

STEREO MOC Status Report
Time Period: 2014:314 - 2014:320

STEREO Ahead (STA) Status:

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

- On day 319, during the DSS-14 support, ranging lock was lost intermittently beginning at 1619z through 1756z. Low ranging margin is a known issue for side lobe operations and the FDF can meet ephemeris accuracy requirements using Doppler data only. See DR #G115660 for more information.
- On day 319, during the DSS-43 support, telemetry lock was lost intermittently between 2036z through 2138z due to heavy rain at the Canberra complex. This anomaly resulted in the loss of 192 frames of telemetry data. See DR #C110699 for more information.
- On day 320, during the DSS-14 support, initial telemetry lock was delayed nine minutes beginning at 1510z due to a receiver anomaly at the station. A second receiver channel was added and telemetry lock occurred at 1519z. This anomaly resulted in the loss of 389 frames of telemetry data. See DR #G115663 for more information.

2. The following spacecraft/instrument events occurred during this week. Note that the Ahead observatory is operating on the first side lobe of the HGA to prevent overheating of the HGA feed assembly which is currently at 114 degrees C with the HGA angle at 7.9 degrees, with respect to the spacecraft-Sun line.

- On day 315, MOps macro release 1.1.26 and DHS release 1.1.10 were loaded to C&DH RAM. These releases contain macros and a RTDFD table to support instrument real-time science and spacecraft housekeeping telemetry using 34 meter stations while downlinking at 633 bps during side lobe operations.
- On day 319, during the DSS-43 support, the spacecraft SSR playback was extended for the 4.75 hour duration of the support. This was necessary as the spacecraft SSR playback

has fallen behind due to the number of Ahead tracks shifted to Behind for contingency operations.

- On day 320, during the DSS-35 CEC transmitter PIT support, the macros and RTDFD table for real-time science telemetry along with spacecraft housekeeping telemetry at the 633 bps on a 34 meter station were tested. Telemetry rates for all instruments and spacecraft housekeeping were as planned and no unexpected data loss occurred.
- The average daily science data return for Ahead, while operating on the first side lobe on the HGA, was 65 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 274, are listed below. To ensure communications on the LGA during long term recovery efforts, the Behind track coverage have been reduced to 3 hour 70 meter supports for 3 days in a row each week.
 - On days 315 through 317, during the DSN 70 meter supports, recovery commanding was conducted on ensuring that the transmitter is in its operational configuration. No signal was received by the DSN radio science receivers.

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 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 bad gyro data flagged good, 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 bad gyro data flagged good 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 operational plan for exiting the solar conjunction testing will continue to return the Behind observatory back to nominal science data collection as soon as safely possible.