

Figure 5: The galaxy A 1409-65. J ($1.25 \mu\text{m}$) (upper left), H ($1.65 \mu\text{m}$) (upper right), K ($2.2 \mu\text{m}$) (lower left); 0.8 arcsec/pixel ; average of 4 40-s exposures; combination of images shifted by 3 pixels; sky subtracted. L band (lower right); 0.5 arcsec/pixel ; average of 140 1-s exposures with sky chopping at the telescope secondary mirror. Note the point-like nucleus at L whose size has been estimated at 0.3 arcsec using 1 D speckle techniques at the 3.6-m telescope (Moorwood, Véron-Cetty and Perrier, in preparation).

a median filter or the replacement of bad pixels using two images displaced by 3 pixels as described above. Some of the images have been flat fielded by ratioing with the sky while in others the sky has only been subtracted. The actual observing parameters and reduction procedure used in each case are specified in the figure captions.

Having offered IRAC in period 43 on the basis of the July test results we are now in the unfortunate position of not knowing exactly which array will be available at that time. The 64×64 array has to be returned to the manufacturers who have promised to do their best either to restore its performance by surface cleaning or to replace it with a detector of comparable performance. An improved array is also not excluded, depending on the results of a new Hg: Cd: Te production technique developed specifically to improve the uniformity and reduce the fraction of bad pixels.

At the moment therefore we remain confident of being able to offer our first Visiting Astronomers at least the performance as advertized and illustrated here.

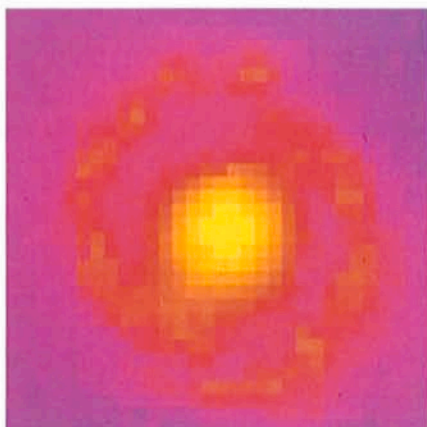


Figure 7: Nuclear region of the galaxy NGC 1097. 32×32 array; K band; 0.8 arcsec/pixel ; average of 5 60-s exposures; median filtered (but almost identical to raw image); divided by sky. Note that the "spiral arms" are composed of star forming regions within about 10 arcsec of the active nucleus.

MIDAS Memo

1. Application Developments

The astrometric package is currently being developed. Coordinate transformations as well as usual coordinate projections can be performed on tabular



Figure 6: Jupiter (Oct. 88). 0.8 arcsec/pixel ; sky subtracted; median filtered with high threshold. Upper panel - K band. Middle panel - CVF at $2.07 \mu\text{m}$. Lower panel - CVF at $2.12 \mu\text{m}$ showing effect of pressure induced absorption by molecular hydrogen in the planetary atmosphere. Note the appearance of a moon on the right side in the CVF images which were taken later than that in K.

format. The plotting package has been extended with commands to draw coordinate grids in different geometric projections. Also, some basic commands have been added to increase the flexibility of the package. For the same pur-

pose the SET/PLOT command is enhanced: the user now has full control over the size of the plot symbols and can produce publication quality plots. In the ASSIGN/PLOT, SEND/PLOT and SET/PLOT an option has been built in to produce plots on a PostScript laser printer (see below).

The upgrade of ROMAFOT to the portable version of MIDAS is nearing completion. This includes several significant improvements of the package such as proper handling of undersampled images which is essential for EFOSS data and eventually also for HST images.

INVENTORY is now in the process of being migrated to the portable MIDAS and at the same time is being improved in a number of aspects.

