Report of the Third Gemini Visiting Committee

28 Oct. 2008

1. Preamble/Introduction

The charge to the Gemini Visiting Committee (GVC) is to provide an evaluation of the scientific productivity, management, performance, and staff vitality of the Gemini Observatory as a scientific enterprise. The GVC met over three days from Sep. 23-25 with the Gemini Midterm Management Review Committee, and met for one day on Sep. 26 to summarize our findings.

On the first day we heard presentations from members of the Gemini staff (Doug Simons, Jean-René Roy, Inger Jørgensen, Dennis Crabtree, Joe Jensen, Gustavo Arriagada, Ron McKinnon, Peter Michaud) and from AURA (William Smith). On the second day we had additional presentations from the Gemini staff (Doug Simons, Jean-René Roy) and we visited the Gemini and Subaru telescopes at Mauna Kea. On the third day we conducted private discussions with staff at both sites. All staff members were given the opportunity to speak with us privately and five of them requested interviews. We also had discussions with the National Gemini Offices (NGOs) for the US, the UK, and Canada, and we had private discussions with members of the Gemini staff at our request.

Our findings are described in Sections 2 to 9 and follow the charge given to the GVC. ***Overall the GVC is impressed with the work of the observatory. It is a very complex operation, with a large number of instruments spread over two widely-separated sites, and its success is a testament to its many highly skilled and motivated staff members.***

Our recommendations fall into three main areas:

1. The level of community satisfaction with Gemini needs to be improved. The decrease in oversubscription might be related to perceived as well as real deficiencies in instrumentation, high-level data reduction software, lack of data delivery after preparing the Phase II work, and a cumbersome TAC process. The GVC feels that this is a matter that should not be allowed to continue and recommendations are given in the following sections.

2. The "science culture" within Gemini needs to be more nurturing and beneficial in allowing career development for the scientific staff. A more natural method of blocking out science time is needed to avoid constant interruptions. A program of visiting scientists and seminar presentations should be developed and a system of mentoring introduced. We endorse

the idea of having different negotiated levels of time committed to research for different staff since individual needs and abilities differ greatly.

3. The GVC saw evidence for a cultural divide within the Observatory – some staff are clearly uncomfortable with the current management approach. Gemini has not yet completely transformed from the commissioning stage to routine operations, and while this may be part of the problem it is not the entire issue. The steps being taken by Gemini top management seem appropriate but communications up and down the organization are still evolving and need to be strengthened. We endorse the movement toward more planning as resources are limited. However, priorities need to be set in a more transparent way that includes input from all levels and thus more "ownership" of the results.

2. Stature as a Scientific Enterprise

The GVC was pleased to see that Doug Simons and his management team have implemented many of the recommendations of the 2006 GVC report and have gone beyond them in some cases. The GVC notes the priority put on managing safety, filling the top positions, reducing workload to a sustainable level, better management of engineering resources, and addressing morale issues among the staff. Gemini has turned the corner in completing commissioning of two world-class telescopes and moving fully into operations. Both telescopes have a full set of instruments and have continued to push development of unique adaptive optics (AO) capability. We find that Gemini has achieved scientific productivity and impact that are comparable with other 8-10 m class telescopes. The staff of the Gemini Observatory are congratulated on their achievements to date.

An analysis of observatory productivity produced by Crabtree shows that the numbers of Gemini papers produced and their citations have nearly reached parity with Subaru, VLT, and Keck. VLT is most productive in the number of papers per telescope while Keck papers tend to have higher impact. Gemini is leading the world at the present time with thermal infrared instrumentation, queue-based operations, and target-of-opportunity programs. It is on the verge of exploiting the capabilities of NICI and Flamingos-2, and in the near future there will be the unique capabilities of MCAO. Overall, this indicates that Gemini has reached a mature state of development and is starting to achieve excellent scientific productivity.

There are near-term challenges, however. These include:

- The dramatic reduction in oversubscription is worrying. There appear to be multiple causes of user dissatisfaction. The causes and possible solutions are discussed in Sections 4 and 8.

- Recruitment of scientific staff continues to be a problem. A main reason for not accepting a position at Gemini is the lack of science time and an in-house scientific culture that needs improvement (see Section 4). The shortage in scientific staff in turn leads to difficulties in keeping up with the required work while providing adequate science time. Thus it is a self-perpetuating cycle that is difficult to overcome and leads to loss of morale.

