wheel can also be used to micro-scan images across the array, e.g. for the purpose of removing dead pixels.

Adapter

IRAC is designed to be mounted on the F/35 infrared adapters at the 2.2-m and 3.6-m telescopes and will therefore have the same TV acquisition and guiding facilities as the infrared photometers.

Software

As with most of the major ESO instruments, IRAC will be controlled via menus, form-filling and typed commands at the HP instrument terminal in the control room. Images will be displayed on a RAMTEK monitor and a graphics terminal will be provided for status and IHAP displays. The actual user interface and terminology will appear very familiar to those who have used IRSPEC. It would be premature here to describe the various observing and display modes currently foreseen, however, as these may still be revised following our actual experience at the telescope.

A. MOORWOOD, ESO

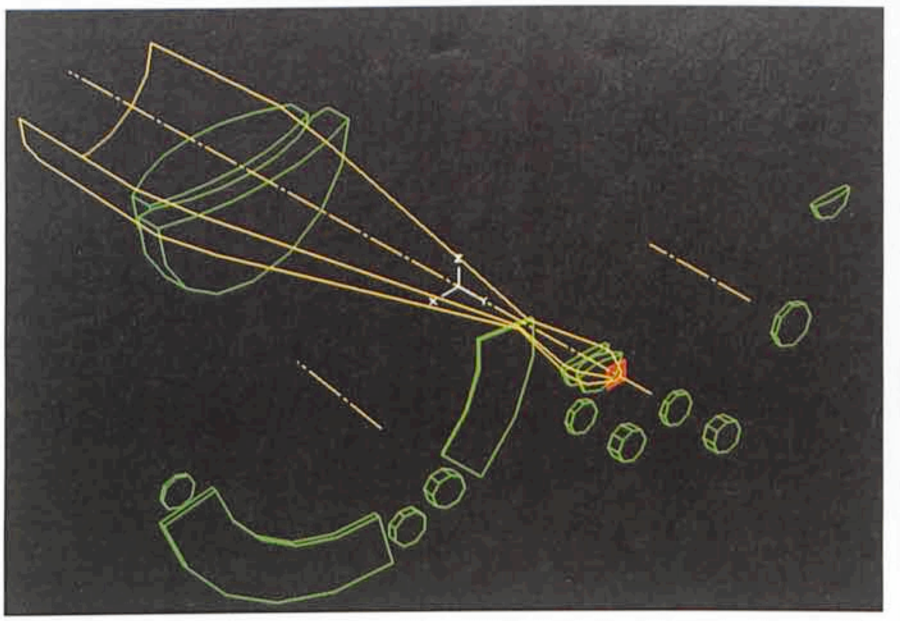

Figure 1: *IRAC optical layout. The filter wheel is located at an image of the pupil formed by the input doublet and carries both broad-band and CVF filters. Immediately behind is a lens wheel containing several objectives which provide a range of image scales at the array detector.*

Optical Instrumentation for the NTT: EMMI and EFOSC2

With the New Technology Telescope a little more than six months from "first light", work is going on intensively at ESO on the instrumentation to be used at the two Nasmyth foci of the telescope.

A detailed, final description of the instruments will be made available after they have been tested in the laboratory and at the telescope. These specifications will be distributed as usual with the relevant Call for Observing Proposals. We give here a short preview of the main characteristics to prepare the community to their use.

Before introducing the instruments, it is important to note that an essential interface between telescope and instruments are the two adapter/rotators (one for each Nasmyth focus) designed and built under the supervision of the NTT Group. They are complex devices which include two TV guide probes, the system to analyse the quality of the optical image for the adjustment of the active supports of the main mirror and the calibration system. The adapters rotate to compensate the field rotation given by the Alt-Az configuration of the telescope.

Two optical instruments are currently being assembled for the NTT:

EMMI (ESO Multi-Mode Instrument) and EFOSC2, a revised version of the EFOSC operating at the 3.6 m. EMMI will ultimately be the NTT optical workhorse, conceived to be semipermanently mounted at the telescope to reduce the maintenance needs and stabilize its performance at an optimal level. It is a two-chanel instrument (UV-blue and Visual-Red) with 6 main observing modes: imaging in the UV-B and V-R channels, grism spectroscopy in V-R, grating, medium resolution spectroscopy in UV-B and V-R and high resolution echelle spectroscopy in V-R. The capability to do multi-object spectroscopy has also been foreseen and will be implemented in a second step. The observers will be able to switch remotely between these observing modes, thus having the greatest flexibility in tackling their scientific objectives. Flexible scheduling to adapt the observing programme to the prevailing sky conditions (transparence, but above all seeing) could also be easily implemented and thoroughly tested. The optical design and the expected capability of EMMI are described in a published article (1986, *SPIE* Vol. **627,** 339) to which we refer those who are interested in more details. The instrument will be assembled in Garching in the course of this year: we will report on its progress and on the most interesting features which characterize it.

