STEREO MOC Status Report
Time Period: 2017:079 - 2017:085

STEREO Ahead (STA) Status:

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

   - On day 079, during the DSS-63 support, turbo decoder lock was lost at 0951z. This anomaly resulted in the loss of eight frames of SSR data.

   - On day 084, during the DSS-43 support, turbo decoder lock was lost intermittently between 0610z and 0729z. This anomaly resulted in the loss of 35 frames of SSR data and three frames of real-time telemetry.

   - On day 085, during the DSS-63 support, turbo decoder lock was lost intermittently between 0807z and 0826z due to rain at the Madrid complex. This anomaly resulted in the loss of 10,602 frames of real-time and SSR data. See DR# M109982 for more information.

2. The following spacecraft/instrument events occurred during this week. The Ahead observatory operated nominally during this week.

   - On day 081, the 97th momentum dump was executed successfully at 2030z, which imparted an estimated delta V of 0.101 m/sec. This was the 16th momentum dump that did not use the IMU. After thruster operations completed, there was a 0.83 degree of roll angle error which was dampened out over the next 14.5 minutes. Fine pointing stabilized 2.3 minutes after completion of the momentum dump.

   - The average daily science data return for Ahead was 6.2 Gbits during this week.

STEREO Behind (STB) Status:

1. Detailed status of the recovery activities this week to restore operations is listed below.

   - None.

2. The Behind loss of communication anomaly occurred on October 1, 2014. Post superior solar conjunction, recovery operations resumed on November 30, 2015. By implementing the NASA Failure Review Board recommendations, the first recovery attempt began with carrier detection by the DSN on August 21st, through September 23, 2016. At a spacecraft range of ~2 AU, the observatory was found to be rotating slowly about its principal axis of inertia for which the uncontrolled attitude allowed some solar array input and continuous uplink and downlink communications on the LGA at emergency data rates. Over the next 22 continuous days, significant obstacles to recovery were overcome with a collaborative effort of the JHU/APL engineering team, NASA GSFC, DSN, FDF, SSMO scheduling, and Mission Operations teams. This consisted of:

   - Reliably commanding a rotating spacecraft with uncontrolled attitude at a distance of 2 AU
   - How to power on the spacecraft that was never designed to be off without collapsing the battery voltage
   - Acquiring telemetry at 35 bps from a spacecraft that is rotating with an uncontrolled attitude
   - Warming a frozen propulsion subsystem with a degraded battery and limited solar array input with an uncontrolled attitude
   - Configuring, loading, and verifying EA, C&DH, and G&C parameters and macros with very limited telemetry
   - Conducting an autonomous momentum dump in the blind and transitioning to C&DH standby mode and successfully receiving telemetry on the HGA indicating star tracker lock and decreasing system momentum.

   However, system momentum level remained above the threshold for re-establishing attitude control with the reaction wheels. Due to the uncontrolled attitude, communication degraded and the last detection of the carrier was on September 23rd.

   Behind Observatory Status – From the last telemetry received on September 18th and the telemetry assessment review held on February 24th, main bus voltage is low, 2 out of 11 battery cells are bypassed, attitude remains uncontrolled, rotating about its principal axis of maximum moment of inertia. While likely all ~42 kg of hydrazine remains and is frozen, both pressure transducers are not functioning. EA mode is enabled and autonomy is disabled. The battery charge rate is C/10. RF is configured for the +Z LGA at emergency data rates and

the range of the expected best lock frequency is known. Necessary macro sequences have been tested to allow the peak power tracker in C&DH standby mode to protect the battery. These macro sequences will be loaded to EEPROM when the communications supports longer commands.

Monthly recovery efforts consist of attempting to power on the transmitter for 30 minutes. If no carrier signal is detected, battery recovery operations will commence which consist of repeatedly sweeping a 3 kHz uplink range and sending commands for IEM switched power and PDU 1553 interface bus off. The next recovery tracks are on April 14th, 15th, and 16th.