Flexures in the Cassegrain Focal Reducer

Following a focal reducer (PUMA) run in December 1988, we found rather large image motions, roughly of the order of 0.7 arcseconds per hour. Subsequently the cassegrain bonnette television pick-up mirror arm was inspected. Its mounting screws were tightened, and the shoulders of alignment pins which protruded slightly were machined down. However, further tests in mid-1989, again with the PUMA focal reducer revealed no improvement in the flexure.

Reinforcements of the focal reducer structure by D. Cowley and D. Sabin were then made, and tested on the sky by O. Le Fèvre and Guy Monnet. These tests have shown a reduction of the focal reducer flexures to a 0.4 arcsec/hour average value, quite better than the previous 0.7"/h. However, the r.m.s. noise in the measurements is 0.3 arcsec indicating that although the flexures can show very low values (~0.1 arcsec), they can also be quite high (0.7-0.8 arcsec). The current set of data did not allow to find any dependency with the telescope location on the sky. Further tests and experiments will be needed to reduce the focal reducer flexures to lower values.

Meanwhile, to check whether a flexure problem associated with the bonnette still existed, a series of exposures were taken at cassegrain using a CCD mounted on FOCAM. The test consisted of centering a star on the bonnette television guide box with its feed mirror on the telescope's optic axis, and then rapidly driving the mirror from the beam and taking a CCD frame of the same star field. This was repeated at 1hr hour angle intervals from -4 hrs to +4 hrs through the zenith, and at 15 degree intervals through the zenith in declination. Since the stars were initially centered on a fixed autoguider box for all exposures, any motion of the star between CCD exposures would indicate the presence of either guide mirror flexure, CCD/FOCAM motion, or inaccuracies in the repositioning of the guide mirror onto the optic axis between exposures.

As shown in the accompanying diagrams we are happy to report that there is no significant relative image motion between the telescope focal plane and the tv guider resulting from these sources.

D. Salmon and O. Le Fèvre

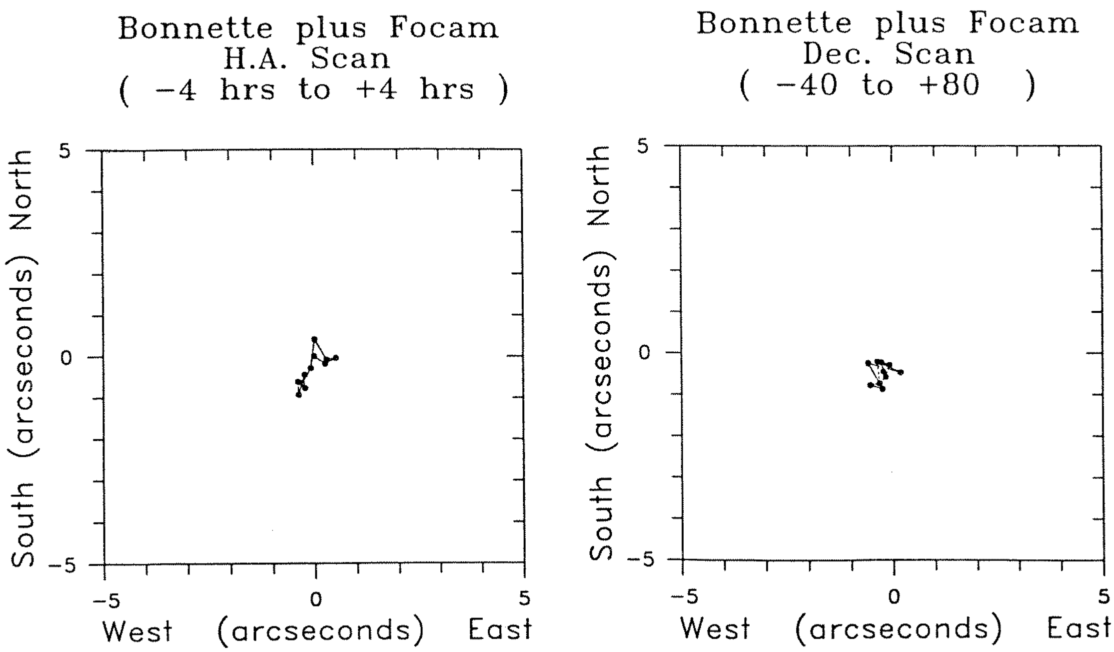

Figure 13

Networked Access to Dome Environmental Control

Control of the dome environment (louvers, shutter, and windscreen) has been a manually controlled procedure. During implementation of computer control for these mechanisms, the opportunity was taken to allow control and status monitoring via the computer network. This allows a distributed, modular integration with our current and future TCS and data acquisition systems. Currently this networked access is implemented using remote procedure calls (RPC's).

The actual control of the dome environment is realized with an industrial version of a MS-DOS PC. This machine is in turn connected into the CFHT network through a serial line to the data acquisition machine (moe). (It is expected that a future version will allow the PC to connect directly to the network.) The rest of the computers on the network recognize moe as the controller of the dome environment and interact with it via RPC's. To the programmer, and hence the user, these RPC calls look just like normal procedure calls, with all of the overhead and details of the network connections, security mechanisms, and locations of the actual control hardware hidden from view. If at some future time it becomes necessary to move the control to another computer or location, no changes to the control programs will be needed.

Allowing monitoring and control of unique resources from an arbitrary set of computers enables easy redundancy, modularity, and the effective use of these resources. By utilizing standard tools to implement this system, we have produced a highly portable system that can be used as a model for other projects in the future.

S. Smith