

# **Report of the 20th GTC User's Committee Meeting.**

**July 29-30, 2019. Held at CALP, La Palma.**

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## **1. General Remarks**

The 20th GTC users committee (GUC) meeting was held at the Centro de Astrofísica in La Palma. The GTC director and representatives of the science, engineering and development divisions informed the GUC on the performance and maintenance of the telescope, as well as development of new instrumentation since the last meeting in February 2019. This report summarizes the most important issues discussed during the meeting, and the recommendations from the GUC. The GUC congratulates GTC for its 10th anniversary and for the large number of visitors received in the last months.

## **Funding situation**

The Financial situation of the GTC is still critical, and the Director expressed his concern, and commented that the prolonged budget deficits will continue affecting the development and completion of internal GTC projects. For example, GTC is starting to suffer obsolescence problems and funding should be devoted to solve this problem as soon as possible. Four new engineers have been contracted in the last months. In fact and following the GUC recommendation, one of the new software engineers is going to work on making the telescope operation automatic. Moreover, funds to buy the new CCD for OSIRIS have been received. Moreover, funds to buy two new CCDs for both EMIR and FRIDA and to reduce the current vibrations in the telescope have been requested.

## **Agreement with China**

The High Resolution Spectrograph (HRS) is planned to be at the telescope not before 2025. The instrument passed the conceptual design review just a few weeks ago. The instrument will be a R~25000 spectrograph covering the spectral range from 3100 to 4200 Å and two arms at R~100000 that will cover simultaneously the ranges between 4200 - 5550 and 5550 – 7200 Å.

## **New GTC instrumentation plan**

The process to define the future instruments of the GTC will be resumed once the new government of the Canary Islands define its funding commitment. The goal to have a new instrument for 2025 is still possible. The proposals presented in the Science with GTC meeting in Valencia are going to be evaluated by an international panel. The overall details of these instruments can be found at,

<http://www.gtc.iac.es/instruments/nextgeneration.php>.

**In the meanwhile, GRANTECAN remains open to receive new proposals following the format of the previous announcement (e.g. the document must contain a scientific case, a conceptual design and a cost estimation).**

## **2.- Responses from the GTC director to the GUC recommendations from the previous meeting**

1. The GTC-AO & FRIDA teams are planning to install their instruments in 2021. GTC has started to develop a plan to improve the phasing of the telescope mirrors to reach the performance needed by the AO system and measurements of the sources of vibration have started.
2. MEGARA and EMIR new pipelines have been delivered to GTC and the new phase-3 web platform developed by the GTC is already working. The phase-3 can be used to request help at any stage of data treatment, including complete reduction. A. Cabrera showed some examples of its use including a request to reduce EMIR data.
3. Comparison between the performance of the different instruments with the corresponding calculators were presented. In the case of EMIR, the expected sensitivities for weak sources with mag. around 21 have not been reached yet.
4. The call to present new GTC instrumentation is still open, and the final list is going to be evaluated by an international panel.
5. GTC has hired a new software engineer to automatize the telescope operation and prevent future inefficiencies.
6. The MEGARA halogen lamp for tracing/flat fielding in the extreme blue, at wavelengths below 4000 Å, does not provide sufficiently strong intensity. After the summer, the GTC will test different lamps and configurations using lamps provided by the IAC.
7. There is a plan to feed the GTC archive with reduced data using the current pipelines.
8. The process to assign DDT has been revised to provide the final resolution as soon as possible.
9. The arrival of CanariCam to the GTC has been delayed due to technical problems. The University of Florida is working on that. The accepted programs will be executed between October and December 2019.
10. Standard protocols have been followed during the observing nights.
11. Due to the large amount of time used to cover Guaranteed Time projects and commissioning, GTC did not offer large programs in the past semester.
12. The air mass constraints in the phase 2 of both EMIR and OSIRIS will be included as soon as the automatic queue system start to work.
13. The system will not charge overheads in the case of small offsets when observing with MEGARA IFU.

### 3. Update on science operations

The GUC members were informed about the performance of the telescope. The presentation can be downloaded from the GUC pages. In semester 2018B **more than 1000 hours of observations were delivered to the users**. The night time available for scientific operations is approximately 1642 hours per semester. In semester 2018B, Spain received 93.6% of the time, and Mexico and UF 3.2% and 1.1% respectively. By July 2019, the number of published papers using GTC observations was 491, including 212 with a first author from Spain, 28 from Mexico and 17 from the UF. GTC showed that the number of published papers increased in the last year, and now we are just above the Keck telescopes at the time of their ninth year of operations.

