

Summary

Work on MODS continues as the primary focus for all lab personnel. Good progress has been made towards completion of the blue correctors, final assembly and wiring of the individual mechanisms and instrument electronics, detector systems, and software.

Optics

The inspection report on the Blue Corrector parent has been received and analyzed. The structure functions on both surfaces are acceptable. An independent CMM scan analysis has also been done to verify the design parameters of the aspheric side. There is good agreement on the radial portions of the scan, although the surface equation does not hold across the entire diameter.

The optical test of the red corrector parent has been analyzed as well. The test is very sensitive to the spacing of the test optics and temperature. Measures have been taken to control both parameters during actual testing.

An optical layout misalignment was discovered and fixed in the red channel. The image quality was not seriously affected, but the shape of the red corrector is being reoptimized to make sure there is no significant degradation.

The blue channel mirrors (both collimators and both camera mirrors) have been shipped to Newport Thin Films Laboratory for coating with enhanced aluminum. The fourth camera primary mirror has been shipped back to SOML for re-drilling of the mounting holes to the correct size.

The wavefront sensor layout has been analyzed. The pupil shift from the on-axis to maximum off-axis position will cause the pupil to come off the grin array. Therefore, if the AGW unit is set up for off-axis use with MODS, then it may not be able to analyze on-axis images. If the AGW unit is used for rigid secondary testing and alignment, some specific alignment may be required or the wavefront sensor collimator adjustment could be motorized. The wavefront sensor subsystem of AGW has been setup and seen first light in the lab.

The major tasks next month are to focus the test pupil on the wavefront sensor camera, adjust the position for the real telescope pupil, and continue to investigate the pupil shift on the grin array. We will also obtain a Shack-Hartmann calibration frame. We will also continue to monitor progress at SOML and discuss the cutting procedure for the blue clear apertures. Continued monitoring of the ZC&R dichroic quality will also take place.

Mechanical

The low-level software program to control the MODS shutter and to detect numerous shutter faults has been written. This routine (written in the MicroLynx controller language) will form the core of the actual MODS shutter software. The MODS Red#1

shutter has been extensively tested for performance and endurance. The shutter now has 40,000 exposure cycles with no endurance related problems and not a single shutter fault. Cold testing of the shutter has begun. The wiring plan for the shutter, which requires several unique features, is under development.

All four of the MODS filter wheels are assembled and wired for operation.

The remaining four MODS grating tilt mechanisms have been assembled. These are now in the queue for final mechanism wiring.

Work on the MODS enclosure design is proceeding by translating the necessary design information to SOLIDWORKS. The goal is to save time but doing this complex design work in this superior software package and to keep up the learning curve on SOLIDWORKS which will be the mechanical modeling and analysis package used on all future projects. Support for the instrument electronics packaging is also on going.

Work continues on the design and test assembly of the light tight enclosures for the MODS cameras.

Next month the major tasks are to finish the design work and CNC programming for the detector systems, continue fabrication of the parts for the detector systems, complete rework on the detector dewars and bonding of internal components, continue enclosure design work, and start camera enclosure fabrication.

O'Brien will shift to working primarily on the analysis and detailed design of the rigid secondary support system.

Instrument Electronics

Final wiring is complete for all filter wheels and rework is done on all 10 copies of the grating tilt.

The motor PCB for the IEB was ordered along with all the parts necessary for populating a complete copy of the PCB.

The large order of MicroLynx controllers was submitted and various paperwork tasks associated with the order has been completed. The order has been faxed to IMS. The Control serial port servers (two 8-channel units) and four 65VDC power supplies were ordered and received. One 24VDC power supply is backordered.

The layout for 16x box was finished and a frame kit from Item was ordered and received. All parts except the Wago I/O components were ordered for the 16x box. The Wago order awaits a quote on a discount price from Monarch Automation. Also, heat exchangers and associated plumbing need to be ordered.

The major tasks for next month will be to finish the wiring of the last four copies of the grating tilt and an additional shutter assembly. The Wago I/O components, heat

exchangers, plumbing parts, and wiring ducts should be ordered. The PCB should be populated and the IEB frame built (including a trial fit on the MODS structure to check accuracy of the 3-D model). The MicroLynx and heat exchanger mounting plates should be designed and fabrication initiated in the shop. IEB component mounting and wiring will start when the mounting plates are complete.

Detector Systems

Substantial progress continues on the detector mechanical systems. In particular, most parts are complete except for the challenging main detector box, the fabrication of which is underway. The field flattener was tested in its cell and position repeatability was found to be acceptable. Warm-up heater bonding to the LN2 tanks was completed, dewar insulator struts were epoxied in place, and the design for internal brackets to hold an internal connector for the dewar electronics was completed. Re-work on all give MODS dewars is also underway.

A trial assembly of the black Dewar was completed. Identified rework, including the following, has been completed:

Holes in the Cu shield for bumpers to locate the shield both axially and radially.

Modified o-ring groove in the main cover.

Relieved mounting surfaces on the vacuum valve, zeolite canister, Dewar electronics connector to match spot facing of top plate.

Zeolite canister mount was modified to act at the over pressure relief, simplifying the requirements for the field flattener retainer.

The field flattener mounting was tested in the piece made to test the detector box program. It was found that the spring plungers did an acceptable job of returning the field flattener to its nominal position but that the requirement that the field flattener act as the over pressure relief was making the retainer design too complicated. The relief function is now incorporated in the zeolite canister mounting. The field flattener retainer will now have a simple mounting with a compliant material between the retainer and the lens.

The new clock-bias board is finished and post-amps are being assembled. These will be tested and shipped in the MDM 4K system if time permits.

Software and Computer Systems

A 2U Altus 1300 rack mounted computer from Penguin Ltd was received. Linux CentOS Distro was installed on the computer and all necessary connections were made. This is the first official MODS computer system with the operating system mandated by the LBT and it will ultimately become the MODS1 monitor and control computer. The Penguin

rack mount computer will make it possible to begin the installation of the first operational Interjoined Software Logic (ISL) system plus tests software for phase I detector testing.

General documentation, testing, and evaluation of software system are on going. MODS1 has been set up with shared memory and the ISL system installed. Tests have begun using the slitmask/AGW stage setup in the Lab. All parts of the ISL will be checked and recheck to make sure all programs associated with the ISL system will function properly before other changes are made. Now that MODS1 is available and working we can begin work on scripts that will make the installation of the system for MODS2 easier.

Major tasks for next month are attendance at the LBTO Instrument Software Workshop in Tucson (and possible attendance at the ADASS meeting), evaluation of the current software schedule and adjustment for major software parts, and continued test and implementation of ISL system.