

**STAC FINDINGS, RECOMMENDATIONS, & ACTIONS  
NOV-2011 MEETING**

The STAC held its first meeting on 7-8 November 2011 at Gemini La Serena Base Facility. This report contains the recommendations and actions coming from that meeting and a subsequent telecon on 8-December.

**GHOS**

The STAC applauds the progress on this project with the downselect to 3 teams to proceed to CoDR.

**1.1 [Action] The STAC intends to closely monitor progress and appoints Nathan Smith to lead the Instrument Science Team for GHOS (& GRACES). Several additional non-STAC IST members will be appointed in the near future.**

**1.2 [Recommendation] The STAC strongly endorses having an external independent cost analysis at the time of the further down-select.**

**GRACES**

The STAC applauds the flexibility demonstrated by the observatory in pursuing this “instrument of opportunity,” which should bring optical high resolution capability to our communities for at least red wavelengths on a rapid timescale.

**1.3 [Action] The STAC intends to closely monitor progress and appoints Nathan Smith to lead the Instrument Science Team for GRACES (& GHOS). Several additional non-STAC IST members will be appointed in the near future.**

**1.4 [Recommendation] The STAC strongly endorses moving forward with this project as a near-term high priority and consulting with the IST concerning on-sky commissioning plans.**

**GMOS CCD**

The STAC applauds the installation of the new E2V Deep Depletion CCDs on GMOS-N and that this new capability will be available to the community in the near future. These E2V DD devices offer significantly better response in both the blue and the red compared with the original GMOS-N CCDs. The STAC heard about and discussed progress in understanding the readnoise and electrostatic sensitivity issues with the Hamamatsu arrays. It was presented to the STAC that the first Hamamatsu focal plane will contain one of the latest blue-sensitive Hamamatsu chips in the blue-most position, one of the HSC-type Hamamatsu chips in the middle position, and one of the original red-sensitive Hamamatsu chips in the red-most position. After discussion the STAC suggested this presents an opportunity to upgrade GMOS-S with Hamamatsu chips before upgrading GMOS-N to Hamamatsu chips without sacrificing blue capability in the south. It is the intent of the STAC to see both instruments upgraded as soon as possible in order to maximize the immediate scientific return. Taking the first Hamamatsu focal plane to the South could simplify the upgrade sequence, potentially eliminating an additional focal plane array swap, but, more importantly, maximize the immediate scientific gains by enhancing both GMOS-N and GMOS-S in the near future. Should technical issues arise with installing the first Hamamatsu focal plane into GMOS-S, the STAC requests the observatory keep it informed via Tom Matheson as PoC.

**1.5 [Recommendation] The STAC recommends pushing ahead full speed with the development work for the Hamamatsu devices, including achieving the desired low read-noise. The STAC recommends this first Hamamatsu focal plane be installed in GMOS-S as soon as possible, ideally in the middle of 2012 during southern winter to attempt to minimize lost observing time and bring this capability online as soon as possible. With lesser urgency GMOS-N would then be upgraded from the new E2V chips to a second focal plane of Hamamatsu arrays, likely containing a similar mix of Hamamatsu chips to maximize sensitivity in both the blue and red.**

**1.6 [Action] The STAC is keen to follow progress on this project closely and appoints Tom Matheson as the point of contact for the GMOS CCD project and requests the observatory forward the monthly project reports to him and keep him informed of developments and decisions that need to be made concerning timeline and order of GMOS CCD upgrades.**

### **Next instrument priority (after GHOS/GRACES)**

During the meeting and subsequent telecon the STAC discussed the next instrument priority following the launch of GHOS & GRACES. The STAC understands that a recommendation is needed in a timely manner so that work can begin and resources committed in 2012. The consensus of the STAC is that the next instrument capability priority should be medium-resolution, single-object spectroscopy covering the optical and infrared wavelengths simultaneously (akin to the capability of XSHOOTER). Such an instrument is highly ranked in recent user surveys of desired 8-10 m instrument capabilities. In the view of the STAC such a capability plays well to the strengths of Gemini (e.g. rapid follow-up of transient objects with ToOs), the desires of the communities, and strategically positioning Gemini to take advantage of both current and future surveys (e.g. PTF, Pan-STARRS, LSST). Numerous other non-transient science cases are envisioned, including icy satellites, TNOs, brown dwarfs, stellar ages & classifications,  $z > 1.0$  faint galaxies, QSOs, etc.. A proposed name for this instrument is the Gemini InfraRed Optical Spectrometer (GIROS).

