RECENT TECHNICAL ACTIVITIES

F/8 Focus Mechanism Upgrade

The existing F/8 focus mechanism has drawn several complaints in past years: slow starts upon movement execution, difficulty attaining a desired focus position, and image motion during focusing. Investigations showed the effects of these problems to be caused by the focus drive system which is an integral part of the central mechanism structure.

The drive system is essentially composed of three independent gear driven screws, set in motion by a single pinion and ring gear. There is notable flexure in the ring gear on start-up and during operation due to the torque required to turn these three gear driven screws. This causes unpredictable and uneven movement at each of the screws which in turn causes collimation and positioning errors. Backlash devices are also underrated for the required torque generated between the pinion and ring gear. Inherent structural flaws in the system also exist. It was therefore decided upon review of the options for correcting these problems to redesign and build a new focus mechanism.

In late 1991 a concept design was presented addressing the above mentioned problems. This concept incorporated a single servo motor, high precision ball screw assembly, transmitting linear motion by means of three block and rail systems, converging to a single motion structure. The advantages being: significantly reduced friction coefficients of the drive system, positive repeatable-incremental moments with finer resolution and positioning accuracy and collimation errors overcome by the use of a single motion structure.

Upon acceptance of this concept, the project was contracted to L&F Industries of Huntington Park California for further development, fabrication and testing. L&F Industries experience in telescope and telescope component fabrication is extensive, providing the facilities and expertise capable of delivering a finished unit.

At this time, the focus mechanism components and central structure have undergone extensive finite element analysis for design optimization. The detail design is nearly complete and the design review process is in progress. Fabrication is expected to begin mid-June and completed by late-September with delivery to CFHT by year's end. Installation is scheduled for the 1993 telescope shutdown.

D. Sabin

TCS IV Update

Progress on TCS IV, while very slow to start with, has been almost non-existent for the last few months. The press of other projects plus the loss of several staff members has put the project essentially on hold. This status will remain until some of the present workload is completed, and the electronics group is again at full staffing. It is hoped the project can be restarted with a full slate of electronics and software participants before the end of 1992.

However, before the work stopped a good amount of progress was accomplished. Three interface cards were designed and built to connect the new VME/vxWorks system to the existing telescope remote buss. All of the low level vxWorks driver code for this interface has been completed. Interrupt service code has been started. The interface between the new system and the R-Buss has been tested on the telescope. Using the driver code and new interface cards we were able to read all the telescope devices, and successfully control a remote motor system. We were also able to verify correct handling of interrupts. This is a big milestone on the move away from the HP 1000 computers. The next milestone is to slew the telescope from the new system.

A complete low-level library has been developed to handle all accesses to the TCS hardware. While coding and initial, emulator testing has been performed, testing on the telescope has not yet taken place. Several other low level systems, such as error handling and a CPU loadmeter have been completed. A prototype user interface for the real time computer has been developed, but is not yet fully implemented. Some conceptual design for higher level modules has been performed. Altogether, about 20% of the Real Time Computer software work has been completed.

Development on improved electronics cards progressed to the point of having a new analog control card ready for testing, and having a completed design for a new digital control card with greatly increased capability. All of the hardware parts of the project are also on hold. A vxWorks driver for the GPIB interface to CAMAC is presently being developed by Mark McDougal, a physics co-op student from University of Victoria, who is working at CFHT through the summer.

The project plan for the completion of TCS IV suggests that slewing of the telescope can be accomplished in 5 months after restart of the project, and that TCS IV can functionally replace TCS III within 12 months after restart. About 2 years will be required for TCS IV to achieve its full, planned functionality. The project needs at least two full time software people, one electronics person, and the part-time services of myself and a software engineer. The overall estimates show 4 man-years of software development, and at least 2 man-years of electronics work will be required to fully complete the project.

B. Cruise

Observatory Communications Software System

A new software system has been developed at CFHT which allows programs on multiple computers to communicate with one another. The software has been dubbed the Observatory Communications System or OCS for short. Currently, it is being used to implement the new CCD software package.

The OCS is meant to be first and foremost, a communications system for processes cooperating in a distributed environment. This arrangement extends itself well to the client-server