

Helioseismic and Magnetic Imager
Stanford University
Contract NAS5-02139
Progress Report for December 2003

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 been modified several times to support work through Phase B with the last modification, #8, complete as of 15 December, 2003. As of 31 December the contract supports work through 15 January 2004 with the expectation that a modification to include Phases C,D,E will be completed by 15 January.

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 technically 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 December.

Both Stanford and Lockheed personnel have participated in weekly SDO spacecraft and instrument team telecons. During December these telecons included discussions planning a visit in January by the SDO Interface Working Group from GSFC and discussions of RFAs resulting from the HMI Preliminary Design Review held in November.

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 worked on understanding the thermal and filter performance specifications for the HMI filter oven and front window filter to assist LMSAL. This work involved detailed comparisons of SOHO/MDI filter oven performance and thermal models of that oven. The HMI oven will be very similar to the MDI oven. These studies suggest that the source of thermal anomalies detected during operations of MDI are due more to oven controller issues than to coupling between the motors and the Michelsons. These results will be incorporated into the HMI oven design by 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.

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,

Significant efforts at Stanford included the development of the miscellaneous documents required for completing the Phase C,D,E contract mod in January.

Stanford University closed for two weeks at the end of the year.

Planned Activities during January

A key goal for January is to support the contract negotiations and documentation for the Phase C,D,E contract modification. A No-Cost extension to the end of the month is likely. Delays past the end of January will result in delays to the HMI development due to lack of funds.

The work on helping to develop filter oven design and filter optical specifications should be complete in January. A visit to Light Machinery is planned for the end of the month to confirm progress in the development of the beamsplitters.

The specifications for the EGSE High Speed Data Collection system should be completed with the order for the systems ready to go to Purchasing as soon as the Phase C,D,E contract is in place.

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

Attachment

Lockheed Martin Solar and Astrophysics Laboratory HMI progress report for December 2003 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.