

Detailed Timeline (1 of 6)

| Date/ Time | Event | Responsible Team Member(s) | Task Completed |
|--|--|---|----------------|
| Feb 23, 2009 10:00 AM-12:30 PM EST | Test Readiness Review | All | Done |
| Feb 24, 2009 5-8 PM EST | Dry Run APL Ground Station test Configuration | Ron Schulze APL Ground Station | Done |
| Feb 27, 2009 12:00 PM EST | Dry Run GBT pointing sequence | Bryan Butler, Scott Turner, Frank Ghigo | Done |
| Feb 28, 2009 9:30:00 UTC | Post Updated Ephemeris to APL Ground Station FTP | ISRO MOps | Done |
| Feb 28, 2009 12:00:00 UTC | Email Ephemeris to Bryan Butler and Scott Turner | Priscilla McKerracher | Done |

Detailed Timeline (2 of 6)

| Date/ Time | Event | Responsible Team Member(s) | Task Completed |
|------------------------------|--|--|------------------|
| Feb 28, 2009 12:30:00 UTC | Brian Sequeira provides updated orbit AoS times to Mckerracher, Schulze, Butler, Turner, Hillyard, APL and GBT Ground Facilities based on new ephemeris. Commence review of ISRO integrated command sequence Verify AoS Plans with APL Ground Station Calculations | Brian Sequeira Matt Hillyard Priscilla McKerracher | Done |
| Feb 28, 2009 14:00:00 UTC | Start the review of ISRO S/C command sequence based on new ephemeris | Brian Sequeira Matt Hillyard Priscilla McKerracher | Done |
| 14:00:00 UTC | Brian Butler provides GBT pointing generation to Scott Turner (APL) for Review | Bryan Butler Scott Turner | Done |
| 14:30:00 UTC | Verify suitability of latest ephemeris and email assessment to the following team members: Butler, Sequiera, Hillyard, McKerracher, Schulze. | Scott Turner | Done |
| 14:55:00 UTC | APL Ground Station supports nominal telemetry pass with Chandrayann-1. Do the latest ephemeris files work okay? | APL Ground Station | Done |
| 15:15:00 UTC | GBT Ground Pointing Review Complete. Email test team results. | Scott Turner | Done 17:15:00 |

Detailed Timeline (3 of 6)

| Date/ Time | Event | Responsible Team Member(s) | Task Completed |
|---------------|---|--|-------------------|
| 16:00:00 UTC | Complete the review of ISRO S/C command sequence | Brian Sequeira Matt Hillyard Priscilla McKerracher | Done 16:00 UTC |
| 17:52:00 UTC | ISRO uploads integrated command data to S/C for GBT calibration events | ISRO Brian Sequeira | Done 18:46 UTC |
| 18:15:00 UTC | Update timeline to test team | Ron Schulze | Done 18:30 UTC |
| 19:00:00 UTC | Bryan Butler provides pointing files to GBT and verifies that pointing files are properly injected. | Bryan Butler Frank Ghigo | Done 18:00 UTC |
| 19:00:00 UTC | Open telecon line: 443-778-2200 <u>Passcode: 266715</u> Required attendees: ISRO (Brian Sequeira, APL Ground Station, POC, Bryan Butler, GBT, Frank Ghigo, Roger Norrod) | Ron Schulze | Done 16:00 UT |
| 19:30:00 UTC | GBT commences reconfiguration process for Forerunner transmissions at 2384.15 MHz. | Frank Ghigo | |
| 19:45:00 UTC | GBT reconfiguration is complete | Frank Ghigo | |

Detailed Timeline (4 of 6)

| Date/ Time | Event | Responsible Team Member(s) | Task Completed |
|--------------------------------|---|--|----------------------------------|
| Feb 28, 2009 <19:44:52 UTC> | Earliest Acquisition of Chandrayaan-1 for Pass #1 | GBT Ground Station APL Ground Station | Done 19:47:00 |
| <19:53:20 UTC> | Initiate Attitude Profile (AtP) for Pass #1 | ISRO | Done |
| 19:59:00 UTC | GBT track S/C S-band Telemetry (Freq=2230.8 MHz, Phase Mod) | GBT | Done 20:48 |
| <20:07:53 UTC> | Power Up Forerunner Instrument | ISRO | Done 20:07:55 |
| <20:09:53 UTC> | Activate Forerunner. | ISRO | Done 20:09:55 |
| <20:13:53 UTC> | Mini-SAR Standby | ISRO | Done 20:13:53 |
| <20:14:53 UTC> | Attitude Buffer TGL (Increases S/C telemetry to high rate) | ISRO | Done 20:14:53 |
| <20:15:08 UTC> | Forerunner Collect Start, This is when Forerunner is transmitting chirped waveform. | ISRO GBT | Done 20:15:08 GBT Happy 20:30 |
| <20:31:08 UTC> | Forerunner Collect Stop | ISRO GBT | Done 20:31:08 |
| <20:31:23 UTC> | Attitude Buffer TGL (Decrease S/C telemetry to nominal) | ISRO | Done 20:31:23 |
| <20:31:53 UTC> | Forerunner De-Activate. | ISRO | Done 20:31:55 |
| <20:32:10 UTC> | Forerunner Off. | ISRO | Done 20:32:10 |
| <20:32:20 UTC> | S/C returns to Lunar attitude. | ISRO | Done 20:32:20 |
| <21:09:00 UTC> | Loss of Chandrayaan-1 for Pass #1 | GBT Ground Station APL Ground Station | Done 21:09:00 |

