

Gemini User's Committee 2020 Report

The User's Committee for Gemini (UCG) met remotely online on Mon 7/27 and Wed 7/29.

The UCG members present included: Karen Meech (University of Hawaii, chair), Matthew Bayliss (University of Cincinnati), Mark Brodwin (University of Missouri), Scott Chapman (Dalhousie University), Thiago S. Gonçalves (Observatório do Valongo UFRJ), J.J. Kavelaars (National Research Council of Canada), Young Sun Lee (Chungnam National University), Maria Celeste Parisi (Observatorio Astronómico de Córdoba), Vinicius Placco (University of Notre Dame), Thomas Puzia (Pontificia Universidad Católica de Chile), Jonelle Walsh (Texas A&M University), and Letizia Stanghellini (ex-officio, US NGO).

Also present: Jennifer Lotz (Director), Andy Adamson (Associate Director Hawai'i Site), Joanna Thomas-Osip (Head of Science User Support), John Blakeslee (Chief Scientist), René Rutten (Associate Director Gemini South Operations), Atsuko Nitta (Gemini North Head of Science Operations), André-Nicolas Chené (Science User Support Astronomer Gemini North), Pat McCarthy (NOIRLab Director), German Gimeno (GMOS South Instrument Scientist), Chris Simpson (Gemini North - Science User Support), Terry Lee (briefly).

The UCG members would like to thank the Gemini staff, for all their work in setting up the logistics for the meeting under these unusual circumstances. If the next meeting needs to be conducted virtually across many time zones, we request that there be a dedicated executive writing session set aside with at least a 3 hour time block. This is critical for facilitating the production of the report, which was difficult asynchronously.

The Gemini COVID 19 response - In response to the COVID 19 pandemic the Gemini staff are to be commended with the rapid response in March to switching to teleworking and to implementing an orderly and safe shutdown of the facilities. In spite of the situation, the staff have been productive with a number of projects, including detailed plans for the quick resumption of night time operations in May on Gemini-N and plans for Gemini-S when this was permitted in Chile. The UCG appreciates that even under these difficult conditions that priority has been placed on maximizing night time observing for the users with respect to the Band 1 rollover policies into 2020B, and the resumption of the FT and DD opportunities.

Response to Last Year's Report

The 2019 UCG report had a ranked list of high priority action items that affected the ability to collect, reduce, and analyze high-quality science data. Additionally, the UCG recommended several smaller action items. The UCG thanks Gemini for addressing many of these issues.

1. Data Pipelines: the UCG compliments Gemini for all the work to get the new Python-based data reduction system, DRAGONS, released in October 2019. The committee applauds the very

thorough documentation showing that the magnitudes obtained from the new DRAGONS software package are consistent with IRAF, but that the former has better handling of bad, non-linear and saturated pixels.

The UCG noted that there are plans for a GMOS spectral reduction pipeline that will be implemented for ToO observations in early 2021, but still urge Gemini to keep a pipeline for GMOS long-slit spectra as a high priority. We want to ensure that this sees the light of day sometime soon. There will be a huge increase in community use and publications if reduced spectra are produced by the pipeline.

The UCG requested that the observatory dedicate resources to create clear, comprehensive data reduction manuals that will allow a wide range of observers to produce the desired scientific data products. We commend that tutorials have been developed, and there are links on the website to a user manual for reductions and this is a good first step. However, the reduction manual cannot be downloaded as a single document, rather it is a series of pages on readthedocs, which makes it difficult to get an overview of the reductions. The UCG understands that the DRAGONS pipeline development is the observatory priority, but the software isn't useful without easy access to the instructions. Could the material now in readthedocs at least be collated into a single pdf file?

2. Flatfielding and Calibration: The UCG is very pleased with the extensive work that has been done to investigate the flat fielding issues, and with the discovery that the flats don't need to be taken as often. However, there are still significant issues that need attention that will be discussed below.
3. Timing issues: The UCG thanks Gemini for the continued work on the timing issues which will be important for many users. The committee appreciates the detailed discussion of the keywords used for time events and which ones should be used. It would be helpful to understand what the actual timing accuracy is. For example, the UTSTART and UTEND keywords are recommended for GMOS, and it is noted that the shutter closure speed is 10-15 ms. Does this mean the accuracy of this timestamp is 10-15 ms?
4. Visible support of non-Time-Domain use of the observatory: The UCG has seen a commitment by NOIRLab on continued support for standard observations using Gemini, as opposed to prioritizing time-domain projects. This is seen as a positive stance. To this end, we request special attention to two items viewed as priorities for these telescope users: developing a functional pipeline for long-slit and multi-object spectroscopy with GMOS (the main instrument for most communities) and maintaining (in the NOIRlab era) a Gemini User Committee that represents all the participants. This is further developed below.
5. Fix the archive bugs: The UCG thanks Gemini for fixing the frustrating archive bugs that (1) prevented searching on comet names, and (2) prevented the selection of file ranges. This has made searching the archive significantly more efficient for small body planetary astronomers.

New Items from the 2020 UCG Meeting

GMOS Flatfielding and Calibration - The UCG thanks Gemini for the effort that has gone into understanding the flat fielding, however, there are issues that are still unclear. It was noted that the E2V detectors were of the same type so there was no need for a relative QE correction across the detectors. It is not clear why the DRAGONS software cannot effectively flatten each CCD individually, taking account of the different QE of the detectors. There was a detailed discussion of using specialized factors to adjust for the differing QE for each of the detectors which are dependent on the sky color which changes during the twilight. In other words, the QE correction is stable for the science data, but unique to each twilight calibration. There was discussion of providing tables or recipes to allow the users to make these adjustments. This is not acceptable; Gemini needs to provide adequate master flats for all the filters and the time frames during which they are used. This is critically important to ensure that all users' flattened data is science quality.

