

HIRES Dewar Upgrade

Project Monthly Report – Dec 20/2

Progress

Optics

The field flattener is at LLNT awaiting coating.

Detectors

The E2V CCD that Keck ordered arrived at the Keck Observatory, was visually inspected (looks normal with all bond wires in place), and shipped to Lick Observatory - it is expected to arrive Dec 19th via FedEx. Noise is low, cosmetics are very good (1 bad column) and q.e. is as expected (63% at 350 nm, 77% at 400 nm, 80% at 500 nm, 76% at 650 nm, 27% at 900 nm).

We tested the two lot 16 CCDs which Gerry Luppino had initially tested. Based on his tests he told Lincoln everything was OK and to start lot 18 (our wafer run). The problems we saw in the lot 18 CCDs are also there in the lot 16 CCDs although at a lower level.

The processing of the first two MIT/LL wafers is going slower than we had hoped. Mike Lesser needed to produce new tooling ("wafer oxide oven support") to handle the full 6-inch wafers (the first test was done on a single device). Mike Lesser's report from the 17th of December reads:

“Just a status update. We were delayed extensively as the shop Making the wafer oxide oven support messed it up and it had to be redone. Then they lost it in shipping! We just got it and are installing it into The oven. It is possible we will oxidize the wafers before break, but Not coat them. We will coat as soon as we get back and restart the Systems after shutdown (Jan 6). The University is closed until after New Years.

Sorry for the delays....”

After U. Arizona completes its work, the wafers will be shipped back to MIT/LL for dicing and packaging, and then shipped to U.Hawaii, and Gerry Luppino will then send them to Lick Observatory (contractual reasons for the shipping path....). Jim Beletic will work with Gerry Luppino to try to expedite these steps since we are getting very tight on schedule for having a fully tested chip prior to the January 30th SSC meeting. Lick Observatory will need to be ready to do testing as soon as the devices arrive.

Mechanical

Dewar Vacuum system

Just missing last report was the vacuum test on the new system, which was successful on the first attempt.

Dewar & Support Frame

Almost all the mechanical components have been fabricated. All that remains are retainer clips to hold the field flattener in place for such conditions as combination of earthquake and loss of vacuum. Drawings for these parts are done and the fabrication is in process.

The support frame has undergone a second modification involving an enlarged opening in its top to allow access to the flange bolts connecting the transfer pipe and LN2 can. Additional modification involved some machining to provide comfortable clearances if the dewar needs adjustment in the Z direction.

Measurements were made on the aligned Ford dewar configuration (prior to disassembly) so that this centering information can be transferred to the new dewar. The new dewar, vacuum system and support frame have been assembled together with the new support vanes and tension rods. Nominally everything fits together great and as expected.

Met with Kirk Gilmore to go over the design of the CCD assembly, test/assembly stand, and the splashguard. The design of some components has been revised as a result of his review and suggestions. Fastening hardware is now in the process of being acquired and silver straps are being fabricated. Once everything is available, it will be given to Kirk to assemble with dead CCD's. Assembly tests with the will then be conducted.

A z-gauge has been designed and built. This will be a temporary fixture which can be mounted on the front of the dewar and forward of the window. The fixture will be a reference distance from the focal plane and will allow measurements in the field to be made without touching the window.

A brace has been designed and built. This brace attaches to the vacuum assembly (Dewar/transfer pipe/flange) and will provide additional rigidity and protection during transport, especially during the electro polishing that will be performed offsite.

Major assembly drawings are now underway.

PAVE Technology is now on the development of the hermetic connector. We have been in communications with their lead engineer on the program. We should see a first iteration of their proposed design sometime in January.

After the first of the year, the major mechanical design effort will be detailing the electronic box.

Electronics

Fabrication of the CCD controller is complete and it is being electrically tested. The VME crate is complete and is awaiting Software testing.

The cable adapter printed circuit board was received and then assembled with its accompanying Faraday box housing. This cable adapter "box" adapts our existing 61-pin cable CCD connector to a new 68-pin cable assembly which offers smaller and flatter CCD cabling to the dewar's electronic box, necessary for the mechanical packaging and optical path constraints. These cable adapter boxes and the 68-pin cable was tested using the CCD lab's SDSU-2 CCD controller with two lot 14 MIT/LL CCDs from DEIMOS' blue mosaic. Noise measurements were made with both the existing 61-pin cable assembly and the new 68-pin cable assembly and compared. The preliminary results look quite promising for the 68-pin cable assembly, but unfortunately it was discovered that an X-ray source was still within the test dewar, making for difficult measurements. The 68-pin cable assemblies tested were using a standard version of the 68-pin cable and not the preferred low-crosstalk version which will arrive mid-December. In early January, the test dewar will be cooled again and the final noise measurements of the 68-pin cable assembly will be made with the X-ray source removed from the dewar and with the low-crosstalk cable assembly being utilized.

An order was placed for the SDSU-2 set of boards for the HIRES CCD controller. Except for the video boards, all SDSU-2 boards including spares were ordered.

Printed circuit board layout of the analog switch board, which resides in the dewar's electronics box, has continued. Enough of the layout has been completed to indicate that all the circuit components will fit within the board's dimensions. This is very good news as spacing is absolutely critical within the electronics box.

Software

No report this month

Issues and Concerns

We are still trying to make up the 3 to 4 weeks lost on the electronics effort to investigate using the E2V chips.

Schedule

The schedule is attached complete with the critical path.

Budget

To the end of November the project has spent \$273,519 or 36% of the project funds not including the contingency. A summary of the budget is attached.