

STEREO MOC Status Report  
Time Period: 2015:040 - 2015:046

STEREO Ahead (STA) Status:

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

- On day 043, the STEREO Solar Conjunction Readiness Review was held at JHU/APL.
- On day 043, during the DSS-43 support, initial telemetry lock was six minutes late due to an operator error at the station. This anomaly resulted in the loss of 6 minutes of real-time data and 4 minutes of spacecraft SSR data. See DR #C110950 for more information.
- On day 044, the DSS-63 support, turbo decoder lock was lost briefly at 1619z. This anomaly resulted in the loss of 5 frames of 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 109 degrees C with the HGA angle at 9.1 degrees, with respect to the spacecraft-Sun line.

- On day 041, the 76<sup>th</sup> momentum dump was executed successfully at 1530z, which imparted a delta V of 0.109 m/sec.
- On day 043, the last update of ephemerides for solar conjunction, which span 2015-043 through 2016-032, were loaded to G&C EEPROM.
- On day 043, PLASTIC tested the entrance system at 2125z to determine the cause of an increasing power supply current indication.
- The average daily science data return for Ahead, while operating on the second side lobe on the HGA, was 14 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 1<sup>st</sup>, 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.