

DEIMOS
SSC Presentation: May 24, 2000
Twenty-Fourth Quarter

Camera/optics:

- Optical testing of the camera was successfully completed. The back focal distance was measured to be 0.251 in, very close to the predicted value, and the field is flat. Images were taken through focus in V-band light on-axis and 10° off-axis at four position angles (edge of the field is 11°5). RMS image diameters averaged 18 microns (0.14 arcsec), versus expected RMS diameters of 23 microns (0.18 arcsec). FWHMs averaged 13 microns (0.10 arcsec). This image quality is sufficiently good that we do not contemplate using the lateral coma-adjustor in Multiplet 4. The camera is now complete except for installation of the thermal compensator.
- Optovac has grown the replacement CaF2 crystal for Element 5 but says that this is the last large CaF2 crystal they plan to grow. Given this information, we have elected not to have them generate the boule into the lens shape but rather take delivery of the raw boule, which could then be used for another CaF2 if necessary. Altogether, there are 6 CaF2 elements in DEIMOS and ESI.
- One tent-mirror epoxy mount failed and was re-cemented. The mirror received its temporary aluminum coating (the final coating is to be silvered) and is ready for installation in DEIMOS.
- RFQs were sent out to three firms for AR coatings on the front window and the clear spectroscopy filter.

Detector/mosaic:

- The procedure for adjusting the heights of the molybdenum pads to achieve a coplanar CCD array was successful, and the invar science backplane was also polished and measured to be flat within a few microns. We appear to be on track for meeting the goal of getting the science array flat to within 7 microns rms.
- The science array is currently being assembled using 8 blue-sensitive MIT/LL devices from Lots 9 and 10. Two Orbit devices are also being mounted for the FC system. We hope to install the completed science detector in the dewar in early June.
- A first distribution of Lot 14 hi-rho CCDs was held with partners Subaru and ESO, and DEIMOS received two very nice high-QE devices. With one red-sensitive CCD already in hand from Phase I, this brings to three the number of such devices now available for the red side of the science array. Five devices are needed, including one spare. As roughly twice as many Lot 14 devices are expected in total, we may in fact receive the full complement.
- The red high-rho CCDs will have to be installed in the science array at some point after regular DEIMOS testing. The schedule for this is TBD.

Dewar/LN2 system:

- The original RTV support ring for the dewar window was replaced with an O-ring seal, solving the problem of water condensing on the CCDs, as well as various other contamination issues.
- The Fe55 X-ray source for measuring CTE was reworked to cure vacuum contamination from the magnet-location mechanism. It is now in routine use.
- Tests on the engineering array including 8 MIT/LL devices and 2 FC devices should be completed next week. We can cool the array and control the temperatures of the CCDs individually. The FC controller was put into operation; testing the FC CCDs is the last item on the engineering-array schedule.
- The biggest unsolved dewar problem is a glow produced by the ion pump, which contaminates the dark current at a level of a few DN per 100 sec exposure. This level has been reduced considerably by installing a light baffle around the ion pump port, but we may ultimately have to replace the ion pump with a cold particulate getter containing zeolite or activated carbon.

Tearing down the dewar to carry such a getter would incur significant delays. We are testing the gettering capability of zeolite and carbon at different temperatures to be ready with these basic data should a new design be needed.

- If the ion-pump glow problem is cured with no additional delays, the dewar should be ready to be installed in DEIMOS in early July.

Structure:

- The collimator cell containing a dummy mirror was installed and passed stability and functional tests.
- A dummy tent mirror was installed using hardware that will support the real mirror.
- Fabrication of the grating system is complete, and two out of four sliders are installed to test the system. The slide drive now runs smoothly in all position angles; final torque and speed measurements are being made. Slider #3 is being set up for use by the Software group for motor-control testing of the grating tilt mechanism. Tests of the slide drive and grating mount mechanism are expected to be finished by mid-June.
- Flexure in the slitmask cassette holder was successfully removed by the last redesign, and the slitmask insertion mechanism now appears to work in all position angles. The cassette holder and insertion mechanism have been mechanically aligned and are ready for software testing.
- The final slitmask form is being designed. The new design eliminates nearly all vignetting and contains mounting points for the FC focal-plane fibers.
- Minor modifications to the filter wheel assembly are complete, and software bench-testing of the unit will begin next week.

Electronics:

- Final wiring of the major mechanical units is largely complete.
- Limit switches on the cable wrap were installed, and most cables have been loaded into the cable wrap, including cooling, pneumatic, electrical supply, and communication lines.
- The AC power system including the UPSs has been designed, and all components have been purchased.
- Various electronic components for the position angle drive have been redesigned to allow the servo system to run at higher speed. The new components are being speced and will be purchased next week.
- Cabling of the interior of DEIMOS is due to start next week.

Flexure compensation system:

- The FC CCDs will be tested in the engineering array next week.
- A final scheme has been adopted for forming $f/15$ beams from the FC fibers, based on optical testing of candidate systems.

Calibration system:

- Various arc lamps from Oriel and Penray were ordered. Tests in DEIMOS will determine the final choice of lamps.

TV guider:

- Fabrication of the TV guider has now started, and an alignment plan is being worked out. We are studying the ESI guider to avoid its focus problems.
- The PXL camera developed an intermittent electrical fault and has been sent back to the factory for repair.

Software/testing:

- A milestone is about to be passed: four systems—including the grating tilt motion on Slider #3, filter wheel, tent-mirror piezo FC drive, and slitmask cassette/insertion system—will be

ready for software testing next week. These are the first DEIMOS actuators to come under software control.

- Kibrick and Alien are completing the mosaic descrambling software that allows us to readout all 8 science CCDs and display them as one.
- Requested improvements to the DS9 real-time image display system were in fact received on time, boding well for future collaborations with the DS9 team.
- We continued to lose software time to the HIRES exposure meter commissioning, including a trip to Hawaii by Bob Kibrick. Final bug fixes are supposed to be done this week.
- Software may incur further delays as the team reorganizes itself to fill the major gap in testing expertise left by Jim Burrous' passing.

Website/documentation:

- It is now possible to view Excel spreadsheets directly on the Web without having to download and translate them. Testing data are being routinely recorded there.

Concerns:

- Stages and mechanisms that may need extensive rework.
- Eliminating ion-pump glow.
- Acquisition of all five high-rho CCDs.
- Software schedule and manpower, especially Kibrick.
- The testing program is still suffering from the loss of Jim Burrous and Ken Diech's leave due to back surgery.

Schedule and Budget:

- The Oct. 11, 1999, baseline schedule showed the dewar/detector being installed in DEIMOS at the beginning of May. We presently estimate early July for this, for a slip of one month, taking advantage of the allotted 15% contingency.
- The same schedule showed the camera being completed in early December. It was in fact finished in early April, for a slip of four months. However, there was extra slack in the schedule for the engineer involved, and this slip does not affect the critical path.
- The same schedule showed the spectrograph as fully assembled and ready for first light in early May. We are now showing this in mid-July, for a slip of 6 weeks, including the allotted contingency.
- Our report on March 14, 2000, showed a Pre-ship Review date in early December, which represented a slip of one month from the original date in October. We predicted a further slip of 11 weeks beyond this, based on our historical scheduling accuracy. The present first-light date in mid-July represents a net slip of 6 weeks from the October schedule, and thus a slip of only two weeks since March. We think this is in the noise and are not now presently revising the Pre-Ship Review date. The estimated-cost-to-complete is therefore unchanged.