Report of Gemini's Science and Technology Advisory Committee (STAC), May 2022

The STAC held its twenty-second meeting on 23-24 May 2022 by videoconference.

STAC Membership

Craig Heinke, Chair	Jeyhan Kartaltepe
Henri Plana, Deputy Chair	Jae-Joon Lee
Ryan Chornock	Damián Mast
Mark Chun	Marcelo Mora
Ivana Damjanov	Jenny Patience
Maria Drout	Gelys Trancho
Ryan Foley	Ashley Villar

Congratulations

22.1 The STAC congratulates the Observatory on its successes of the last six months. Gemini has passed through some difficult times due to COVID and its impacts on Gemini observing, and on the finances and timescales of many instruments. However, there has been significant recent progress on many fronts including (1) the hiring of many key staffers, (2) the successful commissioning of the F2 MOS mode, (3) GHOST integration & testing, (4) the completion of the low-resolution GNIRS IFU component, (5) completing the shipping of GPI to Notre Dame for upgrades, (6) successful development of Gemini Program Platform. We deeply appreciate the careful replanning of GNAO to better fit Observatory finances while maintaining world-leading AO capabilities. We look forward to hearing in future meetings about the science results enabled by these new capabilities.

22.2 STAC congratulates the Observatory on its progress in planning for the Gemini Science Meeting in Korea in July. The STAC appreciates the flexible conference planning, including hybrid options and ability to switch registration status within weeks of the conference.

22.3 The STAC thanks the Observatory for continuing to provide a detailed breakdown of the proposer statistics by gender. Although the numbers are still small, the STAC was encouraged to see that the adoption of dual-anonymous review by several NGOs has apparently led to an increase in the acceptance rate for proposals by women and will be eager to see if the trend continues in the future.

22.4 The STAC thanks the Observatory for its presentation on possible GMOS-S interventions. We endorse the intervention plan. As the STAC has noted in previous reports (e.g., May 2021, item 20.1), both GMOS instruments are aging but are still workhorse instruments for all partners. We are pleased that the observatory is considering GMOS options for both the short and long

terms. The STAC supports the current intervention plan, starting with replacing the ESD board in GMOS-S, and wishes good luck to the Observatory with the intervention.

22.5 We congratulate the Observatory on their continued progress with AURA/SwRI to resolve the REA issues with SCORPIO. The STAC continues to regard the delivery and integration of SCORPIO with observatory systems (including software) in time for the start of Rubin operations as a high priority.

22.6 The STAC congratulates GHOST team on the progress in the integration of the instrument at Gemini South. We are eagerly anticipating GHOST commissioning in June.

Recommendations/Endorsements

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

1. Gemini North 2022B: **81.4%.** This includes the pending M1 coating, the GNIRS IFU commissioning, and the IR detector controller testing.
2. Gemini North 2023A: **95.9%**. No major engineering items.
3. Gemini South 2022B: **80.4%.** The major engineering items here are: GHOST commissioning, M1 coating.
4. Gemini South 2023A: **95.9%.** No major engineering items.

22.8 The STAC endorses the project priorities presented in the Development Report as follows: GNAO+GIRMOS, SCORPIO, GHOST, IGRINS-2, GPI-2, GLAO CoD, GeMS Improvements, GNIRS IFU and GPOL, MAROON-X, IUP.

22.9 The STAC endorses the plan to convene a small focused working group to iterate on the details of GPI-2 CTT policy with the goal of proposing an agreement at the governance meetings in November 2022. Our guiding principle remains ensuring that the science productivity and output of the instrument is maximized and well distributed across the Gemini community and GPI2 team. We recommend that the group include someone from Gemini Operations, the GPI2 team, Gemini governance (Board/STAC), and, specifically, anticipated users both in the exoplanet and disk areas, where most of the time/target conflicts are expected to be, and in other science areas of potential GPI2 use. The STAC would be happy to suggest people to Gemini.

22.10 The STAC is looking forward to hearing more about long-term options for GMOS chip replacements or upgrades in future meetings. The tradeoffs between an upgraded GMOS or new capabilities need to be carefully assessed. The STAC suggests that community engagement should start early on this issue, particularly to identify scientific opportunities that are not satisfied by SCORPIO and other planned instruments. The STAC notes that with the current projections for the instrumentation budget, it will be a long time until a new facility-class

instrument will be available and both GMOS instruments have to continue service for at least another decade.

22.11 The STAC congratulates the observatory on the significant progress of both DRAGONS and the Gemini Program Platform. We appreciate the holistic approaches to building stable and sustainable software. We look forward to continued development and implementation of both, and development of synergies with NOIRLab software support for other observatories.

Additional Concerns/Recommendations

22.12 The STAC was concerned to hear about the significant telescope infrastructure faults reported in the last semester and is worried that continued aging of the telescopes will result in an increase in the number of events resulting in the loss of on-sky time for science. It will be key for Gemini to also focus on the preventive maintenance to ensure that the telescope is also on track. Gemini has already passed half of its lifetime.
The STAC encouraged the observatory to study this issue further and present status on a plan for preventative maintenance at a future STAC and Board meeting.

22.13 The STAC is concerned about the integration of GNAO+GIRMOS from the Operations and Software strategy. GIRMOS PDR reviewers have recommended a joint PDR to address those concerns, and ensure that GNAO+GIRMOS is fully integrated and no software mismatch or missing components in software are overlooked that can affect the retrieval of science in an efficient manner. The STAC endorses this recommendation from the GIRMOS PDR.

22.14 The STAC is also concerned about the process of incorporating major non-facility instruments (GIRMOS, Maroon-X) into the queue as the GPP process is implemented. This has significant implications on software, software interfaces and observing efficiency. We are encouraged by the recent hiring of a project manager and systems engineer for GIRMOS, which will promote communication between the various teams, but emphasize that this will not be a simple process. The STAC is concerned that the slow process of facilitization will subsequently delay the design, commissioning and future observations with those instruments.

22.15 The STAC is looking forward to hearing more about the Observatory's experience with the implementation of AEON in semester 2022B at future STAC meetings.

STAC Points of Contact:
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ToOs & AEON: Craig Heinke, Ryan Chornock, Ashley Villar
SCORPIO: Ryan Foley
Visiting Instruments: Chair
Default for other issues: Chair

Future STAC Meetings:
The dates for the 2022B meeting have not been finalized as of this writing. Pending Board approval, this meeting will likely be held Nov. 14-15, 2022, with the format to be determined at a later date.