Gemini User's Committee 2018 Report

The User's Committee for Gemini (UCG) met at the Holiday Inn, Fisherman's Wharf in San Francisco on July 27, 2018.

The UCG members present included: Karen Meech (UH, chair), Lilia Bassino, Matthew Bayliss, Mark Brodwin, Scott Chapman, Thiago S. Gonçalves, JJ Kavelaars, Vinicius Placco, Thomas Puzia, Jessica Werk, Verne Smith (ex-officio member and member of the US National Gemini Office).

Also present: Andy Adamson (Associate Director for Operations), John Blakeslee (Chief Scientist), André-Nicolas Chené, Laura Ferrarese (Director), Peter Michaud (Manager, PIO), Bryan Miller, Atsuko Kleinman (Head of Science Operations, GN), Joanna Thomas-Osip (Head of Science User Support Dept.), and Henry Roe (Deputy Director).

Response to Last Year's Report

Closer communication between the Large and Long Programs (LLPs) and the contact scientist at Gemini is needed, but there has already been a very positive move in this direction. It would be ideal to encourage the LLP PIs to have a more collaborative relationship with their primary Gemini contact scientists, which would likely be to the benefit of both parties.

The committee feels that more active steps could be taken to alleviate some of the persistent user confusion regarding expectations for completion rates of programs. Specifically, last year's report recommended that Gemini Observatory take steps to communicate some basic information to queue PIs at the beginning of each semester, including some baseline estimate (or range) of the probability of their observations being executed in the queue. In the response to the 2017 report the observatory states that they are working toward a conceptual review of the Observatory Control Software project (that includes this work) in August 2018. The committee feels that there are simple and straightforward steps in this direction that would be easy to implement on a shorter timescale. This could be an estimate accounting for factors such as the distribution of observing conditions (based, for example, on historical data of weather trends by month), RA pressure in the semester's approved targets, and any planned instrument engineering or scheduling limitations.

Data Requirements for Gemini Observatory Archive hosting LLP data products

The UCG is supportive of making publicly available the calibrated observations obtained by the LLPs in the Gemini Observatory Archive (GOA). The UCG members caution Gemini that running an LLP is not an insignificant burden, and thus we recommend that Gemini not place strong pressure on the LLPs to deliver these products on a one-year schedule. Furthermore, we agree that Gemini should support as much as possible the generation and dissemination of higher-level science archive data products. In particular, the LLPs should reasonably be able to archive the specific calibrated data products used to produce the science outcomes of the LLP (see http://archive.stsci.edu/hlsp/index.html). The LLPs should not, however, be required to

produce generic products. Instead, this requirement should be the responsibility of the observatory.

Due to the unfunded, high workload associated with running an LLP (e.g. developing data reduction/calibration processes, running priority visitor mode (PV) queues, and coordinating multiple observing sessions) the UCG recommends that LLPs have at least 2 years of time after the acquisition of the final data associated with the LLP before delivery of the higher-level archival products.

The document produced by Gemini to guide the production of LLP archive data products is reasonable. The UCG encourages Gemini to make the requirements within this document as specific (with tools for verification) and light as is possible. The UCG also encourages Gemini to engage with other observatories and archive centers that are providing similar survey data product archives to establish the best practices in this area, rather than conceiving of a process and requirements *ab initio.*

In addition to providing tools that will enable confirmation that the archive data products being provided are valid for archive ingestion, the UCG recommends that a process of staging the data for ingestion into the archive be developed. This process should have a minimal overhead/burden for the LLP teams and would be most effective if the data storage/staging system could somehow be integrated into the team's science activities. In this way, the eventual transfer of the archive data products into the GOA would be a natural evolution of the work rather than an additional burden. The benefit of being provided some work storage area might even be sufficient to entice more rapid release of the data products.

Because the LLPs will only produce the data products optimized for their specific science goals, it would be welcome to add the 'quick look' reduction (meaning calibrated but with the best calibrations available at the time of the reduction) into the archive. In addition to the team generated products, the UCG recommends that the LLP data processed by the observatory pipeline should be uploaded. The Gemini data pipeline should be a higher priority than archiving the extra LLP products, as this is likely to be of more value to the community.

UCG sees the Observatory's requirement for LLP programs to return their data products to the Gemini Observatory Archive as a burden on users and would encourage the Observatory to reconsider this requirement.

Program length

The committee appreciates being made aware of the twelve-year trend in marginally decreasing program length and the potential strain on observatory overheads. With the existing data, it is difficult to assess both the cause and the impact of such a trend on the scientific output of Gemini programs. We request further monitoring of this trend and any associated metrics to identify where in the path to observations this trend is initiated - at the proposal stage? At the

TAC stage? At the ITAC stage? As a consequence of LLPs? - and whether this trend has any effect on the scientific impact of the telescope.

