

Gemini User's Committee 2022 Report

The User's Committee for Gemini (UCG) met in a hybrid fashion (both in-person and remotely via Zoom) on Monday 7/25, Wednesday 7/27, and Thursday 7/28. The UCG meeting was held in conjunction with the Gemini Science Meeting in Seoul, Korea.

The UCG members present included: Jonelle Walsh (Texas A&M University, chair), Lindsey Bleem (Argonne National Laboratory), Jennifer Burt (Jet Propulsion Laboratory), Thiago S. Gonçalves (Observatório do Valongo UFRJ), Maria Celeste Parisi (Observatorio Astronómico de Córdoba), Thomas Puzia (Pontificia Universidad Católica de Chile), Young Sun Lee (Chungnam National University), David Trilling (Northern Arizona University), Jonathan Williams (University of Hawaii, Manoa), Letizia Stanghellini (ex-officio, US NGO) and observing in-coming members Victoria Reynaldi (Universidad Nacional de La Plata, Buenos Aires), Ana L. Chies-Santos (Instituto de Física, UFRGS), and Matthew Taylor (University of Calgary).

Also present: Jennifer Lotz (Director), Janice Lee (Chief Scientist), Andy Adamson (Associate Director Hawaii Site), Joanna Thomas-Osip (Head of Science User Support), Bryan Miller (Scientist Gemini South), André-Nicolas Chené (Scientist Gemini North), Fredrik Rantakyro (Scientist Gemini North), Andy Stephens (Scientist Gemini North), and Lucia Medina (Executive Assistant).

New Items from the 2022 UCG Meeting

Director's Update, New Opportunities with Gemini, and User Engagement:

The UCG is similarly excited as Gemini about the science arriving on an almost daily basis from JWST and in the near future, from LIGO and Rubin. Gemini is indeed well poised to make an impact in the associated science areas by playing to its strength as the most flexible 8-m class telescope. Due in part to its nature as an observatory split over two hemispheres and the large number of instruments, the pandemic disruption to travel and laboratory work had a perhaps even larger impact to Gemini than many other observatories. This may have slowed progress on hardware and software projects, but it is encouraging to see that the initiatives are starting to pick up speed.

There is a tight schedule for new or upgraded instruments coming to the telescopes, as well as major software changes (GPP and DRAGONS), over the next two years. The timeline converges in 2023/2024, which may strain staffing, management, and data reduction needs. While milestones for individual projects were presented, it is unclear to what extent the projects affect each other and what a delay in one area will mean for another. If the schedule holds, this promises to be an exciting and transformative time for Gemini, but if there are delays, mitigation

strategies and priorities should be discussed at the next UCG meeting. Also, to prevent disillusionment, Gemini should err a little on the side of under-promising and over-delivering when communicating future capabilities and timelines to the users.

The LLPs will start again in 2023B. Some on the committee thought LLPs reduce the observatory's overall flexibility, possibly leading to a mismatch with the rapidly evolving needs that will be produced by JWST, LIGO, and Rubin and that Gemini should be mindful in balancing the nimble approach needed in a quickly changing astrophysical landscape against the important and high-impact science that can only be carried out with LLPs.

The UCG was asked to provide their thoughts on how to increase user engagement and broaden the user base and this prompted an interesting discussion. Different partners may have different instrument or science priorities and different historical user bases so there is likely not a single one-size-fits-all solution to this important issue. Nevertheless, we provide a few ideas below.

- There was general agreement by the UCG in favor of using DDT (i.e., a substantial fraction of the ~60 hours per telescope per semester) for Early Release Science (along the lines of JWST's program) that could be disseminated quickly to demonstrate Gemini's new instrument science capabilities.
- We endorse the idea of Gemini ambassadors for each partner country, although this would require financial support for travel and possibly stipends. The focus of ambassador visits to various institutions should be on the current observatory capabilities and to provide help with the proposal writing process to attract new users. This initiative could be organized in collaboration with the NGOs.
- The committee supports the continuation of the special "JWST synergies" category for proposals and also supports exploring a similar setup for Gemini proposals that complement, enhance, and leverage LIGO, Rubin, and possibly ALMA observations. Doing so will trigger users to think about connections, ensure that Gemini continues to perform alongside those other facilities, and may increase/broaden the user base.

