The ESO VAX Computer's Largest Peripheral... – a Two-Ton Milling Machine

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The Garching workshop has now for some time been equipped with a "CNC" (programmable) precision milling machine, which has proven extremely useful not only for routine machining work, but also for the rather monotonous and extremely time-consuming task of preparing starplates for OPTOPUS observation runs (see also the *Messenger* No. 31 p. 13 [1983]). In the preparation of a single observation run, a total of some 1,500 precision-reamed holes must be machined, each requiring 9 different drilling operations and something like 24,000 lines of machine instructions.

Until recently, the machining instructions for each starplate were prepared by computer and tediously transferred to the milling machine via an intermediary cassette recorder. Programmes could not exceed a certain size because of the limited cassette length, and data errors introduced during recording had to be corrected by returning to the computer and repeating the whole data-transfer process.

These difficulties have now been overcome by the development of data-transfer software which enables a programme of any length to be fed directly from the VAX computer to the milling machine, via a standard RS 232 data cable. The data transfer is initialized from a terminal situated in the workshop, enabling any errors in programme formatting to be corrected with ease by use of the text editor.

The VAX-workshop transfer facility also offers the possibility of formulating long machining sequences in advance (with the text editor), whilst the machine is occupied with different tasks. Frequently used programmes or programme sub-cycles can be stored and recalled at ease.

Perhaps the most intriguing feature which could be implemented via the computer-workshop link is the possibility of using CAD design data (from the Drawing Office) to drive the CNC machine, via specialized data conversion software.

Undoubtedly, it will not be long before the size of this VAX peripheral is dwarfed by that of remotely-commanded telescopes in Chile!

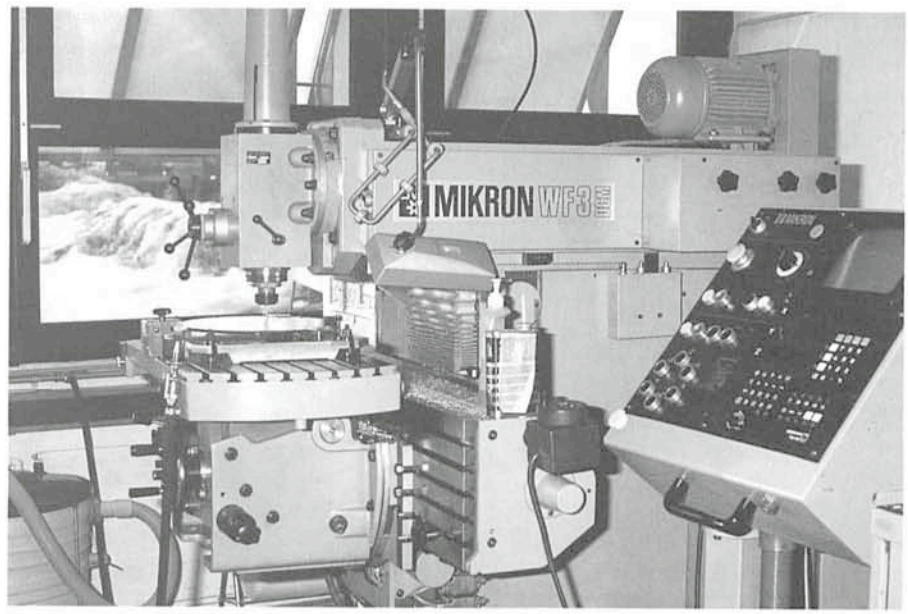

Figure 1: *General view of the MIKRON "CNC" programmable milling machine at the workshop in Garching.*

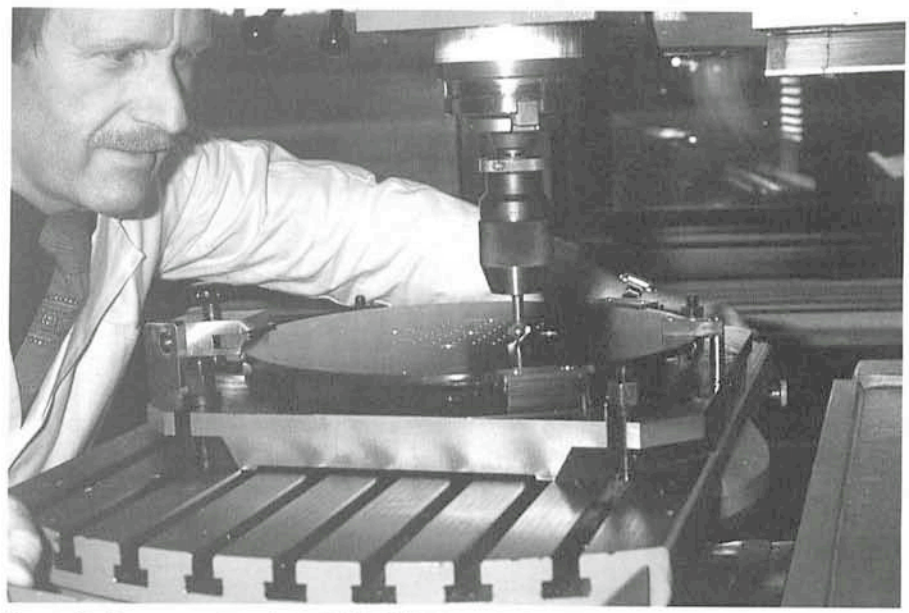

Figure 2: *Close-up view of an OPTOPUS "starplate" being machined at the workshop in Garching. The programmable milling machine is ideal for this type of work requiring frequently repeated machining sequences.*

MIDAS Memo

ESO, Image Processing Group

1. Application Developments

The FITS encode and decode routines in MIDAS have been upgraded to include full support of the Table Extensions (R. Harten et al. 1985, *Mem.S.A.It.* **56,** p. 436). All descriptor information associated with MIDAS files is now encoded in the FITS header as HISTORY cards. Further, the original file names of

MIDAS data frames are saved so that they can be maintained when restored from tape into MIDAS.

