

A New CCD Command Software

For those observers who have used the CCD data acquisition system here at CFHT in the past, you are in for a treat. Starting during the summer of 1988, gone will be the Dialog user interface that served us faithfully since 1982. In its place is a modern, streamlined, windowed "observing environment", data acquisition system.

The Goals

When we started out to redesign the CCD data acquisition software for the new computer systems, the most important goal was to present to the users a very efficient observing environment. The user interface would need to shelter the infrequent observer from a very sophisticated acquisition system and yet permit the power user access to all of its features. It would have to allow any observer to take an exposure with the minimum amount of interaction. If the system didn't satisfy the "10 minute" rule, i.e., the ability of the user to manipulate the basic system in 10 minutes, then we would have failed this most important goal.

We also strove to provide a multi-purpose interface that would allow for a "fill-in-the-forms" mode of command input, keyboard input, or batch mode scripts. The batch mode would allow the data preprocessing computer to acquire and reduce bias, dark, and flat exposures during the day, as well as allow some users to write custom observing sequences, e.g. mosaics.

The data acquisition software would also have to provide easy integration of new adapters/auxiliary equipment, e.g. PUMA, into the architecture. The old system needed to be heavily customized when new equipment showed up.

And finally, the new CCD package would be the prototype after which all the other data acquisition packages would be patterned in order to provide a consistent user interface at CFHT.

The Hardware

The current acquisition hardware consists of a HP-9000 Model 825 minicomputer (a more powerful Model 835 will soon arrive) connected to a Photometrics CC200 controller unit via IEEE-488 interface. The HP-9000 is also connected to a Sun Microsystems 3/180, via ethernet, for data preprocessing. Both systems are discussed with more detail in other articles in this issue.

Some Differences from CCD II

The first big difference you will notice is that an integrated workstation, consisting of a display, mouse, and keyboard, is being used instead of the old HP2648 terminal and the IVAS.

Displayed on the monitor is a X-window based "observing environment". Across the top of the display are grouped the few selections that the user needs to control the session, e.g., the main CCD exposure control, secondary exposure related items, focusing, tape manipulation, and a few other items that can change depending on the auxiliary equipment needed for the run. Any of the items may be picked by

simply putting the mouse cursor on the item and pressing the left mouse button. When activated, a form will appear for the user to act upon. No longer do you have to remember a host of commands and type them in at a keyboard!

Replacing the IVAS is a neat tool called Ximage. Obtained from SAO, this "X" program displays image data in false color. It has the ability to change the color map, zoom and pan around the image, and manipulate cursors. It responds to mouse commands and uses a button-based user interface. Currently, it takes 26 to 30 seconds to display a 680x1024 RCA2 image. We expect that to be even faster by the end of the second semester.

Raster definition will also be greatly simplified. In order to define a raster, the user has only to mouse the area on the displayed image to expose and if desired, select the binning factors.

There is also a very flexible tool for evaluating exposures. Implemented originally for focus exposures, it can do full-width-half-maximum calculations along rows and/or columns, the "Pritchett" mon value, and different background subtractions. The tool also provides the more mundane minimum, maximum, mean, and standard deviation values. Any of these options can be mixed and matched to the observers' content.

Conclusion

Even though, at the time of this writing, we have accomplished the goals we set out to do, the CCD environment will continue to evolve over the summer and into the latter part of the second semester of 1988. We expect to see a faster version of Ximage, a better focusing (maybe automated) scheme, and superior overall system performance. We believe that what we have produced is a simplified user interface to a very sophisticated system that will satisfy the needs of the majority of CCD observers.

J. Kerr

Phase Out of the HP 1000's

Overview

As you probably know by now the HP-1000's are being retired. This retirement is not particularly imminent, nor will it happen all at once, but it does require a lot of planning and foreknowledge on everyone's part. We currently run four HP-1000's: data acquisition, instrument preparation, telescope control, Waimea development. Our basic plan is to make a graceful transition to our new computers with minimal telescope shutdown.

The first part of the project will attack machines that our observers actually use. These are the data acquisition and instrument preparation computers known as DAIC and PICA. Once these machines are taken care of, the telescope control computer known as the TCS will be worked on. And finally the Waimea development machine can be shut down.

DAIC/PICA

For these machines it is our intention to run old machines and new machines in parallel. Not for the same run, of course, but they can back each other up. By keeping both

sets of machines installed we can easily pick off one instrument at a time, supporting just the runs that we need to, until finally there is no need for old machines. The main thing that makes this possible is the technology to share CAMAC crate control so that all computers can access all modules all of the time.

