

Helioseismic and Magnetic Imager

Stanford University

Contract NAS5-02139

Progress Report for November 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 40 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/. 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 14 December 2007 and describes activities at Stanford University in support of HMI and JSOC-SDP development.

Status and Activities during November.

Administrative Issues:

The second LMSAL cost variance proposal has been forwarded to NASA and includes nearly all cost growth to delivery of the HMI instrument to GSFC. 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:

The HMI Pre-Ship Review was held at LMSAL on 6 November and the HMI flight instrument was delivered to GSFC on 14 November 2007. There were several issues remaining to be solved, none of which are likely to require any changes to the instrument hardware. The main unresolved issue so far as instrument calibration and science performance is the thermal bending due to a non-optimal control algorithm. Upon arrival at GSFC apparent ESD damage was detected in some of the high-speed bus interface chips. The damaged chips in the HEB have been repaired at GSFC and one of the spare CEBs is at RAL for repair. 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 will start in earnest after calibration activities are complete, which means in early January after a well deserved break for the holidays.

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 no remaining 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. The problems with the SAIT tapes has led to the decision to migrate completely to the new LTO-4 tapes after the new equipment arrives.

JSOC Data Record Management System (DRMS)

The base DRMS system is stable. Some testing is continuing to expose performance weaknesses with large tables and to explore options for database maintenance. Work is continuing to provide bindings to the JSOC DRMS system for several languages in addition to C. The version 1.0 of the FORTRAN work is complete. The IDL work is progressing. This will enable existing code to be brought into the JSOC environment with less effort. We 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 will continue over the general Stanford holiday shutdown and should be complete or near complete in early January..

JSOC Hardware

The initial JSOC hardware configuration has been selected and purchase orders have been prepared. Approval to proceed has come from GSFC and we expect Stanford procurement to have the orders out before 20 December. 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.

Stanford office space issues

The planned partial consolidation of the Stanford science team is delayed until late spring due to the unavailability of the target space until that time. We will move the team members presently in the Poplar building into the south wing of the Cedar building once the GP-B program (which is near completion) vacates that space. 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 January.

Planned Activities for December

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

10 January	Level-0 processing should be final.
30 September	Goal for level-2 global seismology pipeline. Will be a bit late. Should probably move this goal to January.
30 January	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 for convenience.