

Users' Committee for Gemini 2016 Report

The Users' Committee for Gemini (UCG) met at Gemini Headquarters in Hilo, Hawaii on August 16-17, 2016. The first day was reserved for discussing items related to the data archive, observing tool (OT), data reduction (DR) tutorials and forum, and user expectations for program completion. On the second day, the UCG sat in on the Operations Working Group meeting to hear the summary reports of the partner National Gemini Offices (NGOs).

UCG members present at the meeting included: Franz Bauer (chair), S. Mark Ammons, Lilia Bassino, Matthew Bayliss, Mark Brodwin, Thiago Goncalves, JJ Kavelaars, Karen Meech, Lucyna Kedziora-Chudczer, Minjin Kim (partial attendance).

Response to last year's report

There were a number of concerns that the UCG brought to the attention of the Observatory in 2015. The Observatory considered these and reported on the actions taken to address them where possible. Several of the issues remained topics of discussion this year, and are separated out in the text below. We comment briefly on the remaining items as follows.

The channels of communication between Gemini and the users seem to have improved considerably. The UCG was pleased to see the new streamlined email that accompanies the notification of program completion. One remaining area to work on is with regard to useful ways to improve the channels of feedback and visibility of the UGC, as well as promote better interaction and coordination between UCG members and their respective NGOs. One possible step is to add the names of the UCG representatives when emails are sent to the PIs and send each PI a user feedback form at the completion of their program (a few NGOs already do this, but ideally it should be standardized by the Observatory).

The UCG recognized the Observatory's progress in developing hardware and software solutions for addressing GSAOI's substantial nonlinear static distortion (e.g., [Disco-Stu](#) for distortion correction and image stacking). The recently purchased pinhole mask equipment will substantially improve the ability for GeMS users to characterize instantaneous distortion during any pointing, including all static and time-varying contributions. The envisioned software correction of the instantaneous distortion map represents a critical step forward. The UCG recommends that the Observatory notify the user community about these ongoing improvements and the expected timeline for completion.

Webpages

UCG members participated in "live" website user testing during the Hilo meeting to provide user feedback on the appearance, style, functionality and ease of use of the Gemini webpages in comparison with those from other observatories. The willingness to make changes in response

to the experiences from the perspective of the scientific and public outreach website users will result in a quality product. We commend the Observatory for undertaking this effort and encourage the Observatory to perhaps try shorter versions of this at various meetings and conferences to capture a larger representation of the user base.

Regardless of the outcomes of user testing, the UCG felt that the Gemini Observatory web page should be the primary and most obvious place to go for information about data reduction cookbooks, instrument information etc. Thus, it is critical for the Observatory to provide clear weblinks to any offsite information (e.g., from the NGOs) from the main webpage(s) and the NGOs should encourage their users to go through the official Gemini observatory web pages to find technical instrument information and data reduction help. Likewise, the Gemini main web page should have easily visible links to all NGOs to access partner specific information.

The UCG recommends that the reduction cookbooks be made more visible on the Gemini web pages and recommends centralizing the location of links to information on Gemini instrumentation on the Gemini web pages. It is particularly important to set this precedent now as the first cookbooks are being brought online, subsequent ones will, hopefully, soon follow. Broken (expired) links should be checked frequently.

The Observatory laid out a possible plan to merge / consolidate the current Helpdesk and DR forum with two specific goals. On the one hand, this would provide a way to capture the most frequently asked questions that are relevant to a larger audience and at the same time limit repeat Helpdesk questions. On the other hand, it would drive more traffic to the DR forum, improving visibility and usage. The UCG encourages the consolidation of the Helpdesk and DR forum where possible, but notes that there needs to be a mechanism or option to protect a user's privacy. Also, having an overlap of personnel between the Helpdesk and the DR forum would ensure the synergy occurs in an organized and efficient fashion. Ideally, these Helpdesk/moderators would "write-up" completed tickets as generic/non-proprietary posts on the DR forum or integrate key information onto the Gemini website. In addition to publicizing the solved query, this would save time by allowing them to direct similar future helpdesk questions to the forum.

There continues to be a need for additional advertising of the DR forum. The UCG recommends that Gemini and NGO staff who support the Helpdesk also be appointed as DR forum moderators.

Data Reduction Cookbooks

The UCG was enthusiastic about the recent release of the GMOS cookbook by the US NGO and would like to reiterate support for any and all efforts to provide useful cookbooks and associated scripts to the community. This remains an area with significant room for improvement.

The UCG encourages the Observatory, NGOs, and expert users in the community to collaborate on the production of further data reduction cookbooks. To help the Observatory and NGOs in planning future cookbook work, the UCG strongly recommends that the Observatory poll its users to generate a full prioritized list. Nonetheless, among the priority areas identified by the UCG are cookbooks for:

1. GSAOI (particularly with full time-dependent distortion correction)
2. GRACES
3. GNIRS
4. NIFS
5. FLAMINGOS-2

In addition, the UCG reiterates its previous recommendation that the Observatory continue to support data reduction workshops, led by partner NGOs at partner national meetings, contributing staff members where feasible.

