nomical tests. The author also appreciates the fruitful and pleasant collaboration with the *Fraunhofer Institut für Festkörpertechnologie*

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NTT BITS & PIXELS

With this periodically compiled collection of short notes, the NTT Team intends to keep the community informed about changes in performance, configuration, and operation of the NTT and its subsystems.

EMMI and SUSI Receive Additional Attention

The NTT Team is slowly reaching its full staff complement. On September 19, Albert Zijlstra took up his duties as EMMI/SUSI instrument scientist. He will be in charge of all aspects which can be handled from Garching. A primary task will be the design and testing of standard calibration and reduction procedures for these two instruments. Besides various other assignments, he will also answer user inquiries about EMMI and SUSI (please e-mail them to `ntt@eso.org`) and he will organize the support for remote NTT observers. Having been in Garching for two years as a postdoctoral fellow, Albert is already well familiar with the environment of his new job.

Image Quality

The dynamical range of this subject is currently unusually extreme. On the one hand, several observers succeeded in securing images with an FWHM of 0.5 arcsec or even better (cf. *The Messenger* No. **76**, p. 21). In many of these excellent nights, the effective image quality obtained with the NTT has been slightly better than the seeing measured with DIMM, the Differential Image Motion Monitor.

On the other hand, NTT images are still often plagued by elongations. Some recent extreme cases could be quickly identified with a hardware failure of the guideprobe control. But some weaker aberrations continue to show up. Using the NTT's intrinsic image analysis capabilities, it could be shown that the zenith distance dependence of astigmatism has increased quite significantly since the commissioning. The follow-up work now concentrates on the lateral support of the primary mirror (the problem might be with the lateral support itself or due to imperfect centring of M1 in its cell).

We are grateful to Dr. S. Ortolani for granting permission to technically evaluate the sequence of excellent images which he obtained in May and to Dr. R. Falomo who, as a visitor to the Science Division in Garching, analysed them and several other datasets.

M1 Actuators Checked

As part of a systematic checkout of the active optics system, the currents of all 78 actuators of the M1 radial support system were measured and logged. A number of them were found to be far above the average and, in fact, out of specification, due to increased mechanical friction. These actuators were overhauled one by one in the mechanics workshop at La Silla.

TCS Computer Upgraded

The computer running the Telescope Control System (TCS) has for much of the time been working at a level of 50% or more of its capacity. In a real-time application this is dangerously high and has on a small number of occasions substantially increased the response time to TCS commands even in the case of relatively minor malfunctions of some components connected to the NTT Local Area Network. For this reason, the CPU has with the help of the HP Computer Group at La Silla been upgraded from an HP A900 to an A990 model which more than doubles the safety margin.

Slip Ring Replaced

During the technical maintenance period in August, the slip ring which is the central link for communications, including the time signal from the atomic clock, between the NTT and the outside world, was replaced. This action had become very critical because rapidly progressive corrosion had already paralysed some of the data channels. The reason had been the dripping of condensing water from the pipe through which the cooling liquid of the air conditioning system circulates. The slip ring was fully re-designed; the manufacture of spare parts required significant help from the mechanics workshop at La Silla. At the time of the installation, which went very smoothly, the new slip ring was also properly shielded against condensation.

Instrument Rotators

The rotation of the rotator on side B (EMMI) through 360 degrees in May continues to have the effect which had been hoped for. At telescope positions where the speed of rotation of the instrument rotators changes sign, the torque no longer increases by so much that the motor can hardly, or even not at all, overcome it. However, the same measure taken on side A has not brought about any perceptible improvement. Meanwhile, F. Franza and M. Ziebell have contacted the Technical University in Munich for advice where the problem has met much interest.

By removing a so-called watch dog from the interlock chain of the control system on side A (IRSPEC), the difference in frequency between sides A and B of sudden stops of the power amplifier (a problem completely independent of the one above) could be removed. The search for the origin of the remaining failures continues. But their intermittent origin makes this a difficult task.