- There are some potential concerns about maintaining staff morale while fundamental changes are being made to the "corporate culture". These important changes are being promoted through a training course and efforts of the top management but more time is needed to know if these efforts will bear fruit in terms of higher morale, more effective teamwork, and better planning (see Section 6). It would be helpful for Gemini to have an ombudsman as part of its established management procedures, to hear the concerns of the staff and to bring them anonymously to the attention of top management.

- Current staffing levels may not be sufficient to truly maintain the available instruments and to develop the appropriate high-level software for data reduction (see Section 5 and 7). A quantitative analysis is required, and work priorities should be based on this analysis (as currently planned by the Gemini top management).

3. Stature as a Technology Development Center

The Review Committee was pleased to note evident signs of maturity in the Observatory's contributions to a number of important technological developments that will have an impact in the wider astronomical community. There are strong examples of technological leadership in several key areas, including adaptive optics/MCAO, GLAO, MEMS DM development, and laser development for LGS applications. We commend the Observatory for their appropriate commitment of expertise and resources to these important areas.

The Committee was particularly pleased to record strong signs of a mature and effective queue observing process, where significant operational accomplishments and general streamlining have been realized. Notwithstanding the concerns expressed elsewhere in this report (see Section 5 regarding improvements to the queue, especially the concept of guaranteeing data for all bands), the communities have proven themselves largely receptive to the principles, and appreciative of the benefits, of queue observing. The Committee is pleased to note that the Observatory staff have developed a well-understood and managed queue process, which maximizes efficiencies through its responsiveness to changing conditions and ability to take advantage of the facility for rapid instrument changes. The system seems now to be clearly defined and operating relatively smoothly, after a challenging 'learning curve'. We particularly commend the observatory for the evident

flexibility with which important Targets of Opportunity can be introduced for the greater benefit of the astronomical research community.

In the absence of direct comparators from other institutions, it is difficult to be definitive, but the Committee's impression is that the technical and administrative staff of the Observatory are suitably engaged in international workshops and conferences, both as participants and in leadership roles, and in providing expertise to technical working groups and the like. The contributions of technical staff to important SPIE meetings seem particularly appropriate. The Review Committee also notes with pleasure recent strong developments in outreach and especially in safety. The individuals involved in these areas have shown commendable engagement with sister institutions, and seem poised to step into leadership roles in the broader astronomical community.

4. Scientific Productivity

The Observatory is clearly functioning as a world-class organization. The science highlights provide the excitement and innovation that one would expect for such a leading facility. The widely internationally-reported imaging of a self-luminous Jovian planet provided a timely illustration of the strength of Gemini's science, and a foretaste of the potential from adaptive optics, an area to which the Observatory is strongly committed. The highly-cited work on gamma-ray bursts and supernovae illustrates another of Gemini's great strengths, whereby its ready instrument complement and world-leading queue scheduling allows it to respond very rapidly to such targets of opportunity. ***With further developments in these areas and new instruments like GPI coming on line, the Observatory should have a rich future in producing world-leading science.***

A further positive indicator comes from noting that the output from the different partners, in terms of their first-author publications, is roughly equal across the board. This metric provides some confidence that Gemini is operating effectively as an international observatory, with all partners able to make effective use of the facilities. It is also notable that the resulting papers have a relatively high median citation rate when compared to the output of other comparable facilities, implying that the quality of science that the Gemini partners are producing is also high.

However, there do remain some significant areas of concern. After allowing for the different ages of the various large telescopes, the number of refereed publications per Gemini telescope is comparable to the figures for Keck and Subaru, but is clearly below that for the VLT. As a queue scheduled facility, one would expect productivity comparable to the VLT in the long term. In addition, it is notable that output from all these facilities continues to rise fairly linearly at least to the present day, so that, for example, Keck's refereed publication rate is currently approximately twice that of Gemini due to its earlier start, and if this linear increase continues then it will maintain the lead in perpetuity.

