Gemini Observatory Response to STAC October 2012 Report

January 17, 2013

UK withdrawal

3.1 The STAC thanks its UK colleagues for their expertise and advice and deeply regrets the loss of their contributions to the Gemini partnership with the withdrawal of the UK.

Gemini > We echo the sentiments of the STAC, both appreciating the work of our UK colleagues and regretting the loss of their contributions as full partners in the future.

GHOS

3.2 The STAC appoints Nathan Smith to lead an Instrument Science Team for GHOS. Additional members will include Steve Margheim (Instrument Scientist for GHOS), a member of the GHOS instrument team, and 1-2 additional community members with scientific interests in this area.

3.3 The STAC asks the GHOS IST to investigate the science cases for installing GHOS in the Northern vs Southern hemisphere and report back by the time of its next meeting in April 2013.

3.4 The STAC will consider the choice of hemisphere for GHOS at its 2013A meeting in April 2013 taking into account both the science cases for each hemisphere provided by the GHOS IST as well as the follow-on impacts to other instruments under the 4+AO operations model. Depending on progress with GHOS this hemisphere decision may be deferred until the STAC's 2013B meeting.

Gemini> The contract was sent in December to the AURA Board and the selected team for approval. Because of the duration of these administrative steps, we expect the kick-off meeting for Preliminary Design to happen by the end of March.

SPIRou

3.5 While near-infrared high-resolution spectroscopy is a highly desirable capability, the STAC is not prepared at this time to recommend committing resources to the SPIRou project. At a minimum the GRACES experiment to observe at optical wavelengths via a long fiber needs to prove successful with sensitivity competitive with capabilities on other 8-10 m telescopes. The STAC will reassess the situation at its April 2013 meeting.

Gemini> The CHFT Board has recently evaluated SPIRou, and as a result, any Gemini participation would depend on the response of the SPIRou consortium to the new situation. The relevant CFHT Board resolution reads: "1) SPIRou: The Board noted that the SAC considers the SPIRou science case to be very strong and potentially world leading if the full K-band, polarimetric, and 1 m/s precision capabilities were achieved in a timely fashion. However, in light of the outcome of the Preliminary Design Review of SPIRou, the recommendations of the CFHT Scientific Advisory Council and the comments from the CFHT Executive, the Board agreed that SPIROU will remain under consideration for deployment at CFHT, but only as a Guest Instrument, with a funding scheme to be defined but including a majority of sources external to CFHT."

GRACES

3.6 Given the uncertainty in what performance will be achieved on-sky with GRACES, the STAC will re-evaluate GRACES after Phase 1. To provide a scientifically interesting capability and proceed beyond Phase 1, the GRACES system must provide sensitivity

that is competitive with that of facility high resolution spectrographs on 8-10 meter class telescopes at visible and longer wavelengths.
Gemini> The fiber bundle and slicer delivery has been delayed until early February. After upcoming end-to-end testing, we will confirm whether the installation phase will proceed in Hawaii in March. Specific criteria to accept installation and use GRACES will be defined in the meantime.

GMOS CCD Upgrades
3.7 The STAC concurs with the Observatory's current plans that aim to bring Hamamatsu CCDs to GMOS-South as soon as possible and then later proceed with Hamamatsu CCDs on GMOS-North. The STAC agrees with the Observatory's conclusion that the GMOS-South upgrade should not proceed until another instrument can effectively use the observing time during the time GMOS-S is off the telescope.
Gemini> The triple condition of having GSAOI, F2, and GPI on the telescope to minimize observing down-time is likely to be met in September (when GSAOI will be back after the scheduled winter down-time and when GPI will be commissioning on the telescope).
A decision point remains in February (before issuing the 2013B call for proposals), and an update will be available in April once F2 will be on the telescope and GPI ending its acceptance phase.

