

# **Report of the 18<sup>th</sup> GTC User's Committee Meeting**

## **September 19-20, 2018**

### **Held at CALP, La Palma**

GUC attendees: Silvia Mateos (IFCA; chair), Jesús Gallego (UCM), Miriam García García (CAB), Jorge García Rojas (IAC), Jian Ge (UF), Cristina Ramos Almeida (IAC), Daniel Rosa González (INAOE)

## **1. General Remarks**

The GTC user's committee (GUC) 18<sup>th</sup> meeting was held at the Centro de Astrofísica en La Palma (CALP). The GTC director and representatives of the science, engineering and development divisions, informed the GUC on the performance of the observatory, as well as on progress on the maintenance and development of both the telescope and its instrumentation since the last meeting in February 2018. This report summarizes the most important issues discussed during the meeting, and the recommendations from the GUC.

### **Funding situation**

The budget for operations for 2018 has not changed with respect to previous years. An agreement with MICINN will be signed soon to provide investment funds for actions aimed to improve efficiency, robustness, and quality. Nevertheless, this funding will not be enough for covering operations and maintenance as needed. The GTC strategic plan 2017-2020 has already been submitted to MINCIU and is waiting for evaluation.

There has been some progress in personnel recruitment: a deputy Head of Administration; 1 electrical and 3 software engineers; 2 electrical and 1 software technicians; 1 support astronomer and 4 engineers in practice (funded by the Cabildo de La Palma).

GTC expressed its concern that the prolonged budget deficits continue increasing delays in the development and completion of projects, and are causing that most projects have zero or little contingency. All this makes very difficult to attract and retain highly qualified personnel and it is putting the future of GTC into a serious risk.

### **Remote control Room**

The remote control room at CALP is expected to start routinely use by the end of 2018. The system is already in operation and the room can be used. The integration of an advanced videoconferencing system is in progress. There are also plans to have remote control rooms at IAC, Florida and Mexico.

### **Agreement with China**

China will enter into GTC by providing an ultra-stable, high-resolution spectrograph (R~100,000; spectral coverage from 380 to 780 nm) to look for exoplanets and to study stellar abundances. The GUC was informed that the Chinese spectrograph will have the conceptual design review (CSR) in 2019.

### **Communication to the community and post-observation support**

The GUC highly appreciated the efforts by GTC to continue improving the communications with the astrophysical community, to keep an updated instrumentation plan and to revise any out-dated material in the GTC web pages.

In the previous meeting, the GUC recommended GTC to find new ways to continue and expand the outreach activities of the observatory. The GUC was pleased to hear that GTC has engaged in many outreach activities, including public events, press releases, talks and interviews. Moreover, GTC has launched a project, co-funded by FECYT, to open GTC at night through a dedicated web. This web, that will be active all observing nights, will provide information on where GTC is pointing on real time. Astronomers could talk to people on nights with planned events. A pilot study will begin in 2019 with 18 planned live events and will include webcams on

the control room and inside the dome. A person will be hired to work in this project.

GTC also informed the GUC that the new visitor centre will open in early 2019.

### **New GTC instrumentation plan**

The process to define the future generation of GTC instruments started in March 2018 with an open call for ideas (white papers). The distribution of white papers to the community will be carried out via the GTC webpage in late 2018. Final versions of white papers will have to be submitted to GRANTECAN in February 2019. The scientific evaluation of the proposals by the GTC Scientific and Technical Advisory Committee and an ad-hoc external committee will be completed by April 2019. The decision on the instrument(s) that will be developed will be finalized in June 2019. A search for funding will then immediately start, followed by a tendering process to adjudicate the development of the selected instrument(s).

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

The GUC congratulated the GTC management and all the instrument teams for the progress made in the development and maintenance of the telescope and its instrumentation.

