THE MESSENGER

EL MENSAJERO

La Silla
La Serena
Santiago

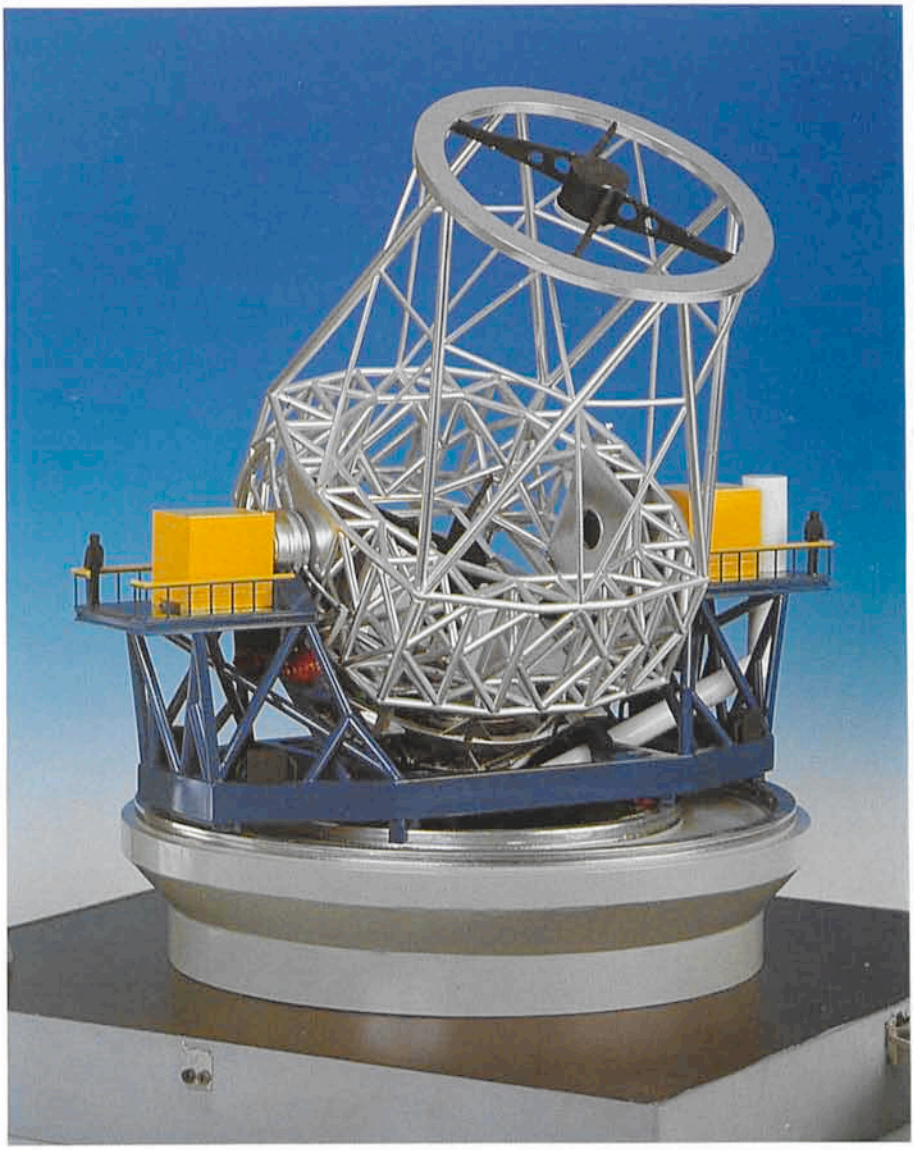
No. 46 – December 1986

The ESO VLT Project: Current Status

Since the last report about the ESO Very Large Telescope in the *Messenger* (**44,** 37; June 1986), this project has passed an important milestone on its way towards realization. More than 80 scientists and engineers from the ESO member countries (and beyond) met in Venice by the end of September 1986. During one week they made a detailed assessment of this ambitious undertaking, which aims at the construction of the world's largest optical telescope. There was unanimous agreement that the present concept is near the optimal, that it is technologically feasible and can be realized within approximately 10 years after funding has been decided upon, and that it will allow European astronomers to perform new and spectacular investigations of the universe, unparalleled elsewhere. Completion is aimed at in 1998 but part of the VLT may become operational already in 1993.

The "Workshop on ESO's Very Large Telescope II" was held on the premises of the Giorgio Cini Foundation, Venice, Italy, from September 29 to October 2, 1986. The four days of discussion were appropriately closed with a very positive appraisal of the VLT project by Mr. Luigi Granelli, Italian Minister for Coordination of Scientific Research and Technology. The minister emphasized the important impact of the project on European science and technology and also stressed the leading role of Europe in this field.