Gemini Data Archive

The UCG commends the Observatory staff for the development of the new data archive, which can accommodate both raw and reduced data products (presently limited to processed biases, flats, fringe frames, and MOS pre-imaging from GMOS), as well as the ability to provide publication statistics. Although principally implemented as a cost saving measure, the new archive already benefits from a number of improvements over the previous one.

The UCG discussed the possibility for further development of automatic data reduction pipelines that could at least allow quick look assessment of data, and preferably allow science level data for simple observing modes. While the highest priority for the Observatory should remain providing competitive instrumentation and observing modes to its users, the UCG was very enthusiastic about the discussion of value-added products like quick-look images. These would provide an immediate benefit to Gemini PIs, allowing rapid knowledge of what was in their data (quality, content) and potentially give them added motivation to move forward with their projects and publish their results in a more timely fashion. Moreover, these products would allow archive users to assess what was in the archive and its utility, opening up the Gemini archive to a considerably larger userbase and enabling new science with old data. This would address past concerns about the low percentage of Gemini archive data currently being exploited.

The UCG reiterates its recommendation to implement automated data reduction pipelines that can provide quick-look (and/or science grade) data products for the simpler Gemini observing modes. This should be given a high priority, and ideally arise naturally as the result of any Gemini release of new science quality Python data reduction tools for a given mode. Producing quick-look capabilities with each tool would provide a very important value-added feature for Gemini users, and should ultimately boost efficiency among Gemini PIs and archive users alike.

In this discussion, it also became clear that the current archive design lacked the ability to search for moving objects in a dynamic way. One option proposed was to generate searches for a static list of objects moving targets (e.g., famous targets like solar system moons and dwarf planets), but this would likely be of limited use especially in the context of rapid discoveries from current and future (LSST) all-sky surveys. A far more versatile option would be to allow users to input their own ephemerides. The latter option was seen as a critical use case for the planetary community that is currently missing in the archive and something the Observatory should strongly consider implementing.

The Observatory should work to include moving-object query capacity into their archive system. This should provide the flexibility to allow users to find observations of well known solar system objects as well as pre-discovery observations of very recently discovered objects. The Solar System Object Image Search (SSOIS) provides a good example of such a service.

New OT

The UCG engaged in considerable discussion about the OT, which has been seen as a regular source of frustration within the user community, often requiring a significant investment of the PI's time with a steep learning curve. There have been some positive improvements, such as the great responsiveness of Gemini staff to solar system requests for implementing moving objects. However, such improvements have generally been offset by ongoing and repeated complaints about the OT, including much too-frequent updates, a lack of backward compatibility, a lack of intuitiveness, no undo function, difficulty in putting moving targets, among others.

The Observatory proposed the possibility of revamping the OT, principally with respect to its backend interface, which had been the root cause for several issues related to user interaction with the OT. The UCG commends the Observatory for considering such changes, but felt very strongly that there should be heavy interaction with the user community on something as significant as an OT redesign. And furthermore this interaction should happen well before significant effort is devoted to this redesign. The Observatory has an opportunity here to redesign the OT from scratch, and to really reconsider every fundamental aspect of how the user interacts with the queue observing process.

Thinking broadly, the UCG would advocate for a new mode of observation preparation in which PIs need only communicate high level descriptions of the desired observations to Gemini staff and NGOs, who could then themselves take responsibility for generating the actual observation sequencing (i.e., the detailed XML output of the OT phase II). This new scheme could be implemented via a simplified OT or a separate open API that users interact with outside of the graphical user interface. Expertise in using the current OT, for instance, is already concentrated among a few experts --- most of whom work within Gemini or the NGOs --- and this new mode would likely improve efficiency for translating approved Gemini programs into active

observations that are ready to be executed by the observatory. It seems obvious that optimizing this translation process should be one of the central goals/concerns of the observatory.

The UCG recommends the following:

(1) The Observatory should systematically survey the broader Gemini user community about the OT. It will likely be essential to perform community-wide tests of the current OT to systematically identify problems and complaints, similar to the website user testing already being carried out. The most obvious path for this is through one-on-one shared-screen sessions during phase II, so that Gemini/NGO staff can see problems as they arise in time-critical situations.

(2) The Observatory should reconsider the roles and responsibilities that are most appropriate for the PI and the Observatory in a dominantly queue-scheduled system like that employed by Gemini. The Observatory should poll the community on this topic, and if Gemini remains committed to the idea of overhauling the OT, then that overhaul would represent a fantastic opportunity to address problems with the OT that lie at the heart of the user community's complaints. Such an overhaul also could represent an opportunity to "reboot" its relationship with the user community.

(3) Regarding community's feedback on long-term OT development, "live" user testing should be performed for any OT updates or changes so that testing is performed not just by developers and experienced staff / NGO members but also by neophyte users.

