

# TELESCOPES AND INSTRUMENTATION

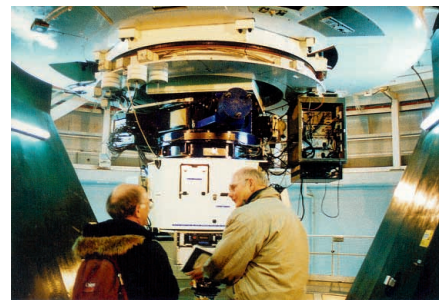
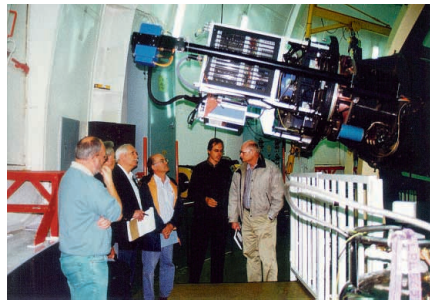
## An International Review of ING

René G. M. Rutten (Director, ING)

As technology and organisation of ground based astronomical enterprise rapidly develops, existing facilities are required to revisit the role they play. The competitive nature of astronomical research implies a continuous development and re-assessment of existing telescopes and their instrumentation. The ING is no exception to this.

The volume, quality and impact of science carried out with the ING telescopes is known to be very high by international standards, which is now well documented. But with an eye on what is coming, a plan for the future role of the telescopes, and in particular that of the William Herschel Telescope, must be developed and assessed.

Over the last few years gradually a strategy for the future use and further development of the ING telescopes has emerged. At the same time it has become clear that the finance available for the operation and development of the ING telescopes will decrease. These key changes prompted the ING Board to set up an independent international review panel to provide a perspective on the ING's likely scientific programme over the next 5–10 years. The panel was asked to specifically look at the likely astronomical prospects for the ING in the era of 8-m class telescopes, to provide an assessment of options to ensure that the facility meets the strategic needs of the UK and NL astronomical communities, to comment on options for development of the facilities, their mode of operation, time allocation and support, and to advise on the ideas on the long term future of the ING. The review panel was also asked to assess progress made since the previous international review which took place in 1998.



*Pictures taken during the visit of the review panel to the observatory.*

The review panel consisted of Prof Kenneth Freeman (Chairman; Australian National University), Prof Bruce Carney (University of North Carolina), Prof Holland Ford (Johns Hopkins University and Space Telescope Science Institute), and Prof Guy Monnet (European Southern Observatory). Before coming to La Palma they met with members of the user community, with representatives from the Instrumentation Working Group, and with officials from the funding agencies and the IAC. The community was also invited to present their views in writing, and many emails were received.

The Executive Summary of the report is printed below. The ING Board discussed the report extensively and provided an official response, which is also reproduced below.

From the perspective of the ING it is heartening to see strong recognition for the changes and hard work of the past years, and it is also reassuring to learn

of the broad support for our plans for the future. I am indebted for the hard work that the review panel put into this review.

The review report has already led to significant activity, much of which directly involved the ING Board. Most importantly, talks with representatives from the funding agencies and the IAC have led to a clearer vision on the future prospects for the ING. Furthermore, talks between the ING and the IAC, the Italian National Telescope Galileo, the Calar Alto Observatory, and the Canada-France-Hawaii Telescope on prospects for close collaboration have been initiated. Some of these initiatives may well form the basis for future collaborations on a wider European scale, such as those being proposed by the OPTICON working group or as part of the European Northern Observatory.

Clearly we live in a time of change, but ING is in a very good position to take profit of these changing winds.

## EXECUTIVE SUMMARY OF THE ING VISITING GROUP REPORT

### 1. INTRODUCTION

The ING Director and his staff have been outstandingly successful in restructuring the management and operations of the ING. The ING has made a very satisfactory response to the recommendations in the Cannon Report that are under its control.

The ING staff have a strong and clear vision for the future of the ING. They are planning for a WHT instrumentation future that concentrates on the high quality of the site and the wide field capabilities of the telescope. The VG concurs with this vision, and recommends that the ING establish a director's advisory committee which would (i) help spread the vision to the user communities and (ii) provide a stronger partnership between the ING and the broader communities.

### 2. SCIENTIFIC USE AND COMPETITIVENESS OF ING

By all scientific measures, the WHT is a well managed, highly productive and competitive telescope on an excellent site, and ranks among the top two 4-m class telescopes in the world. The INT is well ranked among the world's 2-m class telescopes, in terms of impact and productivity.

