NEWS ON ESO INSTRUMENTATION

A Second GEC CCD With UV Sensitive Coating Tested on the CASPEC Spectrograph

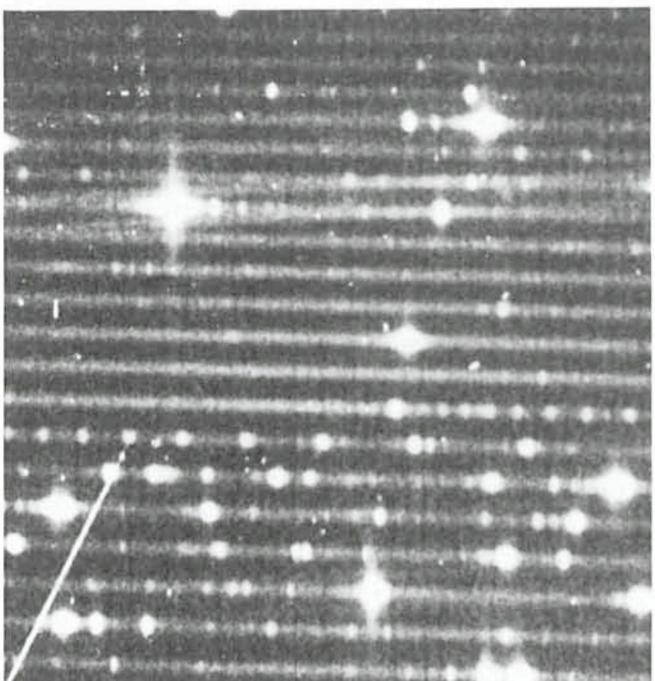
The ESO *Messenger* No. 41 contained a short summary of the properties of the CCDs in operation at the La Silla telescopes, among them a GEC CCD (ESO # 6) coated in the ESO lab to enhance the UV-blue sensitivity. A detailed description of the coating technique, the spectral response curve and the first spectroscopic results have been given elsewhere (1). A second GEC CCD was coated and tested successfully in August of this year in the ESO detector lab by Sebastian Deiries and Roland Reiß and it is now available at the telescopes. Its properties are given below.

ESO CCD #7

Telescope:	3.6 m/2.2 m
Chip type:	GEC P8603/A Fluor. coated
Pixel number:	385 × 576, 22 μm in size
e^-/ADU and gain:	6 at G100
Read out noise:	15 e^-
Dark current:	22 ADU/hr at 130°K
Peak quantum efficiency:	55 % at 650 nm
Average QE 300–400 nm:	23 %

The first spectroscopic tests at the telescope indicate good charge transfer properties. The sensitivity is uniform, with only a few low sensitivity spots and pixels. The quantum efficiency curve is published in (1).

The chip was tested on the ESO echelle spectrograph, CASPEC, with the 52 lines/mm echelle and the short camera.



A CASPEC spectrum of the slow nova RR Tel centered on 350 nm and covering about 100 nm. A GEC CCD coated in the ESO lab to enhance the UV sensitivity was used as a detector (ESO CCD #7). The resolving power is 22,000, the exposure time 30 m. The bright streak in the upper-left corner is present in this frame only and it is probably due to an energetic cosmic ray.

With this combination, the orders are well separated down to 310 nm and full spectral coverage is obtained to about 420 nm. The figure shows the UV spectrum of the slow nova RR Tel at a resolving power of about 22,000. From an observation of the standard star LTT 7987 (2) with a wide slit, the efficiency of the atmosphere-telescope-spectrograph-detector combination at 350 nm is such that 1 photon/A,s is recorded at 350 nm from a star of m_{350} = 14.3, where the magnitude is related to the flux in ergs s^{-1} cm^{-2} Hz^{-1} by the expression $m = -2.5 \log f_\nu - 48.6$.

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References

(1) Cullum, M., Deiries, S., D'Odorico, S., Reiß, R., 1985, *A & A*, in press.

(2) Stone, R.P.S., Baldwin, J.A., 1983, *M.N.R.A.S.* **204,** 347.

MIDAS Memo

ESO, Image Processing Group

This is the first appearance of the "MIDAS Memo" which is intended to be a regular contribution to the *Messenger* with the purpose of informing the ESO community at large of the developments, plans, and changes in the Image Processing Group in Garching. It will deal primarily with subjects related to data analysis and the MIDAS image processing system, but will also report from time to time on other aspects of the Image Processing Group's activities such as the measuring machines, the developments in archiving of data from La Silla, computer operations and policies, as well as activities related to computer to computer communications.

1. Application Developments

This will be a regular subsection of the "Memo", but will only be able to highlight recent developments and future planning and not report in detail on all the minor enhancements and changes to the MIDAS system in the intervening period.

The MIDAS table file system continues to grow as a tool for a wide range of applications. In connection with the ST-ECF project to build models of the various ST instruments, several new facilities have been added as general purpose table system functions. These include: In part new commands, access to tables from any disk directory, and more detailed explanation of errors.

The suite of programs for reducing CASPEC data has been widely used in the last year, and has recently been greatly enhanced to permit many automatic procedures. Work on the determination of absolute fluxes is in progress.