Large & Long-term Programs
The STAC believes that Large and Long-term Programs are an important component of the overall ensemble of observing projects at Gemini. Such projects have been possible via the NOAO Survey TAC, allocations from multiple partners, and/or allocations over multiple semesters. However, the STAC wants to encourage more large programs across the entire partnership as it believes this would benefit the overall scientific output of the observatory.
3.8 The STAC recommends the creation of a new system for Large & Long-term Programs (LLPs) to enable science requiring more time than can be typically acquired via individual PI proposals to the traditional partner TACs. The STAC recommends the following guiding principles:

- All Gemini parties, partners, and host countries should be treated equally within an LLP system and have equal opportunity to participate and partake of LLPs. (In the remainder of these principles, "partners" refers to all Gemini parties, partners, and host countries.)
- Up to 20% of observing time of the participating partners should be invested in LLPs, recognizing that 1-2 years may be necessary to ramp up and that 10% in the first year is a reasonable goal.
- Participating partners will provide equal percentages of their time into a common pool to support LLP programs.
- Observing time for approved LLP programs will be charged against this common pool. If time is ever refunded to partners from the pool this should be done in a fair way proportional to the time contributed to the pool.
- There should be no limits on who may lead proposals or the composition of proposing teams. The goal is to produce the best science with Gemini without regard to team nationality.
- Selection of new projects should proceed once per year with the goal of having 2-4 new starts per year.
- An LLP need not request a balanced program across North/South, RA range,

observing conditions etc., however the ensemble of approved LLPs must not be allowed to overly impinge on other observing programs. Therefore, the ensemble of approved LLPs should not exceed 20% of any relevant parameter, such as hemisphere, RA range, and Band.

- Target-of-Opportunity observations should be allowed.
- The selection process will include Letters of Intent in order to ensure the TAC includes the proper expertise and a lack of conflicts of interest.
- Additional requirements will be placed on LLP proposals, including a management plan, data products plan, and annual progress reviews.
- In order to not create significant new work for Gemini, the TAC should be an expanded version of the existing NOAO Survey TAC. *[The opinion of the Canadian and Argentinean representatives was that the TAC should be a new entity managed by Gemini itself.]*
- This Survey TAC should include representatives of the participating partners and a Gemini staff member to help advise on maintaining a balanced ensemble of LLPs distributed across RA range, observing conditions, and other relevant parameters.
- The TAC should approve only the most competitive and compelling proposals, without regard to nationality of the proposing team.
- The TAC should be willing to approve fewer than 2-4 proposals, including zero if none are sufficiently compelling.
- There should be no minimum time request, given that the additional proposal requirements should be sufficient to dissuade proposals that might otherwise be approved through a partner's TAC.
- Although partners may opt out of such a system, the STAC believes that this system will produce the best science if all partners opt in.

Gemini > The Gemini Board has established a working group with the Observatory and the partners who are interested in participating in large programs (US, Canada, Australia, and Argentina). The group is currently developing a plan for the Gemini LPTAC aligned with the STAC suggestions.

Visitor Instruments

3.9 The STAC views a vibrant visitor instrument program as a key part of its vision for greater community engagement, bringing new capabilities to the community quickly, and providing more niche capabilities than are available with the facility workhorse instrument suite. The STAC recommends one additional principle be added to the proposed Visitor Instrument Policy: "If the effort needed from Gemini for a visitor instrument becomes significantly greater than predicted, Gemini should terminate that particular visitor instrument project." With this additional principle, the STAC endorses Gemini's draft Visitor Instrument Policy.

3.10 The STAC endorses Gemini's plans for offering community access to TEXES and the Speckle camera in a visitor instrument mode in 2013B.

3.11 The STAC received a report on the progress of IGRINS, a high-resolution near-infrared spectrometer covering all of H- and K-bands simultaneously at a resolving power of R~40K. IGRINS is under construction at UT Austin and the Korea Astronomy and Space Science Institute. It will be commissioned at McDonald Observatory in late 2013. The predicted sensitivity of IGRINS on Gemini would provide a highly desired capability. The STAC will stay in touch with the P.I. (Dan Jaffe) to be kept informed of progress on the project and the possibility of IGRINS as a future visitor instrument on Gemini.

Gemini > The STAC's recommended wording was added to the policy document, and the Board endorsed the document in its November 2012 meeting. Work is in progress to offer both the DSSI speckle camera and TEXES to astronomers throughout the Gemini Partnership in the 2013B call for proposals.

