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2nd Report of the Visiting Committee of the Osservatorio Astronomico di Capodimonte

Second Report of the Visiting Committee on the Osservatorio Astronomico di Capodimonte

October 2002

1. Background

This report has been prepared by the Visiting Committee to the Osservatorio Astronomico di Capodimonte (OAC). This independent Committee is charged by the Director of the OAC, Massimo Capaccioli, to examine the scientific programs, instrumental projects, research development areas and organisational structure of the observatory and to produce recommendations in each of these areas. The Committee first met in January 2000, and at that time provided an initial set of recommendations (which in this report are referred to by their number in the initial report). However, given that nearly three years had elapsed since its first meeting, and bearing in mind that the intervening period had seen the introduction of INAF and the re-appointment of the Director within this integrated national framework, it was deemed an appropriate time to evaluate progress against the recommendations of the initial report of the Visiting Committee, and to review the strategic directions of the OAC as a whole.

The Committee met over three days (September 30 - October 2, 2002). It was Chaired by Prof. Lodewijk Woltjer (Obs. Haute Provence, France). The other members of the Committee are Prof. Michael Dopita (Research School of Astronomy and Astrophysics, The Australian National University), Prof. Gustav Tamman (University of Basel, Switzerland) and Prof. Massimo Tarenghi (European Southern Observatory, Germany), who was unable to attend this meeting. New recommendations in this report will be referred to by letter so as to avoid confusion with recommendations from the initial report.

2. Introduction

Our initial report noted the important role of the current Director of the OAC, Massimo Capaccioli, in transforming the observatory into a dynamic centre of astrophysical research and modern technology, his success in reaching out and engaging the support of the local community, and in developing a centre of astronomical excellence in the hitherto undeveloped south of Italy by engaging the OAC in major international instrumental development programs, notably the VST and the VIRMOS projects in cooperation with the European Southern Observatory, instrumentation related to the 3.5m *Telescopio Nazionale Galileo* and space missions such as ROSETTA and the Mars Express. Over the past two years, in the face of an increasingly difficult financial situation, and changing government priorities, it is remarkable that staff numbers have not only been maintained, but even increased in some areas. The staffing structural problems referred to in our previous report have been aggressively tackled. The computing facilities have been notably improved. Student numbers have been increased, and students are now better supported. Scientific productivity has been maintained, and the technological program remains a flagship capability of the OAC.

In general, the Visitor Committee is very well pleased with the progress that has occurred measured against most the goals it set three years ago. We now review this progress in detail.

The effective horizon of all these missions is 2007, and the space instrumentation group should carefully review its strategy and objectives for the period beyond in order to find a way of remaining competitive, capitalizing on existing strengths, while at the same time progressing into new areas of excellence. A more effective collaboration with, and integration into, the scientific life of the other parts of the OAC might well assist in this transition.

6.2. The Technology Group

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The technology group remains a key strength of the OAC, and it provides a essential centre for technical training in the Naples area. The Technology Group is well-led, motivated and appropriately skilled and attention to Program Management is a notable strength of the group. It has a large group of young technicians who are on contract. The formation by Prof. Mancini of a technical "Foundation" with strong industrial links certainly helps diffuse the technical expertise of his group to the region as well as providing a means of independent funding which sustains the group through periods of uncertain funding of astronomical projects. The group currently benefits from major ESO contracts associated with the VST, VIRMOS and OMEGACAM. In our last report we were motivated by a concern that the group was overstretched to formulate the following recommendations:

Recommendation 7: That the Technology Group undertake no new projects until (at a minimum) the TTI, VST and VIRMOS instruments have been both completed and successfully commissioned.

Recommendation 8: That, in the event of a conflict for resources within the OAC, the VST, VIRMOS and ESA related projects have absolute priority.

Recommendation 9: That future instrumental projects for the TTI be carefully evaluated and undertaken only if there are no other pressing projects requiring resources.

We are pleased to note that these recommendations have guided the priorities of the group over the past two years, ensuring the successful commissioning of the VIRMOS instrument, recently completed. On the VST, the OAC kept to its schedule in an exemplary way, and the Visiting Committee sees no reason why it would not have been completed according to the original schedule, had the primary mirror not been destroyed while being shipped under ESO control to Paranal. The Visiting Committee emphasises that absolutely no blame can be attached to the OAC for this disaster, and that the setting up of a new contract for the primary mirror has been conducted by the OAC in a very professional manner. However, the Committee is concerned that the inevitable delay in the acquisition of a new mirror may affect the morale and the drive of those working on the mechanical aspects of the VST. It is vitally important that the schedule for the integration of the structure, acceptance testing by ESO and shipping and erection at Paranal be maintained, as the performance against this schedule will reflect directly upon the OAC when it comes to choosing contractors on new ESO projects.

The enthusiasm of the mechanical contractor concerned with integration of the VST, Mecsud, is remarkable, and demonstrates the great importance of such projects to the social and the economic life of the Naples area (note our Recommendation A, above).

Over the next few months, the relatively small geographical separation between the VST

integration effort at Scafati and the TT1 project at Castelgrande should allow time-effective allocation of staff resources between these two projects. It therefore seems an appropriate time to commission the TT1 (which was delayed in accordance with our Recommendations 8 and 9 from our previous report, given above). However, it must be recognised that the VST integration continues to have absolute priority. In any case, the TT1 telescope needs to be completed within a year so that it can become useful for the research projects planned for it, and as a training instrument for the increasing numbers of students. The instruments which have been built for the TT1 telescope, the spectrograph and the imager, are seen by the Committee as adequate for this telescope for the foreseeable future and therefore no new instruments should be planned or built for this telescope.

For the future, the Committee sees it as very important that the Technology Group become involved with instruments for the Large Binocular Telescope (LBT), since this is the most important ground-based project that Italy is currently engaged upon. The Technology group should work with OAC astronomers in this regard, but ensure that this engagement does not delay the completion of the projects which the group is already engaged in.

6.3. The Galactic Physics Group

In our previous report we noted that the Galactic Physics group suffered from the lack of a senior staff member who is an expert in the areas of cosmology, large scale structure, and the formation of galaxies, and this led to our *Recommendation 10: That the Astronomo Ordinario who is selected for the Galactic Physics area be given the responsibility of developing clear science goals for the OAC imaging science programs in the areas of cosmology, large scale structure, and the formation of galaxies.* The appointment of Cappellaro, with his interest in intermediate redshift supernovae, has assisted in this regard, and it is clear that the group as a whole is now prepared to take effective advantage of the VST survey. The data reduction programs developed for the Capodimonte Deep Field and the VST data reduction pipeline are impressive, and we see a maturing of the science drivers for this activity at OAC, which is very pleasing.

The research on the evolution of the fundamental plane of galaxies is a good example of systematic study that will further our knowledge on the evolution of galaxies in general, while the Planetary Nebular spectrograph is fulfilling an excellent specialist niche in discovering extragalactic planetary nebulae, studying the distribution of dark matter, and evaluating the importance of tidal stripping in elliptical galaxies. The serendipitous discovery of high redshift Lyman-Alpha emitters and the population of cluster field PNe are also important results. These projects will enable OAC researchers to fully exploit the VIRMOS instrument.

In this group, the staff attrition has been very severe, with the loss of three researchers in the last two years. This challenges the viability of the group in the long term, and this represents part of the basis for our Recommendation B, above.

6.4. The Stellar Group

The group continues to make progress on work on Cepheid variables, young stellar objects and cataclysmic binaries. The identification of the first pre-main sequence eclipsing binary has been a