A generalized suite of programs for spectral analysis is in the process of being developed and documented. Although not specifically optimized for any particular instrument or type of data, advanced capabilities to extract and manipulate two dimensional spectra will definitely be a part of this development. In addition, these facilities will handle CES data, EFOSC spectral data, Optopus data and so on.

2. Device Independent Graphics in MIDAS

After a long search for a simple yet effective device independent graphics system, the Astronet Graphics Library has been chosen to be implemented into the MIDAS system. This library has its origins within the Astronet project in Italy and met most of the criteria for the functionality of such a product. In particular, it is not proprietary as many commercial packages such as GKS are and does not require a license if used by academic or research organizations. The AGL library has the necessary subset of the GKS functionality for the MIDAS applications and is an efficient implementation of this functionality. Also it is supported by a strong group within the Astronet project that will insure its continued viability and adaptability in the future. It is anticipated that a release of the MIDAS system in the spring of 1986 will be adapted to the AGL library and will provide drivers for many of the standard graphics devices. In particular, better support of the almost Tektronix compatible family of graphics terminals is anticipated. A definitive list will be provided in a future "MIDAS Memo".

3. Device Independent Image Display Software

After the ST-ECF meeting in Paris in May, it became quite evident that there is a strong desire on the part of many users that some sort of device independent interfaces for image displays be developed along the lines of the device independent graphics standards. These interfaces would allow various image displays to be used with the MIDAS software or with any software that implements these interfaces. This is a more difficult problem than the graphics question since there are as yet no standards such as GKS available to serve as a model. Progress is nevertheless being made. A preliminary draft has been drawn up in collaboration with the STARLINK project in the UK and it is hoped that this set of interfaces will be mature enough for discussion by a wider audience in early 1986. Of course, the time scale for implementing these interfaces into MIDAS and providing support for various other display devices besides RAMTEK and DeAnza is still to be defined. Suggestions are more than welcome at this time and should be directed to Klaus Banse.

4. ESO Archives

The development of archiving of ESO data is proceeding in parallel with the Developments for the Space Telescope "Data Management Facility", and will share in principle the same hardware and most of the same software so that an integrated archiving system will exist.

On the hardware side, ESO is sharing 50 % of a data base computer known as "Intelligent Database Machine". This device implements hardware that permits fast searching of relations between various data. Also, an optical disk has been acquired for the permanent storage of data. Both these devices are in the process of being installed and tested in Garching and are not yet available for public access.

On the software side, programs and procedures are being developed in close collaboration with the ST-ECF and the Space Telescope Science Institute. This software will provide the necessary tools to determine what observations have been made and to retrieve data from the permanent storage. More on these developments will be available in future columns.

Spectrophotometry of Globular Cluster Stars with the CASPEC System; A Comparison with Results from Other Spectrographs

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I. What is the Aim of Abundance Determination in Globular Cluster Stars?

The globular cluster stars, as well as the field halo stars, are among the oldest observable objects of our Galaxy and even of the Universe. The abundance of metals in their atmosphere is small; it is the signature of still older objects which synthesized these metals out of the primordial material (essentially made of hydrogen and helium). The analysis of globular cluster stars provides a unique opportunity to understand the early history of our Galaxy.

During the last ten years, as échelle spectrographs were available at the Kitt Peak and Cerro Tololo 4 m telescopes, numerous globular cluster stars were analysed in detail (see for example the review paper of Pilachowski et al. 1983). Interesting information was gathered but a number of problems appeared.

In particular, it seems that although field halo stars and globular clusters were formed simultaneously (Carney 1979) there are some differences in the chemical composition of globular cluster stars and of the field halo stars. For example, it has been noted that in globular cluster stars the strength of the CN and the CH bands varies from star to star and in some clusters sodium and aluminium appear enhanced in "CN strong" stars.

It has been suggested (Iben and Renzini, 1984) that this phenomenon could be due to the crowding of the stars in a cluster: this crowding would lead to an accretion of the ejecta of intermediate AGB stars onto main sequence dwarfs (at the beginning of the evolution of the globular cluster). These ejecta

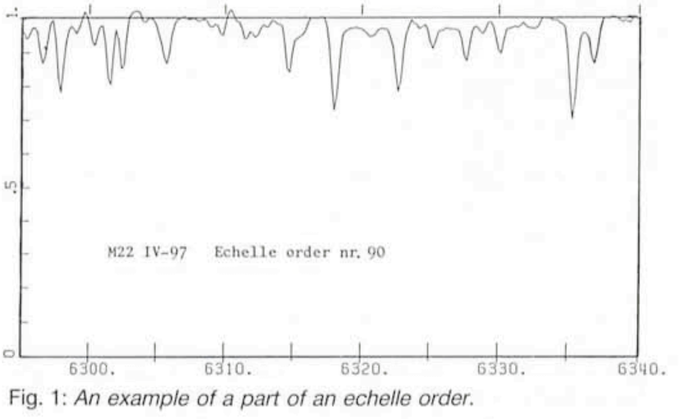

Fig. 1: *An example of a part of an echelle order.*