EFOSC2 will be, if you like, an intruder at the NTT. In November 1987 we saw the possibility to satisfy two different needs with a single effort. On the one hand, there had been pressure from the community to get an EFOSC-type instrument at the 2.2 m to improve the capability at that telescope for faint object spectroscopy and imaging of non-stellar objects over a large field. On the other hand, we saw the convenience to have in the first months of operations of the NTT a simple, easily removable instrument which could be used both for the necessary tests and for scientific programmes. Add to this that the project had to be completed in one year and that the recipe for EFOSC2 was almost fully defined. The specifications for the optical layout were laid down by the Optical Instrumentation Group. It was decided that the instrument had to be optimized for use at the 2.2-m telescope, its ultimate assignment. Secondly, the overall mechanical structure and the remotely controlled slit, filter and grism wheels had to remain unchanged to minimize the redesigning of mechanics and control electronics.

Still the project could not have been realized without the involvement of the TRS staff in La Silla. They took the responsibility of the redesign and the construction of the mechanics and of the integration of the electronics and optics. The assembly of the instrument is now scheduled for November of this year. The La Silla staff will also adapt the EFOSC 1 software to the NTT computer environment. This remarkable effort made possible the introduction of the project in the ESO planning without major disruptions of the projects already on their way in Garching.

Let us now briefly look at the capabilities of EFOSC2. There are two major improvements with respect to EFOSC 1: the optically corrected field is about 30 × 30 mm at the detector and the UV transmission of the optics is expected to be significantly better (about 70 % at 3600 Å vs 35 % for EFOSC 1). At the CCD, one arcsecond corresponds to 113 μm at the NTT and to 52 μm at the 2.2 m.

Note that because of the optimization for the 2.2 m, EFOSC2 tends to oversample the stellar images (or the slit) at the NTT in average seeing conditions. The actual performance will depend on the detector which will eventually be used. At present we consider three possibilities: a high density RCA (1,024 × 640 pixels, 15 × 15 μm in size), a mosaic of four Thomson CCDs (1,160 × 80 pixels, 23 × 23 μm) and a Thomson THX 31156 (1,024 × 1,024 pixels, 19 × 19 μm). The table summarizes the pixel matching and the available fields for the three detectors. Of these, the RCA CCD is the only one with well tested properties as it is used currently at EFOSC 1. The other two are still in the development phase and their performance "in the field" will be known by the beginning of 1989 only.

Pixel Matchings and Fields of View of EFOSC2

	Detector	Pixel size (arcsec)	Field of view (min of arc)
At the NTT			
	HR RCA (2 × 2 binned)	0.26	2.2 × 1.4
	Mosaic 2 × 2	0.20	3.9 × 2.7
	THX 31156	0.17	2.9 × 2.9
At the 2.2 m			
	HR RCA	0.29	4.9 × 3.1
	Mosaic 2 × 2	0.44	8.4 × 5.7
	TH 31156	0.36	6.2 × 6.2

Finally, a few words on the schedule of these projects. It is foreseen to mount EFOSC2 at the NTT in the spring of 1989 and in July of the same year it should become available to visitors for a fraction of the time.

Applicants for observing time in period 43 with EFOSC 1 at the 3.6 m will be asked to indicate whether they would consider acceptable to carry out their scientific programme or part of it with EFOSC2. This will leave open to the OPC the possibility to divert a fraction of the programmes to that instrument, thus relieving the present oversubscription rate of the 3.6-m telescope. EMMI and IRSPEC (the latter to be adapted to the other Nasmyth focus of the NTT) are expected to be offered in period 44. When EMMI will be operational, EFOSC2 will be moved to the 2.2 m, where it should be available from period 45.

S. D'ODORICO, ESO

A Note on Equivalent Widths at the CES

It has come to my attention through my own observation and through discussions with other users of the CES, that there are substantial differences between the equivalent widths measured with the short camera plus CCD and those measured with the long camera plus Reticon. These differences are in the sense that the CCD widths are larger than for the Reticon. These differences appear to be wavelength dependent being larger in the blue and can be as large as 20–30 % around 3880 Å.

Although this is at first sight disturbing, it appears that programmes which compare equivalent widths in the same spectral region have no worries since both detectors have linear output. This is probably due to scattered light in the long camera, but this is not yet proved.

I am interested in further investigating this effect especially with a comparison of data taken with the long camera and both detectors, and in the blue and red regions of the spectrum. Thus I would like to request that CES users send me any information that will help track down the origin of this problem affecting our data.

P. CRANE, ESO

MIDAS Memo

ESO Image Processing Group

1. Application Developments

A new package for reduction of data from the ESO Infrared Spectrograph, IRSPEC, has been developed in collaboration with M. Tapia. The package is described in more detail in a contribution of this issue of The Messenger. The new software, available as a CONTEXT inside MIDAS, includes a tutorial procedure that can be used as an on-line manual for first time users and also as a test for certifying new installations. This software and the corresponding manual will be released with the 88NOV version of MIDAS!

The package CLOUD, used for the analysis and modelling of interstellar absorption lines, has been substantially upgraded by M. Pierre.

A new project to organize and define the calibration information inside MIDAS has been started in collaboration with L. Johansson.

With the completion of the reduction software for IRSPEC, the first priority project in the area of applications is now the support of EFOSC in its different modes.