



Current ESO Activities*

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1. Introduction

The immediate purpose of ESO is to provide European astronomers with first-rate observational capabilities of a size and complexity which are not achievable in the national programmes of the member states. In achieving this goal ESO can place European astronomy at a competitive level with respect to astronomical research worldwide. ESO's task has not been accomplished by building the NTT, nor will it be accomplished by building the VLT or the VLTI. It should be understood as an ongoing process in which, from time to time specific facilities or instruments are built, but the overarching role is to support and foster astronomical research in the member states and in Europe.

These simple declarations have a number of obvious consequences which it may however be worth stating. The manner in which we conduct the ESO programmes must be directed to maximize scientific returns over the long run. In building new facilities we cannot sacrifice current research which prepares the astronomer who will use them. The operation and effective use of the facilities are as important as their con-

struction. Both should be guided by scientific priorities and end-to-end performance considerations.

The final goal must be excellence in science. The process by which we select facilities and instruments, observing programmes and strategies must insure, in so far as feasible, that we can achieve it. The only process I know is peer review of competitive proposals. If we wish to achieve excellence, ESO itself must have first-rate staff to provide services and must be a first-rate research institution on its own. Finally, if we wish to succeed as a European project we must be willing to give higher priority to scientific, technical and managerial considerations than to national interests.

When I was interviewed by the Council last year, I stated my views essentially in the same terms with a little more emphasis on some managerial aspects. In the first five months here at ESO I

have tried to apply these general principles and I have used them as a yardstick to assess the status of the programme. I have reviewed the VLT programme and the Chile situation first because they seemed more urgent.

A number of studies and reviews have been carried out with the following aim:

- (1) Establish ground truth for the status of major technical developments and to assess the technical schedule and management risks.
- (2) Review all aspects of ESO activities to assess the degree to which they are appropriate and necessary and to determine potential staff reductions and savings in some area for use in other areas of higher priority.
- (3) Begin the formulation of a plan which will result in the strengthening of current operations at La Silla and in a scientifically successful VLT and VLTI execution within currently planned yearly funds.

“Future Astronomers of Europe”

The European Southern Observatory is launching a special programme on the occasion of the *European Week for Scientific Culture* (November 22–27, 1993), with support from the Commission of the European Communities.

Read about the exciting essay contest for secondary school pupils in 17 European countries and Chile (page 9).

* Excerpt from the Director General's report to the ESO Council at the meeting in Florence on June 2–3, 1993.

2. The VLT Programme

The major conclusions that I have tentatively reached from this work are as follows:

- (1) Although there are very challenging technical problems ahead we see no engineering or scientific reasons that should prevent us from accomplishing the VLT programme.
- (2) Several technical and scientific areas have not received the degree of attention that they require due to lack of manpower or expertise.

Areas of particular concern are:

- System engineering
- Performance evaluation and error analysis
- Operations and maintenance
- Software architecture and development
- Data calibration and archiving
- Observational modes (service observing, remote observing, observational strategies, pointing and tracking, etc.)
- VLTI

- (3) The programme is delayed with respect to the original schedule. Again this is due to lack of manpower necessary to do all the preliminary studies required to draw up the call for tenders to industry, issue them and evaluate the responses, with the required thoroughness. Furthermore, the manpower to follow up the work of the industrial contractors is wholly inadequate.
- (4) The effort expended on VLTI has not been adequate to keep the programme on schedule. Lack of manpower has prevented us to derive the necessary constraints imposed on the rest of the programme by the high accuracy required by VLTI itself.
- (5) Finally, but by no means less important, there has been a remarkable lack of scientific input in the programme as a whole. Scientific requirements have not been used as drivers to technical requirements and operational considerations necessary to carry out scientific programmes are not used explicitly or in a documented way to set software and hardware designs.

Remedies can be found to all of the above and a number of actions are already under way which should improve the situation:

- (1) Strengthening the involvement and responsibility of scientific staff in the programme should permit us to more clearly identify critical performance requirements and avoid unnecessary overdesign. To this end I am insisting on more involvement by the scientists at ESO in the project in the short

run and in a strengthening of the scientific staff in the long run.

- (2) Development of a first cut vision of how VLT will operate to carry out scientific programmes will permit us to design into the telescopes and instruments the operability and maintainability standards that are required. To this end we are creating a VLT science operation group within the VLT division led by a scientist and we are making use of expert consultants.
- (3) More careful strategic planning of procurement actions could eliminate or substantially reduce the technical and management risks involved in a procurement of this size and complexity.
- (4) Prudent use of consultants and industrial consulting services particularly in the system engineering area could significantly help ESO to carry out the prime contractor responsibilities it has assumed. Massimo Tarengi and I have discussed with industrial contractors the possible mechanisms to provide such support.
- (5) More emphasis on VLT operation analysis and planning will be very useful to prevent a number of retrofitting problems downstream and in assuring that VLT once built will carry the science it is supposed to do. Such analysis will affect the requirements we place on instrumentation builders and on software developers. The starting point of this understanding has to be the scientific considerations developed under point 2 but they will have to be fully worked out in a realistic operational setting.
- (6) To progress in the VLTI part of the project, the programme will have to be given more means, more independence, more accountability and more emphasis. The total staff (3) now involved in this aspect of VLT must be increased to reduce the current slippage in the necessary studies and procurement actions. Recognizable scientific leadership is essential in this programme.
- (7) Manpower resources will have to be increased in critical areas. Without adequate in-house staff the VLT programme cannot be accomplished. It is my belief that the necessary staff increases in the areas that are critical can be accomplished without increasing substantially either the run-out cost of the programme or the yearly budget of ESO.

