# Current Status of the Future CFHT IR Camera

Considerable progress has been made in the development of a new facility infrared camera which will employ a state of the art 1-2.5 μ infrared array manufactured by Rockwell International Science Center. The array was developed by Rockwell as part of the Near Infrared Camera and Multi-Object Spectrograph (NICMOS), a second generation instrument for HST. The detector is a hybrid device, composed of a low noise silicon multiplexer bonded to a Hg:Cd:Te photosensitive layer. It is identical to that used successfully for the past ~1 1/2 years by the University of Hawaii, having a total of 256x256 40 μ pixels. In March of 1991 an order for a science grade array, an engineering grade array, and a bare multiplexer was formally placed with Rockwell. We expect to receive the bare multiplexer, to be used for initial tests of the data acquisition electronics, during the first semester of 1991. The other two arrays are due to arrive before the end of 1991. Acquisition of another science grade array is under serious consideration.

**Data Acquisition:** In early 1991 the decision was made to purchase a DSP controller from San Diego State University. It is based upon a Motorola 56001 DSP chip running at 10 MHz which can handle up to 20 channels simultaneously. The DSP provides timing functions used to readout array detectors via its 100 ns bus. The waveform information needed to control array functions is stored in memory on the DSP card, either in RAM or EPROMs. A single analog channel board is dedicated to each amplifier in the detector (i.e., 4 with the NICMOS 3)

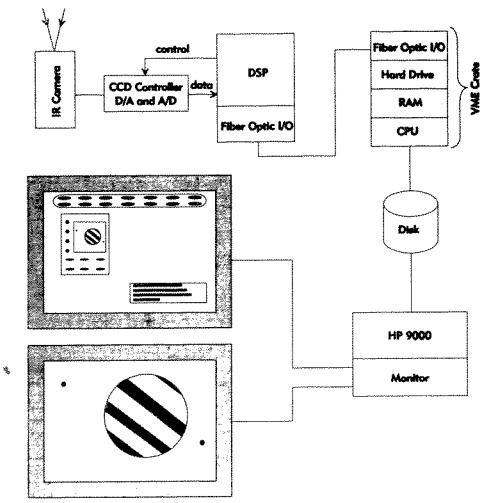


*Figure 6*

which provides bias levels, clock signals, and A-to-D conversion. All bias levels and clock signals being fully programmable, the new DSP controller is an extremely powerful and flexible system.

