The power is down when the movable part is in position. Typical duration for movements will be 2 seconds and repeatability accuracy is expected to be 1 micron at 10 cm from the axis, as demonstrated with our warm dog prototype.

The grating scanner mechanisms are close copies of the scanners applied in the SWS and LWS spectrometers of ISO. These scanners are servo systems with linear motors as actuators and high-resolution LVDTs (Linear Variable Differential Transformers) as encoders. Adaptations of the SWS/LWS scanners for VISIR are being developed by SRON, (Groningen, the Netherlands).

2. 5 Control/software

The Control and associated software represent a heavy load. This work was not our priority during the predesign studies. Our group is well used to this aspect of an instrument and a lot of work has already been done for ISAAC, which will be used as a model.

3. Tools and Test Equipments

Final integration and tests of the instrument, which are the latest phase of a project, generally suffer from the cumulative delays which have happened in the earlier phases of the project. Then those tests are done under heavy time pressure. In order to avoid such a situation, we have decided to start very early in the project the construction of all the test and handling equipments and to prototype in full size many parts of VISIR. The VISIR test cryostat and integration support are already available, as can be seen on Figure 3. The installation of the test equipment has prompted the safety analysis of VISIR. We have the approval of the CEA internal safety panel to operate VISIR and its handling equipments at SAp.

Our early intensive test approach should prevent us from bad surprises during the final integration and tests, and help us to meet the contractual delivery date of VISIR at Paranal, beginning of 2001. The ESO decision to move VISIR from telescope unit 2 to telescope unit 3 should not prevent us from starting the commissioning of VISIR on telescope soon after arrival on site. Scientific observations are expected to start shortly after the commissioning, in the second semester 2001.

Acknowledgements

We wish to thank our VISIR colleagues who contributed so much to a very promising VISIR design and who are too numerous (23) to be quoted here. We also thank the members of the ESO infrared group and the PDR review panel for their numerous constructive comments. Our special thanks go to the panel chairman, Jason Spyromilio, who conducted the review with maestria. We use this occasion to salute Anton van Dijsseldonk, who is leaving ESO and will be missed by the VISIR team.

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NEWS FROM THE NTT

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The relatively quiet situation that had prevailed at the NTT since the return into operations (see the News from the NTT of *The Messenger* No. 90) has come to an abrupt end beginning of December. Since then, the NTT has been the scene of a quick succession of events, which will be reported below in chronological order of occurrence.

SOFI

The installation of SOFI was the first major technical intervention scheduled at the NTT since the end of the big bang. The readers of *The Messenger* have already had various opportunities to get acquainted with this instrument, the first one of the VLT generation. Indeed, the acronym SOFI stands for Son OF ISAAC. It may not be necessary to recall that ISAAC, an IR imaging spectrograph, will be one of the first two instruments to be mounted on UT1 of the VLT. As suggested by its name, SOFI is essentially a scaled-down version of ISAAC. There are many similarities between the two instruments, all the way from the opto-mechanical design down to the control software, which is common to both.

At the NTT, SOFI takes the place on the Nasmyth focus A that has been left vacant by the decommissioning of IRSPEC at the end of June 1996. IRSPEC had already been dismounted during the big bang year. By end of November 1997, SUSI, which had been sharing adapter A with IRSPEC, was, in turn, decommissioned. This was needed because the adapter flange on which SUSI was mounted had to be replaced by a new one, required by SOFI. This new adapter flange furthermore bears SUSI2 (of which more below). As soon as SUSI had been removed from the telescope, the installation of SOFI started. This installation proceeded very smoothly, and the performance of the instrument turned out from the first moment to be very promising.

SOFI is operated from a dedicated workstation, *wsofi,* whose dual-screen console has taken place in the EMMI control room. Another sign of the presence of SOFI which is perceived immediately by the visitor entering the NTT building is the SOFI “heartbeat”, that is, the sound of the Closed Cycle Cooler, which is permanently heard throughout the building and has already become one of its landmarks.

The reader will find more details about the installation of SOFI and SUSI2 at the NTT and preliminary information about the instruments’ performance in separate, dedicated articles in this issue of *The Messenger*.

