

Helioseismic and Magnetic Imager

Stanford University

Contract NAS5-02139

Progress Report for February 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.

We have submitted a proposal for the additional effort needed to extend the launch date to 30 April 2008. We expect the launch delay modification to be negotiated in the next few months possibly with an additional two months effort just after launch to bring our contract into alignment with the 90-day checkout time planned for the mission.

We have received a draft SOW for a proposal to support the HMI-AIA Joint Science Operations Center enhancements of the original HMI SOC tasks. We have submitted comments to the Project and await a request for proposal.

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 February.

Both Stanford and Lockheed personnel have participated in weekly SDO instrument interface, ground system, and individual instrument team teleconferences.

The SU team supported regular Weekly HMI meetings at the LMSAL facilities including the regular weekly status meeting and topical design 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 and blocking filters to assist LMSAL. Additional work continued in the form of technical discussions of the Michelson Interferometer development with LMSAL personnel to support the subcontract (from LMSAL) with Light Machinery in Canada. As part of this effort Rock Bush attended the Pre-Ship

Review in Canada on 8 February. Additional work continued in the form of discussions and management activities on the CCD camera systems for both the development and flight camera systems for both HMI and AIA in support of the LMSAL activities. In the first week of March, Rock Bush joined the LMSAL team in a visit to the UK CCD and CCD camera vendors.

After the HMI Science Team meeting on 26, 27 January we sent all the US Co-Is instructions for revised proposals for their travel to team meetings and code-porting efforts. They will be supported at the level averaging \$50K per year for the two years leading to launch and two years after to do their best effort to move analysis code into the JSOC processing pipeline.

We made significant progress in the documentation of the keyword database design and in implementing the prototype system. We divided the equivalent MDI DSDS system into two cooperating sub-systems which we call the Storage Unit Management System (SUMS) and the Data Record Management System (DRMS). The SUMS functionality is a subset of the MDI DSDS system while the DRMS provides additional capability. The SUMS core system now is functional and the DRMS internal communications subsystem is in test. We have installed a development database on the HMI-0 EGSE unit to allow continued development of SUMS and DRMS until the new database machine arrives.

The issues with the prototype tape system have been mostly resolved with changes to SCSI control parameters. There is still an issue with disk performance that must await the next release of software from SGI for further testing.

The AIA-1 and HMI-1 data EGSE units have been retrofitted with RAID storage and taken to LMSAL. The flight unit data EGSE (HMI-2, AIA-2) purchase orders have been placed and some parts have arrived. The goal is to deliver these to LMSAL by the end of May – well before they are needed.

The JSOC Peer review is scheduled for 17 March in the afternoon.

The construction of the new Varian-II Physics building (now called the Physics and Astrophysics Building) is progressing. We have initial space allocations in this building sufficient for about 1/3 of our office needs. After final review of our needs for the JSOC data center we agreed with Stanford Planning that the Varian-II basement is not an appropriate location for the data center. Work is continuing on identifying the additional space we need. The Dean of Research has identified Stanford funds to ensure the necessary on-campus facilities can be provided. At the February Trustees meeting a decision was finalized to move a large contingent of service tasks off campus (ITSS will be relocated to Redwood City) freeing sufficient space to meet our needs. The new (to us) space should be available in mid 2006. We are examining the potential space for suitability for our needs. The planned demolition schedule for our present building is still set for mid 2007. The pending building tasks will likely consume more management time in the coming months.

Planned Activities for March

We expect the last of the HMI & AIA -2 hardware to arrive. We expect the SUMS/DRMS prototype database machine to arrive and be operational.

We anticipate having a prototype data storage database operating before the end of March. The keyword database operating together with SUMS will be delayed until mid April. This was expected in March but the unexpected need for Rasmus Larsen to be with his family in Denmark and preparations for the JSOC review have slowed work by at least 3 weeks.

We expect to have an IT security plan draft complete and delivered to SDO by the end of March. Some details will need to be modified after the referenced documents are available.

We will support the preparations for the SDO CDR in early April and the SDO ground system CDR in early May.

Near-term Milestones

1 January 2005	Decision on space location within Stanford for the JSOC and Stanford HMI team facilities. <i>This did not happen yet.</i>
17 March 2005	HMI-AIA JSOC Peer Review
1 April 2005	JSOC Prototype SUMS system operating
30 April 2005	JSOC DRMS API and dataserie definition parser available for test. Implies basic SUMS functionality as well.

Attachments

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