

GTC GUC Meeting - September 03-04, 2024

GTC headquarters, Santa Cruz La Palma, Spain

Attendants:

Carlos Román Zúñiga (chair)

José Acosta Pulido

Sara Cazzoli

Nancy Elias-Rosa

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General Remarks

The two-day GUC meeting focused on instrumentation development, data reduction issues, operational challenges, and the need for improved communication with the user community.

The Committee was encouraged by the progress made in many areas but also raised concerns regarding several recurring issues, including the slow delivery of instruments, the underutilization of the GTC archive, and the need for better user acknowledgement of GTC contributions in publications.

The Committee particularly emphasized the necessity of improving data processing pipelines. A recurring theme was the need for the GTC team to improve responsiveness to users' concerns. The GUC also underscored the importance of the ongoing push to bring the Frida instrument online and enhance the adaptive optics (AO) system.

Most Relevant News and Activities since the Last Meeting

Key developments since the last meeting include:

- **Frida Instrument:** The delivery of the Frida instrument has faced further delays. The GTC director is following up with IAC personnel to obtain updates on the software delivery. Additionally, the possibility of enlisting help from the University of Florida for software engineering assistance was discussed. Alan Watson will continue testing to

determine if replacing the damaged helium line has resolved Frida's compressor issues, with delivery expected by mid-2025.

- **GTC AO System:** Significant progress has been made with the commissioning of the GTC AO system. Recent advancements include correcting non-common path aberrations and integrating a filter wheel into the system. Tests using the primary mirror for higher-order corrections are underway.
- **New multi-band imager and spectrograph:** Plans to develop a multi-band imager and spectrograph are ongoing, with a formal -but not binding- preliminary consultation to gather scientific drivers and a tender call planned for this year

GTC Archive

The GUC is glad that the current version of the GTC archive allows queries by Principal Investigator (PI) name, thus increasing its usability. However, manpower shortages have impeded progress, and the team expects improvements by adding new personnel. The GUC expressed concern about the archive's delays and highlighted the importance of ensuring timely access to well-organized data for the community. Moreover, the GTC publication record has been stalled for a few years, and the current publication delay (from data acquisition) is 4 years. This further highlights the need for increasing the use of the GTC archive.

The GUC notes the importance of enhancing transparency and tracking within the archive system. The inclusion of proposal codes in publications was discussed as a means of increasing proposal rate for the most complex instruments, and for improving the visibility and usage of archived data. The GUC strongly supports these efforts as well as those directed towards integrating new tools, such as user-contributed data reduction scripts. It was noted that stronger ongoing support is needed to make these ideas fully operational.

Finally but most importantly, there is a growing concern over time allocations to programs whose IPs have not released their reduced, published GTC data. The need to incentivize users to submit their reduced data to the GTC archive was thoroughly discussed. The GUC suggested that the Time Allocation Committee should consider, when allocating telescope time, whether a group who has published GTC data has submitted those reduced data to the GTC archive. On the other hand, the GTC team will enhance its efforts to better track publications that emerge from GTC observations. The GUC considered these suggestions could improve the GTC archive usability.

Update on Science Operations and Instrumentation

The meeting also reviewed several operational aspects, focusing on instrumentation updates and their associated challenges.

TARGET OF OPPORTUNITY HANDLING

Target of Opportunity (ToO) handling is extremely challenging, with almost one triggered every night (last semester up to 120 hours were dedicated to ToOs!), often generating scheduling conflicts. Currently, the scheduling is an effort taking about 1 hour per day, and is organized by priority, but ToOs are impossible to be fully automated as normal programs. They are also difficult to assess, since sometimes ToO are requested for targets that are not consistent with the original application. For these reasons, ToOs are currently not accepted for Large Programs.

The GUC recommends the development of a dynamic, semi-autonomous scheduler to manage queue observations and Target of Opportunity (ToO) requests.

MEGARA

The MEGARA instrument is facing significant operational challenges. Problems with data resolution were highlighted, specifically in the Galactic Archaeology program, where the required 15k resolution mode has been unavailable. The unusable data from 20 hours of awarded time has yet to be addressed, and the team has not received feedback from GTC. Calibration data issues and problems with the pipeline directory structure were also discussed. The GUC is concerned that these problems, if not resolved, may jeopardize MEGARA.

Efforts by external teams, such as the software developed by J. Zaragoza Cardiel and Rafael Guzmán's data reduction tools, were noted as potential avenues for improving MEGARA's performance. The Committee urges a thorough review of these tools to ensure better data processing capabilities moving forward.