Although the greater output of the VLT can be partially attributed to the build-up of archival data and the long lead-time on some projects, there could well be other factors involved. For example, the absence of full pipeline processing software for Gemini data (similar to that provided for VLT instruments) may slow the conversion of observations into scientific results, or even mean that some data are never properly reduced for publication. Also the complex Gemini TAC processes appears to discourage large programs. **It would behoove the Observatory to identify the factors that limit publication rate and take appropriate steps to close the gap.**

In addition to concerns about the scientific productivity of the Observatory, there is a significant issue over the apparently declining number of applications for telescope time. Inter-observatory comparisons of over-subscription rates for telescopes are difficult to make because of the different way that "available time" can be calculated depending on the balance between classical and queue observing. However, Gemini's oversubscription rate has been falling quite rapidly, with pressure decreasing by almost a factor of two over the last three years. The consistent nature of this decline means that it cannot be attributed to single unforeseen events such as the demise of GNIRS, but must reflect a longer-term cause. Anecdotally, this decrease reflects a disengagement of the community from the Gemini facilities, driven by various disincentives to use the telescopes, such as the absence of adequate pipeline software for initial data reduction, and the onerous nature of Phase II preparations even for Band 3 proposals where the probability of obtaining useful data is low. Even Band 1 and 2 projects have significantly less than a 100% completion rate, which may serve to further discourage applicants. These hearts-and-minds issues can be challenging to turn around on a relatively short timescale. **We therefore recommend that the Observatory urgently study the likely causes, and consider appropriate steps to address them, such as the production of pipeline software to meet current users' expectations (see Section 5) or initiate discussions with the national TACs with a view to allocating rollover status to as many Band 1 and 2 programs as possible.**

Related to the relatively low and decreasing oversubscription rate is the small and decreasing amount of time requested in each application. The current average of less than 13 hours per application appears to reflect applicants' attempts to optimize their chances of getting some telescope time by trimming their proposals to an absolute minimum. It must also be affected by the multiple-jeopardy imposed on international collaborations that have to seek time separately through the individual national TACs for larger programs. Such small applications clearly do not make optimal use of the light-gathering capacity of a large telescope, and many could presumably be carried out with reasonable allocations of time on smaller facilities. **We recommend that Gemini work with the partner TACs to introduce strong incentives for larger applications, by, for example, allowing them a longer scientific case. We also recommend the introduction of "key programs" of larger allocations of telescope time, with only a single TAC assessing these applications. The new Gemini Agreement should consider whether the telescope time could be allocated by a single TAC, although the details of the**

single TAC rules would have to be negotiated to accommodate different partner needs.

The scientific staff are dedicated and work very hard for the Observatory. However, they are clearly over-committed in their work to help run the facilities to the detriment of their research. It is unreasonable to take on staff with a commitment to provide them with significant amounts of research time and then not fulfill that commitment. Such practices can have a long-term impact on the individuals' careers since their lack of productivity can render them non-competitive relative to their peers, preventing them from returning to "mainstream" academia; it is clearly in the Observatory's interests for such career progression to occur, in order to embed expertise in Gemini in the broader community. In addition, a reputation for not delivering on promised research time will compromise the Observatory's ability to recruit top-flight scientists.

It was recognized in our discussion with Gemini management that there are two types of science staff - the tenured, tenure-track and science fellows who nominally have fixed research allocations, and the 'scientists' where the research fraction is "up to" some percentage. The tenured, tenure-track and fellows should be using all of their research fraction whereas the 'scientists' ought to be able to agree infividually with management on their annual fraction - anywhere between 0 and the agreed maximum. **The Observatory needs to develop robust mechanisms to protect science time, particularly for the fixed-term science fellows.** This time should be a top-level item in the planning process, with a protected allocation of science time. Equally, the time should be accounted for properly in time management, and assessed quantitatively in the annual review process. This review process should then feed quantitatively into the next planning cycle in terms of the research time allocation for each staff member: the appropriate size of this allocation should be derived on an individual annual rolling basis, reflecting both the performance of the individual in the previous cycle and their aspirations for the coming year.