**1.7 [Recommendation] The STAC endorses the proposed observatory timeline of presenting a 'strawman' instrument concept at the January 2012 AAS meeting, soliciting science white papers in January 2012 for review in March, leading to a final instrument recommendation from the STAC in April to be forwarded to the Board for approval at its May 2012 meeting.**

### **Flamingos-2**

The STAC is encouraged that F2 appears nearly ready to move forward to Science Verification. It is important that the STAC and observatory begin to advertise to the community that calls for SV proposals are expected in the near-future and that the lead-time between release of the call and proposal due date will be necessarily short. The current expectation is that SV on F2 will proceed in two separate stages, first with imaging and long-slit, followed by a second call focused on the MOS capability. The STAC is preparing to use a subset of itself along with potentially bringing in additional outside expertise to run a TAC for the SV proposals and recommend a program of SV projects to the observatory.

**1.8 [Action] The STAC intends to closely monitor progress and appoints Karl Glazebrook as point of contact for F2 and requests the observatory forward the**

**monthly project reports to him and keep him informed of developments and decisions that need to be made moving toward SV.**

**1.9 [Recommendation] Recognizing that first impressions of instruments are very important, the STAC encourages the observatory consult with the STAC on the decision of when & how to proceed with the two calls for F2 SV proposals.**

### **GeMS**

The STAC is encouraged that GeMS should soon be ready to move forward to Science Verification. It is important that the STAC and observatory begin to advertise to the community that calls for SV proposals are expected in the near-future and that the lead-time between release of the call and proposal due date will be necessarily short. The STAC is preparing to use a subset of itself along with potentially bringing in additional outside expertise to run a TAC for the SV proposals and recommend a program of SV projects to the observatory.

**1.10 [Action] The STAC intends to closely monitor progress and provisionally appoints Tim Davidge as the point of contact for GeMS and requests the observatory forward the monthly project reports to him and keep him informed of developments and decisions that need to be made moving toward SV.**

**1.11 [Recommendation] Recognizing that first impressions of instruments are very important, the STAC encourages the observatory consult with the STAC on the decision of when & how to proceed with the call for SV proposals.**

### **GNIRS repairs**

The STAC understands why the GSC originally recommended a minimum of two years of science operations before removing this highly productive instrument from the telescope for repairs. However, concern over the risk represented by the possibility of a loose screw or other endangering problems led the STAC to endorse the prudent recommendation of the observatory to proceed with servicing GNIRS in early 2012B after only ~3 semesters of operations.

**1.12 [Recommendation] The STAC endorses the Observatory's suggested approach to GNIRS repairs and upgrades, as detailed in the document "GNIRS upgrades summary" dated 1-November-2011. The STAC strongly encourages that the repairs be organized so as to minimize the downtime of this highly subscribed instrument and endorses the observatory suggestion to coordinate GNIRS servicing with the annual northern shutdown.**

### **ALTAIR**

The STAC strongly values having AO capability at Gemini North and recognizes that Altair is the Gemini North AO system for at least the next several years. The STAC commends the observatory for enabling the PWFS tip/tilt star mode, which should become available in 2012 and will significantly increase the available sky coverage for certain spectroscopic LGS projects. The STAC discussed the observatory's proposal to upgrade Altair, fixing vibrations, upgrading computers, and expanding the patrol field to 30" by replacing certain optics.

**1.13 [Recommendation] The STAC recommends that the observatory, via the Gemini web page, NGOs, and STAC, be sure to publicize the availability and performance of this new PWFS T/T mode as soon as possible.**

**1.14 [Recommendation] The STAC endorses the observatory’s proposed upgrades as described in “Altair Upgrades Summary” (1-Nov-2011) and welcomes the expected improvements in performance and reliability.**

**1.15 [Action] The STAC appoints Henry Roe as the point of contact for Altair and its upgrade project and requests the observatory forward the monthly project reports to him and keep him informed of developments and decisions that need to be made concerning timeline and order of Altair upgrades.**

### **GLAO & the Future of AO on Gemini-North**

The STAC strongly values having AO capability at Gemini North as part of its vision for 2020 and beyond. The STAC recognizes that a replacement for the current Altair system (even with the near-term upgrades) will be needed on that timescale to stay competitive. The STAC did not find that the science justification for GLAO as presented compelling enough to endorse proceeding with the proposed \$1.3mil design study. The STAC is in favor of keeping the GLAO option open in the long-term. However, the STAC is concerned that the budget estimates for GLAO would consume a majority of the instrumentation funds available during the next decade, leaving too little funding for other instruments, including new instruments to take full advantage of GLAO. The STAC would like to see additional options for the future of AO on Gemini North covering a range of price/capability points. The STAC intends to host a session on this topic at the 2012 July User meeting to discuss the options developed at the June AO workshop in Victoria, BC.

