Gemini Observatory Commentary on the UCG 2018 Report

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Gemini thanks the UCG for their report from their August 2018 meeting at the Science and Evolution of Gemini Conference in San Francisco. In preparation for the 2019 meeting, we provide here some updates and responses to the issues raised.

LLP Data Products Delivery Requirements

- The deadline for delivery of processed data remains one year after completion (for LLPs beginning in 2018 or later). The requirements on the format will be kept as light and flexible as possible. Teams are expected to define what they will deliver in their proposal and to work towards those deliverables.
- We are actively working on delivering quick look data reduction products for all facility imagers and GMOS Long-slit (with other modes to follow). These will be available in the Gemini Observatory Archive a short time after the observations are complete.

Calibration Strategy

- The major issue with the GMOS flats for the last few years has been their limited ability to flatten the data due to the impact of air bubbles in the optical system (rather than the fact of being taken far in time). This has been fixed only recently for GMOS-S (July 2018; there are several entries in the "status and availability" GMOS page about this) and we have begun characterizing the performance of evening i and z flats although these have previously been shown to perform poorly about half the time. Less invasive work to ameliorate this in GMOS-N will be attempted during the upcoming shutdown. If that is not successful, a more invasive intervention will need to be planned.
- Photometric standards are rarely taken in twilight. The observations are very short so they normally fit into a regular observing night, provided that the conditions are photometric. We acknowledge that color terms for transforming between systems would be useful and will consider how to fit this work in amongst other priorities.
- Telluric standards: We have looked into the currently available modelling packages (essentially, TAPAS and ESO's Molecfit). Both are capable of being used but both have significant drawbacks which at present indicate that we should draw users' attention to them rather than suggesting that they forego the use of telluric standard star observations. We will discuss the two packages above in the next UCG meeting, and seek some clarity on the meaning of the statement about precision of telluric star cancellations. For most purposes, one needs to select a standard which (i) doesn't contain spectral features that you are looking for in your target object; (ii) is reasonably close in average airmass to

your target when observed and (iii) is reasonably close in the sky. This may require provision of "before" and "after" standards for one of them to meet the first criterion.

OCS Upgrades and LSST follow-up Network plans

- User input has been sought via various conferences and communications and more effort will soon go into this via Gemini Focus, enewscast, Gemini software blog, and community testers. There is also an active working group focused on the time domain issues, which comprises not only time-domain scientists but also static universe observers.
- Modernization of the OCS is necessary for the increasing number of ToOs expected and for long-term maintenance and development of the software. We would need to do the OCS Upgrades even if there was not the LSST follow-up driver Additionally, it will benefit all users regardless of their science goals by making Gemini more efficient and our tools easier to use.
- The amount of work going into TDA (funded by the GEMMA program) is small compared to the overall OCS replacement effort.
- The Gemini Board have directed us to be the premier facility for LSST follow-up. Users should contact their STAC and Board representatives with their opinions of a strategic nature.
- Progress on data reduction pipelines is improving because the Gemini Board and STAC directed us to do so for the purpose of LSST and other transient (LIGO, etc) follow-up.

Timing issues and keywords

We have looked at the timing information stored as FITS keywords in all headers for all instruments and and reviewed the timing synchronization protocols.

- The timing information in the keywords for all instruments are synched to a NTP server at the summit which has an accuracy of a few milli-seconds, either directly or through a computer synchronizing to this server. So in theory, this is the order of magnitude of accuracy that could be reached in the accuracy of the timestamp itself.
    - The main cause of issues are that all timestamps are set at the start of an event and due to the software design there are delays (eg. UTSTART is set at the at the moment the detector computer is commanded to start an exposure and not when the detector actually starts the exposure itself).
    - Work is planned on how to best configure these synchronization protocols so that they are frequent enough to correct for inherent clock drifts in the detector computers and identify how to detect any issues.
- Most instruments have up to 10 different keywords related to timing with confusing descriptions. There is confusion between observation and exposure timestamps and also standard to which they are related (UT1 vs UTC vs JD vs TT). The biggest culprit is MJDOBS which is in TT (Terrestrial Time) by definition, but many users believe that it is UTC thus causing a difference of 69 sec compared to actual UTC.
    - Within semester 2019B, we will post on the web a clear document for each instrument about which keywords best define the time for when an exposure starts (in most cases this is UTSTART and UTEND). We will also update the FITS

header descriptions of the keywords to clarify to which event the keyword is related.

Further improvements in accuracy require low level software changes in the detector controllers and the effort necessary makes this a longer term goal.

Various

- Gemini Observatory Archive improvements are waiting an ongoing recruitment. The backlog of work including the items listed will be addressed in priority order once the hiring and training is complete.
- Statistics for the US demand for NOAO TAC panels can be found at the US National Gemini Office Users Support Portal.
- Night-time baseline calibration will be hidden from the PI to avoid confusion: Hiding this information from the PI can be done, but would probably cause confusion later-on. This will need more thinking through (Bryan) so that we understand the full impact.
- Instrument availability (laser): we recognize the issue described in the report. The tension is between giving PIs the earliest opportunity to access new facilities, and wasting their time if it turns out that the facility is not available in practice. The report asks that we make the risk more clear and we will undertake to do that in future calls. “Shared risks” is not the right term, because that has a defined meaning which is not what we are talking about here. But we can be clear (and prominently so) where PIs would be risking their effort in writing proposals for a facility that is expected but not guaranteed to be available.
- FLAMINGOS-2 OI issues: The F2 OIWFS was repaired since the UCG meeting. An extensive investigation took place to understand the root cause of the failure mode and the quality of its positioning. However, since then, the OIWFS failed again and will be repaired in July. Longer-term options will be considered.
- GMOS-S detector issues: Indeed, the GMOS-S detector has suffered repeatedly from a range of unwanted features in its readout. Suspected parts of the electronics and cabling have been replaced in the cryostat. Currently, the situation is nominal, but time will tell whether the intervention has effectively resolved all the issues.
- Policy on competitive ToOs clarified on the web page as requested.
- We appreciate the UCG recommending PIs with timing windows to be proactive in communicating with their primary support (Gemini or NGO staff) and would generalize this to all PIs.

Next meeting

- July 31-Aug 1, 2019 in Hilo, HI.