

Helioseismic and Magnetic Imager

Stanford University

Contract NAS5-02139

Progress Report for October 2005

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 expect to have our proposal delivered by mid November.

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 October.

Administrative Issues:

Funding for FY06 has begun and we are operating at the planned level of effort. We anticipate additional funding at the end of November.

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 November. 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 was delivered in mid October. We have the small business

plan update and are working on final formatting of the combined proposal. No numbers are expected to change from the unofficial draft tables forwarded in 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). We have established methods to get the image data via the RAL EGSE. We will use the DRMS release 1 as a catalog tool for the test images (development progressing well by Rick Bogart and Karen Tian). The GSE for the polarization measurement had been developed at HAO. This instrumentation will be delivered to LMSAL in the second week of November.

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. This work was slightly delayed as efforts were put on being ready for the Sun tests with images via the RAL EGSE instead of the CEB-HEB.

Work on the data EGSE at LMSAL 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 preceding again at full speed. The prototype tape system continued to cause problems during October. The vendor agreed to substitute fiber channel interfaces for the SCSI interfaces for the tape drives. With the robotics controller sharing a SCSI channel with the tape drives the unit was not stable. We believe we finally have a stable tape system. SUMS is now being tested with tapes with a complete test of error conditions to be complete by mid December. 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. We have completed the migration from Oracle to Postgress. The first release is being used to manage the data expected from the sun tests planned for December. The code to manage reading and writing compressed slices of images is near completion.

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 has been sent to the teams. The web site at http://hmi.stanford.edu/TeamMeetings/Feb_2006 contains detailed information.

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.~~ Once again we have received conflicting messages about the certainty of the availability of replacement space. The GP-B mission is now in its final science analysis phase and has a more critical building problem since Stanford wants them to vacate their present building (near ours) by April 2006 – a time 2/3 of the way through their science analysis phase. There is as yet no solution for them either. When they pushed for a definite answer they were told they could simply move to Redwood City which is available now. We would find that answer unacceptable (as did GP-B) and we are continuing discussions. The schedule for razing our current building is still August 2007. This problem will require close attention if not resolved by early winter.

Planned Activities for November

We will complete 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 before mid November.

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

The planning for HMI optical calibration will continue with the Sun Tests to start at about the end of the month.

Near-term Milestones

- | | |
|------------------|--|
| 1 January 2005 | Decision on space location within Stanford for the JSOC and Stanford HMI team facilities. <i>This is finally beginning to happen!</i> |
| 31 November 2005 | JSOC SUMS and DRMS testing of record management well along. This was delayed due to the problem with Oracle and the tape system. |

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.