

# Report of Gemini's Science and Technology Advisory Committee (STAC), November 2019

The STAC held its seventeenth meeting on 18-19 November 2019 in Tucson, Arizona.

## STAC Membership

Elliott Horch, Chair	Jae-Joon Lee
Jane Charlton (video)	Damián Mast (video)
Mark Chun	Marcelo Mora (video)
Ryan Foley	Henri Plana (video)
Craig Heinke (video)	Lisa Poyneer (video)
Robert Hynes	Eric Steinbring
Jeyhan Kartaltepe (not available)	Marsha Wolf

The STAC congratulates Gemini on the progress that has been made in several areas during a difficult time when demonstrations near both facilities have affected and continue to affect day-to-day operations. In particular, we cite the record numbers of Gemini publications in 2019, the successful commissioning of the new Toptica laser for Altair and NGS2 for GeMS, the successful start of MAROON-X commissioning, and the rollout of DRAGONS imaging software as examples of this progress. We congratulate Gemini on GHOST's upcoming commissioning, which offers exciting new scientific capabilities for the Observatory.

**17.1** The STAC accepts the following development priorities, which in order are: GNAO and RTC, NGS2, SCORPIO, GHOST, GNAOI, IGRINS2, GPI-2, GIRMOS, ASM feasibility, GNIRS Controller, IUP, DM0/GeMS improvements. The STAC is encouraged by the plans to consider the ASM in the planning of GNAO, and we continue to strongly support the coeval development of the ASM as a capability, which will significantly enhance a wide range of science at Gemini. We add GeMS improvements (in addition to planned upgrades) in the context of DM0 because GeMS can serve as a testbed to solve difficulties with regular every-night operations, before GNAO faces similar challenges.

**17.2** The STAC notes the Observatory's science-time strategy for the selected GNAOI team as a reasonable plan at this point but cannot endorse it scientifically until the team is chosen.

**17.3** The STAC endorses and encourages an open FY2020 IUP call, subject to the availability of Observatory resources to administer it, where the call will state an interest in improved performance of GMOS North and South, for example a new filter set. The STAC finds this particularly important to do in advance of the LSST era.

**17.4** The STAC endorses the science time request from the Observatory as follows:

2020A: 93% for the South and 93% for the North.

2020B: 85% for the South and 85% for the North.

**17.5** The STAC thanks the Observatory for its willingness to provide documentation to us, such as the feasibility study for GPOL, the CDR documentation for SCORPIO, and the PEP and CoDR committee/response reports, for GNAO. This transparency helps the STAC to better advise the Board.

**17.6** The STAC is impressed by the technical progress bringing GNAO to the Conceptual Design level and in responding to review feedback. We expect that this increased understanding of the relationships between science requirements and AO system specifications will allow the PDR to be reached with a design that achieves key science goals within cost and schedule constraints.

**17.7** The STAC continues to be aware that the GNAO funding structure places significant constraints on the project. We are encouraged by the level of communication on this point between the Observatory and the NSF, particularly regarding scope and execution. We encourage the Observatory to continue to prioritize this, and we note that the technical management of GNAO at this point in the project is extremely important to the eventual science return.

**17.8** The STAC congratulates Gemini on the release of DRAGONS pipeline and recognizes that this pipeline is critical for time domain science. Furthermore, any visiting instrument teams that are likely to be used in time domain astronomy should be encouraged to begin incorporating DRAGONS into their reduction pipelines. We encourage Gemini to develop a software interface document for facility (and transitional) instrument teams to ensure their pipelines can be incorporated into the DRAGONS package. We further encourage Gemini to work within OIR Lab to make this a general-purpose replacement for IRAF within at least the OIR Lab community.

**17.9** The STAC congratulates the TDA working group and acknowledges the importance of their work. In a previous report, the TDA working group discussed two paradigms for time allocation for TDA projects, but a third option was also discussed in the current meeting. We ask the group to study this last alternative with the same level of detail as the first two paradigms. We endorse the general idea of the Design Reference Mission. The STAC sees value in a mock proposal process, or workshop, to further inform the Observatory and the STAC on how to proceed, such as on specific design requirements and synthesizing these across the projects.

**17.10** We congratulate the GPI-2 team on securing substantial funding to improve GPI, enabling a plan for a productive science run on Gemini-North in the future.

**17.11** We congratulate the Gemini team on having a strong instrument suite well into the 2020s. When making choices on which instruments are available as part of the 4+1 model, we encourage Gemini to follow the guiding principle of prioritizing a complement of broadly capable workhorse instruments that match the Observatory's scientific strategic plan.

**17.12** The STAC suggests consideration of an initial deployment of GIRMOS at Gemini-South. The rationale for this is partially scientific (the opportunity for LSST follow-up with the instrument) and partially to mitigate schedule risks for both GNAO and GIRMOS. In order for the STAC to

provide informed recommendations on future instrument deployment, we request an appropriate set of the trade-offs and risks be presented to us by the next STAC meeting.

**17.13** The STAC continues to see value in having Gemini appoint an external reviewer for MAROON-X, who can independently provide the Observatory with an assessment of the specific performance metrics to be inserted into the Call for Proposals when the instrument becomes available.

**STAC Points of Contact:**

ALTAIR & Gemini North AO: Eric Steinbring and Lisa Poyneer

F-2: Rob Hynes

GeMS: Eric Steinbring

GHOST: Henri Plana

GMOS: Marcelo Mora

GNIRS: Marsha Wolf

GRACES: Jae-Joon Lee

GPI: Mark Chun

Instrument Upgrade Program: Damián Mast

ToOs: Craig Heinke

SCORPIO: Ryan Foley

Visiting Instruments: Elliott Horch

IGRINS2: Jane Charlton

Default for other issues: Chair

**Future STAC Meetings:**

The 2020A meeting will be May 11-12, 2020 in Hilo, Hawaii.