Fourth Generation Instrument #3 (next instrument after GHOS)

The STAC discussed possible models for deciding on and procuring the next instrument after GHOS. The STAC feels it is extremely important to have significant involvement in choosing the next instrument by the community and instrument building groups. In consultation with Gemini development staff and to fit with the STAC's developing vision for a Long-Range Plan, the STAC came to the following recommendation:

3.12 The STAC recommends Gemini prepare a Request for Proposals (RfP) to be reviewed at its April 2013 meeting that can then be taken to the Board in May 2013. This RFP would be directed at instrument building groups to propose for funded design studies for instruments that would conform to the following principles:

- The instrument should be a workhorse instrument, meaning that it has broad scientific appeal and enables a wide range of science cases.
- The proposals should be science driven and include science cases. Science cases that provide synergies with new capabilities coming online (e.g. LSST, JWST, ALMA, etc) are highly desirable, especially including capabilities needed to follow up survey discoveries.
- The instrument should fit within the technical constraints of the Gemini telescopes as they now exist.
- The expected cost of the instrument shall be capped at a cost that is to be determined as part of the process of defining the RfP.
- The technical risk of the instrument should be modest, i.e. the success of the instrument should not depend upon some not-yet-proven technology.
- The instrument should be highly efficient, maintaining the 8-m aperture advantage.
- Although proposals for all instruments fitting these criteria will be fully considered, it is the majority opinion of the STAC that a wide-bandwidth moderate-resolution spectrograph is likely to prove most compelling.

Gemini> Scot Kleinman and Stephen Goodsell are assigned to prepare a draft of the RfP process and present it at the April meeting. In our resource allocation, we have assigned a team in 2013B to prepare the RfP for the end of the year. The long timeline is a consequence of needing the full set of facility instrument requirements in the initial RfP, including cost model and guaranteed time or other incentives.

Gemini North Adaptive Optics (GNAO)

The STAC strongly values having a basic workhorse AO capability at Gemini North as part of its vision for 2020 and beyond. The STAC reviewed the report of the GNAO workshop held in June. The STAC does not rule out pursuing a more ambitious upgrade to GNAO, perhaps including an adaptive secondary mirror, starting at some point late in the decade. However, given the current budget environment there is very low possibility in the next few years of embarking on the development of a new GNAO system more ambitious than the first option presented in the report, a $\lesssim$\$5M(USD) single-conjugate narrow-field workhorse replacement for Altair.

3.13 The STAC thanks all the participants of the June GNAO workshop.

3.14 Because any Altair replacement would not arrive for at least 5 or more years, the STAC reaffirms it's earlier recommendation (1.16) to proceed with the proposed

upgrades to Altair detailed in “Altair upgrades summary” with an estimated budget of ~$625K(USD).
3.15 The STAC recommends commissioning in 2013 an external design study of replacement Altair systems that could be built under a $5M(USD) cost cap. Both a major overhaul of the existing Altair system as well as an entirely new AO system are options to be considered. The STAC is particularly interested in understanding the predicted performance (e.g. sky coverage in both NGS and LGS modes, Strehl ratio, and performance under varying observing conditions) in comparison to that of Altair currently and in the future with its planned ~$625K(USD) upgrade.
3.16 The STAC encourages the observatory to reform the Adaptive Optics Working Group (AOWG) to provide advice and expertise.
Gemini> The first focus will be to plan and start the Altair upgrade project as soon as our new GN AO scientist (Olivier Lai) joins us in March. Activities for GNAO will start when once the Altair upgrade is underway.

GPI
3.17 The STAC urges the observatory to work closely with the GPI team to ensure it is shipped by the end of March 2013 and delivered to Gemini South on the current schedule.
3.18 The STAC reiterates its recommendation 2.18 that the Observatory advertise as widely as possible that GPI will be available for PI science and that the Observatory consider mechanisms to include the community in commissioning as early as possible, potentially through a pre-SV call for targets. The STAC’s intent is to involve the community as much as possible in the commissioning process, including Science Verification observations, and to make the process as open and transparent as possible.
3.19 The STAC recommends negotiating a follow-on contract with the GPI construction team for commissioning and support of the first year of operations.
Gemini> The GPI schedule was consolidated in 2012Q4, and the end of the acceptance test stage at University of California Santa Cruz will be in April. A shipping decision will be made in May with an early delivery around June. Good progress is being made on performance optimization, in particular with AO sub-systems and vibration cancellations. We will present a draft of the commissioning contract and the commissioning and early science plan at the April meeting.

