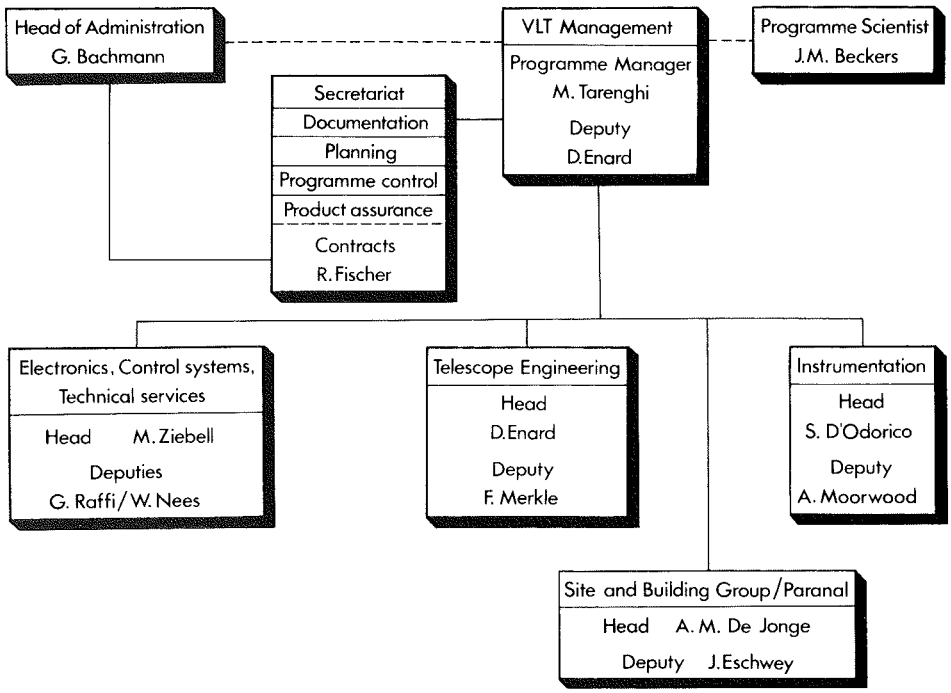
The VLT Progresses as its Programme Management is Adapted

H. VAN DER LAAN, ESO Director General

Every issue of this Quarterly in the last several years has demonstrated the progress of the VLT Programme and this one is no exception. This fifth year after the go-ahead decision of December 1987 promises to be the last in which the VLT Division, along with many in the Administration and myself, spend our time mostly in preparing Calls for Tenders and Calls for Proposals, then assessing the responses. By the end of 1991 we had contractually committed over 40 % of the VLT capital budget; by the end of this year this level will rise to 70 %, with another 15 % in the tendering process. From 1993 onwards the greater portion of the in-house engineering efforts will consist of monitoring problems and progress of both industrial and institutional contracts.

Those who think a small organization like ESO can achieve the demonstrated progress of such a large programme without difficulties, harbour illusions. In the course of 1991 we had plenty of problems to stay on course, i.e. to maintain the schedule and continue within budget while respecting our specifications. But stay on course we did, thanks to the talent and sheer dedication which mark ESO's VLT team. We had to let our programme manager, recruited in industry, go and I decided against another attempt to find outside talent. We therefore mustered inside competence, reshuffling some to put "the right men in the right place". The VLT Division is now headed by Massimo Tarenghi, who has a programme office staff to assist him in the running of the VLT Programme. Three departments make up the division's substance in Garching: Telescope Engineering headed by Daniel Enard, who also serves as Massimo's deputy; Instrumentation, headed by Sandro D'Odorico, and Electronics Systems, headed by Manfred Ziebell. The VLT construction manager is Peter de Jonge, who recently moved to Chile and will oversee all activities in ESO's Paranal area. The Contracts and Procurement Department, headed by Robert Fischer, is the VLT's prime link to the Administration. The science optimization of the VLT's design and construction progress is the responsibility of the VLT Programme Scientist, Jacques Beckers, who reports directly to me. These senior staff and their deputies are mentioned in the accompanying diagram. Not shown but very actively present is a VLT Division staff of some sixty people who thrive on the challenge to build European astronomy's most ambitious observatory yet.

THE VLT DIVISION



VLT News

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During the last few months, major milestones towards the completion of the first 8.2-m VLT mirror took place. At SCHOTT the programme of casting and machining of the 8.6-m blank is continuing as scheduled. The photo on the frontpage illustrates the progress of the activity and gives the first visual impression of this new domain in mirror technology. A long series of experiments, including tests on a 4-m spin-cast Zerodur, carried out during the past few years by SCHOTT even before the VLT contract was signed, have made it possible to control the process. In the

Figure 1: *General view of the shop with the 32-m tower. In the foreground are the meeting room and the offices. On this picture, the sunshield is under achievement and the tower has not been topped with the 4-m dome.*

Figure 2: *The width of the entrance door to the REOSC factory is 10 metres.*

Figure 3: *Milling bridge. This bridge, which has a free span of 9 metres, will be installed over the grinding machine rotating table. The picture shows the computer-controlled carriage which bears the milling head.*

course of the machining of this mirror it was possible to test extensively the handling of these large glass disks.

At REOSC the preparations necessary to receive the first blank in the spring of 1993 are continuing. The completion of the new factory and the installation of the polishing machines are presented in Figures 1–5 which were taken around mid-January 1992. The REOSC building was designed to fulfill all the technical needs for the polishing of the 8-m mirrors but at the same time it represents an interesting and futuristic architectural achievement.