In addition to protecting research time, the Observatory needs to develop more of an internal culture of research, by instituting programs such as regular seminar series, informal staff science talks unrelated to Observatory operations, etc. Encouraging (and perhaps training) the more senior science staff to actively mentor the science activities of the science fellows would also help foster an improved scientific culture. We realize this is not an easy matter to effect change as it depends on "personal chemistry" among the staff and scientific leadership more than conventional management techniques, but nonetheless believe it to be vital for the long-term health of the Observatory

5. High Level Software

Gemini high-level software is used throughout the operations of the Observatory and it is apparent that improvements in this area have led to increased scientific productivity. For example, Gemini's ability to react very rapidly to Target-of-Opportunity calls is impressive and places Gemini ahead of its competitors. The successful operation of the queue, as measured by the substantial completion fraction for Band 1 proposals, is also a highlight, although there is still room for improvement. The efficiency of the queue has clearly been substantially improved by the availability of new queue planning tools, etc. **However, further opportunities for increased efficiency remain in this area through the provision of improved software to reduce the load on the queue coordinator and through better optimization of the queue filling process.**

No substantial complaints were brought to the attention of the GVC regarding the function or utility of the Phase-I Observing Tool (PIT) and the Phase-II Observing Tool (OT), the elements which often provide the first real interaction of a user with Gemini high-level software, and which are a basic part of the Gemini science operations. While the availability of more OT templates would be good, the current OT template library is quite extensive. **The GVC recommends that Gemini and the NGOs communicate more effectively the availability of templates (the ability to download templates is built into the current version of the OT)**.

The more general issue here relates to Band-3 programs: completing Phase-II for a program with the OT often requires a substantial commitment of time from the proposal applicants. If after this effort no data results because the Band-3 program is not started, the applicants can often feel their efforts have been wasted. There are a number of possible remedies: for example, better queue optimization and reducing the queue overfill. The likelihood of all accepted programs receiving data could be raised by increasing the rollover fraction. However, this is set by the individual partners TACs rather than Gemini or the ITAC, and so a coordinated policy would be required. Nevertheless, the GVC is very supportive of the Observatory's desire to maximize the fraction of accepted proposals receiving data, within the current band-based priority system.

Relative to ESO/VLT, Gemini is perceived as handicapped by the lack of a data reduction pipelines with which astronomers in the partner communities (and Gemini staff) can rapidly turn their raw Gemini data into scientifically useful information. In practice, Gemini does provide basic 'recipes' for data reduction through its Data Reduction Development software group, which maintains and extends the data reduction codes and scripts in the Gemini IRAF package. It was unclear to the GVC the extent to which the communities make use of these codes and their suitability for reducing observations that extend the capabilities of the instrument and the telescope to the limit. The Observatory's "Data Flow" project is designed to address the 'data reduction pipeline' issue, and while the aims of the project are laudable, the GVC is concerned about the delivery timescales for the project – new instruments are arriving on timescales shorter than the ~2010 date given for release of the pipelines for internal use in quality assessment, and no time

estimate was provided for an external release (Phase III). **The GVC recommends that Gemini assess whether the current resources for this project are distributed appropriately, whether they are well-coordinated, and whether they are sufficient to meet the project goals.** Until this project is completed, it is likely that Gemini's scientific productivity will be less than it might otherwise be.

Finally, there are also no apparent partner issues with the operation of the Gemini Science Archive, from the users' point-of-view. It is functioning satisfactorily.

6. Planning and Allocation of Resources

The Observatory has made major advances in this area since the GVC report. The new yearly planning process is an excellent development. Its implementation across the year is well managed through daily coordination meetings, weekly planning meetings and quarterly revisions, and the process seems robust and effective. The Project Insight software employed is effective in allowing a top-level view of where things stand, and in allowing one to tunnel down into the details of individual projects. The ease with which all staff can access this tool is an excellent practice. The only significant issue with the planning procedure concerns the upward communication from staff to inform the planning process. How they provide input seems to be left to their individual line managers, some of whom are more effective at soliciting it than others. **The Observatory should develop a robust procedure for ensuring that <u>all</u> staff have the opportunity to provide input to the planning process and comments on the annual plan once it has been formulated. Appropriate management training should also be undertaken if required.**

Now that this planning process is in place, it is vital that the Observatory uses it effectively and realistically. On its initial application, the outcome produced a program that was over-ambitious, resulting in only a small fraction of the proposed work being completed within the planning year. Such unrealistic goals are of concern on many levels: they bring into question the senior management's understanding of the organization's capacity; they severely compromise the ability of the over-committed staff to carry out research in the margins of their other work; and they are demoralizing to all staff because they have failed to meet their goals. **It is vital that the Observatory respond quickly from its initial experience with this planning process, and sets core goals in the current planning cycle that are realistically achievable within the available timeframe.**

