

Summary

Activities in this report cover October and early-November. We continue to make steady progress on MODS.

Optics

The AGW system has been focused. Unfortunately, a control computer failure limited progress in determining the focus position of test pupil on grin array. Recovery attempts are underway. The approximate position is known and can be adjusted for the real telescope pupil. We successfully demonstrated the AGW system for LBT board, which included making an aberration plate for Shack-Hartmann wavefront sensing.

The blue blank cutting procedure was reviewed during an SOML visit. Work on the cutting of the blanks is underway. The CMM stitching procedure has been analyzed to find the source of mismatch between reference frames for different apertures.

NTFL will start work on blue channel mirror coatings in two weeks. Negotiations on packaging of coated mirrors are underway. The possibility of reusing current shipping container with coating protected by polymer film is explored.

ZC&R returned dichroic with AR coating only. They failed to meet specifications for the dichroic coating. CSIRO (Australia) is under consideration as an eventual vendor for dichroic coating and negotiations are underway.

The blue double pass prisms were received. Wavefront maps have been requested to validate image quality. All documentation will arrive along with red double pass prisms.

Design of detector masks was also started.

Mechanical

Shutter Testing and Wiring

Cold testing of the MODS Red#1 shutter has been completed. No change in performance was noted after cold soaks at -20C. 20,000 cycles were completed in the freezer. The MODS Red#1 shutter interconnect wiring is underway; the wiring includes logic blocking diodes, motor connector, and trigger input connector. The routing of this wiring remains to be evaluated in concert with the camera enclosures.

Front AGW

Features were added to the wavefront sensor pupil position adjusters to make fine adjustment easier and work is underway to complete the procedure for aligning the wavefront sensor pupil position for optimal off-axis performance. This is required because the GRIN lens array is not large enough to accommodate the shift in pupil position from on-axis to off-axis positions.

Grating Tilt Mechanisms

The final four grating tilt mechanisms are assembled. These have been wired and are now in the queue for final testing.

MODS Enclosure

Work continues on the MODS enclosure design. The enclosure will consist of a frame built with the aluminum extrusion modular construction system provided by ITEM. Panels in the frame will complete the enclosure. The first conceptual design is 75% complete. Materials have been ordered to evaluate this design. Several key areas of progress include: selection of the ITEM materials, integration on instrument electronics into enclosure design, mounting concept of enclosure, modular breakdown of enclosure.

Instrument Electronics

The first set of panels for the first MODS instrument electronics box have been completed. A rough concept for integrating the instrument electronics into the MODS enclosure has been developed. The choice of ITEM materials for the instrument electronics frame has simplified this integration.

Camera Enclosures

Both BLUE and RED camera light tight enclosures have been mocked up in cardboard. Fabrication in sheet metal will begin when shop labor becomes available.

Detector Mechanics

Re-work improvements and bonding of insulator struts is complete on all five MODS dewars. The machined parts for the all six main detector boxes are complete.

Optics

The fourth camera primary mirror has been shipped back to SOML for re-drilling of the mounting holes to the correct size. We have modified the camera flexure design to accommodate the new larger camera mounting holes. SOML has discovered a problem with their equipment that is causing more delay.

MODS Mechanical Work Plan for November 2006

O'Brien will continue working at about 80% on the analysis and detailed design of the rigid secondary support system. The major orders have been placed so now the cell design work must begin to allow adequate time for fabrication of cell components etc.

Supervision of camera enclosure fabrication and transfer of info to Mark for enclosure design will continue.

Mark D. will continue full time on MODS enclosure design work and some early prototyping of the frame.

Dave S. will continue fab work on the CNC parts for the detector system. Next round of parts includes baffles and new window clamp frames

Dave B. will complete assembly of the detector dewars. He will transition to camera enclosure fabrication.

Instrument Electronics

Wiring of the grating tilt mechanisms is complete. One shutter wiring is complete, but awaits test and evaluation (after which wiring of the other three units will begin).

Motor PCBs are in hand and wiring is underway and will continue through November. Connector

placement and mounting was improved. Wago and Lytron heat exchanger parts were ordered. The Microlynx and the Wago parts should arrive soon, after which final mounting and wiring can start. IMS should be contacted about the Microlynx order. The 4" wiring duct should also be ordered.

One copy of the Microlynx mounting plate and one copy of the Wago mounting plate were made. One complete Instrument Electronics Box will be made before copies are fabricated.

Detector Systems

Great progress has been made on the PCI express sequencer. The ALTERA example design to make the modules we need are now understood. We now can load Dram, and Sram on the card as well as Sram buffers on the Stratix chip (CSram). The DMA working in both directions between CSram and main memory. The "Serial Lite" macro function appears to be straightforward to implement. With these modules the existing sequencer can be dropped into the design. We have ordered a second copy of the demonstration board to use at the HE end of the system (to replace the Rx board, the new one is called the Rxs board) for development.

The MDM 4k system was deployed and tested at the 1.3m telescope. Although a few issues were discovered, the system worked reasonably well. The MODS 4k implementation should be very low risk.

The first copy of the Clock Bias board and 4 dual channel post-amplifiers with ADCs are done. Programs for the associated ALTERA parts remain to be done although they are (straightforward?) extensions of the designs used for the postamp tests.

The pre-assembly of the two red and two blue Dewars is complete. Bumpers for the radiation shield have been fabricated as part of the pre-assembly. Some type of spider will be needed to center the neck of the shield. The machining of the six detector boxes is essentially done with the new style field flattener retainers being the only important remaining part.

The next step on the Dewars is to vacuum and thermal test the black Dewar, shortly thereafter we can add a detector box with the package that was used for the 4k thermal test. The package is painted black, which, based on the equilibrium temperature achieved with the test package and the CCD, closely matches the emissivity of the CCD. The package also has an RTD in the center and an RTD in the corner.

Software and Computer Systems

Progress on the MODS UI requirements continues, with the goal of finishing use cases and design requirements documents in December. Use cases and software design requirements documents for the slit mask design and manufacturing software is underway. The RETROCAM user interface software that is one the main prototype testbeds for the MODS imaging-mode GUI is being upgraded. In particular, enhancements to the scripting utility suggested by users in the field are being added and the next major update should be ready to deploy in November.

The interface code for the MDM4K camera was completed; this is the first deployment of a MODS first-light 4Kx4K detector with the current generation of the OSU controller architecture (this is our fall-back for first light if there insuperable difficulties arise in the development of Bruce's next-generation CCD controller).

We are working on getting the IIF and TCS software running at OSU. Once complete a prototype TCSAgent tool will be created to start learning how to use the IIF library.

We have begun review of possible in-house collaborative documentation systems. A spare Linux box in the lab was set up to act as a webserver and host. There are two candidate documentation systems: DocuWiki, which is used in the College (so we have local help), and Twiki, which is being used by the software group at LBTO.

We assembled and tested the hardware for the LBT TCS simulator and for our own documentation repository. We have been in contact with Alex at LBT, but he hasn't gotten back to us yet with the kickstart configuration we need to make the TCS machine work.

Ray Gonzalez and Jerry Mason attended an LBT sponsored software workshop in Tucson. They presented the MODS software plan and architecture and learned a great deal about the LBT software.