

# Report of Gemini's Science and Technology Advisory Committee (STAC), May 2024

The STAC held its twenty-sixth meeting on 13-14 May 2024 in a hybrid format (meeting in Hilo, Hawaii, and via Zoom).

## STAC Membership

Craig Heinke, Chair	Damián Mast
Henri Plana, Deputy Chair	Rene Mendez
Ivana Damjanov	Jenny Patience
James De Buizer	Benjamin Shappee
Maria Drout (regrets)	Breann Sitarski
Rebecca Larson (regrets)	Gelys Trancho
Jae-Joon Lee	Jonelle Walsh

## Congratulations

**26.0** The STAC congratulates the Observatory on the successful integration and commissioning of IGRINS-2. The STAC looks forward to the results from the IGRINS-2 SV, and to the future availability of IGRINS-2 to the community.

**26.1** The STAC is glad to hear that Gemini has signed a MOU to join the GIRMOS consortium. The STAC agrees with Gemini that GIRMOS is key to Gemini-North's future.

**26.2** The STAC congratulates the Observatory on the excellent quality of the recoating of the Gemini-S primary mirror.

**26.3** The STAC congratulates the Observatory on the successful recommissioning of GMOS-S with new CCDs, and the provision of the new and popular B480 GMOS gratings.

**26.4** The STAC congratulates the Observatory on the DRAGONS 3.2 release covering long-slit spectroscopy and all imaging modes, and the new Gemini IRAF release to accommodate the new GMOS-S CCDs and GNIRS IFU. The STAC also commends the work of the US NGO in reducing and distributing the data from the initial GHOST observations.

**26.5** The STAC congratulates the Observatory on the successful hiring of chief scientist Elena Sabbi, the smooth transition of Scott Dahm into the interim director position, and the return of René Rutten as Deputy Director.

**26.6** The STAC congratulates the Observatory on initiating the pilot graduate visiting fellow program. We are looking forward to hearing more about the feedback from the first group of graduate fellows visiting the Observatory in 2024.

**26.7** The STAC thanks Henri Plana for his service on the STAC and as Deputy Chair.

### **Recommendations/Endorsements**

**26.8** The STAC is aware that Gemini's software development division (SUSD) is substantially overburdened, and needs more resources. The STAC strongly advises funding the replacement of the fixed-price contract employee on the SUSD team prior to their leaving in October. The STAC additionally thinks that hiring more software engineers, and obtaining additional software support services from NOIRLab, should be a significant priority, and that the DRAGONS team of software engineers should focus on the development while delegating non-essential workload to NGOs or lower-level employees (e.g., answering user queries on software installation). The Astro Data Lab is part of the Community Science Data Center at NOIRLab and may have resources or support services that could be used that could help alleviate the overburden on Gemini staff and assist the user community.

**26.9** The STAC suggests that detailed exploration of the GHOST precision radial velocity mode beyond a feasibility study be delayed until pressure on SUSD is relieved.

**26.10** The STAC acknowledges that SCORPIO is essential to Gemini-South's future, and thus has shifted it to the first position in the priority list (below). Continued vigilance will be required to ensure a functional SCORPIO.

**26.11** The STAC appreciates the work put into planning the Gemini Scientific Strategic Plan so far. The STAC suggests releasing a summary of the Gemini Strategic Science Plan survey results (the major points, not detailed comments by respondents) and showing how the answers vary between different groups and partners within the community. It would be interesting to see the opinion of Gemini employees on the scientific survey, as these are the people who know the telescopes the best.

**26.12** The STAC suggests considering expanding the Fast Turnaround program and expanding our partnership with Subaru, enabling more access by the Gemini community to Subaru's instruments and wide field of view. If so, we may want to also consider the interests of the Japanese community in our Strategic Plan.

**26.13** The STAC was concerned by the low turnout to the Strategic Plan survey (which limits the statistical utility of the survey), and suggests that future surveys sent to the community will need better targeting. For instance, the survey should be sent as a single-purpose email, not buried inside the NOIRLab e-News, saying explicitly how long the survey should take to fill out, and that it will guide planning for Gemini's future. The STAC encourages involving Board and STAC members in advertising future surveys at various conferences (beyond AAS meetings), like the upcoming SPIE Astronomical Telescopes + Instrumentation conference and topical conferences. Future surveys could be open for multiple months to cover multiple conferences,

and could be made available at the NSF and Gemini booths as well. It would be reasonable to re-open the existing Strategic Plan survey.

**26.14** The STAC would be interested in tracking the completion rate of Fast Turnaround programs.

**26.15** The STAC agrees that MAROON-X needs to transition from a visitor instrument run by U. Chicago to a Gemini-run instrument in the near future. However, a full facilitization effort may require more resources than currently available. We suggest that Gemini consider front-loading the U. Chicago work and delaying most of the Gemini effort. We encourage Gemini to explore paths that involve less software development in the short term, such as using U. Chicago's Python data reduction suite until resources are freed to port this to DRAGONS.

