

GEMINI VISITING COMMITTEE REPORT

RESPONSE FROM GEMINI OBSERVATORY

[Note to the reader: Gemini responses are in bold font inserted in excerpts from the original GVC report.]

1. Preamble/Introduction

- 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.

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.

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.

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.

- 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.
- It would behoove the Observatory to identify the factors that limit publication rate and take appropriate steps to close the gap.
- We therefore recommend that the Observatory urgently study 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.

GR.1: Several factors are likely involved in the ability of Gemini users to publish their results in a timely manner: quick release of the data, completion of programs, ease of use of Gemini IRAF reduction packages, availability of pipeline reduced data, research environment, team strength and in some cases the amount of data that the researchers already have from Gemini and other facilities.

Every semester, we take steps to improve the rate of completion of programs. As we can now deliver data to users within minutes, we believe that one of the remaining main factors under our control is providing the users with better data reduction tools and access to pipeline pre-reduced data, in some cases close to “publication quality”. From the recent survey of 2006A through 2007B of our users (Crabtree 2009), about 75% of Gemini users depend on and use the Gemini IRAF packages. The expressed degree of satisfaction in the survey with respect to the Gemini data reduction tools can be rated as good. Still Gemini has some way to go to bring data processing to a level that automatically removes most instrument and atmospheric signatures, i.e., at levels comparable to that delivered by several space telescopes and ESO/VLT for most of their instruments.

The Observatory has taken an aggressive strategy to correct and improve this situation and give better tools to our users. The Gemini Observatory, advised by the GSC (and DataFlow Working Group) and instructed by the Gemini Board, has created a DataFlow Project that is managed by the Gemini Software Manager Vasu Upadhyia (with input from science by Associate Director for Science Operations Dennis Crabtree). The Conceptual Design Review of the project was held in December 2008. The Preliminary Design Review will take place in February 2009. A detailed presentation of the project status will be given at the May 2009 Gemini Board meeting. There are currently 6.4 FTEs involved in this effort and completion of Phase I of the project is expected in early 2010.

Gemini is also in the process of completing consultation with the GSC and the OWG/NGO about steps to implement a “guaranteed data” system. Under the system envisioned,

nominally once a program is in the queue it will be guaranteed to receive data, even Band 3 (unless there is a counter-indication from the ITAC). The band 1-2-3 status will determine the “urgency” level, i.e., Band 1 PI’s will get their data ahead of Band 2 and Band 3 PI’s. This will require careful loading, planning and execution of the queue.

Meanwhile we are working to improve quick accessibility to data by improving the messaging and notification system from the Gemini Science Archive.

- We recommend that Gemini work with 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.

GR2: We do agree that the present multi-TAC system is a barrier to large projects or “key programs”. Each Gemini partner owns and controls its TAC process and each country/institution has their own strategic approach, depending on their access to 8-10 m class telescopes/instruments. Therefore the NTAC process is outside of Gemini control. In several partner countries the National Gemini Offices are acting in full “autonomy” and are actually decoupled from the Gemini TAC process, e.g., in the UK this complicates the process. The Gemini Observatory proposes the following approach:

- Consult with each NGO on their national perspectives and proposals to implement a Gemini “key program” system.
 - Discussion at the Kyoto 2009 Users’ Meeting
- The observatory needs to develop robust mechanisms to protect science time, particularly for the fixed-term science fellows.

GR.3: This is a continuing issue where our progress appears too slow. It is frustrating for the Ph. D. science staff and for their managers. The protected research blocks implemented several years ago have yielded some progress, but clearly they are not enough. Better software tools in handling the Phase II proposals and planning the queue have helped but more sophisticated software tools are required. Some of this effort has been slowed down by lack of software engineering resources (in part due to challenges in recruitment and the current freeze on hiring due to 2009-2010 budget uncertainties). At Gemini South, the lack of science staff (also due to recruitment difficulty) was a factor but we now have full staffing, except for one tenure-track position which is frozen until funding uncertainties are clarified

by the Gemini Board. Once new staff have been properly trained, this should help significantly in making more research time available at Gemini South. One can already see the signs of a more vigorous “internal culture of research” at least in Chile.

