

Helioseismic and Magnetic Imager

Stanford University

Contract NAS5-02139

Progress Report for February 2008

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 42 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 13 March 2008 and describes activities at Stanford University in support of HMI and JSOC-SDP development.

Status and Activities during February.

Administrative Issues:

We have received the RFP for the launch delay III and inclusion of a science component for all of Phase-E. We expect to deliver a proposal in April. We have issued an RFP to Lockheed for the first two years of Phase-E Co-I effort. We will shortly begin to update the other Co-I Phase-E subcontracts.

Instrument Development:

Overview:

We are continuing to work with LMSAL and the SDO team to close out the few remaining open items on the instrument. Details are in the LM monthly report. We will support the SDO PER in March and upcoming environmental testing of SDO.

Instrument Calibration:

The HMI calibration team is working on 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. Analysis of CPT data has been performed. The variation in retardance of the front window with temperature is a concern and lab tests will be performed in March to hopefully verify the problem is from radial temperature gradients present in air and not bulk temperature variations. The latter case would lead to a reduction in magnetic field sensitivity during the mission. In any case we should be investigation establishing a regular ground cross calibration.

HMI SDP:

HMI Level 1

Work on Level-1 has started. A prototype Dopplergram code has been completed. An outline of the multiple steps in the level-1 code has been prepared.

HMI Level 2

Work is continuing 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:

Weekly JSOC development status is now available on the jsocwiki at <http://jsoc.stanford.edu/jsocwiki/DeveloperProgressReports>

JSOC Capture System

The Data Capture System (DCS) is complete. Data flow tests with the DDS are continuing with only minor issues at this date. We are updating database maintenance procedures. A test of failover to the backup system exposed some issues of database consistency. The offsite systems have been ordered and should have been received by now. The vendor (Dell) lost the order and has reprocessed the order.

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. Work is underway to incorporate the final tape library (T-950).

JSOC Data Record Management System (DRMS)

The base DRMS system is stable. “Loose” ends are being closed. We have adopted the modified index plan to allow more flexible choice of which keywords have database indexes created and to allow better query response time. We are moving ahead with plans to support a more general IDL implementation within the SolarSoft framework. This work will be implemented by LMSAL personnel. We have done a full release of code version 4.0 and have a stable “NetDRMS” version that does not need local non-DRMS code. This version is for remote DRMS sites.

JSOC Database Development

This topic is added this month to reflect the increased level of work on database maintenance issues. We have installed copies of the database on two test machines and have verified the functioning of the Slony-I software that we will use to distribute key tables to remote DRMS systems. We expect to support remote DRMS/SUMS systems for at least LMSAL, NSO, and SAO in the US and at MSSL in the UK, Max Planck for Solar System Research (MPS) in Germany, and one in Bangalore India. The replication and remote DRMS support is moving ahead and should be operational by the end of March or early April.

JSOC Level-0 Processing

The flight supporting version of the level-0 code HMI is complete. Work is beginning on the minor modifications for AIA. The level-0 code as we define it includes import of S/C ancillary science packets and FDS data. Work is advancing on this area and will support lev0.3 and lev0.5 data products. We need to finalize plans with LMSAL for the access to HK data flowing through the socket connection from the MOC via White-Sands router via the OC3 lines via

Stanford-LM direct link to the LM JSOC-OPS room “open” workstation, then back to Stanford.

JSOC Data Export

We have a specification for the basic infrastructure for export of data (finally) and will implement the code shortly. We will use simple cgi-bin tools to allow traditional web interface, AJAX style interfaces, and command line (wget) access to the data. This will be used to support the browseable catalog, direct data access, access from SolarSoft, and remote DRMS/SUMS support.

JSOC Hardware

The tape library is working as specified now and is waiting mods to SUMS so we can begin using it. The disk file server and disk arrays have been installed and initial testing shows that they really do meet the 3gigabytes/second throughput goal. The first part of the compute servers are expected within 2 days. There was a 2 week delay at the vendor (SGI) due to a problem that has been resolved. The first DRMS database machine is also expected very soon.

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. The web page for meeting planning is http://hmi.stanford.edu/TeamMeetings/Mar_2008/. The list of invited speakers is finalized and working group leaders have detailed the working sessions. As of this date 169 people have registered for the meeting.

Stanford office space issues

We are making final plans for the move from Poplar to Cedar-South for about 1/3 of the team. Three people will move from P&A to Cedar as part of the move. This will get the entire team into the offices they will have for the initial phases of Phase-E. Hopefully the disruptions of office moves will be behind us for a while. We still need to find more space in the Cypress/Cedar area for the rest of the team to have an efficient program. This may take a couple of years.

Planned Activities for March

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 for AIA will be integrated into the DRMS system, the HMI code is finished.

The Level-1 code work will ramp up.

We will continue level-2 pipeline module porting from the MDI system.

Near-term Milestones

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| 15 April | Basic export functions functional |
| 30 April | New goal for level-2 global seismology pipeline. This goal is probably achievable. |
| 31 March | JSOC hardware should be installed and in use. |
| 31 March | Data workstations for GSFC should be at Stanford in checkout. |
| 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.