**1.16 [Recommendation] Given the evolving funding situation and importance of developing instrumentation plans within the current and coming budget realities, the STAC recommends the observatory explore additional, less expensive, options for future AO on Gemini North. These might include a significant upgrade of Altair to allow a wider patrol field and significantly fainter guidestars or an Altair-2 focused on narrow-field higher-strehl operations. Other creative options seem likely to exist. The STAC requests that the observatory pursue additional options for the future of AO at Gemini North so that the STAC can begin to consider them and discuss them with the community at the User’s meeting in July.**

**1.17 [Action] The STAC appoints Henry Roe as PoC for AO on Gemini North.**

### **A&G replacement project**

The STAC applauds the effort to improve the reliability and performance of the A&G units, but expresses concern at the magnitude of the additional costs involved with a GLAO-capable unit that would be spent long before a decision on whether to proceed with GLAO or not is made. From the presented proposal the STAC had difficulty determining how much additional cost the GLAO-capable unit added to the project (vs. two identical non-GLAO units). Given the current budget realities it is unlikely that significant work on GLAO can proceed until at least the end of the current decade. Therefore the STAC recommends not investing the significant additional money in a GLAO-capable A&G unit now, recognizing that if/when GLAO is developed it will require a new Gen-3 A&G.

**1.18 [Recommendation] The STAC endorses the plan to move forward with replacement A&G units, however recommends moving forward with identical (non-GLAO capable) units in North & South.**

## **Detector Controllers**

The STAC endorses the push to simplify the number of different types of detector controllers at the observatory. The STAC is concerned whether a single controller can satisfy the needs of both optical and IR instruments, but notes that even standardizing around two controllers (one IR, one optical) would be a significant improvement and simplification over the current situation.

**1.19 [Recommendation] The STAC endorses the proposed approach in the document “Detector Controller project” (4-November-2011) of investigating the several controllers available for purchase. The STAC requests a progress report on this project at future STAC meetings.**

## **F2T2**

**1.20 [Recommendation] The STAC endorses the concept of exploring how the tunable filter could be incorporated into Canopus and then be used by either F2 or GSAOI. The STAC requests a progress report on this project at future meetings in 2012 so that it can make an informed recommendation in 2012 about whether/how to proceed with installation in 2013.**

## **Future of mid-Infrared**

The STAC is concerned about the viability of mid-infrared at Gemini in the era of reduced resources. The STAC accepts the planned removal of T-ReCS from Gemini South in 2012B to make way for the commissioning of new instrumentation, presuming F2 and GeMS proceed as expected. Before its April meeting the STAC will gather additional information and will hold a more detailed discussion of mid-Infrared at its Spring 2012 meeting.

## **NIRI**

The STAC values highly near-infrared imaging capability on Gemini North beyond 2012 when NIRI is nominally scheduled for retirement. Before making a recommendation the STAC needs to understand what options are available for keeping NIRI alive as an imager by upgrading its detector controller and mechanisms. (Spectroscopy is better accomplished with GNIRS.)

**1.21 [Recommendation] The STAC requests a report for its April meeting on what resources would be needed to upgrade NIRI and continue its life as an imager beyond the end of 2012. In the meantime the STAC appoints Henry Roe as point of contact for NIRI and request the observatory keeps him informed of NIRI developments and decisions.**

## **Single TAC/Large Programs**

The STAC was asked by the Board to begin to discuss how a single TAC might work and how more large programs of higher scientific impact could be enabled on Gemini. A wide range of opinion was expressed by different members of the STAC. Several smaller partners expressed concern about relinquishing control over their time, e.g. Hawaii runs a single TAC for their telescope access and often proposals include requests for multiple instruments on different telescopes. The US could be willing to join a unified TAC effort if it were combined with the current NOAO TAC system, as it is important to the US to keep 8-m access within the system of O/IR resources allocated by the NOAO TAC because some reasonable number of proposals combine asking for Gemini along with other telescope time. Any such combined TAC would include structures to guarantee appropriate distribution of time to partner share. The STAC also

discussed possible models for a combined survey TAC within the NOAO Survey Program structure. No conclusions nor recommendations were reached on these issues, although the discussion was open & useful and the STAC will continue to discuss this at future meetings.