A key factor determining the research power of our staff is their involvement in active and productive collaborations. In several cases, our astronomers came to Gemini just after their Ph. D. and it is clear that in some cases the connection to a strong institutional team was weak and did not survive the transition. It is challenging for them to reconnect and to build links to new teams if the latter are not using Gemini. We are encouraging the science staff to use their research grants strategically for supporting visits by and to collaborators. We are trying to promote collaborations involving the Gemini telescopes that will naturally involve Gemini staff in strategic and productive ways.

We are staffed close to the approved (and planned) budget level. The Deputy Director & Head of Science, AD for Science Operations and Heads of Gemini North & South Science Operations are working to create a stronger mentoring system of the fellows by tenured and tenure-track astronomers as well as scientists. We believe that a person-to-person approach is probably the next step we need to take. The Observatory environment and mission will not change fundamentally in the near future, especially in this era of funding uncertainty. We may also have to accept that this “research time” problem is very difficult to solve due to the nature of the research environment in the current world, be it in universities or industrial environments. Per a recent editorial article in *Nature* (vol. 457, p. 635, 5 Feb 2009), “*those dedicated individuals who do stay in science find that they have less time to do the research they were trained for: a 2007 study by the Federal Demonstration Partnership in Washington DC found that investigators typically spend some 40% of their working week on random submittals and other administrative duties*”. Considering that only about 25% are successful grantees, this represents an enormous waste of intellectual efforts. Our small internal grant program is effective. We are open to any suggestion that will make the Gemini environment more conducive to research.

- 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.

GR.4: A vigorous program of talks presented by visitors and staff is a key element of an “internal culture of research”. With the exception of the colloquia given by people being interviewed for Gemini science positions, Gemini Observatory does not run its own seminar program. Our strategy has been (and will continue to be) to coordinate with the local

observatories in Hawaii (CSO, JAC-UKIRT/JCMT, SMA, Subaru that are Hilo based, as well as Keck and CFHT in Waimea or UH/IfA that is Honolulu based by video) to run a joint system of colloquia. Currently, this is coordinated by JAC in Hawaii. In Chile, CTIO does the coordination of the colloquia on behalf of SOAR, Gemini and CTIO. The presentations are given in the AURA Auditorium, located in the Gemini SBF building. Actually the number of colloquia is so large that it is a challenge for most people to attend even half of them. There are time constraints due to night-time observations or day time preparatory work/meetings that act as an obstacle to the participation in colloquia; one of the most difficult issues is the high number of coordination meetings that take place between Gemini North and South in the afternoons, when most visiting observers are available to give their presentations. Hence our real challenge is not to create a special Gemini colloquium series but to better coordinate with our sister institutions and facilitate our science staff is availability during those time windows. As a case in point, we had 10 colloquia just for the month of January 2009 in La Serena.

Other activities that are going on at both sites include “lunch talks” by staff (reasonably well attended by staff and their frequency can be increased) and weekly “science coffees” with fluctuating attendance. Both of these activities are coordinated by the science staff.

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.
- 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.
- 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].

GR.5: Significant effort has been put into improving the OT libraries that contain templates to ease the creation of a Phase II proposal. These new libraries were advertised in the 2009A Call for Proposals and the NGOs report that the Phase II submissions for 2009A were much improved over earlier semesters. The issue of further improvements to the templates, particularly how to notify PIs when the templates are updated, was discussed during the January 2009A Operations Working Group meeting.

- 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.

GR.6: The hiring of a high-level SW engineer is one of our highest priorities. However, with the current hiring freeze due to FY 2009-2010 budget uncertainties, the position remains on hold until May 2009 at the soonest.

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.
- The Observatory should develop a robust procedure for ensuring that all 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.

GR.7: In preparing for the 2009 Planning Retreat, broad consultation of Gemini staff was conducted with increased participation/consultation compared to the previous years. In reporting year-end results for 2008, The Director and the Associate Directors held several staff wide sessions reporting on the results of the past year. Similar sessions have been held to kick-off the 2009 Observatory Plan. In 2010 our planning will be a more continuous process and will allow for more consultation and input. Crucial to context setting is communicating the science priorities set by the Gemini Science Committee (as endorsed by the Gemini Board), as well as the constraints of the evolving funding environment. Indeed it is our duty to share these external challenges with our staff in a transparent way to avoid rumors and promote trust and visibility in the planning process.

- 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.

