The NTT upgrade project has the following goals:

1. *Establish a robust operating procedure for the telescope to minimise down time and maximise the scientific output.*
2. *Test the VLT control system in real operations prior to installation on UT1.*
3. *Test the VLT operations scheme and the data flow from proposal preparation to final product.*

J. SPYROMILIO, ESO

Last time I wrote for *The Messenger* the NTT news, we had just completed basic functionality tests for all critical systems and were looking forward to the integration phase of the NTT upgrade. At that time, the primary mirror was still in the 3.6-m aluminising plant and the telescope immobilised. I am glad to inform you that we are still proceeding exactly on schedule and I see no problems in returning the NTT to the community as promised on July 1st 1997. In the two months that have passed since the last update was written, a lot of progress has been made.

The telescope, although still not fully integrated (there remains work to be finished on the rotators), has pointed to 1.5 arcsecond (RMS) accuracy. This was the result of a single iteration of the new VLT pointing modelling software, and we expect to do better after the NTT realignment process and the telescope servos are tuned. As expected, since the pointing model is integral to the NTT tracking software, the tracking also seems to be very good. However, we have not, at the time of writing, attacked the "NTT font" error found in the VLT-TCS test in December 1996 (see Figure 3 in Wallander et al., *The Messenger*, 83, 7, 1996).

The detailed state of the system is as follows. The telescope altitude and azimuth axes point and track, but the servos still need tuning. The telescope start-up is not as yet reliable and occasionally we get telescope oscillations. This problem, although as yet not fully understood, is being tackled as this article is being written. I expect that when the axes servos are tuned, this intermittent problem will not recur. The rotators are in a comparable state with some effort remaining in tuning the servo parameters. The primary, secondary and tertiary mirror control is working well with minor improvements pending. The new VLT-TCCD guide probe cameras are now functioning and are being used for autoguiding and image analysis tests. The VLT autoguiding software was tested for the first time this week (30 October) and is now working in an engineering mode. That is to say, commands are sent to the control tasks via a terminal without any of the graphical user interfaces or automatic guide-star selection mechanisms which are envisaged. These are expected to be tested in the next few weeks. Image analysis is still in a rudimentary state but no show-stoppers can be seen. The ACE CCD controllers have arrived on La Silla and are being tested. SUSI integration is expected to start within the next couple of weeks. EMMI follows shortly thereafter.

It is worth noting an amusing incident which occurred during the telescope integration. It demonstrates just how close the NTT and VLT control systems are.

Accidentally, we compiled and linked the workstation part of the system without the NTT flag set. Since the telescope pointing and tracking is handled directly at the VME level, no problems were found, with stars appearing as expected in the centre of the field. However, when we looked at the sidereal time on the workstation it was 2 minutes 48 seconds off. This is the difference in sidereal time between Paranal and La Silla. The tracking and pointing is handled at the VME level and the site parameters were correctly set there, as that part of the code had not been recompiled. We were in fact running the workstations in the NTT as if the telescope were on Paranal! The only difference between NTT and VLT, at the workstation level, is the longitude and latitude of the telescope being controlled.

The Immediate Future

In the first week of November the tertiary mirror will be removed for aluminisation. This will complete the re-coating of all telescope mirrors. While the tertiary is out, the mechanical and optical axes of the telescope will be tested for alignment. In this process, not only do we hope to improve the telescope alignment, but also to test the VLT alignment procedure and tools. Here again is an indication of the complete immersion of the NTT project in the VLT world. Most of the month of November will be spent aligning the telescope and fixing problems we found while testing the basic functionality of the system.

As mentioned above, the new ACE CCD controllers will be installed in SUSI and EMMI in early November. The refurbished camera of the red arm, a new RILD mirror and an improved grism wheel will be installed in EMMI. SUSI got a new M4 last May but, as for EMMI, she will be sporting new software and in fact also new electronics for moving the two motors.

In December, we plan to begin the recommissioning of the telescope and instruments. At the same time the first data-flow modules are expected to be delivered by the Data Management Division. Beta testing of the phase II proposal preparation will take place in November and we expect that the first observing blocks will be built at that time. In December, these observing blocks will be delivered to the mountain as part of the commissioning of the telescope and will be passed to the control system for execution. This functionality is based on the usage of the VLT sequencer tool. The VLT control is designed to be an integrated system. All functions, whether in the instrument, detector or the telescope may be driven directly from the sequencer. The sequencer language is tcl, a very common scripting language used at many observatories already. The ability to co-ordinate and automate all tasks taking place within the dome is critical to the planned operations scheme. In this context, the sequencer is already being used extensively for maintenance monitoring of functions within the NTT.

In January, the NTT will receive the data flow hardware. An on-line archive workstation will arrive with 22 Gb of disk space. This will allow us to have immediate access to data taken during the last 4 or so days of operation. The data taken from the instrument workstation will be directly sent to this place for safe storage. From there they are forwarded to the pipeline workstation. Both these machines will live in the NTT control room. The data will be delivered to the astronomer on CD-ROMs, which will be prepared at a further workstation located at the computer centre in the administration building.

The commissioning of the VLT data-flow system will also start in January. This system has been extensively discussed in previous issues of *The Messenger* and forms the essence of the operations scheme of the VLT. In February/March, we plan to start with some first scientific exposures. These will be executed in service mode and are strictly shared risk.

