nature of the observation, also effect the overall system performance. During this first test, the halogen lamp at $\lambda < 2.5$ μm and the sky at longer wavelengths were used for flat fielding. A few checks made on line indicate that these techniques provide correction to better than 1 % but more analysis of the data is required in order to establish the actual limits and optimum procedures. No attempt has been made so far either to connect frames at different grating settings to produce continuous spectra. (In this latter regard, the old 'vignetting' problem should be considerably reduced because of the possibility of integrating over several pixels along the slit if necessary.) Residual sky lines (mainly OH at $\lambda < 2.5$ μm and H_2O at longer wavelengths) were still found to be present in some regions on object/sky difference frames separated in time by 5-10 min. Depending on the programme this may or may not be a problem but if it is, the sky reference can be measured more often or it should be possible to further suppress the residuals using 'sky' measurements within the flat fielded frames themselves. In this regard, however, it should be noted that due to the Littrow mount used in IRSPEC, spectral lines are observed to be parallel to the array at wavelengths corresponding to the grating blaze angle but can be tilted by up to 8 degrees at the extreme ends of the grating range.

In summary, IRSPEC now has both considerably improved sensitivity, which it is hoped to increase further in future, and extended scientific capabilities (due to the long slit). It is also simpler to operate but whether this is also true of the data reduction remains to be seen.

IRAC

As the new Philips Components 64 × 64 Hg:Cd:Te array only arrived about 10 days before the planned test there was relatively little time available to characterize and optimize it before it was installed on the 2.2-m telescope. Nevertheless, some laboratory measurements were made and yielded a read noise ~ 400 e, a dark current of ~ 1000e/s (at 50K), about 20–100 bad pixels depending on integration time in the range 1 to 60s and an efficiency (q.e x fill factor) of ~ 20 %. Although fewer bad pixels would have been nice, the only real disappointment in these numbers was the efficiency which was expected to be closer to 50 %. Overall, however, the larger format together with the fact that this array operates out to 4.2 μm (with a large well capacity ~ 10^7e) and appears to be rather uniform and stable represents a considerable improvement compared with the 32 × 32 array which it replaces.

At the telescope the 'warm' (i.e. high dark current) pixels are obvious in the raw images and also exhibit 'tails' presumably indicative of some charge transfer problem in the CCD readout chip to which the Hg:Cd:Te array is bonded. Sky subtraction leads to good cancellation of the tails and the warm pixels themselves can be removed with a high cut median filter either on-line or later. (By adjusting the drive voltages it is also possible to substantially reduce the number of warm pixels at the expense of creating a roughly equal number of 'cold' ones which are preferable because they are less visually obvious and do not create tails). Where the tails do potentially cause some problems is for observations of bright stars which also show this effect at least in the J and H bands.

It is not possible here to give reliable limiting magnitudes for the various modes (IRAC is equipped with broadband filters and CVF's which can be combined with on-line selectable magnifications of 0.″3, 0.″5, 0.″8 and 1.″6/pixel). As a guide however, based on measurements with a detector integration time of 60s and with 0.″8 pixels, it appears possible to do photometry at s/n = 5 in a 50 pixel synthetic beam down to K = 15 and J ~ H ~ 15.5–16 on frames obtained with a total integration time of 1 hr equally divided between object and sky. For broadband L (3.8 μm) imaging the corresponding value is L = 9 mag using 1 sec integrations and 0.″5 pixels. Based on the actual detector parameters and overall efficiency measured on stars, the overall performance should actually be better, and this discrepancy is still not fully understood. It appears however that the actual read noise at the telescope was probably 2–3 times higher than measured in the laboratory and that this may have followed changes to settings to the acquisition system. The sky/telescope background also appeared to be high and, at least at K and L, could be attributable to the extremely high telescope temperature (~16C) during the test run. It is therefore likely that the above figures are, if anything, on the pessimistic side. In addition to broad-band imaging, some tests were also made with the CVF and the K band Fabry Perot. As several people have expressed interest in 3.28 μm feature observations, the CVF performance at this wavelength was tested specifically by observing the planetary nebula IC 418 which, unfortunately, could not be detected in 15 min. This is presumably due to the relatively low transmission of our CVF in this region and means that, for the time being, we would not encourage people to propose specifically for such observations.

In summary, IRAC is now both much better and much easier to work with than before and its performance can probably be improved beyond the preliminary guide given here once we have more experience in how to best optimize this particular array. It is also not excluded that this array could be replaced in the future with one of the InSb arrays still to be tested in Garching if this would lead to a substantial improvement in the overall performance. As this would require technical effort, however, this decision also depends on the future progress of IRAC2 and the actual delivery of its 256×256 Hg:Cd:Te array which is now ordered and expected before the end of the year.

Acknowledgements

At the risk of omitting to mention several people who contributed to the work described here we would like to specially thank P. Biereichel, M. Comin, G. Finger, H. Gemperlein, J.-L. Lizon, M. Meyer and U. Weilenmann for their technical support during these two parallel test runs and also our night assistants J. Miranda and M. Pizarro at the NTT.