GeMS/Canopus
3.20 The STAC believes it is important that GeMS be available to users and produce science-quality observations as soon as possible. The STAC is concerned that if GeMS is not available for science observations by the time GPI is ready to be commissioned that the schedule for GeMS may slip significantly. Given the pressure on Gemini resources, the STAC recommends further upgrades to Canopus, e.g. new wavefront sensors, wait until the system has been in regular use for at least 2 semesters and that such upgrades be coordinated with GPI commissioning.
Gemini> We have made significant progress in the last commissioning runs and officially started SV in December. Resources are allocated to ensure success of the transition to regular operations. We are planning to start work on the natural guide star wavefront sensor recovery plan in 2014A and are now scheduling the resources for that activity.

F2
3.21 The STAC recommends commissioning F2 in only imaging and long-slit mode to

reduce the risk of damage due to thermal cycling. Multi-slit mode would be implemented in coordination with other instrument activities at a later date. The STAC will regularly reassess the situation.

3.22 The STAC requests it be kept closely informed on progress of F2 to the flexure rig and telescope so that it has as much warning as possible if additional new problems arise.

Gemini> The F2 December report will be communicated with the most recent update after the cool-down that happened in early January. We have discussed internally the range of options for MOS commissioning: assuming that all commissioning activities remain on schedule, and given that the masks used last year are still installed and ready to be used, and that GPI is arriving slightly later than foreseen, we will attempt to commission the MOS mode until the end of May. Mask exchange could be done once a semester in a very conservative way (or at the end of the first semester of usage in long slit mode), or alternatively every month by cycling the dewar slowly during dark times. The stress on L1 has been mitigated to the point that we believe slow cycles (3-4 days) do not represent risks anymore. Should the commissioning schedule slip, we would follow the STAC recommendation and commission the imaging and long-slit modes only.

Funding of technology development studies

3.23 The STAC strongly endorses the Observatory's plan to budget ~$100K(USD) per year to fund modest technology development studies that would be competed via proposals from the community. The STAC is keen to have such a system for additional community input and engagement, particularly where it can be used to leverage outside resources to help with upgrades to existing capabilities and commissioning of new modes.

Gemini> We have started to work on the guidelines and will submit them to STAC when they are ready. In the meantime, the opportunity has been announced to the community both during Markus Kissler-Patig's US tour in December as well as at the AAS meeting in January. It will continue to be advertised through Gemini participation at other partners' national astronomy meetings in 2013 and on the Gemini website when more information is available.

Instrument Upgrades

3.24 The STAC supports the concept of allocating ~$500K(USD) of IDF money once every 1-3 years to support upgrades of existing workhorse instruments.

Gemini> Work on this fund will start in 2014 at the earliest. In the meantime, we will publicize these upcoming opportunities for instrument teams in the Gemini Partnership to participate in the effort.

Detector Controllers

3.25 The STAC continues to be concerned about the inefficiencies and risk of failures in the NIRI and GNIRS detector controllers. The STAC reiterates its recommendation 2.31 that the detector controller upgrades to NIRI and GNIRS be contracted out if at all possible in order for the project to proceed as soon as possible.

Gemini> We are developing a charter for this project and aim to have it finalized by the end of February. We will outsource as much of the work as makes sense given our available resources and project needs.

Acquisition & Guider units

3.26 In response to its request 2.43 the STAC received a report ("A&G Science Dichroic Feasibility") on the possibility of retrofitting the existing A&G units with a dichroic to enable simultaneous dual instrument observations. The STAC thanks the Observatory for the report. The STAC judged the difficulty and cost of the project high relative to the potential scientific benefit with the existing instrument suite. Additionally, the STAC is concerned that the resources to pursue this project would not be available any time in the near future due to the existence of other higher priority projects. The STAC recommends the project not be pursued further.
3.27 The STAC received a report on the status of the A&G2 replacement project and will reassess the project at its April 2013 meeting. The STAC understands and appreciates the Board's high level of interest in the A&G2 project, however recommends that it be given a low priority relative to other instrumentation projects. While the amount of telescope downtime required for annual maintenance of the current A&G units is high (~1 week per year per site), the STAC places a much higher priority on instrumentation progress.
Gemini> As agreed in October, we will call for a dedicated telecon with the STAC in February to present the alternatives shown to the Board and the most recent updates on this plan.