During its meeting on October 3, 1986, the ESO Scientific and Technical Committee (STC), decided to recommend that the present concept of the VLT project be provisionally accepted



Model of an 8-m unit telescope.

The Italian Minister for Coordination of Scientific Research and Technology, Mr. L. Granelli (right), and the Director General of ESO, Professor L. Woltjer, at the Second VLT Workshop in Venice.

by the ESO Council. It is expected that the definitive, detailed project proposal will be presented in April 1987 and that a final decision, including the financing by member states, may be taken later in 1987. The cost of the VLT proper is estimated at 309 million DM plus 48 million DM for auxiliary instrumentation.

The ESO VLT project consists of an array of 4 telescopes, each of which has a single-blank mirror with a diameter of 8 metres, resulting in a total, equivalent aperture of 16 metres. The telescopes can be used individually or combined, depending on the type of observations, giving an unprecedented degree of flexibility and greatly enhancing the observing efficiency. During the past two years, several specialized Working Groups have evaluated the scientific programmes which can be envisaged with the ESO VLT. Among these, observations of the faintest and most distant quasars and galaxies will have a profound impact on cosmology, the study of the structure and evolution of the universe in which we live. High-resolution spectral observations will allow a detailed chemical analysis of individual stars in our own and in other galaxies, contributing to our knowledge of the evolution of galaxies and the genesis of elements. When used in the interferometric mode, the VLT will achieve angular resolutions in the milliarcsecond range and permit observations of the innermost regions of for instance starforming areas and galaxy nuclei which may have black holes near their centres. These are but a few of the many, extremely interesting observational possibilities with the ESO VLT which were identified by the Working Groups and discussed in Venice.

The technologically most advanced auxiliary instrumentation is needed to perform these observations and much time was dedicated to this central subject. A great variety of instruments, imaging and spectroscopic, visual as well as infrared, were proposed. Based on these suggestions, a preliminary fundamental instrumentation payload for the VLT will now be established and circulated for further discussion in the user community. It was stressed that it is the intention to involve national laboratories in the member countries in the construction of these complicated, high-technology instruments, although a major part of the necessary funds will have to come through ESO.

Among the still unresolved questions is the choice of a site for the VLT. Detailed meteorological observations have confirmed the excellency of the La Silla site, but even better observing conditions may possibly be found on the top of mountains further north in the Atacama desert. Following local investigations, a promising site has been identified at Cerro Paranal, about 150 kilometres south of the town of Antofagasta. There is a clear consensus that the "seeing" (a measure of the atmospheric turbulence which degrades the sharpness of astronomical images) will play a decisive role in the choice of the VLT site. However, other considerations like cost of development of a new site must also be taken into account. In this context, a reduction in operating costs may be obtained by extended use of remote control of the VLT, for instance from Europe. This is now thought feasible, in particular after a very successful experiment earlier this year, during which a 2.2 m telescope on La Silla was controlled via a computer-to-computer satellite link by astronomers at the ESO Headquarters in Garching.

Since the Venice Workshop, several meetings have been held in the member countries and the ESO scientists and engineers have given informative talks about the VLT in a variety of places. With the support of the Institut National des Sciences de l'Univers (INSU) and its director, M. Berroir, a VLT press conference took place at La Villette, Paris, on November 13. The ESO Finance Committee discussed the VLT project during its meeting later in November, as will the ESO Council, when it meets at the ESO Headquarters on December 11 and 12, 1986.

In order to keep to the tight VLT schedule, ESO is engaged in an extensive preparatory programme. Since the time schedule is set by the acquisition of the optics, some work on a prototype 8-m blank should start already in 1987. Both conventional mirror materials, but also aluminium and steel are being tested at ESO. All mirrors will be exceptionally thin in order to reduce weight and thereby significantly save cost. ESO has recently successfully tested the principle of "active" optics, by computer controlling the surface of a thin 1 metre mirror. This new concept will play a decisive role in the VLT, so that it can achieve a superior performance when it enters into operation.

Note that the Proceedings of the Venice Workshop and a VLT Slide Set are now available from ESO; see the advertisement in this issue of the *Messenger*.

The Editor

Open House at ESO-Garching

On October 25, 1986, the science institutes in Garching again jointly organized an Open-house day. Preparations were made at ESO during the weeks before, establishing a well-defined path through the ESO Headquarters with demonstrations and exhibitions along the route.

When the doors opened at 9 a.m., several visitors were already waiting outside and during the next 7 hours, the overworked ESO staff guided about