

STEREO MOC Status Report
Time Period: 2015:068 - 2015:074

STEREO Ahead (STA) Status:

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

- On day 068, during the DSS-63 support, turbo decoder lock was lost intermittently between 1514z through 1620z due to the effects of solar scintillation. This anomaly resulted in the loss 3 frames of spacecraft SSR playback and real-time data.
- On day 069, during the DSS-54 support, a DCD swap occurred unexpectedly between 1303z and 1304z due to a fault tolerance check. This anomaly did not result in any data loss. See DR #M108612 for more information.
- On day 069, during the DSS-14 support, turbo decoder lock was lost intermittently between 2146z through 2157z due to the effects of solar scintillation. This anomaly resulted in the loss 2 frames of spacecraft SSR playback and real-time data.
- On day 071, during the DSS-43 support, turbo decoder lock was lost intermittently between 0524z through 0724z due to the effects of solar scintillation. This anomaly resulted in the loss of one SECCHI command not being received, which was resent on the subsequent track, and 14 frames of spacecraft SSR playback and real-time data.
- On day 071, during the DSS-65 support, turbo decoder lock was lost intermittently between 1219z through 1336z due to the effects of solar scintillation. This anomaly resulted in the loss 3 frames of real-time data.
- On day 071, during the uplink array test with DSS-24 and 25 supports, turbo decoder lock was lost intermittently between 1551z through 1615z due to the effects of solar scintillation. This anomaly resulted in the loss 13 frames of real-time data.
- On day 072, during the DSS-43 support, turbo decoder lock was lost intermittently between 0541z through 0701z due to

the effects of solar scintillation. This anomaly resulted in the loss of 73 frames of spacecraft SSR playback and real-time data.

- On day 072, during the DSS-63 support, turbo decoder lock was lost intermittently between 1414z through 1635z due to the effects of solar scintillation. This anomaly resulted in the loss of one no-op command not being received and 66 frames of spacecraft SSR playback and real-time data.
- On day 073, during the DSS-65 support, turbo decoder lock was lost intermittently throughout the track due to the effects of solar scintillation. This anomaly resulted in the loss of 157 frames of real-time data.
- On day 073, during the DSS-43 support, turbo decoder lock was lost intermittently throughout the track due to the effects of solar scintillation. This anomaly resulted in the loss of 2 no-op commands, and 683 frames of spacecraft SSR playback and real-time data.
- On day 074, during the DSS-25 support, in addition to losing turbo decoder lock intermittently throughout the track, the downlink was lost between 1550z and 1613z, and again between 1619z and 1647z due to the effects of solar scintillation. These anomalies resulted in the loss of 51 minutes of continuous, and 395 intermittent frames of real-time data, and 2 no-op commands were dropped. See DR #G116063 for more information.

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 112 degrees C with the HGA angle at 8.3 degrees, with respect to the spacecraft-Sun line.

- On day 071, an uplink array test with DSS-24 and 25 was successfully conducted by the DSN which increased the Ahead uplink received power by 6 dB.
- On day 068 and 072, PLASTIC loaded timetag commands to the C&DH stored command buffer in preparation for powering down the instrument on day 079 for solar conjunction entry.

- The average daily science data return for Ahead, while operating on the second side lobe on the HGA, was 16 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 124, May 4th, with implementing the Failure Review Board recommendations and increasing the ground transmit power through arraying uplink stations.

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.