*Figure 7*

## FRONT VIEW

## SIDE VIEW

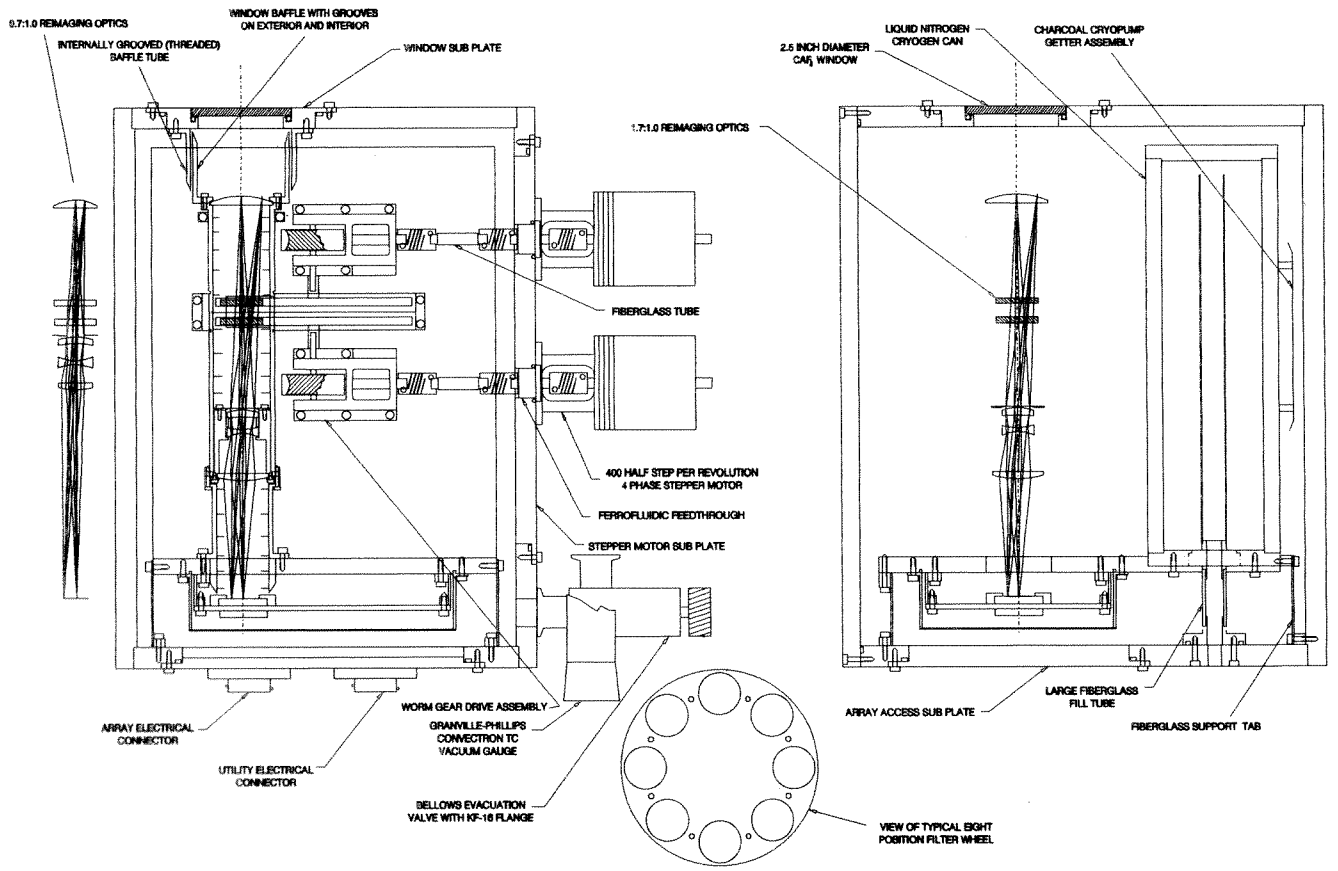

Figure 6 shows the layout of the entire system currently under development, as originally proposed by Chris Clark for the CCD. The controller is coupled to a separate computer (Sparc 1E engine) that serves as an interface between the controller and the HP9000. The Sparc engine and its accompanying 16 Mb of RAM and 700 Mb hard disk are linked to a fiber optic transmitter in a single VME Crate. The fiber link is used for high speed data transfer from the controller to the array computer, where images can be buffered, coadded, or manipulated in a variety of ways. The observer will have a window environment to use for camera control and image manipulation. A large format stand-alone monitor will provide additional image display functions. The overall system will appear very similar to the observer as the present CCD data acquisition package, except of course it will be faster and more powerful.

The timetable for development of the DSP controller specifies having the new 2k CCD running off of this system by June 1991. Soon thereafter, additional controllers will be built for use in Waimea and the summit and a multichannel mode will be implemented that uses the 4 amplifiers built into the Lick1 2k CCD. At this point, we expect to have our bare NICMOS multiplexer and begin work on running the multiplexer with the controller. By the fall of1991 we expect to have complete control oi the multiplexer with the DSP system.

**Dewar Design:** A preliminary dewar design has been completed and is shown in Figure 7. In order to provide redundancy and flexibility in summit operations, two nearly identical dewars will be built. The only difference between the dewars will be that one will house high resolution reimaging optics (0.2" pixels at f/8) and the other will house wide field optics (0.5" pixels at f/8). Higher resolution modes (0.04" and 0.1" pixels) will be provided at the f/36 focus.

By the time this report is published, we expect to have most of the details of the dewar design completed. Fabrication of the dewars will be contracted out to a third party who will subcontract out to the machine shops and electron beam welders needed to construct the dewars.

