

# Report of Gemini's Science and Technology Advisory Committee (STAC), November 2020

The STAC held its nineteenth meeting on 9-10 November 2020 by videoconference.

## STAC Membership

Elliott Horch, Chair	Jae-Joon Lee
Ryan Chornock	Damián Mast
Mark Chun	Marcelo Mora
Ryan Foley	Henri Plana
Craig Heinke	Lisa Poyneer
Robert Hynes	Eric Steinbring
Jeyhan Kartaltepe	Ashley Villar

Since the last set of Gemini governance meetings, it is clear from the reports provided to the STAC and our interactions and discussion during this meeting that the Observatory has forged ahead on important projects in a truly remarkable fashion during these difficult times. While the COVID-19 pandemic has affected all of us and Gemini is no exception, the STAC was extremely pleased to learn of the latest excellent scientific results produced through observations taken with the telescopes and the promise of continued excellence because of the extraordinary efforts of the leadership and staff. The STAC congratulates Allison Peck and Inger Jørgensen on their new roles within NSF and NOIRLab, respectively, and thanks them for their many contributions at Gemini.

**19.1** The STAC is grateful for the clear and complete set of documentation provided well in advance of the meeting. We note the effort that went into these reports; they helped us to come to the meeting well-informed, allowing us to focus on the most pressing issues. In particular, we thank the Director, Jennifer Lotz, for arranging the pre-meeting video conference on the GNAO options. Also helpful in this regard was the ability of the STAC to read the GNAO Assessment of Alternatives Review (AAR) report and the Observatory response. We thank the Observatory for including STAC representation in this important review.

**19.2** Despite the COVID-19 crisis, the Observatory had impressive achievements in several areas. Outside of the GNAO project, which we will refer to below, some other highlights worthy of mention include the following. The STAC was very pleased to see that the number of publications generated by Large and Long Programs (LLPs) continues on an upward trend and was in the last year the highest level to date. The STAC applauds the large number of programs that involve thesis work and thanks the Observatory for compiling those statistics; this is important evidence of the educational role being played by the Observatory in training the next generation of scientists in all the partner countries. The completion rate for Band 1 programs in the face of the setbacks caused by the pandemic were outstanding, allowing the Observatory to remain a source of ground-breaking science. Early data from MAROON-X continues to be very promising. We are encouraged that the Observatory has taken aggressive steps to address the hardware failure of Altair.

**19.3** The STAC recommends the project priorities presented in the development report as follows: GNAO, SCORPIO, GHOST, GIRMOS, IGRINS-2, GPI2, GLAO/ASM Feasibility, GNIRS Controller, GeMS Improvements, IUP.

**19.4** The STAC recommends the following science time fractions proposed by the Observatory for the upcoming semesters, specifically:

2021B: 85% for the South and 84% for the North.

2020B: 89% for the South and 96% for the North.

(The latter is a slightly modified value from our last report.) The STAC recommends that the telescope shutdowns do not overlap.

**19.5** The STAC is hopeful that the next Gemini Science Meeting can still be held in Seoul during the first half of August 2021 (prior to the IAU Meeting). However, it is difficult to predict the state of travel at that time. In order to preserve the opportunity to disseminate Gemini science to the widest possible audience, the STAC suggests that the organizing committees consider a hybrid format where some portion of the meeting is held in Korea for those who can attend, but that others may participate via video or recorded presentations.

**19.6** The STAC reviewed the draft guidelines for compensatory telescope time (CTT) provided by the Observatory. The STAC believes these to be a workable starting point in most cases, but we caution that there is not a “one size fits all” solution in these situations due to the variety of instrumentation and science that is done at Gemini. We endorse the idea of basic tenets which are flexible enough to begin the negotiating process, but we underline the importance of informing and involving the STAC in individual cases as representatives of the Gemini user community. In this regard, the STAC thanks the Board for the opportunity to comment on the GPI-2 negotiations in the form of a memo during the summer. We continue to advocate for guarantees for greater community involvement before the final agreement is reached in a way which will lead to a significant number of community-led proposals that have the freedom to choose targets.