- **Post-observational support:** following the recommendations made in previous meetings, the GUC urged GTC to give high priority to the completion of off-line data reductions for all the GTC instrumentation and to provide support to users beyond the standard quality control of the data. The GUC is concerned that, apart from integrating and understanding the existing pipelines, there has been little progress on the reduction helpdesk project due to lack of resources. It is expected that by early 2019 there will be reduction tools available for EMIR, HIPERCAM and MEGARA. There exist off-line data reduction pipelines for OSIRIS and CanariCam, not developed by the instrument team. These are linked to the official GTC page. The overall performance is good but they still require debugging and extension to all observing modes. GTC should consider taking over the project in order to deliver a robust software and offer help to the users.
- **The new detector replacement for OSIRIS:** although at the time of the meeting the exact dates for refurbishment and reinstallation of the new OSIRIS detector were not precisely defined, at present, the replacement of the detector is scheduled for the second half of 2020. The current plan foresees that OSIRIS will be re-commissioned at the Cassegrain focus during the first half of 2020 with the current detector. The downtime necessary to move the instrument to the Cassegrain focus is expected to be approximately four months.
- **To improve the reflectivity of M1+M2+M3:** the reflectivity of M1+M2+M3 has been low for some time and this is expected to have a significant impact in the system performance. The GUC was informed that from January to August 2018 a total of 20 primary mirror segments were replaced and the total reflectivity has increased to satisfactory values (> 62 per cent at 650 nm).
- **To provide much more clear information on the reserved targets policy for all GTC instruments:** GTC has been working with the science teams of all instruments to provide more clear and specific information on the GTC web on the reserved targets/fields as well as the observations that will be carried out during guaranteed time.
- **Not offering EMIR and MEGARA for Large Programs in 2018:** following the recommendation by the GUC, both MEGARA and EMIR were not offered for Large Programmes in 2018 since their actual performance and sensitivity had to be further characterized.

- **To continue improving transparency regarding the status of the GTC instrumentation:** the GUC was pleased to hear that updates have been made to the GTC instrument web pages, specially for EMIR, for which the GUC identified a substantial lack of information on the current status and capabilities of the instrument. GTC is still waiting for further details regarding the performance of the detector at very faint magnitudes.

### **3. Update on science operations**

The GUC was encouraged by the news that, from March to August 2018, the accumulated average of technical losses remained low, below a six per cent level, and that observatory overheads had decreased to one per cent. For semester 2018B approximately 80 per cent of the time will be dedicated to scientific observations. The rest of the time would be spend on MEGARA operational test, the commissioning of HORS and EMIR-MOS and Fcass-E preparatory works for CanariCam.

The nigh time available for scientific operations is approximately 1642 hours per semester. Of this, 72 per cent of the total data is delivered to Spanish TAC proposals. By September 2018, the number of published papers using GTC observations was 406, including 179 from Spain, 20 from Mexico and 16 from the UF.

As in previous meetings, the GUC was concerned about the low scientific productivity of the telescope. The time delay in publishing continues increasing. The average time lag between observations and publications in 2018 is 2.5 years. GTC presented the results of a survey conducted with users having observations provided from semesters 2015A to 2017A. Only in a minority of cases (less than 10 per cent) the delay in publications was associated with lack of resources, the need of more observations, or problems with the existing observations.

GTC stressed the problem of completing programs requiring observations in overpopulated ranges of coordinates (specially r.a. from 10 to 12 hours and 2 hours; see <http://www.gtc.iac.es/observing/observing.php>). This could also affect A-band programs, since only in semester 2018B there are already 40 A-band programs in the queue, reducing the chances of completing their execution.

Users should be aware that from semester 2018A onwards, important changes have been made to the phase-2 tool allowing for a significant reduction of overheads for observations carried out with OSIRIS (sky observations in long-slit spectroscopy and multi-object spectroscopy) and EMIR (long-slit spectroscopy for telluric standards).

### **4. Time Allocation Committee summary for semester 18B**

The number of proposals continues increasing in all GTC communities. The Spanish nigh CAT received a total of 158 individual proposals for semester 18B. Of these, 101 (60 per cent) requested GTC time. In terms of telescope time, 1581.3 hours including Target of Opportunity (ToO) and Guaranteed Time Observations (GTO) requested GTC time. OSIRIS in long-slit mode was the most demanded instrument. No Large Programs were submitted for 2018B.

A call for Spain-Mexico collaborative proposals was not issued in 2018B.

In total 78.5 per cent of submitted proposals were accepted (Q1-Q4) including seven filler programs and seven ToO proposals. As in previous semesters, there are a very low number of programs requesting visitor observations and only four were approved in 2018B. The GTC oversubscription factor is near three (including ToO). GTC is making a big effort to execute the approved observations for both proposals in Q1 and large programs.

From August 2014 to September 2018, 54 Director's Discretionary Time (DDT) proposals have been approved out of 105 submissions (51 per cent) and all except three were completed. Most submitted proposals requested time with OSIRIS (100.65 hours) and had a PI from the Spanish GTC community. Since September of 2018, MEGARA is also offered for DDT. Despite the success of DDT proposals, the number of projects asking for DDT time continues being low. The average number of requested hours per year (30.8 hours) is still well below the 90 hours maximum granted to DDT programs per year.

