

## ADC Meeting 6/18/03

### Action items last week:

1. Drew contacted Sean: ADC for LRIS, impact on other instruments being discussed. Trade-offs will probably not be an issue, but need to be discussed.
2. Dave C. getting info for work plan re CARA: will have by end of this week.
3. Dave H. got additional cost information from Corning comparing using 2 wedged blanks from one thicker piece, and getting it sawed to prepare for grinding and polishing vs. two pcs previously quoted by Corning: \$342K vs. \$325K. That is not a final figure, as Zygo and Kodak need to weigh in with grinding and polishing; but Dave thinks that we could still come out saving \$18K by using a single, thicker blank. Dave will get decimal point numbers for Drew for the difference between using C and D grade glass per inclusions and bubbles; the cost difference is around \$20K. More information is available at <http://www.corning.com>.
4. Joe to review drawings with Vern. Looked at back support and how instrument rests (on cone or on ring, back plane issues)
5. Next meeting: July 2. Joe may have a conflict, but we can work around it.

### Optics Design: Drew

- Working Zemax model in with tilted cylindrical slit mask surface. Built 5 positions: up 45, 90, 135, and 180 degrees. Zemax model gave expected results.
- Prism angle and spacing options: smaller angle on prism with longer reach is preferred. 2.5 degree prisms and 1.7 meter throw is good. Gets worse with longer prism angles if thicker glass. If active tilt re: field position, cancels aberrations, but not a huge effect. If no active tilt; range in optimum angle 2.5 degrees but as throw shortens angles do, too. Pick slightly tilted angle. Matching prism will tilt at same degree (.8).
- Image quality is better in lower half, due to re-pointing telescope to line things up. Users in general should use lower half. Curved focal surface represented as displacement or tilt. Ideal situation is to design a telescope with linear ADC, drop instrument off optical axis. Always built on axis, and eat defocus and treat as introduced aberrations. Can refocus for center of LRIS field as it moves, plus or minus 6mm difference from top to bottom. Will effect image blur across focus.
- Distortion to be investigated when telescope is refocused. Distortion minimized if front prism slips downward in relation to optical axis. Back will not move. Displace front prism by about 35mm – save about 34mm in diameter. Top surfaces lined up, bottom displaced. Get half of that (17mm) with offset. Might add mechanical complexity, so not worth tradeoff for increase in glass.
- Prism sagging: thin prisms insensitive to orientation, take prism compare to displacement of prism by small angle: envelope for performance. With 10 times max sag, very little difference. Actually a change in plate scale in one direction: 20 microns. But the sag won't be as modeled, down in middle not on sides; image motion will just be fuzz if sag symmetrically. Curvature must be tiny, front and back curved by same amount is assumed. Most likely of no consequence.

- May need to tighten specs on how well the two prism are registered. Tolerance given by Mast is 10-20x larger than needed. This is a non-issue.
- What is left to do? Distortion and how to change plate scale between off and on positions, and prism separation. Residual dispersion chromatic effects is .44 microns, will tell about other issues.

#### Mechanical Engineering:

Vern will do drawings to provide for running with one lead screw, as opposed to three.

#### Electrical:

Ken was to look at circuitry on DEIMOS slit mask system for limit switch parameters to be translated to ADC. Ken found it doesn't work. Problem is that documentation didn't keep up with modifications. Solid state doesn't work. Hall effect fiducials will be used, signal through transistor through mechanical relay, straight thru to computer.

Mechanicals stay on; opticals turn on when working, off when not. Incremental encoder on motor, and is shielded; maybe another on one lead screw as tachometer. Reliability of Hall effect is same as relay switch, fail rate is the same.

#### Software:

Will has concerns about Keck, DCS broadcast at Azimuth. Failure to connect is not considered enough of a problem. No way to report info to DCS, so cannot tell if connection is working. This is a DEIMOS problem too. Only monitoring, not communicating; DCS doesn't have ADC keyword yet, and cannot just grab one because some keywords disconnect others. Must be fixed before proceeding. Need alert on GUI that instrument is out of position; but how to know if not reporting? If position is read from DCS and read fails, then everything closes down. Is there a workaround? Could be, but there is a lot of expenditure in instrumentation having to deal with this problem so that Keck doesn't have to fix it. It needs to be addressed.