The UCG is very concerned with two other issues that affect the quality of the data: (1) the "Manhattan skyline" and (2) the absolute flux calibration of the CCDs.

- The "Manhattan skyline" is a ragged line feature that has an unknown origin. While this often occurs near the top of the chip, it can be found in the central part of the chip and if it coincides with the science target the data cannot be flattened and calibrated and is thus not useful. Gemini should prioritize understanding what causes this and how to fix it, and if it cannot be fixed, then all data should be examined at the end of the night and if this appears in the center of the chips where the target is, the data should not pass quality control. (Note: one of the committee members heard that ESO had an issue like this with an instrument and it was caused by movement between components.)
- Gemini provided the UCG with a report showing that the mosaicked photometric accuracy with the GMOS Hamamatsu detectors is limited to 5% because of the different QEs of the CCDs. This is unacceptably low for a science grade national facility instrument and Gemini needs to deliver 1-2% accuracy across the array. Thus, the UCG recommends that the following as a high priority:
 - Measuring the color terms for each of the CCDs
 - Baseline calibrations should be expanded to include dithering the standard stars so that each chip has calibration stars,
 - DRAGONS software should correct for these issues.

The Next Gemini Science meeting - The UCG appreciates that with the cancellation of the summer 2020 Science meeting in South Korea that there is a desire to have the meeting in August 2021 in Seoul, one week prior to the IAU General Assembly, to save on travel costs. The UCG endorses this but is concerned that because in-person meetings take a lot of lead time, one year out is about the timescale to make a decision of virtual vs in-person format. The UCG recommends that there is a backup plan in development for a virtual science meeting, with the intent to meet personally in S. Korea as soon as feasible. The virtual meeting would have the advantage that it could engage more

early-career scientists since there would be minimal cost to attend the meeting. If a virtual meeting is needed, please spread the meeting out into shorter time blocks over a number of days to better accommodate a wide variety of time zones. Also, talk with organizers of other similar-sized meetings to learn from their experiences. Other virtual meetings have found creative ways to promote audience engagement and mimic networking opportunities. For example, the organizing committee may want to check out Yotribe. It is important to engage the user community in 2021 in some way, as the NOIRLab is standing up.

User Survey - Gemini asked the UCG if we still wanted to implement a User survey. The UCG still wants to conduct a survey. The work is done, and because the psychology is very different when you are asked by peers versus the organization, this survey will provide a different sort of information to Gemini. This is a single survey with the purpose of engaging the community to express any requests or frustrations that have perhaps not been passed through the UCG. This will be used to frame a forum-like discussion at the next science meeting. This helps ensure things are more transparent to the community and reflects what the community wants.

User groups - Gemini requested input from the UCG regarding the structure for Users groups that would be desirable for the NOIRLab. The UCG feels that preserving Users groups for individual telescopes and smaller stakeholders is critical. Gemini is shared by many partners (and for some this is their only large telescope access) so there should be a forum for focused feedback. However, the UCG did like the idea of coordination with other user groups. User committees representing users of different classes of NOIRLab facilities (e.g., survey instruments/projects, mid-scale observatories, data mining, time-domain etc.) would provide feedback about the priorities of separate (but overlapping) user communities. Receiving input from these different user groups would better ensure that Gemini and other facilities will best serve everyone who will use them. The combined input from different user communities would also reveal synergies between the needs of different user communities, allowing Gemini and NOIRLab to identify any broad issues or concerns that extend beyond a single observatory or facility.

The new Webpage - The UCG is pleased to see that the Gemini web pages have had a major revision to fix broken links, bugs that interfered with useability and to streamline and consolidate information. However, change is not something scientists look for and there will be some frustrations learning the new system. We would like to see a “for astronomers” shortcut page that contains the basic information researchers most often want to access (akin to the existing Gemini SciOps page: <https://www.gemini.edu/sciops/>). While the pages look very nice, the banner and images at the top are so large that scrolling is needed to find information. We greatly appreciate the plan to involve astronomers in testing the use cases as was done before. This leads to a better product. The UCG encourages Gemini to converge to the final page within a reasonable (few months) timeframe so that users don't learn a new system only to have it constantly changing.

The “Mirror” - The UCG was impressed with the content and quality of this publication, though the length of the document makes it better suited for distribution to libraries and astronomy/physics departments as a hard copy. Assuming such an audience and distribution plan the UCG agrees that the publication frequency of every 6 months is about right. The UCG felt this was a good document for the non-US partners to get an overview of the observatory. Regarding the science content, the UCG suggests that this would be a good place for the LLP programs (as well as other NOIR Lab survey programs) to write up their final results to share with the community. The UCG felt that there would also be significant interest in the monthly Gemini eNewscast focused on sharing information that is immediately relevant to the user community such as timelines for meetings, workshops, data releases, instrument capabilities, technical information, and the outcome of TAC allocations. In addition a more frequent bulletin could highlight new and timely results.

Gemini Program Platform Inception Design Review - The UCG appreciated the update regarding Gemini’s effort to improve its high-level software that will take Gemini into the 2020’s and beyond. The Gemini Program Platform has many great features that will help PIs more efficiently propose for time and define observations, and users will further benefit from having a more centralized communication system and easier access to nightly conditions. The UCG hopes to hear about how the project progresses through the initial and construction phases over the next few years, particularly the manner in which feedback from external users is solicited and incorporated. The UCG looks forward to seeing, what will be, an impressive end product in action.

February 1, 2021