### 3. ASTRONOMICAL PROSPECTS FOR ING IN 8-M ERA

In the 8-m era, telescopes in the 2- to 4-m class have excellent prospects for general user frontline science that is well matched to their medium aperture and large field. The ING should make the most of the opportunities provided by the excellent site, the wide field of the WHT, and the flexibility of its operations system. The VG strongly endorses the ING proposal to concentrate on adaptive optics, wide-field multi-object spectroscopy, and frontline specialised visitor instruments for the future (see section 4 of the main report). A prerequisite is that adequate funding is retained.

### 4. OPTIONS FOR DEVELOPMENT OF FACILITIES

The VG endorses the proposed rationalisation of instruments, with basically one instrument per focus and enough flexibility to implement queue observing.

(i) ISIS is a low maintenance and highly productive workhorse instrument that is much in demand and should be retained till the end of agreement.

(ii) A high resolution spectrograph is valued by both the UK and NL communities. We recommend that the ING negotiates with the TNG for the use of its SARG spectrograph, or continue the use of UES at the WHT as a very low maintenance fiber-fed facility.

(iii) AUTOFIB/WYFFOS with the current upgrades will be competitive for at least the next 4 years. The input of the ING project staff is critical to the success of this overall project.

(iv) The VG is enthusiastic about the role of AO in the future of the WHT, but urges a clear and fast path to a science-driven facility. Specifically, the main staple in the short term should be visible IFU spectroscopy with TEIFU/OASIS. Near-IR AO imaging with INGRID/NAOMI is a welcome addition. The VG sees this AO development as exciting but not without risk. Consequently, we recommend an expert review of AO at the WHT to be conducted right after the NAOMI commissioning runs in 2001A. We propose that Dr Guy Monnet should identify an appropriate group of experts and chair this review.

(v) A modest wide field imaging capability should be retained at the INT. Alternatively, it may be preferable for the ING to negotiate with the CFHT for use of its forthcoming 1 square degree facility, with reciprocal access to AUTOFIB.

(vi) Queue observing in service mode will be essential in the AO era, because of unpredictable sky conditions. Some innovative approaches to personnel resources will be needed to cope with the costs of queue observing.

(vii) The ING appears well-prepared for remote observing from the sea-level facility. This should be a goal for the future, and makes sense in the context of a coordinated La Palma Observatory at sea-level.

(viii) The relationship between scientific impact and the grades of proposals in the time allocation process should be seriously evaluated. The time allocation process will need to adapt, to handle large projects and queue scheduling in a tight budget situation.

## 5. ASSESSING THE OPTIONS

The VG believes that the challenges of continued internal project work are essential for the future success of the ING. The ratio of operations to development activities should be maintained at the present level, even with a diminished budget.

The IAC is building a new sea-level facility to be shared with other users of the ORM. We believe that the ING sharing in this new facility offers many opportunities for scientific and technical synergy and financial saving.

The WHT is a great asset, and its loss would be a real setback for the astronomical communities, especially in terms of access to the Northern sky. The VG favors the Director's model A with continued development and enhancement of the WHT given top priority over keeping the smaller telescopes open. It sees this model as a framework for continuing the highly successful operation of the WHT with reduced funding. The ING and ING Board should have the flexibility to sell time on the smaller telescopes if demand for them from the UK and NL communities ramps down in the future.

The Director's strongly reduced model B is seen as incompatible with adaptive optics implementation and serious in-house developments. The VG believes that it would lead to demotivation of the staff, followed by growing non-competitiveness, and would very likely lead to the closure of the facility by mid-decade.

## 6. THE LONG-TERM FUTURE

The ING should actively foster co-operation between the ING and IAC, and the other users of the ORM. The long-term goal, by the end of the agreement, should be a negotiated and collaborative integration of the ING within an umbrella that includes the IAC and many other users of the ORM, based in a common sea-level facility. The VG urges the ING and its parent agencies PPARC and NWO to take a prompt and proactive role in bringing about this integration.

The primary scientific goal here would be access to the GTC for the UK and NL communities, in exchange for instrumental input and access to the smaller telescopes. Operational savings would also be likely.

## **ING BOARD RESPONSE TO THE REPORT OF THE INTERNATIONAL REVIEW OF THE ISAAC NEWTON GROUP OF TELESCOPES, APRIL 2001**

### 1. INTRODUCTION

The Board welcomes and accepts the Review Report. It is very pleased to have independent, international and in-depth confirmation of the high quality of the ING facilities, of the very high quality of the staff who operate them, and of the appropriateness of the strategic direction which has been evolving in the Board's policies.

