The La Silla News Page

The editors of the La SillaNews Page would like to welcome readers of the nineth 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. *(R. Gredel, C. Lidman)*

Image Quality of the 3.6-m Telescope (Part VIII) New Seeing Record of 0.47″

S. GUISARD, ESO

The bad behaviour of the lateral pneumatic support of the main mirror (M1) has already been put forward several times to explain the bad image quality of the telescope at large zenith distance. In order to check this assumption, several adjustments were done on the primary mirror support during the technical time last December. We decided to start by recentring the mirror axis on the rotator axis. This was done successfully and we found that the old position of the mirror was about 2 mm away from the rotator axis position. All the lateral pads supports were modified, and it is now possible to adjust them radially to match the new mirror position.

The lateral support system of the primary mirror is composed of 18 lateral pneumatic pads and 3 fixed pads. The pressure in the pneumatic pads is controlled via a mechanical computer, commonly called the “REOSC system” which provides a certain theoretical pressure to each pad according to the position of the telescope, the system therefore has 18 pressure controllers. For each pad, the pressure is a function of the declination of the telescope and hour angle. The problem of the system is that it can only be adjusted for a single position of the telescope and that it does not follow accurately the theoretical law of pressure to be applied on the mirror edge. Furthermore even if that was the case, we proved that a pressure regulation of the air in the pneumatic pads is not sufficient. The reason for this is that because of flexures of the cell and small mirror motions, the distance between the pads and the mirror changes and modifies the contact area between the air cushion and the mirror. The direct consequence is that the force applied to the mirror is not the correct one.

The installation of load cells on all the lateral supports in April 1997, allowed us to do the following test adjustment for the telescope pointing at 45 degrees of zenith distance towards the South. The pressure into the pneumatic pads was adjusted on the REOSC system; then the distances between the pads and the mirror were adjusted until the correct lateral forces distribution could be read on the load cells.

During the following test nights we first tilted the secondary mirror (M2) to compensate for the coma introduced by the recentring of M1 and we measured the aberrations of the telescope for several zenith distances. The position of the telescope for which the Optical Quality (OQ) was the best was between 30 and 45 degrees of zenith distance to the South, position for which the lateral adjustment of the forces was performed. The OQ at this position was around 0.27″ d80% which corresponds to the polishing errors of the mirrors. However for any other position of the telescope, including zenith, the OQ degraded for the reason explained above. To confirm the aberration measurements we also made several direct images at 30 degrees of zenith distance to the South and 15 second unguided exposures (the mirror ventilation was on). The FWHM measured on the star is 0.47″ d80% which breaks down the old record of 0.56″ obtained one year earlier. It must also be noticed that this new value has been obtained at 30 degrees of zenith distance and the old one at zenith. This new seeing record is very close now to the limit we can obtain with this telescope.

This year a new control system of the pressure will be installed. It works in closed loop with the force values read on the load cells, and it should enable us to get an excellent optical quality all over the sky.

EFOSC2 and VLT Autoguider Commissioned at the 3.6-m Telescope

R. GREDEL and P. LEISY, ESO

During three weeks of technical time in December 1997, EFOSC2 and the VLT autoguider were commissioned at the 3.6-m telescope. EFOSC2 is no longer offered at the 2.2-m telescope and replaces EFOSC1 on a permanent basis.

EFOSC2 is equipped with a 2048 × 2048 LORAL CCD and comes with a sampling of 0.16 arcsec per pixel. It thus takes full advantage of the improved image quality of the 3.6-m telescope (see previous articles in *The Messenger* by

Stephane Guisard). During the December run, an overall image quality of 0.7–0.8 arcsec was routinely achieved, while the outside seeing was about 0.5 arcsec.

The standard filter set for EFOSC2 is that of SUSI, that is, Bessel U, B, V, R, Gunn g, r, i, z, and a number of narrow-band filters. The presently available grism set is the one which was previously offered at the 2.2-m. A number of new grisms have been ordered, which should be available for period 61 (see our web page for details, http://www.ls.eso.org/lasilla/Telescopes/360cat). In period 61, MOS shall be available as well. A second EMMI punching unit shall be used to prepare the MOS plates. The quality of the slits punched with the EMMI unit is superior to that available with the old EFOSC1 PUMA machine.

An important aspect of the December technical time concerns the installation of the new VLT autoguider at the 3.6-m telescope. Two new VLT technical CCDs were installed in the Cassegrain adapter, one of which is used for the autoguider. The Cassegrain adapter functions and the autoguider are now controlled by dedicated local control units. The error vectors calculated by the software are fed back directly to the position loop of the telescope control system (TCS). This is a significant improvement over the old autoguider, where constant offsets were applied to correct for tracking errors. Thus, the new autoguider provides a faster response to large tracking errors, and ensures a smoother tracking when the errors are random.

With the commissioning of EFOSC2 at the 3.6-m telescope, a major milestone of the 3.6-m upgrade project is concluded. Our main effort now goes into the replacement of all HP1000 computers. Next milestones include the adaptation of the NTT software modules to replace the TCS, and the adaptation of the EMMI instrument software for EFOSC2.

Signing of Contract for the Delivery of the Delay Line of the VLTI

At a ceremony in Leiden, the Netherlands, on March 12, a contract was signed between Fokker Space B.V. and ESO for the delivery of the Delay Line of the VLTI.

Fokker Space B.V. is the largest company in the Dutch space industry. It is based in Leiden. Fokker Space is mainly active in the field of solar arrays, launcher structures, thermal products, instruments and simulators. It also plays a key role in the development of robotics and is responsible as a prime contractor for the European Robotics Arm (ERA) to be used on the International Space Station.

Fokker Space is well embedded in the Dutch aerospace infrastructure, thanks to close relations with the Dutch Space Agency (NIVR), the National Aerospace Laboratory (NLR), the Delft University of Technology and other Dutch space industries and institutes like TNO-TPD (Netherlands Organisation for Applied Scientific Research - Institute of Applied Physics).

The VLTI Delay Line programme will be realised in collaboration with TNO-TPD.

P.G. Winters, president of Fokker Space B.V., and R. Giacconi, ESO Director General, signing the contract.

Prof. E.P.J. van den Heuvel, Dutch delegate to the ESO Council, speaking at the ceremony. ▼