The high tower contains a second tower detached from the external one on top of which all the interferometric instruments for the optical tests of the mirror will be located. Great care was taken to avoid a vibration of the inner tower and to control the air along the optical path. The large 10-m entrance door and a 36-ton crane installed inside the building will allow easy access of the track transporting the mirror box and the handling of the mirrors. Inside the building, two milling machines manufactured by INNSE (Italy) and a robot manufactured by SOCOFRAM are being installed and are expected to be tested in a short time. The existence of two machines will allow the grinding and polishing of the two mirrors in parallel reducing considerably the delivery time.

On April 24 the 8-m shop will be inaugurated by the French Minister of Research, Mr. Hubert Curien. A few weeks later the 8.2-m concrete dummy will arrive at REOSC in its transport box after a journey from Dunkirk to Paris. This will be a good test for the different transport phases on roads and rivers. The dummy will be used to test the handling of the mirror while in the factory. Later on the same dummy will be used to test the mirror cell and will probably be sent to Chile for the first integration of the telescope.

As reported in the last issue of the *Messenger*, the first of a series of explosions to remove soil took place on Paranal; this was seen by the Council members on their visit to the summit. The activities of levelling of the mountain is continuing at full speed and about half the material has been removed. An article about the geology of the area is included in the current issue of the *Messenger* and on the basis of geological analyses it was decided to remove 28 m from the summit in order to obtain a large plateau to accommodate the VLT installation.

The final configuration of the VLT site is in the process of being frozen and will take into consideration all the scientific and technical aspects required by a project of this dimension. Particular atten-

Figure 4: *Base of the polishing rotating table installed in its pit. The oil pads at the periphery of the table base are protected by grey yellowish plastic. The track is attached to the table.*

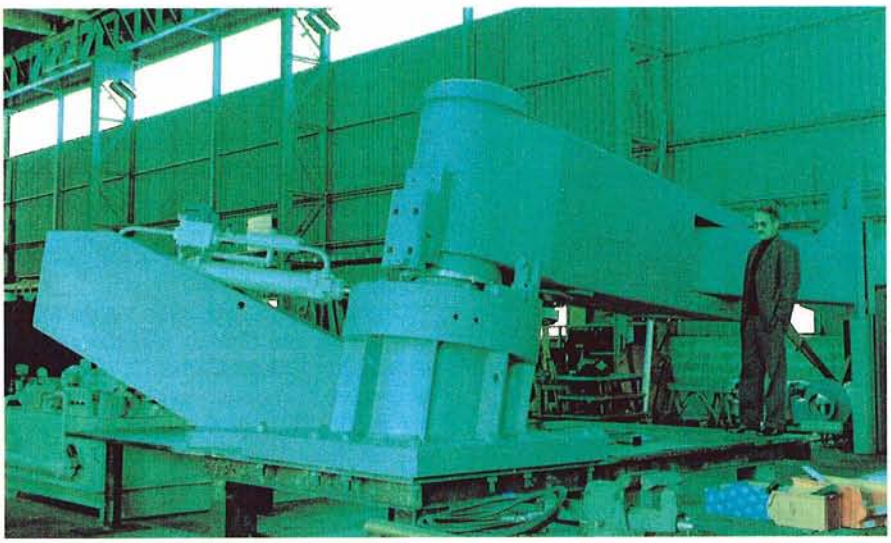

Figure 5: *The polishing robot in Bordeaux.*

tion is given to the need to maintain the summit of the mountain free from any source of disturbance for the observations.

In Denmark, COWIconsult is completing the design of all civil engineering complexes both in the hotel area and the telescope area and is preparing the technical specifications for the call for tenders that will be sent out in spring 1992. It is interesting to note that a major effort has been devoted to the requirement to keep underground all the infrastructure such as the laboratories and interferometry tunnel which need to be kept in stable thermal conditions. Another area of careful study was to create easy access to the different buildings during observation and also to simplify the transport of large pieces such as the mirror cell. In the hotel area the need to create a pleasant environment for the Paranal population has been one of the goals of the design of the offices, hotel facilities and dormitories. Also the design of the interior both from the furniture point of view and the colour scheme are part of this work and will help considerably in the future life at the observatory.

In France IRAM and STEC are collaborating in the detailed design of the VLT enclosure. A concept of a carousel type was chosen, fulfilling all the requirements of the astronomical community and giving good protection of the telescope from any source of disturbance. At the same time more analyses are being done on the effects of earthquakes on such large structures, and a wind tunnel study is foreseen to optimize the ventilation of the enclosure to reduce the dome seeing to zero.

In Italy AES is continuing the first phase of the telescope structure contract which will culminate in the preliminary design review in summer 1992.

The work done so far has concentrated on the definition of the critical components such as the direct drives which are a peculiar characteristic of the VLT, the hydrostatic bearings and the encoder system for which various technical solutions are being considered. After the preliminary design review the project foresees the detail design review for the rest of 1992 and the start of the construction early 1993. The plans for the erection in Chile in 1995 of the first telescope is confirmed and will be preceded by extensive tests of the telescope erected in Europe.

A Geological Description of Cerro Paranal or Another Insight Into the "Perfect Site for Astronomy"

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Paranal, where the ESO Very Large Telescope project is situated, is not just any old place! It is unique because it is *the* "perfect site" for astronomy. But it is also unique because of its location in the Atacama desert. It is a place of character by its remoteness, its loneliness and its desolation. Nevertheless, it is also a place of beauty by its colours, its silence and its space. No one who comes here is left unmoved by the spectacle that unfolds in front of his eyes. Yet if we stay here long enough we realize that there is still more. There is something "deeper", something that emerges from the land and earth itself. As our perceptions become sensitized

* Editor's note: Fabien Bourlon is a French geologist working as coopérant with the VLT Site and Building group at Paranal.