Director Discretionary Time (DDT) is producing 1 paper after 6 hours of observing time. GTC encourages users to make use of the DDT that at the moment is used **well below the assigned time of 10 nights (~50 hours) per semester**.

GTC stressed the problem of completing programs requiring observations in overpopulated ranges of coordinates (specially r.a. from 10 to 12 hours; see the full report given by A. Cabrera at the GUC pages). This is affecting even A-band programs. On the other hand, the **month of August was almost free of targets**.

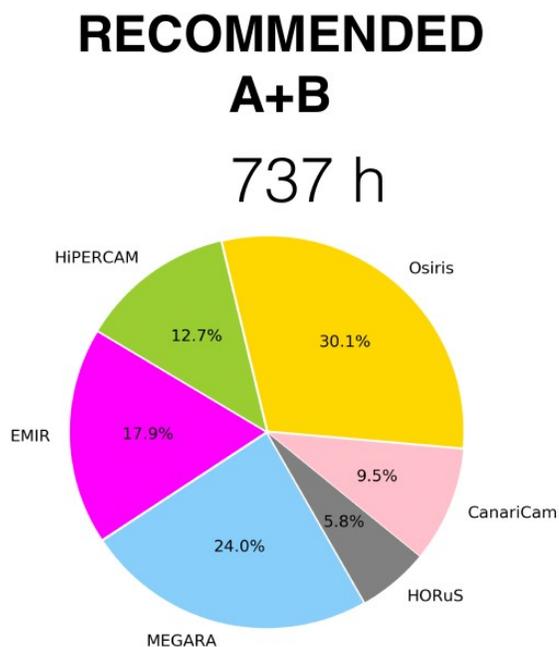
The telescope rail presented a small loss of oil that affected the telescope azimuth operation for three days during March 2019. A final solution to ensure this won't happen again has been found and it **will be implemented in a planned stand down on 2020B, when both OSIRIS and EMIR will be dismantled for different reasons**.

### 4. Time Allocation Committee (TAC) summary for semester 19B

The Spanish TAC received 168 proposals, ~60% of them requesting GTC observing time. No Large programs were offered. The GTC over-subscription factor is ~3.5 for the Spanish community, ~2.5 for the University of Florida and just above 6 for the Mexican community.

The Spanish CAT recommended 737 hours to cover the A & B priorities. The distribution of this time is shown in the figure at the right. The CAT president noted that the allocated time per instrument is well correlated with the requested time per instrument.

A call for Spain-Mexico collaborative proposals was not issued in 2019B. This topic was discussed during the Science with GTC meeting in Valencia (December 2018), but an agreement between the IAC and GTM directors has been not reached yet.



## 5. Updates on instrumentation and GTC archive

**OSIRIS:** the new monolithic 4kx4k detector will be installed in between 8 months and a year from now. OSIRIS will be moved from the Nasmyth-B focus to the Cassegrain focus in September 2020. **Notice that this instrument will not be offered to the Community during the semester 2020B.** The change of focus is motivated by the arrival of the adaptive optics system to the GTC.

**MEGARA:** the optical integral-field unit and multi-object spectrograph are working regularly and inside specifications. Four robots used to place the fibers are unusable and part of the supplied spare parts are also not working properly. GTC is working to fix these problems. The instrument is going to have a better cover to enhance isolation from stray light, so that it can be used in bright time. The latest version of the data reduction package significantly improves the detection of faint emission lines. The arc observations are taking around 30 minutes, GTC is exploring the use of another set of lamps provided by the IAC and analyzing the possibility of buying a new set of lamps (the approximate cost is around 15,000 euros).

**EMIR:** the instrument team has provided a new reduction pipeline that was presented in a workshop in July. The pipeline has been tested by different researchers with satisfactory results. The instrument is working inside the specifications for sources not weaker than 20 mag. Some comparisons with the results from other telescopes were presented during the meeting. However, some works are still in progress to achieve expected sensitivities for faint magnitudes (K = 21-22 Vega system). EMIR has caused several time losses due to different technical problems. **It will be dismantled in October 2020 for maintenance.** There is a plan to buy a new H2RG detector.

**HiPERCAM:** this high speed, multiband imager visitor instrument will have its last runs during August & September 2019. The raw data are reduced by the instrument team, and delivered to the proposal PIs. The instrument team is considering to modify the instrument so that it can be permanently mounted at the new FCass focus. The instrument team has obtained a grant of £90k to study and develop this possibility.