**Timetable:** We are expecting delivery of the dewars near the end of 1991. Custom ground and coated optics should also arrive by then, though the vendor for the optics has not been selected yet. The design and acquisition of the optics will be controlled entirely in Waimea. Wiring and integration of the optics and an engineering array in one of the dewars will then be completed in early 1992, followed by several months of lab testing in Waimea. Such tests will be phased into engineering observations at the summit near the end of the first semester of 1992. Assuming all goes well, we expect to make the camera available for general use during the second semester of 1992.

*D. Simons, C. Clark, S. Massey*

# MOS/SIS Status Report

Although the project has slipped a few months with respect to the projected completion date set in 1988, considerable progress has been made on the MOS/SIS second generation instrument since the last report in this bulletin. The Paris-Meudon Observatory has delivered the central octagonal support structure as well as the wide field multi-object spectrograph (MOS) sub-assembly to the Dominion Astrophysical Observatory. Laboratory tests held in Meudon before shipment showed an excellent behavior of the mechanical assembly, being as good or better than the specifications. At the reception of the units at DAO it was found that the travel had no impact on the measured mechanical performances.

While the team in Meudon is busy finishing the SIS high spatial resolution spectrograph, the DAO is proceeding apace to integrate the control system, as well as the optics for the octagon and MOS sub-assemblies. Extensive optical, mechanical and control tests will follow. The SIS assembly is expected to be delivered to DAO in July, only to be applied the same treatment by the DAO experts. Acceptance tests will also be conducted by CFHT during this period. The goal is to ensure that, upon arrival at CFHT (expected early in 1992), the MOS/SIS will already be a sound instrument and that the commissioning period will quickly proceed.

At CFHT, the user interface is being designed, including refined tools and procedures for multi-object spectroscopy tested with the MARLIN focal reducer.

*O. Le Fèvre*

# Report on the Herzberg Spectrograph New UV Configuration

The Herzberg spectrograph is now better equipped to collect light in the UV domain. A new grating with 1200 lines/mm blazed at 3000 Å is now available. Also a new f/2 output module optimized for the UV was designed and fabricated at DAO which uses only one UV grade fused silica lens instead of a triplet like the other modules. This lens received a broad band monolayer anti-reflection coating centered at 3200 Å. In addition to this, the former WHITE optics for the spectrograph (collimator and camera mirror) and a new folding mirror were given an enhanced UV reflective coating. The blue Schmidt corrector lens

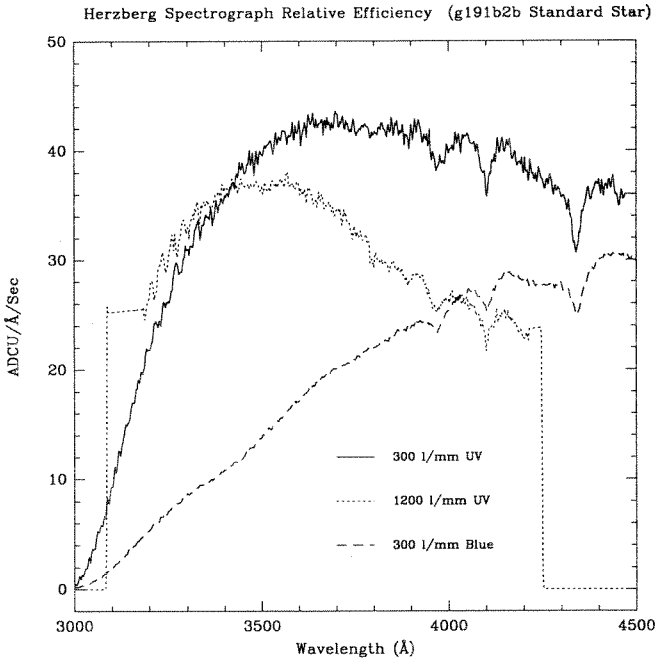


*Figure 8*