GPO dir. + prism

No. of proposals

ESO Period No.

1.54mD + CCD cam.

No. of proposals

ESO Period No.

1.54mD + CORAVEL

No. of proposals

ESO Period No.

1.54mD + $uvby\beta$ phot.

No. of proposals

ESO Period No.

0.5mD + $uvby\beta$ phot.

No. of proposals

ESO Period No.

0.9m NL

No. of proposals

Walr. phot. CCD cam.

ESO Period No.

The 93NOV Release of ESO-MIDAS

ESO Image Processing Group

The new release of ESO-MIDAS contains a substantial number of improvements and new features. Among these is the implementation of a new set of Graphical User Interfaces based on OSF/Motif, which makes the usage of a number of application packages easier. In the sections below the main improvements are highlighted. For more detailed information we refer to the last issue of the ESO-MIDAS Courier (July 1993).

1. New Features and Application Packages

1.1 System

Significant modifications and enhancements have been implemented in the MIDAS Command Language, e.g. an improved debugger for MIDAS procedures, more robust error handling and direct access to all data structures from within a procedure. To improve the information transfer, the support of help text for descriptors in data files has been added. A prototype of communication protocols has been implemented to enable interaction of any stand-alone programme with MIDAS.

1.2 Data Organizer

A new application package called DO (Data Organizer) for preparation of data reduction procedures has been implemented. The Data Organizer uses as input a list of FITS files or MIDAS images as well as a list of FITS keywords or MIDAS descriptors which are considered to be relevant (e.g., exposure time, telescope setting, instrument mode) to create an Observation Summary Table.

Each entry of this table is then classified according to a set of user-defined rules: the user may for instance group the data according to the exposure type and put together all frames observed in a given instrument mode. An interface based on the Table Editor has been developed to facilitate the formulation of these rules.

The association of science frames with suitable calibration exposures is achieved by using the same rule-generating interface as referred to above even though the rules to be applied are different: One may want for instance to look for all the Flat Fields which have been taken within a certain time interval of the science exposure. The Association Process creates a MIDAS table which can be used by any reduction package. It contains one column for each type of exposure (e.g. SC, BIAS, DK, WCAL), while each row contains for the corresponding science image the set of suitable calibration frames.

The Data Organizer has been tested on the ESO Archive which contains so far 30,000 EMMI/SUSI exposures. This version of the package is still a preliminary version and the structure of the output association table may be changed in the future.

1.3 CCD Package

Since the last update of the MIDAS CCD package in 1986 a number of new instruments have been installed on the La Silla Telescopes. In addition, new CCDs became available offering large pixel areas and higher quantum efficiency. With these innovations the variety of observing modes has grown and, as an obvious consequence, the amount and the diversity of data taken have dramatically increased. It is clear that the MIDAS CCD reduction software should be able to cope with these improvements and hence requires compatibility with the hardware as it exists at present.

When designing the basic layout of the CCD software, a number of basic requirements were kept in mind: e.g. robustness, user-friendliness, easy adaption for new or non-ESO instrumentation, automatic calibration procedures to enable a quick-look facility at the telescope. In what sense these requirements can be realized depends on the data-acquisition system, archiving and, obviously, the data-reduction

system. In this respect the development of the CCD package took place at the right time. The ESO archive project has accomplished that for a number of telescopes and instruments the setup specifications are stored together with the data. In addition, the new MIDAS Data Organizer package offers a significant help in preparing the data for reduction (see above).

The new CCD package in MIDAS makes use of the output MIDAS table of the Data Organizer package that contains the science and calibration data and the relation between these two. The package provides commands to do the various bias calibration steps like combining calibration frames, subtraction of the bias level determined from the overscan area or from a separate bias frame, correction for dark current, division by the correction for illumination, and correction for the fringe pattern. Also, tools are provided for trimming the frames of the unwanted over-scan strip, and for correcting the frame for bad pixels intensities. All operations steps that successfully finished are recorded in the descriptor of the reduced frame. This recording, which includes updating the HISTORY descriptor, avoids repetition of reduction sequences, and provides the user with the information on what has been done to the data.

