

# Helioseismic and Magnetic Imager

## Stanford University

Contract NAS5-02139

Progress Report for December 2007

### 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 41 times. The contractual launch date is 31 August 2008 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/](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 15 January 2008 and describes activities at Stanford University in support of HMI and JSOC-SDP development.

Stanford’s holiday shutdown and the preceding AGU meeting meant that December was a short work month, as usual.

## **Status and Activities during December.**

### **Administrative Issues:**

The second LMSAL cost variance proposal has been forwarded to NASA. At NASA's request we are revising this proposal to include all costs up to delivery of HMI to NASA. We expect there will be a third cost variance proposal from LMSAL at some point prior to launch since there were some remaining unresolved issues at the time of instrument delivery and those issues must be resolved but the effort to do so is beyond the current plan. We expect RFPs at some future point for support of the later launch date and for inclusion of a science component throughout all of Phase-E.

### **Instrument Development:**

#### **Overview:**

HMI was integrated onto the SDO spacecraft.

Upon arrival at GSFC apparent ESD damage was detected in some of the high-speed bus interface chips. The damaged chips in the HEB were repaired at GSFC and one of the spare CEBs was repaired at RAL. It will be installed on the HOP in January. Work continues at LMSAL to resolve the open issues from the Pre-Ship Review.

#### **Instrument Calibration:**

The HMI calibration team is moving into the mode of completing the detailed analysis of the calibration data obtained during testing and producing a 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. The first objective is a detailed program processing flow description.

#### **HMI Level 2**

Work is proceeding on tasks for the time-distance pipeline. Existing programs for all parts of the pipeline have been identified and tested. Work is proceeding to convert them to run in the DRMS environment. The pace of work on these topics will increase leading up to the joint HMI-AIA-EVE Team meeting in March.

### **JSOC SDP:**

#### **JSOC Capture System**

The Data Capture System (DCS) is complete. Data flow tests with the DDS are continuing with only minor issues at this date.

### **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.

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

The base DRMS system is stable. After consultations with AIA we have decided to stop work on an IDL binding for the DRMS API. AIA programs that will run in the JSOC pipeline will be coded in “c”. We are moving ahead with plans to support a more general IDL implantation within the SolarSoft framework. This would allow SolarSoft users (much of the non-seismology part of the user community) to access AIA and HMI data in a much more convenient fashion as remote users. This work will be implemented by LMSAL personnel.

### **JSOC Level-0 Processing**

Work is continuing on moving the level-0 code developed for the mission version in the DRMS/SUMS environment. This work is nearly complete.

### **JSOC Hardware**

The initial JSOC hardware configuration has been selected and purchase orders have been placed. The tape library has been received at Stanford and the remainder of the core system is expected in late January and early February. The configuration of the DRMS database machines has been finalized and the procurement process has begun.

### **Science Team:**

The science team funding issues mentioned in prior reports continue to be a concern. We are exploring several methods to solve the most critical of these issues.

We will hold a joint HMI – AIA – EVE science team workshop on 25-28 March in Napa. This will be a focused workshop with the goal of detailing work to be done for the highest priority early science goals of the mission. The web page for meeting planning is [http://hmi.stanford.edu/TeamMeetings/Mar\\_2008/](http://hmi.stanford.edu/TeamMeetings/Mar_2008/) and the list of invited speakers is nearly finalized and working group leaders are detailing plans for their tasks.

### **Stanford office space issues**

We have obtained use of the small Cypress Annex (trailers in the parking lot) to replace the temporary space we have been using in the basement of the Physics & Astrophysics building for EPO activities. This move will take place in mid January.

## Planned Activities for January

Continue testing data flow through connection between DDS and Capture system.

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

The Level-0 code will be integrated into the DRMS system.

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

## Near-term Milestones

20 January                    Level-0 processing should be final, slipped a bit.

29 February                New goal for level-2 global seismology pipeline.

15 February                JSOC hardware should be installed.

29 February                JSOC Database machine installed

25-28 March                Joint HMI, AIA, EVE science teams meeting.

## 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.