The staff restructuring associated with the move to service delivery and queue operations has been well thought out and implemented. The Observatory has overcome many of the challenges of recruitment, and effectively addressed the long-term staffing issues. The new position of AD Science Operations is an essential and appropriate post. One remaining question in this move to a stable operations mode is whether there is a need for PhD-level staff in all aspects of queue scheduling and implementation. **In the medium-term, we recommend that the Observatory**

consider the steps necessary to develop more robust procedures and software to reduce the load in scheduling the queue, and transfer the more routine queue implementation and execution tasks to qualified non-Ph.D. staff, so as to increase the science time of those in scientific positions.

We understand that the Observatory is also considering splitting off development teams for key projects, separate from those responsible for more routine operations. Although this approach has its attractions, we are concerned that the organization has recently implemented wide-ranging restructuring, so further changes are probably not appropriate at this time. **We therefore suggest that the Observatory continue for the present with its integrated development and operations team.**

The longer-term planning process for the future operations of the Observatory and the development of the next generation of instrumentation is in its initial stages. This process must complete the cultural transition to robust routine operations. The process must also take into account the economic climate, and the uncertainties inherent in the need to renegotiate the international agreements that underpin the Observatory. It is therefore vital that a flexible approach is adopted, whereby options are developed for the full range of possible financial outcomes. Since different outcomes will result in very different scenarios for the optimal operations of the Observatory, these plans must go beyond a simple prioritized list of new instrumentation, etc, but must develop distinct plans for each possibility. In addition, the planning must be carried out with sufficient flexibility to accommodate the associated uncertainties in timescale. Thus, for example, no single specific science goal should be so intimately related to any new instrument that it will be fatally compromised by any delays in its development. Finally, this planning process must be mindful of the community's needs as well as the Observatory's strategic aspirations: for example, workhorse instrumentation and access to optical wavelengths will remain key drivers well into this cycle. **The Observatory should consult closely with the community in this long-term planning process, but it is important that this process is carried out in a manner that is grounded in the realities imposed by the constraints of finance, timescale and community requirements outlined above.**

7. Instrument Plans and Deployment

The instruments deployed with the Gemini telescopes are obviously vital to the scientific productivity of the Observatory. Through considerable efforts of the Gemini staff an impressive suite of instruments are now available for the Partner communities.

The GVC notes that many of the instruments have become available for community use much later than originally anticipated. While to some extent this has been beyond Gemini's control, the delays have led to a sense of dissatisfaction in the partner communities with Gemini's instrumentation program. It is important that delays of this kind are avoided in the future, or at least expectations within the

communities in this respect are managed better than they have been in the past. For example, given the current status, it would probably be prudent not to advertise the availability of Flamingos-2 for semester 09B in the Call for Proposals that will be issued at the beginning of March 2009, in order not to raise and then potentially dash the expectations of the many potential users of this instrument. In the context of GPI, the steps taken by Gemini to involve itself in the management of the program are appropriate and mean that the Observatory will be well placed to have oversight of the delivery timescale as fabrication proceeds.

In the following we present our comments on the instrumentation program for the near-term (3 years approximately) and for the longer-term categories separately. In general our comments are not strongly different from the plans presented by Gemini, though there are some differences in emphasis.

Near Term.

As noted in Section 4 the demand for time on the Gemini telescopes has been dropping in recent semesters. To help counteract this trend **it is important that GNIRS be returned to the telescope as soon as possible**. Consequently, completing this task needs to be a high priority within the instrumentation group. Similarly, the community has been expressing its desire for improved CCDs in the GMOS instruments for some considerable time. **Although Gemini is taking steps in this direction for GMOS-N, the GVC urges the Observatory to expedite this process as much as possible.** The improved red sensitivity will permit users to tackle fore-front scientific programs that are not currently feasible. Once the upgrade is achieved for GMOS-N, implementation of similar devices in GMOS-S should also occur as rapidly as possible, subject to resource availability. As regards the actual devices, consideration should not only be given to the far-red QE but also to minimizing the time these workhorse instruments are unavailable – the extent of required modifications to detector mounts and packaging should also play a role in the choice of detectors.

