Phase III

The NTT will be returned to active duty for the community as soon as possible. After the big bang, which barring unforseen problems will last around 6 to 7 months, the VLT science operations scheme shall be tested in real operations with the community providing the critical feedback to ESO. The details of the VLT operations scheme fill more than 70 pages so it is not possible to go into it at length here. The fundamental principle is that operations shall be predictable and reproducible. Given this starting principle we believe that it is possible for the users of the NTT to define their observations in an accurate enough manner that it shall be possible for the NTT team to execute these observations. The benefit to the community if such a scheme is successful is tremendous. One of the most obvious benefits is that observations shall be scheduled exactly when the conditions are best suited for them. During the first months following the big bang service observations shall be interleaved with system test phases. In normal operations we do not plan that all observations will be performed by the NTT team. Clearly some significant fraction of all observations on the NTT are sufficiently specialised that the principal investigator should be present when they are being executed. The exact ratio of service observations to classical observations is not specified and will, we believe, be determined by market forces.

The immediate future

At the time this article is published the big bang will be only 6 months away. The NTT team has a lot of work ahead of it both in building the new control system and in working on the tools necessary for the new operations scheme. Detailed calibration databases are being established for EMMI and SUSI. Reliable and accurate physical models of the instruments are being used to provide a good understanding of how the NTT really works. The combination of these activities is planned to culminate in good tools that make it possible to accurately define the observations.

As mentioned in previous issues of the Messenger the communications between the users and the telescope team are being facilitated using the ntt@eso.org email account. Information about the telescope and the instrumentation is now maintained on the Web for easy access. Check us out on http://www.eso.org/NTT/

Automated data reduction tools are being developed within ESO to receive the data coming from the instruments. The NTT data have been kept (archived) for many years now. However the goal of the archiving system is not simply to keep the data but to make them useful. Significant effort is being dedicated to make the archive into a scientifically useful tool.

Comings and goings

The restructuring of La Silla has resulted in the departure of Jesper Strom from the NTT team. As a founding member of the team he will be sorely missed. Congratulations Jesper on your new job as 2.2-m team leader. New arrivals in the NTT team are Paul Le Saux and Joaquin Perez from the operations and optics groups in La Silla and Karen Mueller in Garching. Welcome to all.

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ADDITIONAL NEWS FROM THE LA SILLA SITE

The La Silla News Page

The editors of the La Silla News Page would like to welcome readers of the Messenger to the second 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 Telescope Teams

The recently formed 3.6m + CAT and 2.2m + 1.5^2 Telescope Teams are glad to inform Users that accounts have been created at La Silla and Garching for general user support. These accounts will be checked daily by the Telescope Team coordinators, ensuring a more prompt interaction between ESO Users and Telescope Teams.

3.6m + CAT:

The account 360cats@eso.org has been created to enable ESO observers to provide both set-up requests and feedback of their observations. Observers are kindly invited to use this facility. In the case of special requests, we would like to have your input well before the beginning of your observing run. The account in Garching (360cats@eso.org) is mostly meant for assistance with proposal definition and data reduction. In addition, the 3.6m + CAT weekly reports can be accessed by typing 3p6wkrp nn, where nn is the number of the required week, from any account on the La Silla off-line system. The weekly reports can be retrieved as postscript files via ftp from lw5.ls.eso.org (username: ftp; password: userid; directory: pub/360cat). Via netscape, the reports are available using the option open location with address ftp.//lw5.ls.eso.org/pub/360cat.

2.2m + 1.5m^2:

The account 2p2team@ls.eso.org has been implemented at La Silla. This account is meant to serve as a contact point for all problems, questions and requests related to the ESO-MPI 2.2m, the Danish 1.54 m and the ESO 1.52 m telescopes. Support will also be available for the Dutch 90 cm and the ESO 50 cm telescopes. In the future it is foreseen to implement automatic forwarding to this account from the WWW ESO pages.

The Quality of the 3.6m main mirror

A. GILLIOTTE

With this note, a brief history of the 3.6 m main mirror is given, together with a summary of the actions that have been and will be taken to better understand the problems affecting this unit.

The 3.6 m main mirror is made with cemented hexagons of fused silica. On top of these hexagons, a layer of silica is deposited. During the first polishing phase, this layer had to be re-manufactured because it was originally too thin. Early after the installation of the mirror at the telescope, during 1976, a few "white frosted stains" were noticed on the main mirror surface. The evolution of these surface defects has been analysed during each aluminisation. Over the last ten years, the mirror was aluminised during 1985, 1988, 1990 and 1994... During the 1985 aluminisation, recording of the surface defects started, by producing manual maps of the surface. This recording can be done only during the aluminisation period because the fresh aluminium and the absence of dust allows a precise recognition of the surface structures.

