

## HIRES Dewar Upgrade

Project Monthly Report – July 20, 2003

### **Progress**

#### **Detectors**

The Engineering grade CCD mosaic is awaiting installation in the dewar.

#### **Mechanical**

Footlocker framing ordered from Amco Engineering. Delivery due at the end of the month. Extren structural fiberglass tubing also ordered and due in about a week.

The feed-thru flex circuits (flex cable between dewar lid and interconnect boards) are now soldered to their connector without bending. The connector pins are bent instead. This avoids possible failure of the flex circuit. A fixture was developed that will hold and protect the connector and the soldered end of the flex cable. This will allow safe manipulation and the application of permanent bends in the more remote and robust area of the cable. Six more PAVE micro-D connectors have been ordered. Delivery time is 8 weeks, but they may come in sooner.

Cable pipe assembly (sheet metal shrouding cables between pre-amp electronics and footlocker) components have been fabricated.

Basic design of footlocker is complete; drawings to start this week. Plumbing for heat exchanger has been laid out. However, coolant supply and return line size has to be confirmed. It is not certain if the line size is 3/8" or 1/2". Once the facts are known, the plumbing can be finalized and parts ordered. Parker has CAD files available and the parts can be incorporated into our drawings. All that remains are penetration locations, hanging concept and hardware, and thermal insulation. For the access panels, PORON (cellular urethane foam) will be used for the airtight gasket material. We're in the process of identifying a soft grade in tape form with an adhesive backing so that an order can be placed.

Related to the unknowns of the coolant lines are all the electrical connectors and penetrations thru the existing footlocker. Detailed information of all the interface items is needed before the footlocker can be completed properly. An added concern is the possibility of incurring long lead time on required connectors. It is important to know this info as soon as possible. For this reason, another survey request plan was generated and passed on to Keck. Unfortunately, documentation for the existing system is light in this area. We are hoping that they can help us out with addressing all that we need to know about the interface issues.

## **Electronics**

Nearly all time last month was spent resolving connectivity issues with all the flex circuits in the dewar that pass each CCD's signals from the its associated hermetic connector to its internal dewar circuit board.

Time was spent finding the problem and searching for several solutions. Due to the tight tolerances of the flex circuit layout the construction of it demanded the use of a cured material for the outer layers as opposed to the standard cover lay material. This cured material was discovered to be intolerable to any bending or stress and would cause some breaking or cracking of several copper traces. A solution was achieved by bending the pins of the hermetic connectors to form a right-angle connection and then making a special fixture to place a slight curve in the flex circuit away from the cured material, insuring its outer layers weren't stressed.

Once all flex circuit and hermetic connector assemblies were remade and then passed their continuity tests, each CCD's set of signal paths were verified for continuity from the CCD controller cable to the CCD circuit board within the dewar. Some modifications to the analog switchboard position clamps were made to insure the boards remained fully seated in the electronics box.

At this point in time the electronics box has now been sent to the CCD lab and attached to the CCD controller for temperature diode calibration. It is anticipated that the engineering mosaic will be installed into the dewar by the end of this week.

## **Software**

Power jumpers were updated on all six video processing boards, and PAL chips U12 and U17 were updated on the timing board. Using DEIMOS software for baseline hardware checkout, both the timing board and utility board software is booting up properly and communicating reliably with the CCD Lab's VME fiber interface board in the CCD VME crate.

Using the baseline DEIMOS CCD software running in the HIRES CCD controller and VME crate, "mosaic" noise images have been successfully read out both in "single-amp" and "dual-amp" mode.

Controller measurements for the six analog channels in the HIRES controller (floating input, i.e., no coax connected to input SMA connector on video processing board) as measured with ds9 stats box function:

Channel 1: 0.80 DN (board S/N 319 in backplane slot 8)

Channel 2: 0.81 DN (board S/N 324 in backplane slot 7)

Channel 3: 0.83 DN (board S/N 322 in backplane slot 6)  
Channel 4: 0.87 DN (board S/N 325 in backplane slot 4)  
Channel 5: 0.79 DN (board S/N 323 in backplane slot 3)  
Channel 6: 0.76 DN (board S/N 321 in backplane slot 2)

By displaying these noise images with ds9, baseline instability problem was found on one of the video processing boards (serial number 320). That board has been replaced by a spare (serial number 321) that appears to be working OK.

Using the DEIMOS software as a baseline, modifications are now underway by Allen and Kibrick to generalize it for use with the HIRES mosaic.

### **HIRES instrument computer**

The new Sun Sparc server machine (a Sunfire 280R server) that was purchased by CARA as the replacement for the existing HIRES instrument computer has arrived and has been installed in a rack in our server room. It is configured as a CARA machine but is connected to our network as host lehoula. We have reached agreement with CARA on the specifications for a second ethernet interface board (for the HIRES private network), and CARA has issued a PO; that board is expected here by the end of July. When that board arrives, we will be able to connect lehoula to the HIRES upgrade CCD VME crate and CCD Controller.

The CVS directory structure for the HIRES upgrade project has been set up in our Lick CVS repository, and a copy has been established on lehoula.

### **Issues and Concerns**

No particular issues or concerns at this time.

### **Schedule**

The updated schedule is attached.

### **Budget and Spending Profile**

To the end of June the project has spent \$583,392 or 77% of the original project cost estimate, not including contingency. A summary of the budget is attached as is a chart and the spending profile.