Calibration Strategy

There is an issue that GMOS flats are often taken so far from the data in time that they are not optimal for science. In the vast majority of cases, usable twilight flats can be constructed from 5-10 images. The requirement of 25 flat images per band per instrument, while desirable, does not work in practice. The UCG confirms that Gemini users would greatly prefer having slightly noisier flats taken either the same night, or on an adjacent night with a similar lunar phase. In the g and r bands, the lunar phase variation produces systematic issues with the flats that dominate the noise budget. The need for better, more timely flats is urgent. We recommend testing the efficiency of a procedure in which the redder bands (i and z) are taken as evening twilight flats and the bluer twilight flats are taken in morning twilight.

For some observers (optical broadband imaging north of declination -30) the need for 'in night' separate standards is minimal. There are frequently in-field photometric standards available from the PanSTARRS and SDSS surveys and dark time that is spent on observing standards might achieve more science observing for those programs that do not require flux standards. We make the following recommendations: (1) that twilight time not be used for standards, but instead for twilight flats; (2) that Gemini compute the color terms for transforming between the Pan-STARRS and GMOS filter system.

Regarding Telluric IR standards: Please assess and quantify the required number and type of telluric standard star observations to meet 1% and 10% telluric correction over the entire near-IR wavelength range. Finally, we suggest exploring the implementation of atmospheric absorption modeling software for Gemini N and S (e.g. molecfit).

Various Other Issues

Archive Suggestions: There are several software errors which make accessing data in the archive difficult - e.g. comet names cannot be searched because parsing a name with "/" is not possible. Additionally, when calibrations are brought up associated with a program, the only options are to select all of them or click on files one at a time. The UCG requests that it be made possible to select a range of frames without clicking individually. This will significantly increase the functionality of using the archive. The UCG requests that the Gemini staff fix these errors at the earliest convenience.

NOAO Solar System TAC: The feedback from many in the planetary community has been that it has been difficult to get time on Gemini through the NOAO TAC. The UCG appreciated the work by the US NGO to demonstrate that the final allocation of time reflects the subscription pressure per subject sub-panel. More proposal pressure in the Solar System sub-panel may

help increase the fraction of planetary proposals that make it to the final ranking list. It would help to post the oversubscription rates by subject sub-panel.

GRACES ITC: It is currently necessary to have IDL in order to use the GRACES ITC. It is requested that Gemini move the ITC to a software platform that is free. A new ITC based on python is at the conception stage and Argentinian users offer help to complete the change.

Night baseline calibration time: In Phase I, a percentage of the program time based on instrument and mode is added to the Observation Time as "Night Basecal Time". The purpose of including night baseline calibrations in the time request is to ensure appropriate queue filling at ITAC. In the Gemini web pages it is pointed out that this corresponds to partner time. However, it is quite confusing for the PIs filling in the PIT, as it is misunderstood as extra added program time. It is recommended that this step should be hidden from PIs.

Announcements of instrument availability: The 2018B semester announcement of laser AO availability at Gemini North led to considerable community resources being spent in serious proposal writing. This was on top of resubmissions of a semester's worth of previously accepted proposals that were not observed when the laser broke in the first place. The subsequent retraction of the instrument availability led to many dissatisfied users feeling they would have much rather spent their proposal writing efforts on other instruments/science programs. If an instrument is not effectively working at the time of the call, it should be offered in a 'shared risk' mode, and this should be advertised at the top level of the call for proposals. The committee realizes that this was offered in shared risk but it was difficult to find this: The 2018B call for proposals states: "pending the successfully commissioning of the LGSF in late 2018A (see the *Summary of 2018B Gemini Capabilities* section for details)." Two redirections are required to arrive at the 'Altair' section which then states: ". . .carry the risk that will not be accepted if there are issues with the commissioning of the new LGSF"

Timing Issues: The UCG is pleased that the observatory has been responsive to concerns brought up by solar system observers about the accuracy of the time-related keywords in the headers for GMOS. The observatory will begin with a 2-stage approach by (1) putting together a document that describes what the timing header keywords are and what they mean, and (2) then will document what the precision level is for those keywords. The UCG, however, believes that there is an important third step that needs to be taken in which the open shutter time is made as accurate as possible (ideally at the millisecond level) so that Gemini data can be used for critical moving object astrometry that would be suitable for mission support and other time-critical applications.

Flamingos-2: The OIWFS sensor does not work and observers are using PWF2 instead, but the vignetting is enormous compared to using the OIWFS. This mode of operation has significant consequences for MOS operability.. The UCG asks for a timely resolution of this issue.

GMOS-S: The erratically (re-)occurring detector stripes are impacting, at least, parts of the observations (last documented appearance May 14, 2018). The UCG asks for an efficient solution or a characterization of the problem.

New Policy for Data Access Rights for ToOs: The UCG feels that the policy is reasonable. However, there are some issues that need to be clarified in the FAQs about the specifics of the competitive ToO policy. Wording needs to be precise to avoid misunderstandings in at least two instances: (i) definition of "... the same instrumental configuration"; (ii) how the observatory will determine which program was the first to request the trigger.

