

Helioseismic and Magnetic Imager
Stanford University
Contract NAS5-02139
Progress Report for February 2004

Introduction

The Helioseismic and Magnetic Imager (HMI) 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 accepted by NASA on 15 August 2002. The contract to NAS5-02139 between NASA and Stanford University was in place as of 27 September 2002. That contract has now 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.

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. For months in Phases A and B where the Stanford component is not separately reported the LMSAL Monthly Status Report is the HMI Monthly Status Report.

Status and Activities during February.

Both Stanford and Lockheed personnel have participated in weekly SDO spacecraft and instrument team telecons. During February these telecons included discussions planning a visit to GSFC in March to support the SDO PDR and to discuss issues relating to the pending contract.

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 continued work on understanding the thermal and filter performance specifications for the HMI filter oven and front window filter 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. Rock Bush supported the visit to the UK in early February to visit both e2v and RAL. The results of that visit are described in the LMSAL part of this monthly report.

Phil Scherrer visited GSFC on 17 February to support the presentation to W. Townsend on the feasibility of the SDO ground systems including the HMI and AIA joint SOC.

The material prepared for this meeting was also used in preparation for the SDO PDR. We supported the preparation of the HMI instrument portion of the SDO PDR presentation as well.

The Stanford personnel responsible for the design and development of the HMI Science Operations Center (SOC) and science data processing participated in several SDO ground data system telecons. The efforts of this SU team were focused on development of the EGSE system that will handle the science data flow from the SDO Spacecraft Simulator, work on verifying estimates of computer I/O bandwidth requirements and performance for the HMI Science Operations Center (SOC) data capture component, and work on testing performance of algorithms for level-1 calibrations and spatial remapping.

Work on the Data EGSE continued with testing the porting of the heritage MDI data catalog to a stand-alone workstation. The implementation plan for the data EGSE was reviewed and modified after discussions to clarify our plans to use the existing MDI Data Storage and Distribution System (DSDS) infrastructure for the data EGSE. We decided to store each test CCD image as a DSDS dataset indexed by the CCD image number. A new database table will be created to store the metadata associated with each image. In this way we will be beginning the transition to the planned HMI approach of storing the meta-data apart from the image data that it describes internal to the DSDS. Specifications for export tools that will bind the metadata to the image data as FITS files were begun. The development system for the data EGSE arrived and is being prepared for use.

Significant efforts at Stanford included the review of the miscellaneous documents required for completing the Phase C,D,E contract mod in February. The LMSAL subcontract period of performance was extended to give enough time to extend the full terms of the Mod 13 contract changes.

Stanford University planning for the new Varian-II Physics building is progressing and we have initial space allocations sufficient for about 30% of our needs. Work is continuing on this issue. If we have not obtained a firm commitment for sufficient space on campus by January 2005 we will need to begin the process of leasing off-campus office and data center space. There should be no increase in cost to the project for this since the off campus effort will be “taxed” sufficiently at a lower rate to pay the lease and related costs.

Planned Activities during March

We will support the development of the AIA Concept Study Report proposal with an unofficial proposal for the Stanford efforts to add AIA processing to the HMIK SOC to turn it into the data part of the HMI-AIA JSOC.

We will continue work on the LMSAL subcontract terms and conditions.

The initial data EGSE system arrived in late February and initial configuration should be completed with the installation of the core DSDS software. Work should be nearly complete on the prototype data simulator that will be used to test the data unpacking in the data EGSE and the modules to do that unpacking will be integrated into the prototype raw to Level-0 program. Work will begin to develop specifications for handling the housekeeping data that will also flow into the data EGSE via the high speed bus and the data portion of the spacecraft simulator.

The HMI SOC Ground Data System Development Plan will be further revised to reflect the planned joint activities with the SDO-AIA SOC.

The SDO PDR presentation of HMI and the JSOC will be supported.

A goal for the month is to complete porting the JSOC development plan into Microsoft Project.

Near-term Milestones

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| 30 April 2004 | Basic data EGSE functioning to Level-0 with simulated data. |
| 31 August 2004 | Data EGSE ready to accept data from spacecraft simulator and make it available for analysis. |

Attachments

Lockheed Martin Solar and Astrophysics Laboratory HMI progress report for February 2004 is attached by reference. It is forwarded to GSFC separately by LMSAL and is also available at http://hmi.stanford.edu/Status_Reports for convenience. Also the HMI EPO progress report for February is attached and available online.