2. Portable MIDAS

The 88NOV release of MIDAS is the first to support multiple operating systems namely, VAX/VMS and a long list of UNIX like systems. It has been implemented on machines from DEC, IBM, SUN, Apollo, Nixdorf, PCS, Stellar, Bull,

Tektronix, and Masscomp. This first release contains almost all basic MIDAS commands although some of the application contexts are not yet available. This refers to a few very complex packages such as INVENTORY, ROMAFOT, CCD and Long Slit. They are expected to be ready for a minor MIDAS release 89FEB which will be sent out to sites that have the 88NOV version. This minor release will also resolve bugs and problems reported by users. The 88NOV release includes several improvements e.g. upgraded plotting routines, standard IDI routines, a terminal independent interface and a package for IRSPEC reductions.

The graphics commands use the portable version 3.2 of the Astronet Graphic Library (AGL) which supports a large variety of devices such as TEK 4010/14, VT 640, PostScript and X Window systems V 10.4 or V 11. Since we have only recently had access to version 11 of X Window, the 88NOV release only provides IDI routines for Gould IP8500 and X Window V 10.4. MIDAS will, however, support version 11 of X Window as a standard for work-

stations. Institutes with other image display devices should upgrade their IDI implementation to the standard. Another component which varies significantly from system to system is the interface to magnetic tapes. This may have to be rewritten at the individual sites.

3. MIDAS Hot-Line Service

The following MIDAS support services can be used to obtain help quickly when problems arise:

- EARN: MIDAS @ DGAESO51
- SPAN: ESOMC1::MIDAS
- Tlx.: 52828222 eso d, attn.: MIDAS HOT-LINE
- Tel.: +49-89-32006-456

Users are also invited to send us any suggestions or comments. Although we do provide a telephone service we ask users to use it only in urgent cases. To make it easier for us to process the requests properly we ask you, when possible, to submit requests in written form through either electronic networks or telex.

ESO Image Processing Group

MIDAS Benchmarks of Work-Stations

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1. Introduction

The number of computer systems on which MIDAS can be used has increased substantially with the introduction of the portable version. MIDAS is now available for both VAX/VMS and UNIX systems. This opens the possibility of using a large number of work-stations which offer many interesting features for astronomical image processing such as high performance per cost unit, integrated display options and good interactive response.

To improve the situation for interactive MIDAS users within ESO, it was decided to shift parts of the image processing from the VAX/VMS systems to work-stations. For this purpose, an early version of the portable MIDAS was implemented and tested on a wide variety of work-stations. A set of typical MIDAS applications were used to benchmark the performance of the different systems used in single user mode. These performance tests were done in the spring of 1988 and used to make a final decision for the purchase of image processing work-stations for ESO.

2. Work-Stations

A typical configuration of a work-station for interactive image processing with MIDAS consists of a 32-bit CPU with a floating point processor, 8 Mbyte main memory, 300 Mbyte disk, colour display with approx. 1000*800 8-bit pixels and an Ethernet interface. The software requirements are a UNIX or VMS operating system, X Window system for the display and standard compilers for Fortran-77 and C. A number of systems with roughly these specifications were tested. The systems are listed in Table 1 including their CPU type and operating system.

In addition to standard work-stations, a few larger systems were included for comparison e.g. VAX8600, Trace 14, Targon 35 and Alliant. MIDAS was implemented and tested on all the systems; the installations on the Trace 14 and the Alliant were done remotely over a modem line. The conditions for the benchmarks of these two machines were not well controlled and for this reason the results were omitted. For the IBM PC-RT 6150 system, only the basic

installation and tests were performed, the actual benchmarks could not be made due to lack of time.

The tests were carried out at the vendor sites on demonstration models which meant that some variation in the actual configuration was unavoidable. The whole installation and tests were typically done in less than two days. For that reason it was impossible to spend time on optimizing the individual systems. It is estimated that differences in configuration and optimization may introduce up to 25% variation in the benchmark results.

3. Scope of Benchmarks

The benchmarks were made to measure the typical real time performance of interactive usage of MIDAS on single user work-stations. For this reason the tests included a number of actual, frequently used MIDAS applications. The important quantity for the user is how fast the different systems respond. This depends on the performance of the system in three main areas, namely: