STEREO MOC Status Report
Time Period: 2017:184 - 2017:190

STEREO Ahead (STA) Status:

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

   - On day 185, during the DSS-63 support, turbo decoder lock was lost briefly at 1045z and 1115z as the subreflector brakes were momentarily set. This anomaly resulted in the loss of 163 frames of real-time telemetry and SSR data. See DR #M110077 for more information.

   - On day 186, during the DSS-15 support, turbo decoder lock was lost briefly at 2317z and 2319z. This anomaly resulted in the loss of three frames of real-time telemetry and SSR data.

   - On day 188, during the DSS-63 support, telemetry lock was lost intermittently between 0836z and 0847z due to heavy rain at the Madrid complex. While this anomaly resulted in the loss of 52,269 frames of real-time and SSR data during this track, SSR pointers were repositioned on the next support and all SSR data was recovered. See DR# M110083 for more information.

   - On day 190, during the DSS-63 support, turbo decoder lock was lost briefly at 0755z and 0804z. This anomaly resulted in the loss of 1612 frames of real-time telemetry and SSR data. See DR #M110100 for more information.

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

   - The average daily science data return for Ahead was 6.4 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, 3 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 4 kHz uplink range and sending commands for IEM switched power and PDU 1553 interface bus off. The next recovery tracks are on July 11th, 13th, and 15th.

To evaluate the readiness of the project for recovering the observatory upon the next signal detection, a STEREO Behind Recovery Readiness Review will be held on Friday, August 11th, at 9 AM EDT at JHU/APL.