The CASPEC package has been improved by a better flat-field correction, an absolute flux calibration scheme, and a more flexible determination of the instrument chromatic response. The wavelength calibration was also made more automatic to simplify it and to minimize user interaction.

The COMPUTE/IMAGE command has been optimized in the case when all image operands have the same world coordinate limits. Gains of more than 50 % in execution speed have been recorded for expressions involving several large frames. A set of routines for vector operations are now used so that computers with fast vector instructions can be easily utilized later.

A set of routines for analysis of optical interferograms (Pirenne et al. 1986, *The Messenger* **42,** p. 2) has been included. Although the main application of these routines are within the area of evaluation of optical systems, they are also useful in astronomy e.g. for location of echelle orders.

2. Measuring Machines

The OPTRONICS measuring machine will be modified in order to optimize its use for positional measurements and to enable fast scans of large plates. A new optical system has been designed and includes an LED light source, a CCD full field camera for position determinations, and a 1-dimensional diode array for photometric scans. Also a new computer control system based on VME modules will be installed and linked to the main computer facilities through an Ethernet. The design objectives have been to provide fast automatic measurements of stellar positions with an accuracy of the order of 1 μ and to make it possible to scan a 900 cm^2 plate area with a step of 10 μ and a dynamic range of at least 2.5 density units within a 12-hour period.

The new optical system will be implemented and tested on the OPTRONICS in the time from May 5 to May 30 during which period the machine will not be available. From June 2, manual measurements of positions on plates will be possible while the photometric scan mode first will become available towards the end of the year. It is anticipated that the OPTRONICS will be reserved two weeks each month for testing of the photometric system until this option is released.

3. Move to New Wing

The building extension of the ESO headquarters in Garching contains space for the new computer room and image processing user areas. It is foreseen that the technical preparations for the move of the computer equipments to these new locatations are finished in June 1986. Due to the total relocation of the main computer facilities the normal operation will be disrupted for several weeks in the period June–July. The exact dates for the closure will first be known in May. During this period only very limited computer and image processing facilities will be available such as the measuring machine facility and some IHAP stations. Visitors who want to use ESO data reduction facilities in the time June to August are kindly requested to check the availability of the equipment needed.

On the MIDAS Reduction Package for CASPEC Spectra

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"Le CASPEC n'est plus un CASSE-TÊTE"

1. Introduction

The échelle package inside MIDAS has been used for the reduction of CASPEC spectra for more than one year, over 500 scientific frames have been reduced, and many astronomical results have already been published. The reduction scheme has evolved during this time, due mainly to the invaluable user feedback. Algorithms have been improved and the operation optimized so that the required user interaction is reduced to a minimum.

In a previous note (1) we have considered the accuracy of CASPEC spectra in two critical points of the reduction, namely the wavelength determination and the flat-field correction. The results confirmed the suitability of CASPEC for velocity determinations and for the detection and measurement of faint spectral features. In the present note we discuss three other aspects: the definition of the background an the correction for the instrumental response, which are relevant in the determination of the flux scale, and the session concept which provides a simple and natural way to control the reduction. This paper, together with the previous reference, gives an overall view of the status of the reduction method.

2. Background Definition

As pointed out by several CASPEC users (see for example reference (2)), the determination of the background is one of the critical aspects in the reduction of échelle spectra, and much care has to go in understanding the contribution of the different background components. The background of CASPEC images consists of:

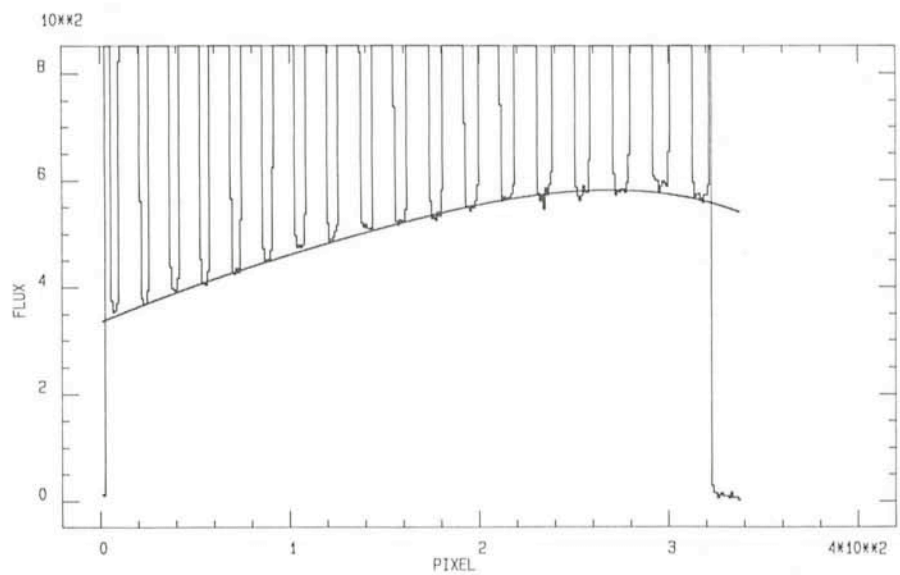

Figure 1: *Trace perpendicular to the dispersion direction through a flat-field image showing the fitted background (Flux in Counts).*