Another important near-term goal should be to improve the reliability of the laser system on Gemini-N and to make its operation less resource-intensive. In combination with queue mode observing, Altair/LGS with NIRI and NIFS (and GNIRS in the near future) offers a particularly powerful scientific capability that is proving increasingly popular in the partner communities. As such, increased reliability and ease-of-use of the laser system will result in a higher science output. It also necessary that lessons learned in improving the operation of the laser on Gemini-N should feed through to MCAO laser operations on Gemini-S where appropriate.

There is little question that the deployment of Flamingos-2 and the introduction of MCAO, which can be used with the imager GSAOI as well as Flamingos-2, will be key to continuing the Gemini-S telescope as a world-class facility. **Thus, to the extent that admittedly limited resources will permit, the commissioning and integration of Flamingos-2 and of MCAO/GSAOI should be expedited. In particular, if there are any choices to be made regarding resource allocation,**

the GVC recommends that implementing MCAO should take priority over any GLAO-related activities. Indeed the GVC sees GMOS-S (with new CCDs), Flamingos-2 (stand-alone and behind MCAO), and MCAO+GSAOI as the main workhorse facilities on Gemini-S for at least the next 3-5 years. Coupled with NICI, and GPI once available, this will provide a very powerful set of instruments for the science programs of the partner communities.

The future of TReCS is less clear: although the Gemini telescopes are optimized for the mid-IR, the demand for TReCS has not been high, with TReCS proposals being consistently awarded <15% of G-S time. It may be worth considering decommissioning TReCS within a 3-5 yr time frame and concentrating mid-IR programs at Gemini-N, which, after all, is the better mid-IR site. For Gemini-N, the forefront science focus in the near term will likely be Altair/LGS with GNIRS, NIFS and NIRI, GNIRS without AO and the revamped GMOS-N which, given the strong demand for optical instrumentation, is likely to remain in operation until WFMOS is deployed. It will also be necessary to continue the use of Michelle over this timescale for mid-IR programs.

Longer Term.

It is difficult to be very prescriptive in the longer time frame because of the uncertainty as to whether the WFMOS project will go ahead. Clearly though, future instrumentation development should occur in the context of keeping the Gemini telescopes at the fore-front of international astronomy. Through the Aspen process, the partner communities have set WFMOS as a very high priority for Gemini because of its potential substantial scientific impact in a number of fields. Nevertheless, given that the proposed WFMOS surveys are unlikely to start much before 2015, **it is important that the decision process for approving WFMOS construction actively consider whether the proposed science outcomes will still be as transformational as originally proposed, given the delays**. It would be appropriate that this question forms part of the terms of reference for the WFMOS Concept Design Review process.

Assuming WFMOS goes ahead, it is likely to take a large fraction of the funds available for instrumentation development for a significant period, and thus it will be necessary to consider carefully what additional longer-term programs can be undertaken. One possibility that should be relatively inexpensive is to consider moving GPI to Gemini-N once the list of suitable southern hemisphere targets is exhausted; this will extend the scientific impact of the instrument. Consideration could also be given to decommissioning NIRI with its imaging functionality being replaced by a new instrument that would have plate scales/field-of-view capable of functioning with GLAO as well as with Altair/LGS. Such an instrument would not need a spectroscopic capability, since that is provided by GNIRS and NIFS. The advent of larger detectors could also potentially provide impetus for new mid-IR instrumentation, though this would likely also require improvements in the chopping performance of the telescope (e.g. larger chopping distance).

8. Responsiveness to the Partners' Astronomical Communities

There appears to be a general consensus that the NGO model is working much better than previously. This is a very important achievement in making Gemini a world-class facility. The GVC commends the NGOs for their effective service to the communities.

It was noted that the number of proposals as well as the time per proposal has dropped in recent semesters. How is one to interpret this? Our sense from speaking to members of the community and the NGOs is that **there are a significant number of users who have frustration with some aspects of the Gemini operation, although this is difficult to quantify. There is also a sense that Gemini could be more responsive to the community needs, but this is also hard to quantify**. We discuss some aspects here.