### 2. SCIENTIFIC USE AND COMPETITIVENESS OF ING

The Board welcomes and affirms the Review's assessment of the excellent scientific record of the ING, which has led the field in a number of high priority science areas. The WHT is considered to be one of the two top 4-m class telescopes in the world. This is in part due to the excellence of the site, telescopes and reliability of the instruments, but also due to the dedication of the staff who support the science programme. The Board approves the moves that have been made since the closure of the RGO, noting that this has led to a better integration of the programme for improvements with the operation of the telescopes and a focussed and successful development programme. Additionally, for many La Palma staff this has led to better quality work and greater involvement in the development of the facilities, creating an increased sense of ownership. The Board is happy to echo the praise that the Report gives to the Director and senior management of the ING for their role in this transition.

### 3. ASTRONOMICAL PROSPECTS FOR THE ING IN THE 8-m ERA

The Board is convinced, in line with the Report, that the ING has a very important role to play in key science areas for at least the next decade, notably in support of the 8-m class telescopes but also in providing capabilities or modes of operation which the 8-m telescopes are unlikely to be able to offer. These include exploitation of the wide field of view of the WHT, and development of AO assisted high-resolution imaging and spectroscopy in the optical (NAOMI+OASIS). Other exploitable assets include geographic position (in the Northern hemisphere and in Europe). However, in order to retain the ING's world-leading position, the Board accepts that further changes will be necessary and it is working actively with the senior management and staff of the ING in developing a reasoned and well-planned strategy for the future. The Board notes that the recently agreed plans for accession of the UK to the European Southern Observatory

has brought these issues to a focus for the UK. The Board is keen to reassure staff that they will be properly consulted and informed during the coming months as the plans for the ING future develop further.

The Board strongly endorses the Report's recommendation to set up a Director's advisory group. This would provide an improved link between the ING management and the user community and ensure that priorities are consistent with the aspirations of the community. The Board has asked the Director to develop terms of reference for this advisory group and to propose a membership, which should include representation from the UK, the Netherlands and Spain, together with independent members with broad international experience. It expects the new body, replacing and incorporating the ING Instrumentation Working Group, to be in place and to have met before the next meeting of the Board.

#### 4. OPTIONS FOR DEVELOPMENT OF FACILITIES

The Board is pleased that the Report supports the Board's policy by its endorsement of the proposed rationalisation of instruments, with basically one instrument per focus and enough flexibility to implement queue observing. It agrees with the suggestion that for the WHT this suite include ISIS and AUTOFIB/WYFFOS, as well as AO assisted integral-field spectroscopy (NAOMI+OASIS), and access to a high-resolution spectrograph (possibly through collaboration with other telescopes), and that the INT retains a modest wide-field imaging capability. The Board encourages the Director in his discussions with the Directors of other facilities, and through OPTICON (the EU-funded Network in Optical/IR Astronomy), with regard to sharing of instrument capability.

The Review points out that one of the unique features of the WHT is its ability to receive newly developed (visitor) instruments, and highlighted the success of instruments such as SAURON. The Board agrees that it is of key importance for the ING to continue to provide a flexible approach to support of visitor instruments which rapidly exploit exciting and novel niche areas. Since Adaptive Optics is expected to be a major driver for the future of ground-based astronomy, the Review recommended that an expert group be set up to consider the possibilities for AO on the WHT in more depth. The Board endorses this recommendation and has asked the Director to take this forward in a timely manner, so that the review can take place immediately after the next NAOMI commissioning run in June 2001.

The Review emphasised the need to retain the ability for staff to undertake project-related work in order to provide interest in the future of the facilities and to foster good morale and quality employment. The Board endorses this requirement to maintain a high quality operational capability and agrees to try to ensure that there remains sufficient flexibility within the ING budget, even if decreased, to allow the process of upgrading and developing systems and instruments to be continued.

The Board welcomes the encouragement by the Review to move to queue observing in order to increase the observing efficiency and to maximally exploit periods of excellent seeing. It has asked the Director to develop a proposal to do so, but notes, as the VLT experience is showing, that this move would not be without cost to the ING. It expects that the Funding Agencies will use savings and efficiencies in cost of travel to the Observatory in helping to reduce the direct cost to the ING.