MIDAS Memo

ESO Image Processing Group

1. MIDAS Environment Document

The first official version (1.0) of the MIDAS Environment document is now available. It contains complete documentation about the development of MIDAS application software for both FORTRAN and C. Besides a revision of the document, a chapter about Coding Standards for MIDAS applications and a table example programme have been added. This document will be *the* reference for anybody wanting to contribute software to MIDAS. Copies will be sent to all MIDAS sites automatically. Additional copies can be obtained from the Image Processing Group at ESO, contact Resy de Ruijsscher.

2. MIDAS Directory Structure

A revision of the MIDAS directory structure has been made to provide a clear separation between the Core system and all other application software. A standard directory structure for contributed packages is defined to enable easy implementation of software into MIDAS. See the MIDAS Environment Document for a detailed description of the new directory structure.

3. Installation Procedure

A new extended installation procedure will be available with the 91MAY release of MIDAS. It provides an easy question and answer session during which a customized version of MIDAS, only including the application packages required, can be installed. The procedure is available for both UNIX and VMS systems.

4. Application Developments

The Table File System has been extended in order to store arrays at table items. This upgrade was required to provide compatibility with the Binary 3-D table format being proposed as a FITS extension. This format is expected to be used by a number of projects (e.g. ROSAT for event tables) due to the high efficiency of the format. Only the very basic table applications can currently manipulate such arrays. The command syntax of the previous versions is still valid but the upgraded syntax includes some additions.

An old table can be read and processed by the new Table File System. A command RETRO/TABLE is provided to convert a 3-D table to the old format.

5. MIDAS Newsletter

The Image Processing Group intend to start a MIDAS-Newsletter with two annual issues. In order to make an inventory of the MIDAS usage at ESO and the various other MIDAS sites we passed a questionnaire to the participants of the Data Analysis Workshop last year. Although not everybody reflected on the questionnaire, from the forms which have been returned it became clear that many users find the information about MIDAS published in the *Messenger* (the MIDAS Memo) insufficient. A large majority would like to obtain more detailed information, for example in the form of a separate newsletter.

In order to serve the user community better, the Image Processing Group of ESO will start a MIDAS newsletter. We hope to publish the first issue in the month of May, shortly after the release of the 91MAY version of MIDAS. At first, we will start the newsletter with a periodicity of two issues per year.

The newsletter will contain various kinds of information, e.g.:

- new commands or command modifications/improvements;
- new packages or upgrades;
- MIDAS installation and performance;
- bugs found and bug fixes;
- experiences and results obtained;
- suggestions, criticism;
- plans for the future.

It is not the intention of the ESO-IPG to be the only group that provides contributions to this newsletter. We would like to encourage all MIDAS users to make contributions as well. Obviously, such contributions should be of interest for the general MIDAS user. Clearly, the emphasis in the newsletter will be on MIDAS and on its software. However, since MIDAS is made for data analysis in astronomy, the inclusion of some astronomical results obtained by using the MIDAS software is welcome.

We would hereby like to invite you to contribute to the MIDAS newsletter. Since the first issue will probably appear in the course of May, we would be happy to receive contributions before April 1. The contributions should be submitted as a computer readable ASCII file in LaTeX format using the article style with an 11 pt font. Contributions must be submitted to the editor Rein Warmels, ESO Image Processing Group (E-mail addresses EARN: REIN@DGAESO51 or SPAN: ESO::REIN).

6. Personnel

We are happy to announce that Resy de Ruijsscher has joined the Image Processing group as technical secretary. She is responsible for documentation and distribution of MIDAS and will be your prime contact person for these matters.

7. MIDAS Hot-Line Service

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

- EARN: MIDAS@DGAESO51
- SPAN: ESO::MIDAS
- Eunet: midas@eso.uucp
- Internet:midas@eso.org
- FAX.: +49-89-3202362, attn.: MIDAS HOT-LINE
- 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 in urgent cases only. To make it easier for us to process the requests properly we ask you, when possible, to submit requests in written form either through electronic networks, telefax or telex.

Automatic Photometry at La Silla

C. STERKEN, Astrophysical Institute, University of Brussels (VUB), Belgium
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1. Automatic Telescopes and Photoelectric Photometry

Automatic telescopes represent a novel concept leading to a radically new way of planning and conducting observations. This is best illustrated in photoelectric photometry where the human factor is responsible for errors and for degraded accuracy. Man, with his slow reaction time and high tendency to fatigue, certainly cannot compete with a computer and with ultrafast equipment. In manually conducted photometric observations, most of the time is spent with the photometer in idle status, when the observer moves the telescope to the next star, when the observer is identifying or centring the object, or when he or she is planning the rest of the night. Above all there is the problem of manpower: for each telescope in operation a skilled observer is needed all year round, and this is a major limitation on the total number of measurements that can be made.

Especially in differential monitoring of variable stars, short integration time and short time intervals between successive measurements are essential for high-accuracy photometry. Fast speed of measurement also means that a lot of measurements can be made each night, and this means that it is much easier to incorporate many more standard and constant star measurements. This in turn leads to more consistent reductions and higher accuracy and homogeneity in the data.