### **GPI Campaign Oversight**

The STAC discussed the need to create a GPI Campaign Oversight WG, drawing upon additional outside expertise. This WG does not need to be assembled until later in 2012 and therefore the STAC will revisit this issue at its April meeting.

### **Science Time 2012B**

**1.22 [Recommendation] The STAC endorses the observatory proposed science time goals and minimums for 2012B, including that the GLAO design study laser testing is contingent upon the Board's decision on proceeding with the GLAO design study.**

### **Software - quality assessment, pipelines, and cookbooks**

The STAC was asked to consider what information it wanted reported to it on this project. The STAC notes the importance of data cookbooks to scientific productivity of the user community, as well as the utility of developing such cookbooks as part of the process toward developing automated quality assessment tools.

**1.23 [Request] The STAC requests a report on the status of this project at its April meeting, including current goals and progress.**

**1.24 [Request] The STAC requests the report on calibration that was provided to the Board in November 2010.**

### **New operational modes - eavesdropping, remote observing**

The STAC discussed how stronger user engagement with observing can lead to both better data and higher scientific productivity. There are specific cases where a PI's input is valuable, such as in assessing whether sufficient data have been taken or in the case of GRB ToOs whether a spectrum is warranted. The STAC is interested in understanding what resources would be needed to implement a form of eavesdropping for certain programs.

**1.25 [Request] The STAC requests a report on what would be involved with implementing remote eavesdropping for selected PIs on their queue observations.**

### **2012 Gemini Science & User Meeting**

The STAC notes that the 2012 Gemini Science & User Meeting is scheduled for 17-20 July 2012 in San Francisco and represents an opportunity for the STAC to inform and gather feedback from the community.

**1.26 [Action] The STAC will work with the SOC to help plan the meeting, particularly including sessions in the areas of: future desired instrument capabilities and the future direction for AO on Gemini North.**

### **Election of Deputy Chair**

The STAC will elect a Deputy Chair via email in the near future.

## **Phase I/II Software improvements**

**1.27 [Recommendation] The STAC recommends the new User Committee be tasked with reviewing and providing advice on the Phase I/II software project.**

### **Prioritized list of projects**

The Director requested the STAC provide a ranked priority list of the endorsed instrumentation projects to help guide the observatory's resource allocations. That ranked list is:

1. F2 commissioning
2. GeMS commissioning
3. Hamamatsu -> GMOS-S (presuming no technical difficulties with going South first)
4. GPI
5. GHOS
6. GRACES
7. Develop options for keeping NIRI alive for imaging
8. A&G replacement
9. Next instrument (post-GHOS)
10. GNIRS repairs
11. Altair upgrades as proposed
12. Investigate next-gen mid-priced AO for GN
13. Detector controllers
14. Hamamatsu -> GMOS-N
15. Further investigate F2T2 -> Canopus bench

### **Public report from the STAC**

The STAC will draft a version of this report for public distribution and will consult with the Board Chair, NSF Program Officer, and Directorate before release.

### **Future STAC Meetings**

For planning purposes the STAC intends to meet in-person twice per year and to schedule meetings approximately a year in advance. Interim telecons will be held as necessary. The Spring 2012 meeting will be in Hilo at Gemini North HQ on April 24-25 to be ahead of the Board's meeting (9-11 May 2012). The location of the Fall 2012 meeting is TBD, but will be scheduled for sometime in the few weeks ahead of the Board's meeting (7-9 November 2012).

### **Point-of-Contacts and Instrument Science Teams**

GHOS & GRACES IST: Nathan Smith, Sebastian Lopez, TBD

GMOS PoC: Tom Matheson

F2 PoC: Karl Glazebrook

GeMS PoC: Tim Davidge

A&G: Henry Roe

ALTAIR & Gemini North AO: Henry Roe

NIRI: Henry Roe