simple and can reduce large amounts of data very quickly and is not sensitive to the many flaws that may exist in the array.

This small amount of hardware combined with the extensive software will allow us to scrutinize the important optics that we use here at CFHT including the primary mirror. By measuring the lines of constant optical path difference between the test and reference wavefronts, imperfections and flaws of the optic under the test can be determined and then possibly fixed or corrected with another optic. The knowledge of inherent flaws within an optical system is important, especially when light is being magnified and focussed.

Use of this interferometric tool will help us to maintain a telescope facility with the highest imaging capabilities.

J. Seerveld

Computer Based Telescope Operations Log

Since the Canada-France-Hawaii Telescope first opened, telescope operators have recorded a variety of data in handwritten logs. The current effort to create a computer-based version of these logs has been inspired by the desire not only to make the recording process easier, but to make better use of the data thus accumulated by easing retrieval.

The actual logging of telescope operations is made easier under the new system, as many items previously entered by hand can be made to be recorded automatically by existing equipment. Telescope positions, for example, will no longer be transcribed from computer screens to handwritten logbooks, but recorded from the telescope operating system directly into the electronic "log."

Retrieval of data is also to be easier under the new system. Remote access of records will be possible and the application of computerized search techniques will enable the user to locate desired entries much more quickly than is possible with a non-computerized system. Statistical analysis of records using databases and spreadsheet programs — formerly only possible after extensive keypunching of handwritten data — will also be facilitated. The night report is also part of this system, allowing the telescope operator to describe problems, suggestions and data quality evaluation during the night.

Every morning at 7:00 AM, the log is distributed by electronic mail to all engineering and astronomers staff. The present system has been in operation for almost 2 months, but still under evaluation and several suggestions for improvements are under consideration.

B. Grundseth, K. Bartlett

Data Reduction Facilities

The data reduction facilities have advanced in a number of areas since the last CFHT Information Bulletin. In summary:

- The summit Sun data reduction machine, 'wiki,' has been upgraded from a SPARCstation-2 to a SPARCstation-10 model 41. The new cpu is up to 3 or 4 times faster than the old one.
- As predicted in the last Bulletin, a SPARCstation-2 hosting an Exabyte tape drive, a SPARCprinter, and disk work space for users has been installed at the CFHT office at Hale Pohaku.
- Uwila, one of the three Sun servers in Waimea, has been upgraded from a SPARCserver 490 with one cpu and 32 Mbytes of memory to a SPARCserver 690 model 140 with 4 cpu's and 64 Mbytes of memory. In addition, four old SMD disk drives have been replaced with new SCSI disk drives.
- Nuilolo, a Sun SPARCserver 690 located in Waimea, has been upgraded from a model 120 to a model 41. The new cpu runs at 96 MIPS and is about three times faster than the old pair of cpu's.
- A SPARCstation-10 model 30 has been added to the pool of machines available to all users in the Waimea computer room. This machine has been very popular for cpu intensive tasks since it is about 3 times faster than the other machines available to users in the computer room.
- Network backups of Sun-hosted data reduction disks are now performed on an Exabyte EXB-10i Jukebox which has a capacity of 50 Gbytes (10 cartridges). Previous network backups were performed on a single Exabyte drive which had to be shared with other users. The new system allows much of the network backup task to be automated.
- Major new software additions include the Interactive Data Language (IDL) and the Statistical Analysis System (SAS).

R. Link

A Ray-Tracing Model of PUEO

A ray tracing model of the proposed Adaptive Optics Bonnette (PUEO) has been developed using the ZEMAX ray tracing software. The models are based on the "Report on Optical Design of Adaptive Optics Bonnette" of 14 September 1992 by E. H. Richardson. Models which have been produced based on this report are of the main optics and the wavefront sensor module.

The wavefront sensor module model is based on the smaller lenslet array design. Lenslets from both the inner and outer circles of lenslets have been modelled in different versions of the wavefront sensor model. Appropriate apertures have been placed in front of the lenslets to give the lenslet the correct shape.

Interferograms have been produced from the models for the main optics and also for the wavefront sensor with a lenslet in the inner ring modelled (Figure 8). The interferograms shown are simulations of the output of a double pass interferometer. Very little aberration is present in these systems. Without added tilt, there is approximately 0.2 waves of optical path difference in the main optical system and 0.3 in the wavefront sensor module. Other tools available in ZEMAX show that the main optics, as designed, are diffraction limited.

Plans for the model include performing a tolerance analysis on both the optical elements of the system and the mechanical placement of the elements. Also, an investigation of the effect of moving the wavefront sensor module to view a star not at the center of the field of view of the telescope is planned.

G. Barrick