Introduction
The Helioseismic and Magnetic Imager (HMI) investigation proposal was submitted to NASA on 24 April 2002 in response to the Solar Dynamics Observatory Announcement of Opportunity AO 02-OSS-01, and this investigation was selected by NASA on 15 August 2002. The contract (NAS5-02139) between NASA and Stanford University was in place as of 27 September 2002. That contract has been modified (via Modification #13) to extend through Phase-E at launch plus 30 days plus six years with the launch expected in 31 August 2007. To date the contract has been modified 23 times.

We have received the RFP from NASA for the merged program changes which include the original launch date to April 2008, the addition of 2-months to Phase-D after launch, the merging of HMI and AIA SOC and EPO activities to form the JSOC and merged EPO, and the funding driven launch delay to August 2008. We hope to have our proposal prepared by mid October.

We are proceeding with development of the JSOC and support of AIA development under the verbal assurance that NASA approves of the plan.

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/.

Status and Activities during September.

Administrative Issues:

The project is still operating at a level reduced from the original plan due to funding limitations. We anticipate additional funding at the end of October and will then be able to resume work at the planned level and to begin the hiring process for the needed programming help for the JSOC development.

The Co-I subcontracts are moving ahead with most in place and the few the others in final stages of negotiations. We expect to have all the Co-I contracts in place before the end of the year. The next actions expected from most of the Co-I teams is the support of the joint HMI-AIA Science Team meeting in February 2006.
We received the RFP for the “omnibus” contract modification on 18 August. The proposal development will occupy most of September and October’s administrative effort. An “unofficial” copy will be delivered in mid October.

**Instrument Development:**

**Overview:**

The SU team supported regular Weekly HMI meetings at the LMSAL facilities including the regular weekly status meeting and topical design/development meetings in areas including mechanical, optics, thermal, electrical, software, CCD cameras, and others as needed.

The Stanford personnel responsible for the HMI instrument performance (R. Bush and J. Schou) continued work on understanding the optical, thermal, and filter performance for the HMI filter oven and front window filter to assist LMSAL.

**Instrument Calibration:**

Work is continuing on detailed preparations for the first optical tests of the complete HMI Optics Package expected to begin the end of November 2005. J. Schou is leading an effort to develop calibration sequences to be used in these stimulus telescope and sunlight tests. Sebastien Couvidat is continuing work preparing for calibration activities for the filter sections. Cristina Soares is working on measurement of distortion and image motion. Calibration planning meetings continue on a semi-regular weekly schedule (most Fridays at 4 PM). The impact of doing the first light tests with the RAL supplied development camera with its EGSE has been studied. The planned tests will still be possible to accomplish but the image cadence will be constrained and data handling will be more complex.

The parts for the polarization test equipment have arrived at HAO and have been assembled. This instrumentation will be delivered to LMSAL in late October.

**Data EGSE:**

We continued progress on adding housekeeping handling to the EGSE data system software. This will allow capture of the image status packets from the high speed channel during ground testing – but not the initial sunlight tests. The same code will be used in the flight level-0 processing for HK data in the high rate stream.

The flight unit data EGSE (HMI-2, AIA-2) machines have all been delivered to LMSAL and integrated into the “tall” EGSE racks. Work on the data EGSE is now complete except for some planned enhancements for image viewing, needed when the CIF boards are ready.

**JSOC SDP:**

**JSOC Capture System**

No work planned until 2006.
JSOC Storage Unit Management System (SUMS)

The SUMS system development is proceeding the prototype tape system. The file server arrived and has been integrated into the system. SUMS is now being tested with tapes. The initial non-tape version of SUMS was released for general use on the first of October. This will allow integration with DRMS and the initial development of science processing modules.

JSOC Data Record Management System (DRMS)

The DRMS system development continues. During testing a known bug on the Oracle DBMS was found. This bug has been in Oracle for some time and is now considered to be a “feature” by the vendor. The DRMS system counted on the serialization of transactions to work as specified. Since it does not we are studying the impact of ad-hoc workarounds using Oracle or switching to another DBMS system. We are examining the IBM system and two open-source systems. A decision on a) the necessity to change, and b) an alternate system to use will be made in late October.

JSOC Science Module Development

No work in September.

Science Team:

The joint HMI and AIA science team meeting will be held in February 2006. We will meet in Monterey, CA, during the week of 13 Feb. A draft agenda has been made and will be sent to the teams in mid October.

HMI Home and JSOC-SDP Site:

The construction of the new Varian-II Physics building (now called the Physics and Astrophysics Building) is progressing on schedule for occupancy in the summer 2006. We have initial space allocations in this building sufficient for about 1/3 of our office needs. We have now been told that there will be space in the Forsythe building that will meet our needs. We hope to have an initial inspection of the proposed solution soon. The present occupants will move out in December 2006 but there is some empty space now that should be sufficient for the initial installation of the capture system in time for the February 2007 testing. We must vacate our existing buildings by June 2007 so there should be sufficient time for refurbishment of the Forsythe space and an orderly move of offices.

Planned Activities for October

We will continue detailed work on the combined proposal to cover the original 8-month launch delay, the JSOC, the 2-month flight phase extension, and the new 4-month delay
in launch with funding limits for FY05 and FY06. The goal is submission to NASA in October.

We expect the SUMS/DRMS initial system including tape support to be tested on the JSOC prototype hardware.

We expect to complete the housekeeping packet simulation and unpacking in the EGSE system.

The planning for HMI optical calibration will continue.

**Near-term Milestones**

1 January 2005 Decision on space location within Stanford for the JSOC and Stanford HMI team facilities. *This is finally beginning to happen!*

31 October 2005 JSOC SUMS and DRMS testing of record management well along. This may be delayed due to the problem with Oracle.

**Attachments**

Lockheed Martin Solar and Astrophysics Laboratory HMI progress report and the HMI/AIA EPO progress report for September 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.