A New Release of the VLT Common Software

The VLT common software, which is the cornerstone of the NTT control system, keeps being developed. At regular intervals (6 months, for the time being), a new “official” package of this software is released, which contains the most recent versions of the various modules that have been fully tested and debugged off-line by the developers. This new release is then ported to the tele-

scope. This is true not only in the current period of pre-VLT development: it is foreseen to apply the same scheme once the VLT has come into operations. Indeed the software will keep being updated then, to fix problems, to improve performance, and to expand functionality.

During the first six months of operations, the NTT has been running the May 97 release of the VLT Common Software. In January 1998, this version was replaced by the one of November 1997 (in short, VLTSW NOV97). The implementation of the latter took place during a suspension of the operations scheduled from January 8 to January 20 (the last 3 days were devoted to tests of SOFI, in parallel with the final checks and bug fixes of the new software release). The step from VLTSW MAY97 to VLTSW NOV97 was a major one, because it also involved an upgrade of the operating systems of the HP workstations (from HP-UX 10.10 to HP-UX 10.20) and of the LCUs (Local Control Units, on which Tornado was installed). The change affected the telescope and all of its subsystems as well as the EMMI and SUSI (or SUSI2) instruments, but SOFI, which has not been commissioned yet, was left aside for later intervention. The installation was performed by the NTT Team with the support of the La Silla Software & Communication Team and of members of the VLT Division sent from Garching to La Silla to this effect.

The newly installed version includes many changes with respect to the previous one which are almost invisible for the casual user, and which were made e.g. to improve the overall robustness of the system or to provide a better platform for implementation of some VLT specific applications. However, the impact of some modifications can be perceived right away. For instance, overheads in the executions of observation templates have been drastically reduced thanks to the combination of improvements made at the level of the EMMI/SUSI Observation Software and in the templates themselves. Also changes made on the autoguider and image analysis modules have allowed the ranges of magnitude of the stars to be used for guiding and for analysis of the wavefront to be better matched, so that executions of image analysis in parallel with scientific observations, hence closed-loop active optics operation, have become possible. This possibility has now started to be exploited in regular operations, where it is expected to contribute effectively to the achievement of optimal image quality.

Regrettably (but probably not quite unexpectedly, given the magnitude of the change performed), some new problems have appeared with the installation of VLTSW NOV97, which may either be bugs of this release or already existing weaknesses that surface or are emphasised by differences in the use of the system with respect to the previous software version. These problems are currently under study, and one can reasonably hope that it will be possible to fix them within the next few weeks. The most prominent ones are:

– most LCUs from time to time reboot themselves spontaneously, without obvious reason;

– the technical CCDs (autoguiders, EMMI slit viewer, image analysis cameras) fail unpredictably at irregular time intervals (typically a few times per night);

– read-out of the EMMI CCDs hangs infrequently.

In spite of those newly introduced difficulties, the installation of VLTSW NOV97 has to a large extent been successful. This is an extremely positive result for the VLT, since the software version that will be initially installed on UT1 should be very close to the current NTT version. Also, for the longer term, the work that has just been done at the NTT gives confidence that it will be possible to perform similar upgrades at the VLT on a regular basis, as planned. Of course, lessons will be drawn from the analysis of the difficulties encountered this time, in order to make future interventions of this kind smoother and safer.

Data Flow

Some of the readers of this column will remember that the NTT has been, since its return into operation, running a temporary application for file transfer between different workstations, and that transfer of the data taken at the NTT to the archive group in Garching was made through DDS tapes (see the News from the NTT in *The Messenger* No. 89). This somewhat primitive mode of operations had had to be adopted because it had been impossible to bring the data transfer chain to a sufficiently stable state on time for the beginning of NTT operations. The time elapsed since has been taken advantage of to modify the archive chain in order to increase its reliability. As a result, a new version of this chain was released, and it was installed at the NTT in parallel with the new version of the VLT common software. The new transfer chain has proved much more robust than the one tested in June 1997: accordingly, it has been decided to bring it into operations.