**CanariCam:** after several improvements developed in the UF during the last months the camera is still suffering from an unknown source of noise, causing that observing modes such as the polarimetry cannot be used. This is causing a delay in the process of coming back to the telescope. The last observations with this instrument are planned for the last 3 months of 2019, **just before the arrival of MIRADAS to the telescope.**

**HORuS:** first observations of the high optical resolution spectrograph were performed during July 2019. It will be operated by using reserved observing campaigns at the telescope (same as HiPERCAM). However, there are some discussions regarding keeping the instrument available once OSIRIS migrates to Cassegrain focus.

**MIRADAS:** the new near-infrared multi-object echelle spectrograph operating in the 1-2.5 $\mu$ m bandpass. The current plan includes sending the instrument to the GTC in the last months of 2019, to start the commissioning at the telescope in early 2020.

**FRIDA:** the diffraction-limited NIR imager and integral field spectrograph is expected to be sent to GTC by the 2021B semester. The process to buy a new detector for FRIDA has started (funds have been requested) however, the scientific team has a lack of resources of around 375,000 euros to complete the project. The GTC Director commented that this issue will be discussed during the next Executive meeting.

**GTC archive:** at the moment the archive is fed with reduced data obtained directly from the proposal PI, once the corresponding paper is completed. The archive is also filled with reduced data from the instrument teams. Now, there is a plan to include data reduced by the Virtual Observatory using the current pipelines. At the moment, they are reducing OSIRIS images, and MEGARA data. In the case of MEGARA the reduced data will be delivered without any professional supervision or science validation. Neither any supervision is planned for future reductions. The products of the pipeline are going to be posted in the archive considering the one year proprietary period. The corresponding PI will have access to the reduced data as soon as the reduction process finishes. The archive will mention clearly that the reduced data have been reduced in an automatic manner, and its scientific use must be restricted. Therefore the reduced data must be treated as “Quick look”. Plans to reduce spectroscopic data from OSIRIS or EMIR data are still under discussion.

## **6.- Summary of recommendations from the GUC**

1.- As mentioned in the previous section, FRIDA has a serious money deficit of around 375,000 euros. FRIDA is the only GTC instrument that will make use of the GTC AO system, and the GTC has started to work in the telescope to receive these two instruments. The GUC would appreciate prompt communication following the next Executive meeting.

2.- The GUC congratulates GTC for making the phase-3 available to the users. We hope that this new form of interaction with the GTC users will solve many of the issues presented in previous meetings (e.g. problems with the installation and use of pipelines, incomplete observations ...). This platform will help to increase the use of the OSIRIS-MOS mode. GUC recommends to include in the phase-3 web page a link to all the active pipelines and instrument web pages, in order to have all relevant information in a single page. Moreover, GTC should include a sentence in the MEGARA web page explaining that the users can contact GTC team if they need the reconstructed data-cubes.

3.- The GUC agrees with GTC that an effort is needed from the user community to reflect on the role of the GTC to keep the GTC competitive in the era of extremely large telescopes. The GUC fully supports GTC's initiative to keep the call for new instrumentation open.

4.- The GUC recommends GTC to give high priority to the replacement of the MEGARA blue lamp.

5.- The GUC recommends GTC to work together with the EMIR team to improve the performance of the camera at the faintest magnitudes. We also suggest to include in the corresponding web page some information about the performance of the instrument for magnitudes fainter than 20. This information must be also included in the ETC web page, since the ETC does not provide the correct noise for these faint magnitudes.

- 6.-** The GUC recommends GTC to employ one of the new software engineers to work in aspects related with the designing mask tools of EMIR and OSIRIS. The current tools are obsolete, and difficult to use. Improvements on these tools would be well received by the community.
- 7.-** The GUC recommends to have a GTC-Newsletter where the most important facts occurring at the telescope are regularly published. Topics such as the new release of pipelines, shut down of instruments or similar events could be the material of this publication.
- 8.-** In relation to having unsupervised reduced data in the archive, the GUC members started a discussion and plan to do a poll to extract more information from the whole GTC community.
- 9.-** Considering GTC's present commitments on Guaranteed Time programs of both EMIR and MEGARA, and the commissioning efforts in the near future, the GUC recommends not to offer large programs in the next semester.

September 30, 2019

The GTC user's committee