This operation was refined during the following 1988 aluminisation with a mapping done under stronger illumination. With this technique, all kinds of defects such as scratches, cleaning stains, aluminium projections and "frosted zones" can be well resolved and mapped in detail. Following the results of this first detailed mapping, attempts were made to contact the main mirror manufacturing company in 1989, unfortunately, with no success. The same procedure was applied (under the same conditions) after 1988 and the evolution of the defects was described in the aluminisation reports of 1988, 1990 and 1994.

In Figures 1 and 2, the maps of the 3.6 m main mirror, as recorded in 1988 and 1994, are presented. The comparison between these maps show the evolution of the blemishes in the last 6 years. During these years some new frosted zones close to the mirror center, affecting less than 0.2 percent of the mirror area, appeared. Please note that, due to the manual design of the maps, the maps give a picture which appears worse than in reality. This is due to the fact that all the defects are drawn with the same intensity, regardless of their true effect. Figure 3 shows a picture of a small affected area (also indicated in Figure 1) with a frosted zone and spots, which appear as white regions. The size of the larger frosted stain is 70mm. Despite the low contribution of these defects to the overall telescope efficiency (see below), it was decided to establish a diagnostic of the mirror "illness", in the framework of the 3.6 m + CAT Upgrade Plan.

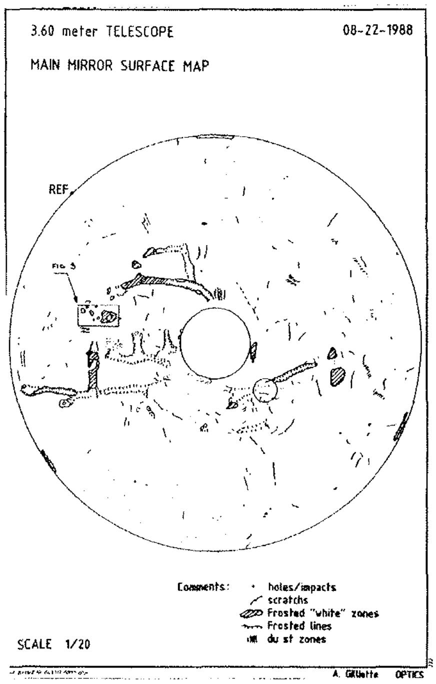

Figure 1.

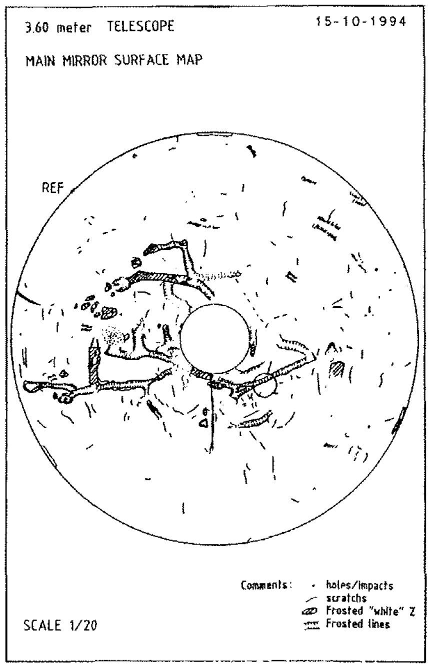

Figure 2.

During the last aluminisation qualification of the frosted zones began, using both magnified surface images and the measured reflectivity of the affected areas. In Figure 4, the transition area between a frosted spot and a sound zone is shown. The spot appears in black and the magnification of the picture is 135, giving a spot diameter of about 0.5 mm. A grain structure is easily visible, with a grain size of about 3 microns.

How do these defects affect observations?

After a fresh aluminisation the reflectivity at 670 nm varies from 89% for for sound areas to 82% for the frosted ones. The rugosity (a measure of the roughness), which is 15 Å for an excellent mirror, varies from 60 Å in good zone to 140 Å in an affected one. Dust on the mirror produces a similar roughness of about 120 Å. The zones affected by the defects cover only 2% of the whole mirror surface. The contribution of the defects on the overall telescope efficiency is negligible, in comparison to that produced by dust.

IR observers may be concerned by the influence of the surface blemishes on emissivity. Emissivity is regularly monitored at 10 μm, and no enhancement has been recorded in the last few years. In fact the measurements show a decreasing trend of emissivity with time, probably due to the CO_2 cleaning procedures that were adopted in the last few years. This shows that emissivity is largely dominated by dust.

Future Steps

Contacts have been successfully re-established with both the manufacturing and polishing companies. It was found