**26.16** The STAC was intrigued by the possibility of IGRINS-2 and MAROON-X sharing a port, and possibly using a dichroic to operate them simultaneously, providing a unique wide-spectrum high-resolution capability. This is a very interesting idea that we recommend pursuing at a later time.

**26.17** The STAC suggests that Gemini should have a backup plan in case the IGRINS-2 SV time is weathered out.

**26.18** The STAC suggests that XT programs might be done using actual science programs from the current queue, with the agreement of the PIs. (This might be most attractive to Band 2 program PIs). Then if the data is unacceptable, Gemini can designate it engineering and reobserve the target, but if it is science-quality, just give it to the PI.

**26.19** The STAC suggests that Gemini add the names of the NGOs on the Gemini web page in addition to the STAC and Board members.

**26.20** The STAC suggests that the Gemini team performs a risk analysis and assessment regarding removing the M2 Positioner. Given that this action has not happened in quite a while, there is risk regarding the realignment of the optical train and possible damage to the positioner. A procedure should be written and reviewed for this task and the STAC members should be included in the review.

**26.21** The STAC looks forward to the results of the GPI-2.0 end-to-end modeling and creation of a contrast budget, with particular attention to how the following factors may impact contrast from their anticipated performance: the vibration environment currently on the telescope, vibration from GNIRS, contrast increase with the new M2, contrast degradation from the 147 nm RMS wavefront error print-through from the current M2, the impact of a new coronagraphic mask that mitigates current M2 print-through issues but impacts core throughput, contrast improvements using the anticipated CAL2.0 system, and contrast degradation using the current CAL system.

**26.22** We would like to see results from the vibration analysis to understand the limits on stability for future AO activities at Gemini-North.

**26.23** The STAC supports fixing the camera turret issue with GNIRS in early 2025 and correcting the remaining Altair LGS AO issues, so that the long camera and HR IFU mode can be used as part of normal queue operations. The GNIRS HR IFU mode provides the only high angular resolution integral field spectroscopy capabilities to Gemini users.

**26.24** The STAC hopes that the new cybersecurity "normal" will be established by the next STAC meeting in December, and that progress will be reported to the STAC about what roadblocks have been lifted so that daily work is less onerous than at present.

**26.25** The STAC appreciates that it has been difficult to keep preventive maintenance activities up to date during the recent difficulties. We look forward to regular reports on preventive maintenance activities.

**26.26** The STAC suggests that the GPP program may consider reducing their planned scope of replacing everything all at once, and choose targets that are plausible—e.g. focusing on Explore first, and leaving Navigate for when they have more resources.

**26.27** The STAC agrees that it would be more helpful for us to change to working with the Portfolio Management Office to develop a prioritization plan for all major Gemini projects, instead of only the instrument development projects. The STAC requests that we are provided such a list to work from.

**26.28** The STAC notes the engineering time estimates provided by the Observatory for 2025A.

**26.29** The STAC recommends the following priority ordering for instrumentation projects, in three categories:

- The top priorities are where Gemini should spend its resources.
  - SCORPIO, GNAO/GIRMOS, IGRINS-2
- The secondary priorities are those where we suggest only providing the necessary Gemini assistance to enable external groups to make progress.
  - GPI-2 development work from outside Gemini, MAROON-X transition work from outside Gemini
- The priorities in Deep Freeze are those we suggest not spending any Gemini resources on at this time (don't work on these).
  - GHOST PRV, GeMS improvements, GLAO conceptual design plan, GPOL, IGRINS-2 and MAROON-X shared port

**STAC Points of Contact:**

ALTAIR: Jennifer Patience, Jonelle Walsh

DRAGONS: Gelys Trancho, Damián Mast  
GNAO: Gelys Trancho, Jonelle Walsh  
F2: Maria Drout, Ivana Damjanov  
GeMS/GSAOI: Gelys Trancho, Breann Sitarski  
GHOST: Henri Plana  
GIRMOS: Gelys Trancho  
GMOS: Breann Sitarski, Ivana Damjanov  
GNIRS: Damián Mast, James De Buizer  
GPI-2: Breann Sitarski  
IGRINS2: Jennifer Patience, Rebecca Larson  
Instrument Upgrade Program: Damián Mast  
NIRI: Damián Mast  
ToOs & AEON: Craig Heinke  
SCORPIO: Maria Drout  
Visiting Instruments: Jae-Joon Lee  
GPMO: Breann Sitarski, Gelys Trancho  
Strategic Scientific Plan: Ivana Damjanov  
Default for other issues: Chair

**Future STAC Meetings:**

The dates for the 2024B meeting are planned, pending Board approval, to be Dec. 9-10 in a hybrid format and in La Serena, Chile.