Additional Field Tests of New Control Software

The preparation of the new control system proceeds closely along the lines of the NTT Upgrade Plan. The field test of Work Component No. 3 was executed in October. Its objective was the control of the secondary and tertiary mirror. With the help of the Electronics Group at La Silla an adapter board had been developed to map the signals between the present and the future system so

that the changeover could be achieved very quickly. The goals of the test were achieved, and some dark time could even be used for further astronomical and optical tests of the telescope. The latter confirmed that the new control system also satisfies all quantitative requirements.

The M2/M3 application software includes position servo loops similar to the control of the telescope main axis. The experience gained during the development and the field test is becoming very valuable for the design of the VLT ALT/AZ software. In general, the NTT experiences are receiving more and more attention now when the detailed design of application programmes within the VLT Telescope Control Software is starting.

Increased Robustness of CCD Data Acquisition

In the operations log it was noted that in about 1% of all CCD readouts, the VME node concerned would time out during the transfer of the data file to the control computer. Since it was suspected that the reason is a bug in the OS-9 operating system of the VME (which would be out of reach for ESO to correct), a workaround was installed which consists of repeating the file transfer until it succeeds. This simple solution has eliminated the problem. We are grateful to A. Longinotti and P. Sinclaire for their joint efforts in this matter.

New Graphical User Interface for EMMI

The software group at La Silla is responsible for developing the new control software for EMMI which will be installed together with all the rest of the new VLT compatible control system for the NTT. For the design of the graphical user interface (GUI), R. Schmutzer came for an extended visit to Garching where a small group of astronomers in close interaction with him provided the user requirements. The result offers a maximum of, partly user configurable, functionality on a minimum of screen space without compromising clarity. The VLT Software Group will probably make the code available to VLT instrument consortia in order to inspire a common look and feel of the GUI's of VLT instruments.

IRSPEC

F. Gutiérrez has completed his work to enable the automatic transfer of data files to the workstation for on-line analysis with the IRSPEC package of MIDAS. After partial adaptation of the set of FITS keywords, archiving of the observations will begin (similar to what for some years now has been the practice for EMMI and SUSI).

Check Lists for Telescope Operations

We are trying to steadily improve the reliability of the NTT by upgrading our operational standards. Recent examples are the extensive check lists which the night assistants have compiled. In the afternoon, the night assistant uses these lists to record all steps to be taken to prepare the telescope for the night. This systematic check-out of various subsystems may in some cases conflict with the observer's need to calibrate the instruments. Observers have the possibility to request that the startup procedure be abbreviated. However, by doing so they also accept an increased risk of discovering a problem only after scientific observations have started.

Similar procedures are followed for the shutdown of the telescope after the end of the observations.

MIDAS Observing Batches

The MIDAS procedures which are essential for a number of on-line operations (e.g. telescope and instrument focussing, target acquisition), have with the help of C. Levín and the MIDAS Group in Garching been included in the software configuration control scheme used also for MIDAS in general. Before every new release of MIDAS, the master-copy of the procedures will be thoroughly tested and the results compared with reference data.

Together with other colleagues at La Silla, a prioritized list with requests for enhancements of these procedures has been submitted to the MIDAS group. A number of minor improvements are expected to be implemented already in the first quarter of 1995.

Higher Throughput Expected for Remote Observers

First tests have been performed with the new roof-to-roof communication link between La Silla and Garching which has a bandwidth of 2 Mbit/sec. Early in 1995, this link will replace the 0.064 Mbit/s tie line which is currently used for observations with the NTT under remote control from Garching. This will enormously improve the throughput of the system. Especially the transfer of data files will be accelerated by nearly an order of magnitude so that sending a 2k×2k to Garching will take about 1.5–2.5 minutes. However, file transfer may for many applications no longer be needed since the display in Garching of a 1k×1k picture kept on the disk at the NTT will be much faster still.