We have already begun supporting some runs on the new equipment. And, it is our plan to shut down the DAIC and PICA computers for the last time sometime in first semester 89. We have not asked, and do not plan to ask, for any night engineering time. It is our plan to take advantage of other engineering nights, discretionary time, etc.

TCS

Information on why to switch computers has appeared in several previous documents. (See "Our New Summit Computers" this issue). In addition to all the normal arguments, the TCS is also suffering from severe overloading. Unfortunately it may not be feasible to run old and new systems in parallel for telescope control. It turns out that there is considerable custom HP-1000 hardware involved, and that switching back and forth is not easily accomplished. This part of our project may well require a couple of nights for engineering.

This project will definitely require investment from both the telescope control team, and the computer team with each supplying the appropriate components. This project could begin in second semester 89, with earliest switch over in first semester 90. There will of course be a great deal of leverage from the previous DIAC/PICA replacement effort.

Summary

You may not know which computer you will be using before you get here. However, if we set you up on the new computers you will receive direct support at the summit until you are comfortable. We have found so far that the new computers are very friendly and capable, even in their early engineering state. An astronomer from another dome was through recently and said: "This is great, I'm going to have to start applying for time here."

J. Brewster

DATA PREPROCESSING AT CFHT

The Data Reduction Facility (DRF) has taken on a "sunny" new look during first semester 1988. At the close of 1987 the DRF consisted of a Vax 11/750 and a Microvax II; these machines handled all data preprocessing, data reduction by CFHT staff, general purpose computing, CFHT's accounting system, and electronic mail. The total power of this resource was some 1.5 Vax MIPS and was supported by a single engineer. The DRF has undergone a number of changes in the last six months.

New Staff

Two staff members have been transferred into the DRF bringing the DRF staff to three; a computer systems engineer, a systems programmer, and a technician. Dr. Robert Link has joined the DRF as a systems programmer and is

handling the FTS port and data preprocessing. Mr. F. Echeverria has joined the group as a technician and is responsible for our network, its machines, and our tape archives.

Sun Network

CFHT has been able to take advantage of Sun's discount program and seven diskless Sun 3/60 color workstations and a single 3/180 file server have been purchased. This network is supported by two gigabytes of disk space and two high density tape drives. This forms the nucleus of a new data preprocessing and reduction system available to visiting observers and to CFHT staff. We have also taken delivery of a Sun 3/180 color workstation which has been installed at the summit to handle preprocessing during observing runs. By the time this article is read we will have proceeded with the next step in this expansion; a 10 MIPS Sun-4 for the network in Waimea. The total power of CFHT DRF is now 35 Vax MIPS.

Demise of the Vax 11/750

In order to support the new Sun network we have had to retire less used, less capable equipment. The Vax 11/750 has been the backbone of the DRF for more than four years but the cost of maintaining it has grown out of proportion to its performance. We will also be retiring the IIS model 70 image display and the FPS array processor. The Microvax II continues as a general purpose VMS computer but we will be moving all scientific computing onto our Unix network.

IRAF at CFHT

The reason this expansion was possible was the adoption of IRAF as the data preprocessing and reduction standard for the DRF. As IRAF is computer vendor independent we have been able to take IRAF users off of our (overloaded) Vax network and transfer them quickly to the Sun network.

IRAF is now available on the Vax network, the Sun network, and the HP9000 network in Waimea. The facilities of IRAF networking allow us to share expensive resources such as tape drives and plotters between computers.

Waimea Preprocessing

The Sun network and the increase in staff have dramatically changed the DRF's capabilities to preprocess data from the summit. Visitors can expect to have a Sun 3/60 workstation, a Sun-4 "number cruncher", and about 500 Mbytes of disk space to preprocess their run. As well, there will be a DRF staff member to assist them with their preprocessing. For standard CCD imaging runs the DRF has the capability to preprocess the data and make a tape of preprocessed data for the visitor to take home.

Instruments supported for full preprocessing on the Sun network are CCD standard imaging and CCD/Reticon spectroscopy. Visitors with preprocessing needs outside of these detectors should consult with their support astronomer for our current capabilities.

It generally takes a day to preprocess the average 3 day CCD imaging run with the current computers. We expect this to decrease as preprocessing shifts to the Sun-4.