< > These times subject to change based on Sat. ephemeris

T₁(Equatorial Crossing for Pass #1)=20:23:05

Detailed Timeline (5 of 6)

| Date/ Time | Event | Responsible Team Member(s) | Task Completed |
|--------------------------------|---|--|-------------------------------------|
| Feb 28, 2009 <21:43:15 UTC> | Acquisition of Chandrayaan-1 for Pass #2 | GBT Ground Station APL Ground Station | Done 22:01:48 |
| <22:06:17 UTC> | Initiate Attitude Profile (AtP) for Pass #2 | ISRO | Done 22:06:17 GBT 22:12:15 (S/C) |
| <22:20:51 UTC> | Power Up Forerunner Instrument | ISRO | Done 22:20:51 |
| <22:22:51 UTC> | Activate Forerunner. | ISRO | Done 22:22:51 |
| <22:26:51 UTC> | Forerunner Standby | ISRO | Done 22:26:51 |
| <22:27:51 UTC> | Attitude Buffer TGL (Increases S/C telemetry to high rate) | ISRO | Done 22:27:51 |
| <22:28:06 UTC> | Forerunner Collect Start A, This is when Forerunner is transmitting chirped waveform. | ISRO GBT | Done 22:28:09 |
| <22:28:08 UTC> | Forerunner Collect Start B | ISRO | Done |
| <22:32:08 UTC> | Forerunner Collect Stop | ISRO GBT | Done 22:32:08 |
| <22:32:23 UTC> | Attitude Buffer TGL (Decrease S/C telemetry to nominal) | ISRO | Done 22:32:23 |
| <22:32:38 UTC> | Forerunner De-Activate. | ISRO | Done 22:32:38 |
| <22:32:55 UTC> | Forerunner Off. | ISRO | Done 22:32:55 |
| <22:33:00 UTC> | S/C returns to Lunar attitude. | ISRO | Done |
| <23:07:23 UTC> | Loss of Chandrayaan-1 for Pass #2 | GBT Ground Station APL Ground Station | Done |

< > These times subject to change based on Sat. ephemeris

T₂(Reference Time for Pass #2)=22:30:08 UTC @ 27 S Latitude

Detailed Timeline (6 of 6)

| Date/ Time | Event | Responsible Team Member(s) | Task Completed |
|--------------------------------|---|--|------------------------------------|
| Feb 28, 2009 <23:41:15 UTC> | Initiate Attitude Profile (AtP) for Pass #3 | ISRO | Done |
| <23:41:35 UTC> | Acquisition of Chandrayaan-1 for Pass #3 | GBT Ground Station APL Ground Station | Done Done |
| <23:55:49 UTC> | Power Up Forerunner Instrument | ISRO | Done 23:55:49 |
| <23:57:49 UTC> | Activate Forerunner. | ISRO | Done 23:57:49 |
| Mar 1, 2009 <00:01:49 UTC> | Forerunner Standby | ISRO | Done 00:01:49 |
| <00:02:51 UTC> | Attitude Buffer TGL (Increases S/C telemetry to high rate) | ISRO | Done 00:02:51 |
| <00:03:06 UTC> | Forerunner Collect Start A, This is when Forerunner is transmitting a chirped waveform. | ISRO GBT | Done 00:03:06 Verified 00:03:26 |
| <00:03:08 UTC> | Forerunner Collect Start B | ISRO | |
| <00:07:08 UTC> | Forerunner Collect Stop | ISRO GBT | Done 00:07:08 |
| <00:07:23 UTC> | Attitude Buffer TGL (Decrease S/C telemetry to nominal) | ISRO | Done 00:07:23 |
| <00:07:38 UTC> | Forerunner De-Activate. | ISRO | Done 00:07:38 |
| <00:07:55 UTC> | Forerunner Off. | ISRO | Done 00:07:55 |
| <00:08:00 UTC> | S/C returns to Lunar attitude. | ISRO | Done |
| <01:05:02 UTC> | Loss of Chandrayaan-1 for Pass #3 | GBT Ground Station APL Ground Station | Done |

< > These times subject to change based on Sat. ephemeris

T₃(Reference for Pass #3)=00:05:08 @ 43N Latitude

APL