The GUC also expressed concerns about MEGARA being essentially unusable for ~50% of the time in summer due to high temperatures. A thermal enclosure for MEGARA is being designed to overcome this limitation.

Some users request calibration frames that can be used to assess and possibly correct for crosstalk among fibers for bright sources, since a bright star on pixel/fiber bleeds over into adjacent fibers. The GUC requests that GTC carry out and provide those calibration frames. The GUC notes the on-going need among the user community for the MEGARA MOS high-res capability, while recognizing the GTC does not have resources to address this concern.

OSIRIS

The GTC team informed that tests required to assess the second-order contamination in the blue grism are finished. The instrument pages have been updated with all the information. The u filter also shows contamination and will be replaced.

The GTC director noted the team's work on developing a more robust pipeline for OSIRIS MOS data reduction. Additionally, a quick-look tool for OSIRIS is expected to be released soon, which will provide users with faster feedback on data quality during observations. The GUC welcomes these developments but stresses the need for better documentation and user support to ensure the tool's effectiveness.

EMIR

The GUC is pleased to know that the new EMIR detector shows an increased efficiency, especially in the J band.

Adaptive Optics (AO) System

Updates on the AO system were provided, showing significant promise in recent tests. The GUC considers very positive that the AO system has produced its first preliminary results, achieving a very good spatial resolution. The system has successfully integrated non-common path aberration correction and is moving forward with the testing of higher-order AO corrections using the primary mirror. However, concerns remain regarding manpower and the slow pace of software and documentation updates. The GUC recommends continued prioritization of the AO system, as its full functionality will significantly enhance GTC's observational capabilities.

HORUS and the Collaboration with partners in China

The upcoming HORUS system for GTO programs and the continued collaboration with a Chinese team on a new instrument were discussed. While the market consultation process is ongoing and funding approvals have been secured, there are some remaining concerns about the capability and impact of these new instruments. The Committee recommends regular updates on their development to ensure alignment with GTC's strategic goals. GTC community-wide access to HORUS would be very much welcomed.

HIPERCAM

HIPERCAM's pipeline and its usage were also discussed, with the GTC director confirming that the pipeline specialist is available to assist users with deep imaging data processing. The Committee is encouraged by the progress made with HIPERCAM but noted the importance of providing users with updated recipes for reducing imaging data, particularly to address issues such as gradient-related cosmetics.

Recommendations from the GUC

- 1. FRIDA Delivery and Development:** The GUC recommends that GTC management take the necessary steps to improve the timeline for delivering FRIDA. The Committee also encourages the exploration of external collaborations, such as with the University of Florida, to expedite software development and ensure FRIDA is operational by mid-2025.
- 2. Enhance Data Reduction Pipelines and User Support:** Improvements to data reduction pipelines across all instruments should be prioritized, with a particular focus on OSIRIS MOS, MEGARA, and HIPERCAM. The GUC emphasizes the importance of better documentation and user support for these tools. Additionally, tools such as user-contributed reduction scripts should receive ongoing support to ensure their long-term utility.
- 3. Improve Archive Usability and Data Submission Incentives:** The GUC strongly encourages the Time Allocation Committee to take into account the submission of reduced data to the GTC archive when evaluating proposals, whenever those data have resulted in publications. Ensuring that reduced data are available in the archive is crucial to maximizing the impact of GTC in the scientific literature. The GUC also urges the GTC team to improve tracking of publications resulting from GTC data, as this will help increase the visibility and usage of archived data.
- 4. Optimize Target of Opportunity (ToO) Scheduling:** To alleviate the burden on the scheduling team, the GUC recommends the development of a semi-autonomous scheduler to handle ToO requests. This would help optimize the allocation of observation time and reduce the manual workload while ensuring the fairness of ToO-triggered observations, particularly for high-priority science.
- 5. Address MEGARA's Operational Challenges:** The ongoing issues with MEGARA, particularly the unavailability of the 15k resolution mode for Galactic Archaeology, require immediate attention. The GUC recommends a detailed review of the pipeline and calibration issues to avoid further loss of observation time. In addition, the thermal

enclosure for MEGARA should be prioritized to minimize its downtime during the summer months.

6. **Continue Development of the Adaptive Optics (AO) System:** The progress made with the AO system is commendable, but there is still room for improvement. The GUC recommends maintaining the current pace of development and resolving outstanding manpower issues to ensure the system reaches its full potential, thereby enhancing GTC's competitive edge in high-resolution observations.