Status of the GMOS-S repairs:

The UCG shares Gemini's interest in solving the GMOS-S problems in order to keep the instrument operational and competitive. The committee supports the short-term intervention plan (outlined on Slide 7 of the presentation) and believes it should be a high priority. GMOS-S is one of the most requested instruments and it is clear that the community still needs the technical capabilities and performance provided by GMOS-S.

In the longer term, the commissioning of SCORPIO will not affect user interest in GMOS-S, since among the many aspects that make the instrument Gemini's workhorse are the MOS and

IFU capabilities. The committee does not view SCORPIO as a replacement for GMOS-S; they are independent and complementary instruments. We recommend that Gemini reach out to the community to communicate about the long-term proposals under consideration and to determine which of the options (replace with a single 9Kx9K CCD or replace with 3 E2V chips, with or without the M1 coating that will boost blue sensitivity) works best for the users. This is especially important if the wavelength sensitivity will significantly change. In the future if GMOS-S is decommissioned, Gemini needs to plan ways in which to continue covering the community's MOS and IFU needs, otherwise there will be a loss of users.

Next Generation Software Infrastructure for Gemini Phase I and Phase II Support:

The committee applauds the work that has been put into the GPP and the planned software is a clear and significant improvement over the OT and PIT. We enjoyed the demonstration of the EXPLORE application. The ability to invite Co-Is to collaborate on a proposal, bring proposals forward from previous years, and handle the proposal and observation execution (if selected) within one program are all exciting improvements. We encourage the GPP developers to also include the ability for PIs to indicate that their proposal is a continuation of a previous program in order to help with the interpretation of user surveys (e.g., understanding if users' opinions change over semesters if their program takes multiple proposals to reach completion).

The updated GPP timeline seems more feasible than what was presented in 2021, although it is reliant on the success of new hires and retention of the existing team. The committee encourages advertising a conservative estimate of when EXPLORE and the other applications will be ready for public use. An official roll-out date that is publicized but then pushed back would have a negative impact on user engagement.

DRAGONS: The Future of Gemini Data Reduction:

The committee thanks Gemini and the DRAGONS team for the hard work that has been put into developing a sustainable data reduction pipeline for all modes of Gemini observing. The switch to Python from IRAF is necessary and time-critical. In the meantime, it is encouraging to see that Gemini has put significant effort into developing workarounds so that users of Mac M1 chips can use IRAF in the form of 32-bit images or servers running remote desktop services. They should be commended for taking these steps, and such services should continue to be made available (scaled up as necessary) until the full DRAGONS software suite is available. In fact, Gemini should consider continuing to make them available even after the full DRAGONS roll-out, so that users have as much time as they need to transition to the new framework.

While the committee appreciates that significant effort is needed to build the DRAGONS foundation, and that the software development process will accelerate once the foundation is in

place, the committee unanimously remains very concerned about the timeline. We understand that the funding landscape is difficult at this time and we commend the DRAGONS team and Gemini for creatively searching for funds beyond 2024 to prevent a reduction to 2 FTEs. However, we recommend that contingency plans be developed now or (better yet) ways to speed up the process while the GEMMA funding still exists be seriously explored. A reduction to 2 FTEs after 2024 will unacceptably stretch the timeline for a fully functional data reduction pipeline for all instruments and modes. Given the new instruments and exciting changes happening at Gemini in the coming years, having a complete data reduction package is essential for maintaining science productivity and lowering the entrance barrier for new users.

The committee agrees that the common phrase “perfect is the enemy of good enough” applies to the development of DRAGONS. The pipeline must produce science quality data and needs to be tested, but it is unnecessary for the pipeline to have all the bells-and-whistles from the start. It is far more important to have a working pipeline for all observing modes first before improving and automating the procedure for reducing only a few observing modes. It would be sufficient to have a working pipeline for all observing modes, with the well-tested modes, potential issues, and planned improvements/timelines clearly communicated to the users.

Good documentation and cookbooks need to be released along with the DRAGONS software, as they are essential to get users to consistently and successfully use the tools. When done right, a good manual is more valuable than workshops, only takes a single up-front effort, and may even eliminate the need for workshops. ESO has a rich history in producing very effective user manuals/cookbooks, and would likely be a reasonable style to emulate. However, the committee does not think that the documentation and cookbooks need to be produced by the DRAGONS team. As discussed further in the next section, we believe this could be a task completed by the US NGO, which in turn would allow the DRAGONS team to focus on software development and testing.