GR.8: On the execution of the annual Observatory plan, we now have quantitative results for 2007 and 2008 regarding our success or failure at delivering the >100 projects programmed into our plans each year. Overall, ~74% of the planned activity in the 2007 and 2008 Observatory plans was completed and about half of the projects planned were in fact 100% completed. Other metrics point toward improved planning and execution though we recognize that there is considerable room for improvement. Nonetheless it is important to note that ~15% of the projects planned in 2008 were hampered by failures of outside commercial vendors (e.g., 50 W MCAO laser by Lockheed Martin Coherent Technologies),

instrument providers (Flamingos-2 from the University of Florida), or agencies imposing a large external review burden on the Observatory. This outside dependency on the execution of planned work indicates that our project completion rate may not go above ~85%. If we achieve this level of completion, we will consider ourselves successful.

- 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 the 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.

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GR.9: Data Analysts and System Support Associates are now doing many of the tasks that used to be executed by Ph. D. science staff. There is flexibility in the personnel pool, but unless we convert a Ph D. staff position into two non-Ph.D. science staff positions, we will not see much improvement in this area. Again, more SW effort is being deployed. However at some point the choice is between hiring more SW engineers versus science staff, i.e., a zero-sum game given our fixed budget. All things considered, we believe that we are close to a reasonable balance now.

- We therefore suggest that the Observatory continue for the present with its integrated development and operations team.

GR.10: We consider the current integrated model, although not ideal, as the best avenue to balance resources and FTE deployment between the operations of the telescopes and in-house development and innovation in the current funding context. This model is viable as long as development initiatives are aggressively pursued in the Gemini partner country institutions in close contact with Gemini engineering and science staff.

- 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.

GR.11: The observatory oversight structure through the GSC and the OWG/NGOs enables a continuous interaction with the community. For example, the GSC acts as the channel for collecting information and input of the national communities in defining the Gemini Long Range Plan (2010-2020). The Observatory is planning a third A++ (following Abingdon in 1997 and Aspen in 2003) in 2010. It is expected that this A++ meeting will be preceded by several

national meetings organized by the NGOs, “local” GSC representatives, and coordinated with national efforts such as the Decadal Survey in the US.

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

Near Term

- To help counteract this trend it is important that GNIRS be returned to the telescope as soon as possible.
- Although Gemini is taking steps in this direction for GMOS-N, the GVC urges the Observatory to expedite this process as much as possible.
- 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.
- 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.

GR.12: GNIRS’s return to the telescope (planned for 2009B), new CCDs for GMOS-N, and improved reliability for the Gemini North laser AO system have been Band 1 projects for 2008 and continue to be in 2009. For Flamingos-2, we depend on the successful completion of the instrument by the University of Florida. For MCAO, the timeline is now substantially determined by the delivery of the 50 W solid-state laser by Lockheed Martin Coherent Technologies. Hence our ability to push forward is driven by outside factors. GLAO is not a funded facility, hence very limited work is devoted to this area, and it is in the form of a study of the atmospheric turbulence above Mauna Kea.

Longer Term

- 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.

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GR.13: WFMOS is undergoing a competitive study by two groups (Anglo Australian Observatory and Jet Propulsion Laboratory). The refined science case developed by these two teams will provide an answer to this concern.

8. Responsiveness to the Partner’s 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.
- 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.

GR.14: Gemini has conducted a survey of our users that has provided quantifiable and insightful answers to “*frustrating aspects of the Gemini Operation*”. We are conducting a detailed analysis of the response to this survey in close collaboration with the NGOs/OWG and the GSC. We will present a draft analysis and propose steps forward to the Gemini Board in May 2009 and at the Kyoto Users’ Meeting of May 2009.

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 launched, with a strong emphasis on education and outreach to schools in the Hawaiian and Chilean communities in particular.
- 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.

GR.15: In several of the Gemini partner countries, the PIO lead person is not a member of the NGO. This may lead to some of the disconnect that the Gemini Visiting Committee alludes to. To alleviate this issue, Gemini is now (on a trial basis) experimenting with an electronic newscast (Gemini e-newscast). This is in the form of a short e-mail message that highlights a few recent events and science results, generally simply giving links to the new stories or information items on the Gemini web pages. PIO will ensure that such messages are distributed to all the appropriate contacts in the partner countries. However a high degree of responsibility for further distribution rests on the NGOs who have better knowledge of their media and national information culture.