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 16 January 2007 the contract has been modified 36 times to extend through Phase-E with launch expected by 31 August 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 report is written on 15 May 2007.
Status and Activities during April.

Administrative Issues:

The LMSAL cost proposal for costs to complete Phase-D work was received just before the Stanford holiday closure and was forwarded to NASA in mid December. After receipt of specific authorization from NASA we increased Lockheed’s authorization enough on an interim basis to allow work to continue. We hope to have the negotiated contract mod in place by the end of May. A response to some clarification questions from LMSAL has just recently been forwarded to NASA.

Instrument Development:

Overview:

The SU team supported regular Weekly HMI meetings at the LMSAL facilities including the regular weekly status meeting and topical development and I&T meetings in areas including optics, thermal, electrical, software, and others as needed. This list should get smaller very soon.

The Stanford personnel responsible for the HMI instrument performance (R. Bush and J. Schou) are working intensively supporting the calibration activities. Sebastien Couvidat, Cristina Soares, Richard Wachter, and Tom Duvall are participating in analysis of calibration data.

Instrument Calibration:

The vacuum calibration first-cut was completed on March 2. During this run plan which lasted a day less than the planned 10 days we verified performance and demonstrated readiness for determining the remaining parameters once the instrument is in its final configuration. The original front window has optical errors that prevent a full resolution image. A replacement will be available before the final calibration. The focus gradient which was characterized in January was corrected by inserting an 0.4mm wedge in the mount of the reimaging lens assembly. The focal planes will also be finalized this week. Aside from waiting for the new front window and waiting for opportunities to run the in air calibration and vacuum calibration on a complete instrument and waiting for final flight software the instrument in basically complete and ready to start environmental testing.

HMI SDP:

HMI Level 1

Work on Level-1 will start in earnest after calibration activities are complete.

HMI Level 2

Work is continuing to provide bindings to the JSOC DRMS system for several languages in addition to C. The FORTRAN work is proceeding and the IDL
work will begin when Jennifer Spencer joins the group in early June. This will enable existing code to be brought into the JSOC environment with less effort.

The local HS team has continued weekly meetings and definitions of the at-launch capability for level-2 analysis is progressing.

**JSOC SDP:**

**JSOC Capture System**

Work on the capture system has continued. The basic functionality should be complete by the end of May. It was delayed a bit due to the computer room move and other non-JSOC work (MDI pipeline software maintenance).

**JSOC Storage Unit Management System (SUMS)**

The SUMS system development is complete. Several minor issues remain and will be accomplished after the capture system is complete.

**JSOC Data Record Management System (DRMS)**

The base DRMS system is stable. While correcting an incorrect order in the general purpose query tool for data naming we introduced a performance penalty in the SQL interface. We are examining approaches to resolve this issue.

The [http://jsoc.stanford.edu](http://jsoc.stanford.edu) web site continues to be improved.

**JSOC Level-0 Processing**

Work is continuing on moving the level-0 code developed for the mission version in the DRMS/SUMS environment. The level-0 specification review has been delayed due to uncertainty in the AIA Region of Interest nomenclature and due to the availability of Keh-Cheng who was away for two weeks. The HMI level-0 ground code is being modified (by LMSAL) to support AIA ground testing with the DCHRI/CIF boards when they become available shortly.

**Science Team:**

As mentioned before, we completed a detailed review of the Phase-D plans for the Co-I team provided data product computation code, status and risks of insufficient funding. We are still reviewing the status after updates from the team at the workshop in early March. Several members received LWS TR&T grants for work in the local helioseismology area. We are assessing the remaining needs.

We are planning another local-helioseismology workshop for August to continue detailed work for the local-HS pipeline components. We will participate in a one-day HMI/AIA/EVE meeting after the conclusion of the LWS workshop in September.
HMI Home and JSOC-SDP Site:
The Solar Group data center including the JSOC Capture System was moved to the new location in the Physics and Astrophysics building basement on the weekend of 28 April. The move was accomplished over the weekend with little loss of equipment (3 disk drives failed, only temp data was lost.) For our offices we are proceeding with the distributed on-campus “solution”. It looks like the best plan is to place people in buildings known as Poplar, Cypress North, Cypress Annex, Physics and Astrophysics, and the Physics and Astrophysics Basement. We would be able to leave the basement in January after the GP-B program shrinks again after November. At that time we would have some space in Cedar South, near to Cypress North. We do not view this as a good solution but are proceeding with the first moves expected in June. We will schedule office moves to not impact HMI calibration activities.
**Planned Activities for May**

We will help prepare for HMI CPTs and support final instrument alignment activities.

Capture system tape subsystem operational with LTO-4 tapes.

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

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

**Near-term Milestones**

- **30 May 2007**  
  Capture system operational.

- **31 July 2007**  
  Be completely out of our existing office space.

- **30 September**  
  Level-0 processing should be ready.

**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](http://hmi.stanford.edu/Status_Reports) for convenience.