

STEREO MOC Status Report
Time Period: 2015:061 - 2015:067

STEREO Ahead (STA) Status:

1. The following Ground System anomalies/events occurred during this reporting period:

- On day 062, during the DSS-43 support, turbo decoder lock was lost intermittently between 0320z through 0504z due to the effects of solar scintillation from an M8.2 class solar flare from active region 12290. This anomaly resulted in the loss of 3 SECCHI commands not being received, which were resent on day 063, and 41 frames of spacecraft SSR playback and real-time data.
- On day 063, during the DSS-43 support, turbo decoder lock was lost intermittently between 0551z through 0729z due to the effects of solar scintillation. This anomaly resulted in the loss of 3 SECCHI commands not being received and 109 frames of spacecraft SSR playback and real-time data.
- On day 064, during the DSS-63 support, turbo decoder lock was lost intermittently between 1402z through 1626z due to the effects of solar scintillation. This anomaly resulted in the loss 123 frames of spacecraft SSR playback and real-time data.
- On day 065, during the DSS-14 support, turbo decoder lock was lost intermittently between 2051z and 066-0014z due to the effects of solar scintillation. This anomaly resulted in the loss of 17 frames of spacecraft SSR playback and real-time data. See DR #G116027 for more information.
- On day 066, during the DSS-65 support, turbo decoder lock was lost intermittently between 0742z and 1038z due to the effects of solar scintillation. This anomaly resulted in the loss of 79 frames of real-time data.
- On day 066, during the DSS-14 support, the downlink was lost between 2152z and 2305z due to an antenna power anomaly which resulted in the antenna being stowed. Once back on point, turbo decoder lock was lost intermittently between 2305z and 0028z due to the effects of solar scintillation. These anomalies resulted in the loss of 73

minutes of continuous, and 9 intermittent frames of spacecraft SSR playback and real-time data. See DR #G116029 for more information.

- On day 067, during the DSS-63 support, turbo decoder lock was lost intermittently between 0757z and 1003z due to the effects of solar scintillation. This anomaly resulted in the loss of 9 frames of spacecraft SSR playback and real-time data.
- On day 067, during the DSS-35 support, turbo decoder lock was lost intermittently between 2101z through 2305z due to the effects of solar scintillation. This anomaly resulted in the loss of 3 SECCHI reset recovery commands not being received, which were resent on day 068, and 41 frames of spacecraft SSR playback and real-time data.

2. The following spacecraft/instrument events occurred during this week. Note that the Ahead observatory is operating on the second side lobe of the HGA to prevent overheating of the HGA feed assembly which is currently at 111 degrees C with the HGA angle at 8.5 degrees, with respect to the spacecraft-Sun line.

- On day 064, the last timetag command load, covering days 068 through 083, before the Ahead observatory enters solar conjunction was loaded and verified.
- On day 064, PLASTIC conducted a stored command buffer timing test and after verifying the contents on day 065, the commands were flushed.
- On day 067, the SECCHI instrument reset due to a critical task not responding at 00:00:20z. The SECCHI team reconfigured the instrument to operational mode at 068-1445z. This was the 37th reset of SECCHI on the Ahead observatory.
- The average daily science data return for Ahead, while operating on the second side lobe on the HGA, was 17 Mbits during this week.

STEREO Behind (STB) Status:

1. The following Ground System anomalies/events occurred during this reporting period:

- None.

2. Detailed status of the activities that occurred on the Behind loss of communication anomaly, which occurred on day 2014-274, are listed below.

- The Behind observatory entered superior solar conjunction at the two degree SPE angle on day 022. Recovery efforts will resume post solar conjunction on day 082 with increasing the ground transmit power through arraying uplink stations and implementing the Failure Review Board recommendations.

Significant findings to date:

1. Analysis of the three DSN extracted telemetry frames from the carrier signal just before the planned observatory reset/anomaly occurred on day 2014-274, October 1st, showed nominal performance of the spacecraft, i.e., no anomalies, IMU off, and the star tracker providing an attitude solution.
2. Post reset, from the very limited telemetry, three packets, extracted from the carrier signal by the DSN, the X-axis gyro on IMU-A had failed. Unfortunately, this telemetry contained only G&C anomaly data and no spacecraft summary data, i.e., the state of the RF, G&C, fault protection and other subsystems is not known at the time of the anomaly. With a failed IMU and the star tracker being off-line for an undetermined duration, the sun sensors will keep the observatory pointed at the Sun, though the G&C will not have any roll knowledge, and cannot roll the observatory as part of the safing configuration to re-establish communications on the LGAs. From analysis of this telemetry and initial G&C simulations, it is highly suspected that the observatory is rotating about the principal axis of inertia due to an autonomous momentum dump initiated by biased gyro data flagged good by the IMU, but this has not yet been confirmed.
3. At least two anomalies occurred post reset, the star tracker not promoting to AAD mode and the X-axis gyro

failure. Unfortunately, due to the number of possible combinations, the STEREO fault protection system is not designed for simultaneous failures.

The cause and effect analysis of the loss of communications from the LGAs is continuing. G&C simulations using the biased gyro data flagged good by the IMU are continuing to better understand the potential impact to the observatory state. Recovery from a negative power state is also being investigated. While the recovery and analysis efforts continue on Behind, as the Ahead observatory will enter superior solar conjunction in March, the primary focus of the engineering team is on developing operational configuration changes to add robustness to the G&C rate sensor usage to ensure the Ahead observatory's continued safety.

Once communications are restored and the anomaly resolved, the Behind observatory will be returned to nominal science data collection as soon as it is safely possible.