Scheduling of Programs with Timing Windows: There is some frustration in the solar system community about the level of completion of programs with timing windows. In contrast, the observatory statistics showed that these programs actually have higher completion rates. Our recommendation is that Gemini encourage the solar system community in particular to be proactive about communicating with the Gemini staff about requirements when timing windows are involved, providing flexibility when possible, because this may increase the likelihood of successful execution. For some timing window issues, the situation would benefit greatly by having a delivered condition-dependent signal-to- noise criterion rather than meeting specific observing conditions.

OCS Upgrades and Development to support LSST follow-up vs. Traditional queue scheduling: The UCG appreciates and strongly encourages the development of software designed to efficiently manage the expected increase in ToO triggers in the near future. With the advent of LSST and the recent discoveries in time domain astronomy, we understand this might have a significant impact on queue management for the Gemini Observatory. We were pleased to see that the LSST resources are leveraging what they will be developing in terms of upgrading the software support, which offsets the costs of the time invested. We also encourage the observatory to reach out for user input on the upcoming OCS upgrades, in the form of email invitations for community inputs on changes and improvements.

Nevertheless, we would like to emphasize that the majority of Gemini users is comprised of astronomers who focus on the "static universe". Gemini Observatory resources and staff FTEs are limited, and the UCG is concerned about the level of resources being diverted to time domain astronomy at the expense of other initiatives. One example is the release of instrument pipelines and data reduction documentation, which have long been considered urgent by the UCG, with little real progress after several years.

This issue is especially sensitive to small partners, given their dependence on Gemini facilities. Since this is the only 8-m class telescope accessible to some countries, we foresee that workhorse instruments such as GMOS and non-time domain observations will still comprise the bulk of the demand in these regions for years to come. An increased level of specialization in either telescope might particularly hurt these communities. Furthermore, even though LSST

alerts will be publicly available, most astronomers in these areas will not have access to the full dataset, which limits the investment return for non-associated partners.

Taking all of these into account, we request the Gemini observatory to prioritize user support for traditional queue scheduling, and to encourage resources be spent on improvements that support the general observer base (e.g., pipelines, communication, optimizing availability of existing instruments and modes). We are especially concerned about getting the basic pipelines up and running, as we think this is the single biggest impediment to getting data published quickly from Gemini.

Future Meeting

The next UCG meeting will be held in Hawaii in mid-August 2019.

The User's Committee for Gemini
Lilia Bassino (AR) - *Universidad Nacional de La Plata*
Matthew Bayliss (US) - *MIT Kavli Institute for Astrophysics & Space Research*
Mark Brodwin (US) - *University of Missouri, Kansas City*
Scott Chapman (CA) - *Dalhousie University*
Thiago Signorini Gonçalves (BR) - *Observatório do Valongo, UFRJ*
JJ Kavelaars (CA) - *National Research Council of Canada*
Karen Meech (UH, Chair) - *University of Hawaii*
Vinicius Placco (US) - *University of Notre Dame*
Thomas Puzia (CL) - *Pontificia Universidad Catolica de Chile*
Verne Smith (ex officio) - *US National Gemini Office*
Jessica Werk (US) - *University of Washington*
Joanna Thomas-Osip - *Gemini Coordinator*
June 19, 2019

Appendix: Prioritized Suggestions

Major Action items in priority order – these affect the ability to collect, reduce and analyze quality science data

1.   Finish the development of the data reduction pipelines for science quality calibrated data (flatfielding for imaging and spectra, and wavelength calibration for spectra) – *This has been requested as urgent for several years*

2.   Assess strategy of getting fewer (than 25 flats) per filter per twilight to ensure observers have near simultaneous calibrations at the same lunar phase. Assess if red band twilight flats in evening, and blue in the morning is a good strategy to accomplish this.

3. Characterize and solve the problem of the GMOS-S detector stripes

4. Repair the F2 OIWFS sensor

5. Document the timing keywords in the GMOS header and ensure that the exposure start time is accurate immediately to 1 sec, longer term to millisec

6. Quantify what is needed for telluric IR standards.

7. Explore use of atmospheric absorption modeling software for calibration.

Small Action Items in priority order

1. Fix the archive bug preventing search on comet names

2. Fix the archive bug that does not allow selection of ranges of images

3. Provide estimates of likely completion rate for conditions, RA requested with the time allocation award letters. – *improves community satisfaction with the observatory*

4. Move the GRACES ITC software to a free platform (with the help of users in Argentina)

5. Hide the "Night Basecal Time" from the PIs in the Phase I - *annoying, but not urgent*

6. Set up a data staging area for ingestion of LLP data products – *will help LLP programs implement observatory request faster*

7. Monitor trends in program length (*if the observatory feels there is an issue that needs to be addressed; it was not clear to the UCG that this is an issue*)

Short / Easy action items – all should be done at the earliest convenience

· Clarify wording in ToO policy to specify what is meant by "same instrument configuration", and determination of "first trigger" of observation.

· For instruments that are not fully functional, ensure that they are advertised as "shared risk" in the call for proposals