At the front end of the data flow, the use of the Phase 2 Proposal Preparation (P2PP) tool, of the Observing Tool (OT), and of the High-Level Observing Software (HOS, aka BOB – Broker of Observation Blocks) to handle the Observation Blocks (OBs) has been described in some detail in the News from the NTT of *The Messenger* No. 90. These tools worked very well, but their use, initially intended for and well suited to service observing, proved rather awkward in classical observation, and many visiting astronomers have expressed their wishes for an improvement at that level. They have been heard, and a visitor mode of P2PP (referred to as P2PP/VM) has been implemented. Major improvements of this upgraded tool are enhanced facilities for edition and modification of OBs, and the fact that P2PP/VM talks directly to BOB without need for explicit communication with the OB database and for passage through the OT (database handling is still done but is fully transparent for the astronomer).

On the other hand, new developments have been made for service observing too, with the installation, at the end of January, of the prototype version of a Short-Term Scheduler (STS). The STS handles a list, established by the Medium-Term Scheduler (for the time being, a human being), of OBs to be executed during a given time interval (series of nights – typically a service observing run of a few nights), and determines an optimal time of executions of each observations according to some pre-defined criteria. The output of the STS is updated in real time according to the current meteorological conditions and to the history of the observations already performed, so that at any given moment, the service observer sees in the short-term schedule which is the OB best suited for execution. The first version of this tool which has been installed at the NTT is still preliminary in many respects, but its first tests during the service observing period of January 30 to February 5 have been quite promising and have yielded a large number of indications that will be exploited for the development of an improved version. The STS will continue to be used during the remaining service observing runs of Period 60 to gain more feedback for future developments.

The NTT Team has taken advantage of the installation of VLTSW NOV97 and of new versions of P2PP and OT to introduce a new release of the observation templates, which features increased functionalities of the already existing templates as well as a set of brand new templates (e.g. for observations in the dichroic medium-dispersion mode of EMMI).

Furthermore, in the new template release, the cryptic keywords that were displayed on the P2PP user interface were replaced by more explicit “labels”: for instance, WIN1.UIT1 has become “Exposure time”. This should make the use of the P2PP tool and templates more user-friendly.

SUSI2

Beginning of February, the installation of SUSI2 at the NTT started. Let us recall that SUSI2 is an imager, which uses as a detector a mosaic of 2 CCDs of 2k × 4k, with a pixel size of 15 μm. The resulting field of view is approximately 5′ × 5′ (about 6 times as large as the field of view of SUSI), with a sampling of 0.08″ per pixel. As a matter of fact, the opto-mechanical part of SUSI2, which is attached to the adapter flange, had already been on the telescope since the SOFI installation in December. But a major step remained to be done in February with the arrival of the CCD and of its controller. At that level, SUSI2 features two premieres: the first new ESO controller FIERA to come into operations and the first new-generation EEV CCDs. FIERA is the controller that will be used for the VLT scientific CCDs, and EEV CCDs will be used in various instruments at the VLT, starting with the test cameras to be used for first light and during commissioning, and later on in FORS and UVES; they will also be found in the Wide-Field Imager on the 2.2-m telescope on La Silla. Hence the test represented by the installation of SUSI2 at the NTT is a critical one for the future of CCD-based instrumentation at ESO.

This is written just before the beginning of the SUSI2 commissioning period. Accordingly, it is too early to present definitive conclusions. However, it can already be mentioned that the preliminary tests carried out during the installation period yielded quite promising results, both with respect to the performance of the EEV CCD mosaic and of the FIERA controller, and with respect to the image quality achieved. The reader can find a more detailed report in a separate article in this issue of *The Messenger*.

On the control system side, SUSI2 presents a lot of similarities to SUSI, and the Observation Software of the new instrument derives directly from that of its predecessor. In particular, the astronomers interact with the system through a set of templates bearing the same names and having essentially the same functionalities as the old SUSI templates (even though the adaptation of the templates to SUSI2 has been accompanied with an almost complete re-coding in order to improve their performance and robustness).