We have identified some general sources of dissatisfaction among the US/UK/Canada/Australia communities. There needs to be better organized web-based information for proposal preparation during Phase II. Better software for error checking would also be welcomed. Improvements in both areas have been noted but more is needed. As discussed in Section 4 a major source of unhappiness arises when much effort is expended to set up the observations but then no data is delivered, especially in Band 3. There are some deficiencies in the available instruments and their capabilities as discussed in Section 7. Users have also expressed the desire for an effective set of data reduction software, which is discussed in Section 5.

Improvements to the TAC process could also be helpful in increasing user demand. The current TAC process appears to discourage large programs. The decreasing time requested per proposal could be a product of the TAC process in which users perceive that they can increase their chances by shaving the time request to the absolute minimum. Although politically challenging, one of the goals of the new Gemini agreement could be the establishment of a single TAC and to have mechanisms for proposing large programs. In the interim, one solution might be to create a limited "off the top" allocation for large programs.

We note that the South American partners find that access to a wide variety of instruments is important, with GMOS very popular in all countries. The sharing of time on other facilities in which the Gemini share is given as classical observing is not popular.

9. Education and Public Outreach

The GVC was impressed by the evident enthusiasm and commitment with which the Gemini Observatories have addressed the need for Public Information and Outreach (PIO). Recent hires have clearly revitalized and stimulated this aspect, and imaginative programs have been launched, with a strong emphasis on education and outreach to schools in the Hawaiian and Chilean communities in particular.

The GVC noted with particular approval the evident signs of cooperation with other observatories, most notably in the Hawaiian community, as part of a broad program of public engagement. We commend those responsible for the strong degree of self-funding which has been secured in support of these activities (and are pleased to see that local businesses have taken up the opportunity with apparent enthusiasm, creating some imaginative advertising around astronomical themes). In a time of delicate political relations, the importance of having the local communities onside cannot be overstated, and the key role played by these outreach activities are clearly well-understood by the Observatory administration.

The Observatory Web Page is the gateway to a host of very useful and imaginative elements, and there are many commendable elements in its current manifestation, but the GVC was concerned that, as it now stands, it might be somewhat difficult to negotiate for all but the most diligent inquirers. For a lay member of the public, or an interested teacher, for example, it would take a fair bit of 'burrowing down' to elicit some fairly basic information. The PIO staff themselves acknowledged their awareness of this shortcoming, and we would encourage the development of a simpler portal that splits at a much earlier stage to provide a more straightforward flow.

Although it is evident that the PIO effort has been extremely successful on a local scale in the two communities which house the Observatory, the GVC expressed some concerns over the extent to which the farther-flung partner nations are directly served (in, for example, communities such as the United Kingdom). Given that PIO now receives some 2.5% of the operating budget, it will be important to ensure that the partners can be reassured about value received for the expenditure, and that public awareness of the existence and significance of the Gemini Observatories be enhanced. The GVC has been informed that such in-country responsibilities devolve to the local NGOs, but we understand that they receive only limited assistance and encouragement from the PIO staff about effective ways of communicating Gemini outreach information to the user and public communities in the partner nations. **While the GVC appreciates that the NGOs are undoubtedly already very much stretched in providing direct technical support and advice to astronomical users, we would encourage the Gemini PIO to develop a better-defined and more effective method for the wider dissemination of PIO information and best practice to the member nations**.

Appendix A

GEMINI VISITING COMMITTEE

Alan Tokunaga Chair)
Institute for Astronomy
University of Hawaii
2680 Woodlawn Drive
Honolulu, HI
Tel: 808-956-6691
E-mail: tokunaga@ifa.hawaii.edu

David Hanes
Queens University
Physics Department
Stirling Hall, Queen's Crescent
Kingston ON K7L 3N6
Canada
Tel: 613-533-2706
Fax: 613-533-6967
E-mail: hanes@astro.queensu.ca

Gary Da Costa
Research School of Astronomy & Astrophysics
ANU, Mt Stromlo Observatory
via Cotter Rd
Weston Creek, ACT 2611, Australia
Tel: 61 2 6125 8913
Fax: 61 2 6125 0233
E-mail: gdc@mso.anu.edu.au

Michael Merrifield
Department of Physics & Astronomy
University of Nottingham
University Park
Nottingham NG7 2RD UK
Tel: 44-115-95-15186
E-mail:
michael.merrifield@nottingham.ac.uk