Introduction

The Helioseismic and Magnetic Imager (HMI) investigation contract (NAS5-02139) between NASA and Stanford University has been in place since 27 September 2002. As of this date the contract has been modified 43 times. The contractual launch date is 31 August 2008 which is soon, however the official “launch readiness date” is now 1 December 2008.

The development of the HMI flight instrument is subcontracted to the Lockheed Martin Space System Company at its Lockheed-Martin Solar and Astrophysics Laboratory (LMSAL) in Palo Alto California. The monthly progress of the LMSAL subcontract is reported in parallel with this report and is considered to be an attachment to this report. The monthly report for E/PO activities is also attached to this report. All monthly reports are available at http://hmi.stanford.edu/Status_Reports/. The quarterly reports from science Co-Investigators are also available online and are considered to be attachments to this report. These monthly reports are written a week or two into the following month and include some status as of the date written. This section of the monthly report is written on 14 July 2008 and describes activities at Stanford University in support of HMI and JSOC-SDP development.
**Status and Activities during June.**

**Administrative Issues:**

We have submitted a proposal for the launch delay III and inclusion of a science component for all of Phase-E. We have received a proposal from Lockheed for the first two years of Phase-E Co-I effort. We are in the process of updating the other Co-I Phase-E subcontracts.

**Instrument Development:**

**Overview:**

HMI is essentially finished and ready for launch. Details are in the LM monthly report. Rock Bush and Jesper Schou have been supporting the SDO observatory testing as needed.

**Instrument Calibration:**

The HMI calibration team is working on completing the detailed calibration report. This report will serve as the basis of a detailed instrument performance paper.

**HMI SDP:**

**HMI Level 1**

Work on Level-1 has started and is progressing slowly. Jesper Schou, when not supporting SDO I&T, is testing and tuning the image remapping code to be used as the first step in generating observables. This code is core to the performance of the observable code since each image must be remapped several times. The present speed is such that more than 8 processors will be busy full time for HMI. Sebastien Couvidat is continuing work on the level-1.5 code for line-of-sight Doppler and magnetograms. Richard Wachter is continuing work on the level-1.5 distortion mapping.

**HMI Level 2**

Work is continuing on tasks for several standard product pipelines. Existing programs for all parts of the time-distance pipeline have been identified and tested. Improvements are being made for the inclusion of statistical errors in the inversion process. We are developing proxy data based on MDI observations so we can test the new code modules with HMI-sized files. Work is continuing to convert the code sections to run in the DRMS environment. A key team member, Juan Borrero, has left HAO for MPS (Germany). Rick Bogart coordinated porting his code to the JSOC.
JSOC SDP:

One of our key team members, Karen Tian, has now left Stanford. We are developing a job description for a database sysadmin person.

JSOC Capture System

The Data Capture System (DCS) is complete. The offsite system for offsite tape archiving has been configured and code is running. It is presently in the JSOC computer room at Stanford and will move to LMSAL prior to launch. The emergency backup DCS system is waiting final configuration before being shipped to the MOC. The DCS to pipeline interaction is functioning fine now with support of TB/TV planned for AIA data. New, larger, disks have been ordered to meet the buffer requests of the DDS as well as the needed local cache. These disks will be installed after TB/TV when the DCS is expected to be idle for a while.

JSOC Storage Unit Management System (SUMS)

The SUMS system code development is complete. Several minor issues remain that are being worked as part of the overall database efficiency and maintenance topic. These include such topics as deleted series removal and making the code easier to port to remote users. The T-950 work is complete and we have nearly completed the process of migrating the data from the prototype SUMS system (both disks and tapes) over to the final system. All tapes have been read to disk and are mostly written on the T-950. A software issue in the SGI fileserver has apparently been corrected but only one drive is active due to our poor choice of “tape group” codes for the T-120 HMI and AIA ground test data that is the bulk of T-120 data remaining on disk. This move should be complete in July. We will then begin the migration of the MDI archive into the JSOC (supported by MDI).

JSOC Data Record Management System (DRMS)

The base DRMS system is stable. “Loose” ends are being closed. We have done a full release of code version 4.5 and have a stable “NetDRMS” version for remote DRMS sites. Several remote DRMS sites are now functioning “stand-alone” waiting for the database “Slony” scripts (see below).

JSOC Database Development

We have verified the functioning of the Slony-I software that we will use to distribute key tables to remote DRMS systems. We are ready to begin support of remote DRMS systems. We expect to support remote DRMS/SUMS systems for at least LMSAL, NSO, and SAO in the US and at MSSL in the UK, Max Planck for Solar System Research (MPS) in Germany, and one in Bangalore India.
We have migrated the full JSOC database from the prototype machine “hmidb” to the new server and we moved the machine names to follow the database. We will develop processes to swap servers as part of the development of the warm standby system in the next two months. This work has progressed slowly due to vacation time and the departure of Karen tian.

**JSOC Level-0 Processing**

The flight supporting version of the level-0.1 code HMI is complete. The full level-0 code as we define it includes import of S/C ancillary science packets and FDS data. Work is advancing on this area and will support lev0.3 and lev0.5 data products when Rock Bush is not supporting I&T. We need to finalize plans with LMSAL for the access to HK data flowing through the socket connection from the MOC via White-Sands router via the OC3 lines via Stanford-LM direct link to the LM JSOC-OPS room “open” workstation, then back to Stanford. LM has installed workstations at Stanford and will have them running shortly. They will be moved to LM after the dedicated high-speed Ethernet link is installed. (this paragraph remains unchanged from last month).

**JSOC Data Export**

We the prototype development of the basic web access code is complete. The ability to export files rewritten to full-header FITS files is working and the export request handling and tracking system is functional but not yet pretty. Scripts have been made to support AIA access to TB/TV image statistics and user direct viewing of level-0 ingest status and level-0 images. See http://jsoc.stanford.edu/ajax/watch_lev0.html.

**JSOC Hardware**

The base JSOC-SDP hardware is in place and in regular use. The second phase procurement of cluster nodes is in process and the machines has been installed and is nearly in full operation. SGI has a few more service calls scheduled to correct the final issues. The data viewing workstations have been installed at GSFC. We are nearing the end of the hardware procurement and configuration for the beginning of the mission. We need still to define and buy the database warm standby and web access machines. The dedicated line to Lockheed-Martin is being installed by AT&T and is supposed to be active now, but at least soon. LM is preparing the machines to connect to the JSOC/SDP via this link.

**Science Team:**

The helioseismology science team is preparing to describe the new Time-Distance and global seismology pipeline codes at the August SOHO/GONG Workshop in Boulder. The JSOC data export tools and remote access will also be presented to the community.
Planned Activities for July

Continue testing data flow through connection between DDS and Capture system as opportunities arise. We need to test various DDS-DCS failure modes.

We expect to continue documentation updates and code development of the DRMS system.

The Level-1 code work will continue.

We will continue level-2 pipeline module porting from the MDI system.

Near-term Milestones

31 July  Remote DRMS support functioning
21 July  Job posted for database administrator
20 June  The LMSAL link installed and operational.

Attachments

Lockheed Martin Solar and Astrophysics Laboratory HMI progress report and the HMI/AIA EPO progress report for the month are attached. This report, the LMSAL report, and EPO reports are also available at http://hmi.stanford.edu/Status_Reports for convenience.