The Board has considered the arguments for simplifying the time allocation procedures, noting that there had been a single UK/NL Time Allocation Committee (TAC) up to the early nineties and accepting that the multi-TAC approach was not optimal. It believes that the present system has been proven to work, with reservations about the arrangements for International Time, and senses that it would not be easy to change the opinions of the user communities. However, given the changes that are likely to occur in the way in which the telescopes are operated and the type of programme supported, the proposal to change the time allocation system should be reviewed in the medium term. The Board is also aware of an OPTICON proposal to establish a common pool of telescope time with a European-wide TAC. If the ING agrees to contribute to this pool with the International Time or more, then at least some proportion of ING time would be allocated by this unified European TAC.

#### 5. ASSESSING THE OPTIONS

The Review accepted that, because of scientific advances such as the completion of larger telescopes, the financial climate within which the ING would be operating in the coming years would be less favourable than in the past and that savings would need to be made. Considering the scientific prospects for the facility and the likely needs of the community, it recommended that the Board seek to move by 2005, for a period beyond the formal expiry date of the International Agreements in 2009, to a model of operations described by the Director as model A, i.e., one that

- rationalised the instrumentation suite for the WHT,
- maintained the INT with a single instrument and minimal support,
- continued the JKT only at no cost to the UK/NL,
- expanded the capability for service and queue observing,
- minimised overheads where possible but
- retained the ability to support specific enhancement and development for the WHT.

Continued development and enhancement of the WHT should be given priority over keeping the smaller telescopes open.

The Board endorses the Review's recommendation but notes that the savings required by the UK by 2005 are greater than those which such a model might deliver. However, it is convinced that there is a very real opportunity to develop the ING through greater collaboration with Spain, which would include a larger share of the observing time in return for Spanish contributions to operations and support. The Board welcomes the IAC's open approach to this possibility, which would provide a high quality ING while satisfying the interests of all parties. The Board recognises that this will have to be a staged process, building on common ground and shared goals but felt that the benefits could be considerable for both parties. Accordingly, it has asked the Chair to discuss this possibility with the IAC and the funding agencies.

The Review and the Board offered strong support to shared participation in the IAC's proposed La Palma sea level centre (CCALP). This could act as a focus for scientific and technical collaborations not only with the GTC/IAC but also with other partners in the ORM. The Board and ING management is under no illusions that realising the full potential of co-location will be easy, but agrees that, assuming the basis for the ING locating its sea level operations at CCALP can be agreed, efforts should be made to foster natural affinities and shared facilities. The Board has asked the Director ING to consider options for remote observing from sea level, noting that the GTC was also considering this as a mode of operation.

The Review recommended that a working group, at the level of managers and scientists, be set up to explore how to progress this collaboration further. The Board has asked the Director ING to take steps to set up this group, bearing in mind the progress of discussions at Funding Agency/ING Board chair level.

At the same time the Board encourages the Director to further pursue his discussions with other potential partners who have expressed interest in collaboration with the ING where the benefits to the ING community could be clearly demonstrated in terms of science capability.

The Board is determined to make every effort to ensure that the new model of support and operations will be at a level in keeping with the needs and priorities of the majority of the user community. It recommends that the Director implements a plan to reduce the operation of the ING facilities to be consistent with model A by 2005. This will allow the retention of the balance between operation and development and allow the prospect for planning significant developments in due course. Many of the components of this plan are already within the Director's strategic plan for the facility and some have already been applied.

The Board agrees with the Report that reducing operations beyond that proposed within model A is incompatible with the long-term viability of the facility. Further reductions will not allow further development of the WHT and will, by default, lead to a steady decline in effectiveness and the ING's ability to recruit and retain high quality staff, leading to early closure before, if not in, 2009. The Board does not believe that this is in line with the needs of the UK, Netherlands or Spanish communities and firmly rejects it as a possible model.

## 6. THE LONG-TERM FUTURE

There is much work to be done to realign the short-term future of the ING with the likely resources to which it will have access, the changing needs of its user community, and to take advantage of the opportunities offered by working more closely with its partners in the ORM and elsewhere. The Board strongly believes that the ING can play a key role in the strategic needs of its three partners, that it will continue to deliver world-class science and that it has the potential to develop as a model for wider European collaboration. It has confidence that, working with the Director and staff, these challenges can and will be met.

## 7. THANKS

The Board offers its thanks to Professor Freeman and the Review Panel and to the Director and his staff for their support. □