U.S. NGO services and products for the Gemini Community:

The U.S. NGO provides excellent services to U.S.-based users as well as all Gemini users through the web portal, the data reduction tutorials and cookbooks, and social media presence. The committee enjoyed hearing about, and being reminded of, the U.S. NGO's work. The UCG sees a potential opportunity for improved coordination between Gemini and the U.S. NGO in order to make most efficient use of limited resources.

As discussed above, accelerating the DRAGONS timescale should be a high priority and since the U.S. NGO already provides tutorials and cookbooks to supplement the information provided by the DRAGONS team, it seems possible for the U.S. NGO to fully take over the documentation role while the DRAGONS team completes the code development and testing.

Such division of labor will result in a faster roll out of DRAGONS. Likewise, both Gemini and the U.S. NGO use social media to promote the great science coming out of Gemini, engaging users and the public. We certainly support the social media presence, but we see a duplication of efforts in this area as well. If the U.S. NGO were to take over the social media work, Gemini could dedicate those resources to other areas in need. We recognize that the U.S. NGO currently reports on Gemini science led by U.S. PIs, but perhaps that could be expanded to all Gemini PIs or the other NGOs could run the social media campaign for the science produced by their country's PIs.

The committee further suggests that the U.S. NGO (and/or other NGOs) reach out to authors of Gemini science papers and offer to do social media broadcasting (twitter threads, brief YouTube summaries, etc.) of their results. Such information about working with the NGO social media groups could be posted on the same webpage that lists the Gemini acknowledgement statement, as authors often visit that page prior to submitting their paper.

User Survey Results and their Effectiveness for User Engagement:

Brief surveys at key points in the life cycle of a Gemini program are a good way to maintain communication between users and the observatory. We support the continuation of the surveys, especially with the expected rapid changes (new instruments, GPP, DRAGONS releases) in the near future.

Some UCG members were not aware that contact scientists are available to help the user after the data have been collected and thought the role of the contact scientist was to help with Phase II preparation and to serve as a resource during the semester only. The committee recommends that Gemini communicate to PIs and their teams that contact scientists are available to answer questions during the data reduction process as well.

Other Recommendations:

The UCG members would like to thank the Gemini staff for their work in setting up the logistics and providing presentation materials ahead of time. Ahead of future meetings, we would also like to see the annual statistics on proposals, papers, and citations broken down by instrument, science area, and demographics. These metrics would help the UCG understand the performance and impact of the observatory and would inform our feedback.

We appreciate the brief (~10 minute) closed-door session at the start of the meeting and would like to continue having the session at the start of future meetings. We additionally request more time be allocated to the presentations by Gemini. The discussion with Gemini staff felt rushed during the three hour time period. With future in-person meetings, we hope to be able to return to

the normal UCG meeting format. Moreover, we found the UCG meeting clashed with the Gemini Science Meeting. Having the UCG closed-door sessions and the outbrief presentation while data reduction workshops and the Gemini Science Meeting were on-going was difficult to manage. We recommend that the UCG meeting have the usual two-day format either immediately prior to or after the Gemini Science Meeting.

Regarding user engagement, the UCG requests assistance from Gemini in making users aware that they can reach out to a UCG representative with concerns/requests regarding use of the observatory. Some initial suggestions include advertising in the e-Newsletter (as was recently done in September 2022), posting on social media, and getting the message out through the NGOs. There could even be a Gemini or NGO webpage that reminds users about the UCG and links to a google form where users select their Gemini partner and input a message detailing concerns/questions. The UCG notes that with this system, there should be a concerted effort to close the loop with users who take the time to write in, either with a solution (if reasonable/feasible) or with a note saying that the topic will be considered in the next UCG meeting.

Finally, in order to improve lines of communication and following practice with user committees at other facilities, we request Gemini investigate whether a UCG member could be given observer status at STAC meetings.

Response to Last Year's Report:

The UCG appreciates Gemini's response to the 2021 UCG report, and we have follow-up comments as shown below.

Opportunities for Support through NOIRLab's CSDC - It is unfortunate that NSF did not fully fund the proposed CSDC activity and the committee hopes that the CSDC finds the necessary resources to collaborate with Gemini in order to maintain high-level user support. We also suggest establishing a more clear connection between the Gemini and US NGO web pages as quickly as possible.

GMOS flat-fielding and photometry - The UCG thanks the Gemini staff for resolving issues regarding the GMOS flat-fielding and photometry. The posted document does a good job of describing the method for flat-fielding and photometric calibration. It is also great to see that the planned release of DRAGONS 3.1 will implement this new approach and will reduce the three CCDs separately.