pump, will hold the film firmly against the surface of the mandrel. The contact between film and mandrel is so tight that even a small dust grain will show up as a tiny deformation in the smooth film surface. The image quality is uniformly excellent across the film, with the exception of a small region in one corner, and we are currently looking into how to correct this.

In addition to its sensitivity and resolution, the Tech-Pan 4415 film has a number of practical advantages. One is cost, since the price of a 30 cm × 30 cm film currently is about 10 US dollars, almost a factor of ten lower than for the glass plates used up to now. Other advantages are the ability of storing hypered emulsions for longer periods without degradation, and the ease of transport. In the future, films will be mailed directly from La Silla to the users, without the delay of sending them via Garching, as was done for the glass plates.

The arrival of film at the ESO Schmidt telescope and the end to the use of emulsions on glass plates has, however, two disadvantages. The principal one is that we, at least for now, cannot take blue exposures that can be photometrically calibrated. To create a band-pass similar to B or V we would in the past select an appropriate filter that defines the blue limit and an appropriate emulsion that defines the red limit. However, the 4415 emulsion always has a red limit of 690 nm. We have looked into the possibility of purchasing a special B-band and V-band filter set, but for the very large size that we require, prices are exorbitant. Another problem with our blue filters is that they have red leaks. These red leaks were not of any consequence for our old glass-based emulsions with their more limited wavelength range, but they overlap with the extended red sensitivity of the 4415 emulsion. A possible exception to the above comments is our UG1 filter (300 nm–400 nm), where the contamination of red light appears to be small. The red leak of UG1 starts at 670 nm, and the tail of the 4415 emulsion sensitivity reaches out to 690 nm. We have tried to qualitatively estimate the effect of this impurity by exposing a 4415 emulsion through the UG1 filter and our objective prism. It turns out that for only the very brightest stars do the resulting spectra show a small and very weak red spectral component. This suggests that the red contamination is small, and that the UG1 filter can be used to make ultraviolet/blue exposures for projects where high photometric accuracy is not critical.

The second disadvantage is that it is not clear that films have the same structural stability as glass, and consequently high-precision astrometry is not recommended with film. The thick (178 μm) estar base that supports the emulsion has nonetheless great strength, and with a sufficiently fine grid of astrometric reference stars, it is likely that good results can be achieved, although a specific study is required to establish this.

Figure 1 shows part of an exposure on 4415 film centred on the Orion Nebula. The exposure was 150 minutes through a RG 630 filter, which transmits in particular the Hα emission of the region. The delicate large-scale structure of the HII region is remarkably well detected, and provides an example of data which can only be produced with a wide-field instrument like a Schmidt camera. Other recent studies that are now being carried out with the new 4415 emulsion include surveys for microlensing events towards the Galactic Bulge, light curves of RR Lyrae stars in a nearby galaxy, studies of large tidal tails of globular clusters, variability of young X-ray sources around molecular clouds, searches for new Trojan asteroids, and large-scale structure of the bright comets Hyakutake and Hale-Bopp. Also, using the objective prism, a major systematic survey is in progress, which identifies new young Hα emission stars in all the star forming dark clouds along the southern galactic plane; more than 1000 new pre-main sequence stars have already been discovered this way.

The ESO Schmidt telescope, with its large 5° by 5° field, continues to be a unique facility for the ESO community, and with the introduction of a modern, fine-grained and highly sensitive emulsion like the 4415 Tech-Pan emulsion, users are now able to conduct large-scale surveys that are deeper and have better resolution than in the past.

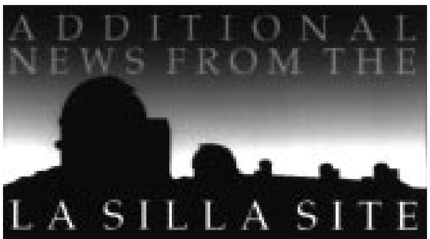
Acknowledgements

I am grateful to Quentin A. Parker of the United Kingdom Schmidt Telescope Unit for supplying very useful information on the progress of 4415 film use at the UKSTU in the early phases of this work. I also thank Lucky Achmad and night assistants Guido and Oscar Pizarro, who carried out the extensive hypering and development tests.

References

Parker, Q.A., Phillipps, S., Morgan, D.H., Malin, D.F., Russell, K.S., Hartley, M., Savage, A.: 1994, in *Astronomy from Wide-Field Imaging*, IAU Symposium No. 161, eds. H.T. MacGillivray et al., p.129.

Bo Reipurth
breipurt@eso.org



The La Silla News Page

The editors of the La Silla News Page would like to welcome readers of the fifth edition of a page devoted to reporting on technical updates and observational achievements at La Silla. We would like this page to inform the astronomical community of changes made to telescopes, instruments, operations, and of instrumental performances that cannot be reported conveniently elsewhere. Contributions and inquiries to this page from the community are most welcome. (P. Bouchet, R. Gredel, C. Lidman)

News from the 3.6-m Upgrade Project

L. PASQUINI, U. WEILENMANN; ESO La Silla

1. Introduction

The objective of the 3.6-m Upgrade Project is to improve performance and operations of the 3.6-m telescope, and to put this telescope into the front line for the first decade of the next century. In order to reach this goal, several points have to be investigated to firmly establish the real telescope capabilities, namely:

(i) Image quality and seeing,
(ii) M1 degradation and
(iii) Telescope pointing and mechanical behaviour.

