

Helioseismic Magnetic Imager Program at LMSAL

Contract PY-2223 Progress Report for October 2002

Introduction

This is the first monthly progress report for the HMI program at LMSAL. We/LMSAL are collaborators with Stanford University on the HMI/SDO solar physics investigation, being led by Prof. P. Scherrer of Stanford University. The investigation was selected, on 15 August, in response to NASA Announcement of Opportunity AO 02-OSS-01. In record breaking time after the selection, NASA and Stanford signed, on 27 September, the prime contract for Phase A of the program and a Letter Subcontract was issued to Lockheed Martin by Stanford a day later. Phase A, which includes the periods described as Phase A and the Bridge Phase in the AO, will last 12 months.

Summary of Status

Highlights during this initial reporting period included starting work at LMSAL on 1 October under a Letter Subcontract from Stanford University, beginning to form the HMI team, frequently interacting with the Project via e-mail and telecons, and participating in a face-to-face meeting with the Project on 17-18 October. Even before this, several members of the team participated in an SDO Kickoff Meeting that was held at GSFC on 5-6 September. At this meeting a number of Action Items surfaced and some additional ones have surfaced since then. We have been responding to them in a timely manner. Various concepts for accommodating HMI onto the spacecraft (S/C) are under discussion with most of them acceptable to us. By the end of October the team had grown from zero to about 4 EP (equivalent people) made up by fractions of a dozen or so individuals.

Schedule and Milestones

The HMI proposal contained a top-level schedule that was based on the dates given in the AO. Now that the program has begun, a more rigorous schedule will be developed. We will make the schedule using MS Project and update it monthly in phase with the monthly progress report. The first submission is planned for January. Shown below are some key milestones, with an emphasis on those that will occur in the near term, or have occurred recently (for completeness).

SDO Kickoff Meeting	Sep 5-6	Occurred at GSFC
Letter Subcontract Issued by SU	Sep 30	

First Weekly Project Telecon	Sept 18	10 AM Wed, but will now be 8 AM
HMI Interface Meeting	Oct 17-18	Occurred at GSFC
First HMI-Project Telecon	Oct 24	Will be weekly at 1 PM Thursdays
Electrical Meeting at NRL	Nov 7	Cameras and high-speed bus
Mission Definition Retreat	Dec 3-5	At GSFC
Systems Requirements Retreat	Feb '03	At GSFC
HMI Requirements Retreat	Feb '03	At Palo Alto
Begin Phase B-E	Fall '03	
PDR	Winter '03	
CDR	Fall '04	
Deliver HMI to S/C	Summer '06	
Launch	Aug '07	
Five year baseline mission		

Major Activities During this Reporting Period

The HMI program at LMSAL officially began on 1 October under a letter subcontract from Stanford University. This occurred almost immediately after the HMI contract at Stanford was signed, which in itself happened in record breaking time. A good programmatic start on all fronts. By the end of the reporting period, a draft contract between Stanford and Lockheed-Martin had gone through a couple of iterations and minor modifications, with the anticipation of it being formally signed in early November. Even before 1 October, members of the LMSAL HMI team participated in the SDO Kickoff Meeting at GSFC in early September and in the Project-wide weekly telecons. Weekly HMI-specific telecons were initiated on the 24th. One key element of the Project-wide telecons has been to establish and track action items that originated at the Kickoff Meeting and during interactions since then. We have been responding on time to these Action Items. More comprehensive responses will be developed as the program matures, but the response to date should help bound a number of spacecraft accommodation/interface possibilities (mechanical, thermal, electrical, programmatic, etc.).

Five members of our team, along with Scherrer and Bush of Stanford, participated in two days of meetings at GSFC on 17-18 October. We began organizing this meeting shortly after receiving the selection letter as a way for people in the various disciplines to get to know their counterparts on the Project and begin discussing technical and programmatic topics. The first day of the meeting was devoted to this and was highly successful. On the second day we were joined by several folks from the SHARPP team and a representative of EVE. The primary topic of that day was how the high volume science data might be handled as well as what quality of data perfection is required. Quite useful interchanges took place. In addition, a splinter group continued to discuss the physical and thermal spacecraft accommodations.

Internally we have begun to form the HMI team with initial emphasis on the disciplines that interface to the spacecraft. A local web site, modeled after those in use on our other programs, was established as were several e-mail lists. We also began to refine the instrumentation concept described in our proposal – the first step being to refamiliarize ourselves with what we were thinking a half-year ago. Weekly team meetings have begun, the purpose of which is to keep

everyone informed of what is happening, to identify areas that need attention, and to schedule the additional efforts and meetings that are required to progress in these areas.

Other Activities During October

1. A Subcontracting Plan was provided to Stanford University.
2. Comments were provided to the Project on the wording of the draft Letter of Agreement between the US and the UK, and a copy was given to our UK partners so that they could obtain informal comments from their governing agency.
3. We began to think about mechanism life testing. This will have to begin very early in the program for mechanisms that are planned to move every 2-4 seconds during a 5 year mission to be able to undergo an accelerated life test that is adequate.
4. We provided the Project with a variety of preliminary items including:
 - a 3-d solid model of the HMI optics package (OP) as originally proposed
 - a surface geometry model of the HMI OP for use in thermal considerations
 - responses to the contamination control questionnaire
 - an approximate electronics box size and power dissipation
 - information on disturbance torques generated by typical internal mechanisms
 - initial requirements on orbit knowledge
 - information on disturbances by (very infrequent) HMI repointings
5. We had a telecon with N. Waltham and J. Lang, of RAL, concerning details of the camera electronics they will be providing.
6. A number of interactions took place to keep track of the potential problem our UK partners may have in obtaining the funds required to carry out their portions of the HMI program.
7. Several NASA Mission Assurance leads visited LMSAL on 22-23 October to discuss how we perform the MA activities on all of our NASA programs. The group included B. Calvo, the MA lead for SDO.

Planned Activities During November

1. Establish the baseline wavelength and begin to slightly modify the optical-mechanical design to accommodate it if it has changed from the proposal baseline.
2. Participate in meetings with our UK partners, and the Project and NRL, on 7 November, taking advantage of the fact that they are in the country for the SECCHI/STEREO CDR.
3. Prepare for the MDR in early December.
4. Enjoy a 4-day Thanksgiving “weekend” right before the MDR trip.

5. Increase the size of the team.
6. Receive a draft IMAR and provide comments upon it.

Design Updates

It seems likely that the HMI wavelength may change from 6768A to 6173A. This should have minimal impact on the instrument design and what impact it does have will likely make the design “easier.”