AM	DSS-63 Pre-cal	Pass# 4591. This pass is for Telemetry support
	16:15		9:15 AM	DSS-55 BOT	3-way with DSS-34
	16:36		9:36 AM	Uplink Transfer from 34 to 55	DKF time 163600
	16:45		9:45 AM	RSSG: Begin RSR recordings (X) at DSS-63	
	16:55		9:55 AM	DSS-34 EOT	
				DSS-34 Disable Monopulse	At loss of Ka-band signal
	17:15		10:15 AM	DSS-63 BOT	3-way with DSS-34
	17:16		10:16 AM	End Enceladus Gravity - Continue Coherent Downlink	Continue coherent data for Gravity Science Enhancement (GSE)
				Begin Outbound GSE	

DOY	Time ERT	Date/Day PDT	Time PDT	Event	Comments
	19:00		12:00 PM	DSS-55 Tracking Mode Change	3-way to 2-way. DKF time 190054
				DSS-63 Tracking Mode Change	3-way with 34 to 3-way with 55. DKF time 190054
	23:55		4:55 PM	DSS-55 Tranmitter OFF	5 minutes after DKF time 235032
119	02:15		7:15 PM	DSS-55 EOT	
				DSS-55 Disable Monopulse	At loss of Ka-band signal
				DSS-63 EOT	
				End Outbound GSE	
	02:16		7:16 PM	Ka-band OFF	On-board s/c
				Begin s/c Turn from Earth	Turn by Science Planning (SP)