Adaptive Optics Usability

Based on user feedback to the UCG, the Gemini user community appears extremely supportive of the Observatory's efforts to improve the AO user experience, including the NGS2 and Toptica LGS upgrades. The UCG recognizes that the majority of usability issues with GeMS stem from staffing limitations and technical shortcomings of the instrumentation, which these upgrades will address in part. Since the capabilities of GeMS may change significantly as a result of these upgrades, the Observatory may want to consider scheduling a second GeMS "Science Verification" phase to publicize these advances.

As reflected in the 2015 User Survey, the user community anticipates future AO developments that extend correction to wider fields and bluer wavelengths than currently available, with high sky coverage. LGS+P1 mode represents an important, yet relatively inexpensive, step in this direction. To encourage usage of this mode, which is a unique capability among 8-10 meter class telescopes, the Observatory should maintain downward pressure on the overheads. For programs utilizing non-sidereal tracking, LGS+P1 could potentially provide a major benefit, as this mode could reduce the trailing on the object when stars are simultaneously well guided.

Acquisition and overhead times will likely be increased in LGS+P1 mode, which along with anticipated improvement in S/N or resolution, will affect a user's decision to use this capability.

The UCG encourages the Observatory to quantify and reduce LGS+P1 overheads for each instrument and share these with the user community in a timely and clear manner. As LGS+P1 usage increases, users will also benefit from a projected improvement in encircled energy and image FWHM for a given guide star configuration in addition to the automatic Strehl calculation performed by the OT Guide Star tool. The UCG is very supportive of a Gemini Focus article on LGS+P1.

Queue Descriptions and Band Completion Rates

The UCG discussed how current online queue descriptions relate to actual band completion rates and user expectations. The user community has the highly optimistic expectation that a typical Band 1 designation equates to a guarantee that the PI's observations will be 100% completed. However, the Gemini-board mandated requirement has always been that 90% of all band 1 programs should be 100% complete after rollover. And even this was recently acknowledged by the board to be overly ambitious based on past completion rates, and thus changed to 80%. A number of factors likely contribute to the apparent user expectation gap.

For one, the definition of Band 1 could be made clearer and more consistent across the relevant Gemini web pages. For instance, the Observatory states as its baseline requirement that Band 1 equates to "at least 90% completion rate after rollover period"; it should be made clear that this does not 90% complete for all programs, but "90% (now 80%) of Band 1 programs should be 100% complete". This goes for the other band designations as well, for both the requirements and goals. Additionally, the existing documentation describing the expected completion rates for the various bands is out-of-date and confusing. For example, the latest completed semester shown is 2012A and the time periods shown in many of the graphics differ, making it hard to form a reliable and complete picture. Furthermore, there is a considerable description provided on the history of changes of the process, rather than a clear and concise statement of what a PI should expect given the band their program is placed in the current semester.

The band designation and completeness rate documentation desperately needs to be clarified, homogenized, and regularly updated.

Secondly, there has been a strong disconnect between the initial band completion requirements set by the Gemini board and what the true capabilities of the Observatory are. Hopefully the recent modification to 80% mentioned above lessens this. One additional issue highlighted by the Observatory was that ITAC allocations were not properly accounting for the required calibrations, and this led to an artificial 10% drop in the completion rates. The UCG looks forward to seeing the impact of this full accounting, and hopes that the rates improve in line with previous definitions. If not, then the Observatory should consider stronger measures to manage expectations.

The UCG feels that it is important to place a premium on improving transparency and clarity about the queue scheduling and prioritization. These are essential for minimizing confusion and angst within the user community about why and how different programs end up with different completion rates. Regardless of the cause, the UCG stresses that it is absolutely critical that the Observatory close this completeness rate gap. This gap has created elevated expectations within the user community which have been impossible to meet and likely have contributed to bad perceptions of the queue system.

The UCG was worried about how completion statistics were skewed due to the evaluation of completion by program numbers rather than by hours. Without presenting both, it remains unclear how large programs factor into the completion statistics for Bands 1 and 2. The completion rates also likely vary substantially by instrument, with a few inefficient instruments potentially negatively skewing the results.

It is essential to show completion rates as a function of total hours awarded in a given band, alongside the currently used metric, number of programs. It is also imperative that completeness rates for each instrument/mode be made available, in order to better manage user expectations and Observatory priorities.

Future Meeting:

The next UCG meeting will be held in La Serena, Chile in conjunction with the Ops WG meeting in August 2017.

The User's Committee for Gemini

Franz Bauer (CL, Chair) - *Pontificia Universidad Católica de Chile*

S. Mark Ammons (US) - *Lawrence Livermore National Laboratory*

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*

Thiago Signori Gonçalves (BR) - *Observatorio do Valongo, UFRJ*

JJ Kavelaars (CA) - *National Research Council of Canada*

Lucyna Kedziora-Chudczer (AU, Limited-Partner) - *University of New South Wales*

Minjin Kim (KOR, Limited-Partner) - *Korea Astronomy and Space Science Institute*

Karen Meech (UH) - *University of Hawaii*

Tracy Webb (CA) - *McGill University*

Verne Smith (ex officio) - *US Operations Working Group*

Jessica Werk (US) - *University of Washington*

Dec 30, 2016