The Not So Immediate Future

Exciting developments are also foreseen for the second half 1997 for the NTT. We are currently planning to upgrade the EMMI red arm CCD controller. The new FIERA controller, a prototype of which underwent functionality tests in Garching in November and came through with flying colours, is planned to arrive at the

NTT in the third quarter of 1997 (for specifications see Beletic, *The Messenger*, 83, 4, 1996). FIERA will deliver an order-of-magnitude improvement over ACE in readout speed and depending on the detectors used, possibly a further improvement over the already low noise figures. In the last quarter of 1997, the NTT will get two new instruments. SOFI (Son OF ISAAC), a derivative of the first instrument to be installed on UT1 of the VLT, is an infrared camera/spectrograph delivering both narrow- and wide-field imaging and intermediate-resolution spectroscopy. At the same time, SUSI II, or as she is affectionately known within the NTT team, SUSANA (SUperb Seeing At Nasmyth A), equipped with a 4k CCD mosaic and FIERA, will also be installed replacing SUSI.

The NTT will thus remain truly the New Technology Telescope it was always envisaged to be, with cutting-edge instrumentation and capabilities. Stay tuned for exciting results. All of these developments are in the spirit of using the NTT as a test bed for the VLT. SOFI uses many common functions with ISAAC, and SUSANA is a derivative of the VLT test camera to be used in the commissioning and science verification phases of Paranal.

Staff Movements

The NTT team bids farewell to Roland Gredel who is taking over the duties of 3.6-m+CAT team leader. Many thanks Roland and good luck with your new responsibilities.

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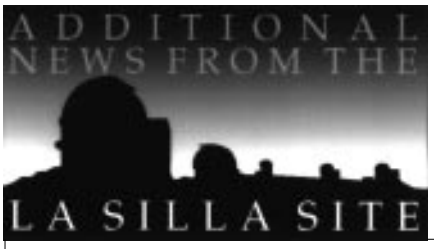

The La Silla News Page

The editors of the La Silla News Page would like to welcome readers of the sixth 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).

A New CCD for EFOSC2 at the ESO-MPI 2.2-m

T. AUGUSTEIJN

A new CCD (#40) has recently been installed in EFOSC2 at the ESO-MPI 2.2-m telescope. This thinned CCD has a very high quantum efficiency in the blue and UV through "UV flooding" of the backside. The new CCD for EFOSC2 is a 2048×2048 array of 15-micron pixels, which corresponds to 0.262 arcsec on the sky. The field of view with the new CCD is currently limited to a circular area with a 7.7 arcmin diameter. This limitation is caused by the diagonal mirror in the DISCO adapter used to divert light to the guide probe.

The efficiency of the new system was measured by observing several photometric and spectrophotometric standard stars on several nights. In Figure 1 we show the relative increase in efficiency with respect to the old CCD(#19) by plotting the ratio of the observed count rate as a function of wavelength of the new CCD with respect to that of the old. In this figure the triangles connected by a dashed line correspond to measurements made with grism #1. The horizontal lines correspond to measurements made with broad-band filters. The circles are placed at the effective wavelength of each filter and the tick marks give the FWHM of each filter. From this one can see that the new CCD gives a seven-fold increase in sensitivity in the blue, a two-fold increase in the visual, and a three-fold increase in the red with respect to the old CCD!

Also shown in the figure, as squares connected by a dotted line, is the ratio of the quantum efficiencies of the two CCDs (measured in Garching before shipment to Chile). From the figure, it can be seen that the measurements made with the grism and the broad-band filters are reasonably consistent, but that there is a significant discrepancy in the blue with respect to the increase in efficiency expected on the basis of the quantum efficiencies measured originally. This difference probably reflects a decrease in the efficiency of the old CCD with respect to the original measurements and might explain the observed de-

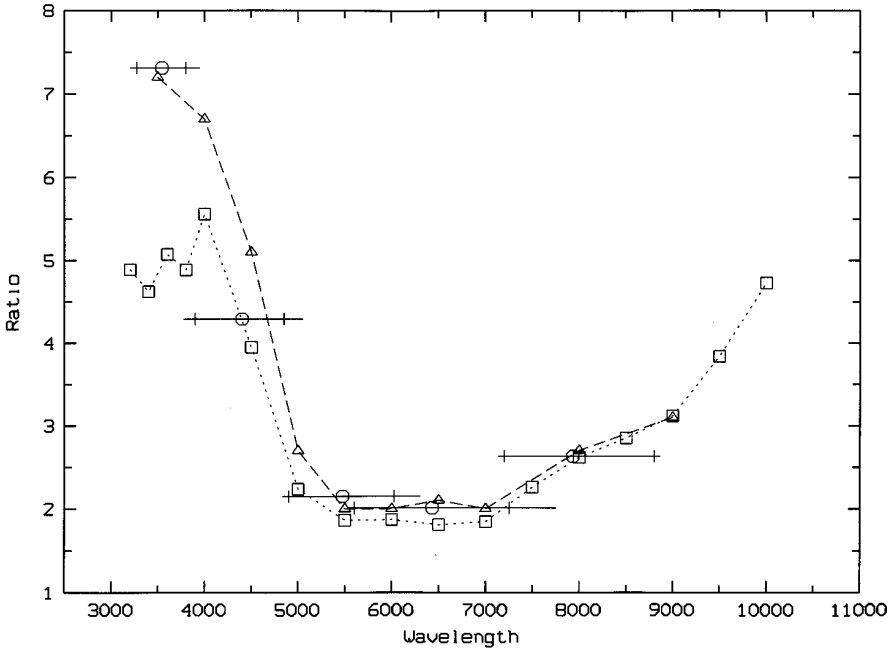

Figure 1: Ratio of observed fluxes of CCD #40 with respect to CCD #19 as a function of wavelength using grism #1 and broad-band filters.