Telescope News

In the News from the NTT in *The Messenger* No. 87, J. Spyromilio had described in some detail the optical realignment of the telescope that had been performed as part of the big bang. In particular, he had noted that, although the intervention had been mostly successful, it had not been possible to adjust optimally the secondary mirror (M2), which was only marginally within the specified limits. The practical impact of this was an extreme sensitivity of image quality towards the edge of the EMMI field of view to the configuration of the primary mirror and to the telescope focusing. With time, this had proved critical, since small changes of the telescope conditions during an integration (such as, e.g., a drift of the temperature of the Serrurier structure by 0.5°) could yield unacceptable image degradation (elongations of several tens of percent) away from the EMMI field centre.

The problem was followed up, and further analysis, based in particular on mappings of the astigmatism with the image analysis system throughout the field reachable with the guide probes, allowed us to understand better its origin and to devise a corrective action. The latter was executed in the beginning of February. Its outcome was a spectacular reduction of the amount of field astigmatism by a factor of approximately 6, which reflects the fact that M2 is now very well aligned.

On the other hand, study of the problem of telescope pointing degradation reported in these pages in the last issue of *The Messenger* has continued. In particular, telescope pointing performance has been put under regular monitoring. As part of this monitoring, a large pointing jump, of the order of 30″, has been observed at the time of the earthquake of October 14, which with its epicentre close to Ovalle, has been the strongest one affecting La Silla in a long period of time. Since then, the NTT pointing has behaved very well, showing no other large sudden variation and achieving a performance close to specifications. This is somewhat surprising, since before October 14, pointing errors of up to 20″ were appearing on timescales of a few days. The much improved behaviour of the telescope pointing over the last few months is, of course, welcome, but not understood yet. One can, for the time being, only speculate about possible causes of the degradations previously occurring: for instance, unrecognised seismic activity or seasonal effects (e.g., some unexpected sensitivity to temperature below a certain threshold). This lack of understanding is unsatisfactory, especially because the reappearance of the problem at any time cannot be ruled out. Accordingly, the NTT Team keeps actively studying and monitoring this issue.

Staff Movements

The last three months have seen an unusually large number of changes in the composition of the NTT Team. This is partly due to the facts that the NTT upgrade project is nearing completion and that the integration of the first unit telescope of the VLT is well under way.

In the middle of December, José Parra became the NTT Team's second Data Handling Administrator. He is one of the two Data Management Division members undergoing a training in the area of VLT Data Flow Operations at the NTT before being transferred to the VLT. His main tasks are the preparation of the CD-roms for data archiving and the maintenance of the databases.

End of December, Percy Glaves and Roberto Rojas left the NTT Team to go back to the La Silla Software & Communication Support Team, which they had left temporarily to participate in the NTT upgrade. Percy is taking up new duties, becoming one of the La Silla System Administrators. Roberto's assignment is a genuine continuation of his work at the NTT: he is one of the VLT Software programmers participating in the upgrade of the 3.6-m telescope (in particular, he is developing the control software of EFOSC2). He will also continue to give occasional support to the NTT when required.

End of January, two more software engineers, Marco Chiesa and Thanh Phan, left the NTT Team. They had joined it early in the upgrade project, first in Garching and then on La Silla, and had accordingly participated in most of the developments of the new control system. This involvement had from the start been intended as a preparation for the VLT, and along this line, Marco and Thanh have now moved to Paranal to participate in the integration of the first Unit telescope. The vast experience that Marco and Thanh have acquired through work at the NTT will undoubtedly be extremely beneficial for the VLT.

Finally, end of January was also the time of departure for Griet Van de Steeple, after three years of fellowship at ESO. During that time, Griet had been the astronomer in charge of monitoring the performance of the NTT CCDs and of co-ordinating maintenance and corrective actions in this area with the Optical Detector Team. The dedication and the commitment to excellence that she showed in the execution of these tasks served the astronomical community even better than the many introductions that she gave to visiting astronomers, which have always been highly appreciated by the latter. Griet has now joined Mount Stromlo and Siding Spring Observatories, in Australia. She will soon be replaced by a new fellow.

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