**19.7** The STAC reviewed the testing time methodology proposed in the XT document. We support the basic approach and note that, while a significant amount of telescope time is likely to be used in this activity, the scientific potential of Time Domain Astronomy (TDA) is vital in our opinion and is also consistent with the Gemini Scientific Strategic Plan. Some members of the STAC voiced concern about the level of participation of all of the partners, but we were somewhat reassured by the Observatory’s commitment to widely advertise the opportunity for participating in the program (and we encourage them to specifically advertise this to NGOs). The STAC likewise commits to continuing our advocacy for this science and facilitating participation in all partner communities. The STAC is excited about the development of GPP and looks forward to many more details about this at our next meeting.

**19.8** The STAC was pleased to see the progress made toward a workable and fair time allocation system for Gemini’s participation in AEON. We congratulate Gemini on providing a detailed explanation of how the time allocation processes in their proposed system work. While we remain open to further discussion, at this point the majority of the STAC favor Model 2. This is driven in part by the desire of smaller partners to retain substantial control over the use of their Gemini time.

**19.9** The STAC was disappointed to hear of a possible descope for SCORPIO due to budget overruns. However, from a scientific point of view, if a descope does become necessary, losing K band capability when the instrument is delivered is a reasonable first option to consider, especially given the lower performance expected at that wavelength. If at all possible, we would like to see the design preserve a future upgrade path to restore the K band capability at a later date. The STAC sincerely hopes that a careful edit of the budget will prevent any descope beyond that in the future. If the situation does become more

serious, the STAC can make rapid recommendations regarding science trade-offs of further descope options, if needed. The STAC notes that the loss of K-band in SCORPIO would have consequences for the future of F2 in the long-term planning.

**19.10** The STAC finds that a rescoped GNAO (Path 2, with a ground-layer correction optimized for GIRMOS) is a compelling science capability for the Gemini user community. Regarding the science trade-offs versus other possible rescope paths, the STAC agrees that Path 2 represents an acceptable impact to unique science done with GNAO. We note that the Observatory will need to be vigilant moving forward in order to protect future instrumentation needs including next generation instrumentation.

**19.11** The STAC agrees that the Observatory's plan to develop the conceptual design for a rescoped GNAO (Path 2) for a future NSF project review is the only viable plan forward. The STAC anticipates that the rescoped GNAO plan will provide compelling science capabilities, and also a useful infrastructure for future AO systems (e.g. ASM).

**19.12** The STAC endorses the Observatory's intent to negotiate an agreement to join the GIRMOS partnership with a contribution of \$4.8M. We agree with the reasoning provided. Although atypical in terms of the delivery of an instrument of this complexity to the telescope, the STAC remains enthusiastic about the unique science opportunities that the instrument will bring to Gemini, and we also note the important role that GIRMOS is likely to play as a pathfinder for ELT instrumentation. Regarding the two potential upscope options, we find that the upscope to 4 IFU arms is extremely scientifically compelling, as this dramatically improves the competitiveness of GIRMOS among IFU instruments, vs. the lower priority of upgrading the imaging detector and providing a full filter set.

**19.13** The members of the STAC unanimously support Henri Plana as Deputy Chair of the STAC. While he does not have an interest at this time in being the Chair of the STAC at a future date, he is willing to serve at least through May 2022 to help facilitate a smooth transition at the end of Elliott Horch's term as Chair.

**STAC Points of Contact:**

ALTAIR & GNAO: Eric Steinbring and Lisa Poyneer

F-2: Rob Hynes

GeMS: Eric Steinbring

GHOST: Henri Plana

GMOS: Marcelo Mora

GNIRS: Jeyhan Kartaltepe

GRACES: Ashley Villar

GPI: Mark Chun

IGRINS2: Jae-Joon Lee

Instrument Upgrade Program: Damián Mast

NIRI: Ryan Chornock

ToOs: Craig Heinke and Ryan Chornock

SCORPIO: Ryan Foley

Visiting Instruments: Elliott Horch

Default for other issues: Chair

**Future STAC Meetings:**

The 2021A meeting will be held May 10-11, 2021, with the format to be determined at a later date.