By combining the basic reduction steps, a complete reduction pipeline procedure is built that enables the user to do an automatic reduction of all science frames. The pipeline procedure is controlled by a set of reduction keywords in combination with the information stored in descriptors of the data frames. Therefore, apart from commands that do the actual work, a number of commands help the user to manage keywords and descriptors.

1.4 Spectroscopy Packages

The long-slit spectroscopy package Long has been totally refurbished since the version 92NOV. It includes all functions of the previous packages Spec, Long and XSpectra as well as many additional features, such as batch reduction. The Long package now supports 1D and long-slit spectroscopy and includes a graphical user interface. A tutorial (command TUTORIAL/LONG) demonstrates the commands of the package.

A new package for spectral analysis has been developed by Juan Veliz at La Silla and is based on the graphical user interface XAlice. It provides basic functions for:
● flux integration, including continuum fitting and determination of line parameters like fwhm, equivalent width, flux and continuum level
● rebinning (logarithmic, frequency, red-shift)
● filtering by smooth or median filters
● multiple-component fitting by a set of gaussians.

2. Graphical User Interfaces

The version 93NOV includes four OSF/Motif based interfaces:
1. XHelp provides access to the on-line documentation. More functions have been implemented since the 92NOV version, including a history mechanism, strings search, files printing, context selection and feedback (problem report).
2. The new interface XDisplay implements a number of display related commands. It enables manipulation of images, LUTs, ITTs and cursor commands in an easier way.
3. The interface XLong is related to the new long-slit spectroscopy package Long. The interface allows the activation of calibration commands and provide convenient panels for arc lines identification and batch reduction.
4. The interface XAlice is related to the new spectral analysis package Alice (see Spectroscopy Packages).
All these interfaces conform to the ESO GUI Common Conventions which define the Look and Feel for all ESO

interfaces in the fields of telescope and instrument control, archives and data analysis. In addition to the OSF/Motif XHelp interface, the 92NOV release included several Athena-based interfaces (XSpectra, XEchelle, XFilter, XStella). Some of them (XEchelle, XFilter, XStella) have not yet been ported to OSF/Motif and compiled versions for Sun and HP will be available through our anonymous ftp account.

3. Availability

The 93NOV release of MIDAS is scheduled for distribution in December 1993. An alpha version was frozen in July and tested internally. After this test, the beta version was shipped to more than 15 sites representing the major hardware platforms. Based on these test reports, the release will be finalized in November. The 93NOV MIDAS release will be verified on the following systems: SUN SPARC Solaris 1.x and 2.x, HP 9000, IBM PS/6000, DEC Ultrix-(MIPS), DEC VAX/VMS, DEC Open VMS (APX), Silicon Graphics and PC/Linux. DEC OSF/1 systems are not yet supported but a beta-test version is expected to be available in the spring of 1994. Sites must explicitly request the release, specifying the medium.

The MIDAS system is, at the moment, distributed free of charge to non-profit research organizations. They must sign a User Agreement with ESO in order to obtain the system. Information and requests for MIDAS should be directed to the Image Processing Group at ESO, Karl-Schwarzschild-Str. 2, D-85748 Garching, Germany, or through E-mail (Internet: midas@eso.org). A Hot-line service is also available at the same address. New releases and patches can be copied from the midas account on the Internet host 'ftphost.hq.eso.org'. Application packages and documentation are also available on our anonymous ftp account. A bulletin board can be accessed through the 'esobb' account on the Internet host 'bbhost.hq.eso.org'.

An ESO-MIDAS Implementation for PC/Linux

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It may seem to be a contradiction to implement a large image processing system like ESO-MIDAS on PC type systems; however, they are becoming surprisingly powerful. Although normal reduction of data is better performed on workstations, the final analysis, which requires much more time for the interpretation of data than for actual computing, may be well suited for a PC. One of the main objectives is to provide an ESO-MIDAS implementation on a very inexpensive system that small institutes and even individual scientists can afford.

We decided to focus on Linux, a public domain Unix system, as the most suitable for the MIDAS community.