In the course of the last year, these studies have been carried out and the first results obtained were presented at the ESO UC/STC in April 1996.

Some of the early reports have been reported in *The Messenger* (Gilliotte, 1996; Guisard, 1996; No. 83). The document presented at the UC/STC is available in the 3.6-m+CAT www page.

The 3.6-m Upgrade, in addition to the refurbishment of the telescope, also foresees an upgrade of the present instrumentation and instrument control, according to a plan which follows the suggestions of the 'La Silla 2000 Committee' (Andersen, 1996). The instrumentation plan is given in Table 1.

At first, the status of the Upgrade Project shall be briefly illustrated and thereafter detailed information will be given on the two important issues of the main mirror aluminisation and image quality analysis.

Table 1: Base Line Instrumentation

Instrument	In Operation	Decommissioned
EFOSC 1	Now	June 1997
EFOSC 2	October 1997	July 1999
CASPEC	Now	January 2000
ADONIS	Now	January 2001
TIMMI 2	January 1999	January 2003
CES Very High Res.	January 1998	January 2003

2. The Status of the Upgrade Project

The Upgrade Project has been divided in smaller sub-projects, called work components (WC). An overview is given in Table 2. Activity has been already started in 15 WC's, most of the requirement specifications have passed review by this time and are ready for the conceptual design.

The definition of the TCS GUI (graphical user interface) (WC1) is one of the major tasks. The aim is to develop one single standard user interface that shall be available for all telescopes at La Silla in the future. There is a lot of experience accumulated at La Silla for building the human-machine interface, and an attempt is made to receive from the review as much input as possible. The TCS software (WC2) will be VLT compatible to the largest extent possible, the difference is found at the level of the servos and the interface to existing subsystems which are not subject to upgrade.

The conceptual design for the modification of the Cassegrain adapter and the calibration unit (WC6) is already well advanced. Most of the opto-mechanical functions will be refurbished, but without building a new adapter. Great care shall be taken in order to limit heat dissipation in the adapter. The guide-probe field will be ~ 36′ and the unvignetted field for EFOSC2 6′ × 6′. The new calibration unit will be housed in tow intermediate flanges which are required because of (i) the different front focal distance of EFOSC2 and (ii) the new position of the focal plan. The unit consists of an integrating sphere in the upper flange with fiber-fed calibration sources located outside the adapter, both for space reasons and also to prevent heat dissipation. The same calibration unit will also be available for the CES fiber link (WC 45). A VLT-standard technical CCD is employed for the guide-probe and centre field and it shall have a position accuracy of < 1″. A second CCD will be used for image analysing and for the slit view option. First it was planned to use the same CCD, but optical and mechanical constraints oblige us to choose an approach with two CCDs.

The auxiliary functions (WC 5) are already well advanced and due for review, further work has to be closely co-ordinated with the Cassegrain adapter and the calibration unit, as these functions are controlled from the same subsystem.

The upgrade of EFOSC2 includes WC 11 for the GUI, WC 15 for the instrument modification like new grisms, polarimetry mode, Lyot stop, MOS wheel and the mechanical interface to the telescope, and WC 17 for the MOS star plates punching machine. EFOSC2 shall be controlled by modern instrument control SW (ICS), similar to EMMI at the NTT.

The same applies for CASPEC (WC 12), but there is no instrument modification foreseen here. CASPEC will be later in the pipeline, as priority has been given to EFOSC2.

The Cassegrain/CES fiber link (WC 45) and the Image Slicer/Focal Enlarger (WC 53) are in the preliminary design phase. For the very high-resolution option it is foreseen to seek the collaboration with an interested institute. Two minor work components are: (i) the modification of the F/35 infrared top end, to increase the adjustment range for the coma correction. This implementation will take place already in October, and: (ii) the installation of pneumatic sensors on the lateral support pads of the main mirror for diagnostic purposes.

For TIMMI 2, an external institute (University Observatory Jena) made an interesting proposal to ESO and they could provide this instrument by the 1st Quarter of 1999. TIMMI 2 shall fulfil the important role to serve as a test bench for the VLT–VISIR instrumentation. A memorandum of understanding is presently being prepared.

Table 2: Work Components for the 3.6-m Upgrade Project

WC	Description	Status
1, 2	TCS: Graphical User Interface and Control SW	Requ. Specs.
4	Autoguider with technical CCD	Requ. Specs.
5	Auxiliary Systems Functions	Prelim. Design
6	Modification of F/8 Cassegrain Adapter and new Calibration	Unit Design Review
11, 15	EFOSC 2: Instrument Control Software and Instrument Modification	Requ. Specs.
17	MOS Starplate Punching Machine	Requ. Specs.
12	CASPEC: Instrument Control Software	Requ. Specs.
19	F/35: Top End Modification	Prelim. Design
31, 32	Image Quality & Seeing and Structural Analysis of Telescope	Study
35	Hydraulic and Pneumatic Sensors for Pressure Monitoring	Study
45, 53	CES: Fiber Adapter and Image Slicer	Prelim. Design
–	TIMMI 2 (external provider)	Negotiations
–	CES: Very Long Camera (external provider)	Negotiations

3. Report on the Technical Time in June 1996

J. FLUXÁ, S. GUISARD, G. IHLE; ESO

Although a lot of the work is still in the requirement specification phase (see Table 2), a few urgent interventions were needed, and the study of some of the relevant telescope aspects had to be completed.

In the two last weeks of June the main mirror aluminisation was per-