Michelle and T-ReCS
3.28 The STAC received the report "Mid-IR in a Campaign Mode" and concurs with its conclusion that a visiting campaign mode for Michelle or T-ReCS is not practical. The STAC reaffirms its earlier recommendation 2.5 that Michelle and T-ReCS be retired at the end of 2012B.
Gemini> Michelle and T-ReCS were not offered during the call for proposals for 2013A. Gemini hopes to be able to offer some mid-infrared capability through visiting instruments. TEXES is likely to be the first of these in the near future, open to the entire Gemini community during a run late in 2013, which would be announced with the regular 2013B call for proposals.

Remote Observing
3.29 The STAC received a report on "Remote Classical Observing" proposing a set of principles for how to proceed with enabling users to observe remotely from non- Gemini sites. With the removal of the requirement that remote observing be "necessary to the completion of the programme" and the addition of recommendation 3.30 below the STAC recommends that the principles laid out in this report form the basis of a future remote classical observing mode.
3.30 The STAC recommends that a core remote observing capability be installed by each NGO, and that these include the capability for a backup internet connection (e.g. direct ISDN dial in to base as Keck does). This would also require Gemini to have the required equipment at their end to support this. This would enable remote observing from partners countries with less risk and more local support, as an
intermediate option from the 'home university' one. It could also be used to phase in and test fully remote observing.
Gemini> Gemini will pursue remote observing following base facility operations, which is planned to be in place in 2015.

Data Reduction
3.31 The STAC received a "Data Reduction Update" report. The STAC reiterates its

earlier statements that making cookbooks and reduction pipelines available to users will be transformational and enable a significant increase in scientific output. The STAC also reiterates its recommendations 2.34 and 2.35 that much progress could be achieved with a pragmatic 'quick-and-dirty' approach. While the STAC is keen to see progress in this area, it recommends the newly formed User Committee take responsibility for oversight of this issue.

Gemini> Following the recommendations of the Users' Committee for Gemini (UCG), Gemini expects to launch a DR forum in the first quarter of 2013 and make a development version of the quality assessment pipeline available to users in third quarter. The latter would include GMOS imaging and (dependent on release schedule) other modes, most likely NIRI and possibly FLAMINGOS-2 imaging.

Priorities

The STAC discussed several likely or potential resource conflicts in the near-to-mid future.

3.32 The STAC views the commissioning of F2 long-slit and imaging modes as a very high priority, however if F2 is not commissioned by the time GPI is ready to be commissioned the priority will likely shift to GPI. The STAC will assess progress on F2 in early 2013 ahead of its April meeting.

3.33 Given the time critical competitive nature of direct imaging of exoplanets, the STAC places a high priority on the commissioning of GPI and commencement of the GPI Campaign. The STAC currently recommends that if GeMS is not commissioned by the time GPI arrives on site that commissioning of GPI take priority over commissioning of GeMS. The STAC will reassess the situation at its April 2013 meeting.

3.34 Should a resource conflict occur between GPI and the GMOS Hamamatsu CCD upgrade, the priority should go to GPI as the science impact of a short delay on GPI is potentially much greater than that of an additional short delay on the Hamamatsu upgrade.

3.35 While ideally both projects would proceed in the next few years, the STAC places a higher priority on the development of the Fourth Generation Instrument #3 compared with a new AO system to replace Altair.

3.36 The STAC places a low priority on the A&G2 and GCAL2 projects relative to other instrumentation projects, including new instruments and instrument upgrades.

Gemini> We are working on our resource allocation for the rest of 2013 following these priorities and are striving to prevent any major conflict with GPI as long as F2 and GeMS enter operations by June (achievable if there are no new problems causing large delays).

Science Time 2013B

3.37 The STAC endorses the observatory proposed science time goals and minimums for 2013A.

Future STAC Meetings

The STAC will convene by telecon as necessary and intends to hold its next in-person meeting in April 2013 ahead of the May 2013 Board meeting. The location and dates of the next STAC meeting are TBD.