It is difficult at this late date in the programme to fundamentally change the design of VLT or substantially change its scope. Furthermore, I firmly believe that the current programme con-

sisting of an integrated VLT, VLTI and associated laboratories, shops and facilities should be conceived as a single entity whose realization as a whole will place us in a competitive position with respect to other large telescope projects. Although we have examined possible cuts to the programme, we find them to yield quite small financial returns at a disproportionate scientific cost.

The alternate plan we have developed is aimed to carry out the full VLT programme as currently conceived, including a number of necessary activities which were neglected in the original plan but which are essential. It is in my opinion reasonably robust with respect to technical risks, manpower estimates and schedules.

3. Other ESO Activities

I have not yet been able to review in similar detail all other ESO activities although I have formed some opinions on them through visits, in-house reviews, discussions with consultants, etc.

3.1 La Silla Activities

It is quite clear that La Silla will remain for the many years before the advent of VLT the only substantial ground-based astronomical facility available to many European astronomers.

Furthermore, even after the advent of VLT there are a number of programmes which could and should be done on smaller telescopes of the 3–4-metre class. It is not at all obvious that transporting these telescopes to Paranal would be either financially, operationally, logistically or scientifically advantageous. Thus I think one cannot consider for the next several years (or possibly next decade) that La Silla could or should be shut down. Once this is understood there remains the issue of the scope of the work that should be carried out there.

The variety of different facilities, telescopes, modes of operations, developmental programmes, collaborative programmes, remote observing, and service programmes which are being carried out in addition to the basic operations of the major facilities is bewildering and constitutes a fragmentation of effort without a clear idea of priorities. The effort of the working group on “La Silla scientific priorities” chaired by Johannes Andersen will provide important suggestions in this respect.

This effort will be important to improve the quality of work at La Silla and is absolutely essential to permit us to carry out those activities which will allow

us to recruit and train the staff required to operate effectively the VLT.

To achieve these goals it is difficult to see how the level of personnel and expenditure at La Silla can be reduced in the foreseeable future.

3.2 Scientific Staff

I have mentioned in several instances the apparent lack of scientific input in several of the most important activities of ESO. This may be in part due to a policy of separation between the Science Division and the VLT project and the La Silla Operations.

I hold the view that an enterprise such as VLT cannot be done without the enthusiastic commitment of a first-rate scientific staff. My concept is that all astronomers at ESO should be required to both do service and carry out their own research. A review of each scientist commitment to service has been under-

taken and it is clear that little more can be squeezed out of the current staff complement. I therefore believe that a vigorous campaign to attract and retain first-rate scientists is essential. Furthermore, the very mechanisms for hiring and promotions must be rearranged in order to give the scientists as a whole a feeling of involvement and responsibility in the improvement of the situation.

I have started treating the scientists as a faculty and I will insist that they take on the task of self-improvement. This could be very greatly aided by the creation of a Visiting Committee of distinguished scientists from both within and outside ESO member states to examine the overall scientific health of the organization. Council has in principle approved this concept.

I also believe that it is important to more deeply and broadly engage the European astronomical community in planning the scientific programme to be

carried out by VLT/VLTI. This is necessary to more clearly focus ESO's priorities in the many trade-offs which occur during the development phase of the programme and to permit the efficient scientific use of the facility during operations.

4. Final Remarks

In my report to Council, I also included a very provisional assessment of the need to achieve optimal operations at La Silla and Paranal. We are now looking into a number of approaches to achieve this result and will be guided by the La Silla priorities' study. At the same time, I am taking steps to change the pyramidal managerial structure which I have found at ESO and which I consider unsuited to carry out the variety of complex activities which ESO has undertaken.

Relations Between the Republic of Chile and ESO

In 1963, the Government of the Republic of Chile and ESO concluded a Treaty (Spanish: Convenio) which has formed the basis for the formal relationship between the signatories during the past three decades.

Recently, two issues were raised by the Chilean side which implied important changes in the established Treaty relations between ESO and the Republic of Chile. The first concerned the access of Chilean astronomers to ESO facilities at this organization's astronomical observatory and the second the question of labour relations between ESO and its employees of Chilean nationality.

In 1992/1993, a joint Chile/ESO Committee with representatives from the Chilean Ministry of Foreign Affairs on one side and the ESO Executive and Council on the other side was constituted to look into these matters. The joint Committee met in Santiago de Chile on April 19 and 20, 1993. During these negotiations, ESO proposed that the Republic of Chile might become a full member of the organization. Both sides emphasized the efficient and mutually respectful interaction during the past 30 years and their wish to achieve an acceptable solution which would ensure ESO's continued activities in the Republic of Chile.

Later in April, the Chamber of Deputies (one of the chambers of the Chilean Parliament; the other is the Senate) adopted a resolution formulated by the Commission for Foreign Affairs of the Chamber of Deputies, which

formally requested the Government of Chile to re-negotiate the 1963 Treaty with ESO and also mentioned the possibility that the Chilean Government could make use of its right to revoke this Treaty.

ESO was preoccupied by this development after thirty years of smooth collaboration with the Chilean Government and the Chilean astronomical community, taking also into account its considerable investment in Chile. The revocation of a host state agreement with an international organization would have constituted an extreme precedent in international cooperation between states and international organizations.

During the recent meeting of the ESO Council in Florence on June 2-3, 1993, the relations between ESO and Chile were thoroughly discussed. Council also gave specific instructions concerning the various aspects of the future scientific and technological cooperation to the high-level ESO delegation which participated in the next meeting of the joint Committee, which took place in Santiago de Chile from June 18 to 22. As a result of this meeting, a Joint Press Release by the Ministry of Foreign Affairs of the Republic of Chile and the European Southern Observatory, was issued in Chile on June 23, 1993 (Spanish text) and from the ESO Headquarters (Germany) on June 24, 1993 (English text). The English text of this Press Release is given hereafter.

The Editor