The GUC was informed that starting in September 2019A, all GTC proposals (including ToO) will have a different ranking: bands A, B, C and filler. Approximately one quarter and three quarters (according to the CAT ranking) of the total amount of GTC available observing time fall in A- and B-bands, respectively. Only A-band proposals will have carry-over status for two more semesters (or until they are completed) if they are not finished by the end of the corresponding semester. B-band proposals will be executed on a best-effort basis during the requested semester while C-band proposals will have very little opportunity of execution since they will be executed only if no A- or B-band objects are available but the good weather conditions permit observations during the requested semester. C-band proposals will also be executed if no A-band or B-band proposals can be executed at current weather conditions. C-band proposals have higher priority than fillers. Filler programs will be executed only under adverse weather conditions.

OSIRIS-MOS, ToO and programs in visitor mode will be accepted only if they fall in A- or B-bands. C-band proposals requesting visitor mode will be included in the observing queue.

## **5. Updates on instrumentation**

### **OSIRIS**

The instrument has not had any relevant problems during semester 2018A and maintenance has been done regularly. A small issue of folded mirror silver coating has recently been detected. A correction (recoating) has been proposed that could be done when OSIRIS leaves the Nasmyth B Focal Station. The funds approved by MINECO for the new monolithic 4kx4k detector have been received. The requirements definition is finished and GTC is looking for an external tender. The estimated time for replacement of the detector is about one year since the ordering of the detector.

Since the commissioning of OSIRIS at the Cassegrain focus will not start until the end of 2019, the replacement of the OSIRIS detector is scheduled for March 2020. It is expected that OSIRIS will not be available to the GTC community during 1-2 semesters. Once the migration of OSIRIS to the Cassegrain is finalised, not all the observing modes will be offered. Moreover, tunable filters are expected to change.

### **NEFER**

The integration tests done on December 2017 produced satisfactory results. Short test images taken on sky also showed very promising results in terms of efficiency. NEFER was included in the call for proposals for 2018B as a private filter only available to the instrument team (P.I: Margarita Rosado, UNAM, México), and in the 2019A call for proposals for open use.

### **EMIR**

There has been a strong improvement on operational issues, as well as software refactoring.

A tilt of the EMIR detector in two directions with respect to the focal plane has been seriously affecting both imaging and spectroscopic observations since the instrument was first offered in 2017B. All observers with EMIR data taken during this semester should be aware of this issue.

During the maintenance shutdown in late 2017, the tilt was reduced by a factor of 3 to 4. As a result, there has been a noticeable improvement in the image quality although there is still a minor amount of field of view where some improvement can be achieved. A technical report with a quantification of the effect has already been

uploaded to the GTC web pages ([http://www.gtc.iac.es/instruments/emir/emir.php#Detector\\_Tilt](http://www.gtc.iac.es/instruments/emir/emir.php#Detector_Tilt)). There are plans to complete the fix of the EMIR tilt although the exact details are not defined yet.

A recent revision of the control system of the EMIR detector has revealed that the ramps in short exposures were not properly computed, causing an extra source of noise that led to worse signal-to-noise ratios than those predicted by the EMIR Exposure Time Calculator. The instrument team is at present fixing the problem and trying to establish a robust method that, in addition, gets rid of some biased reads that the EMIR detector performs at the beginning of the ramps.

As indicated before, GTC is still waiting for further details regarding the performance of the detector (limiting magnitudes/sensitivity limits) at very faint magnitudes. A high priority should be given to clarify and update all the information regarding the performance and actual efficiency of the instrument.

The commissioning of the MOS was completed on April-May 2018 (10 nights allocated in two different periods). The Optimized Slits Positioner (OSP) can produce reliable position files with high accuracy when GAIA coordinates are available and good results when using other catalogues (HST, UKIDSS). Some minor problems have been identified with other catalogues non accurate enough (2MASS). The OSP is still not working with EMIR pre-images. There has been a MOS science verification call in 2018. A total of four proposals were selected (20 hours of observing time) to start the observations in late 2018.

## **HORS**

The stability problems of HORS have already been solved. GTC supported the IAC to verify and align the arm of the instrument. After that, there were two satisfactory nights of commissioning to characterize the instrument. Since OSIRIS will be removed early in 2020, the observing window of the instrument will be very small so it will be offered to the community as soon as the commissioning is completed, approximately on February 2019 in an extended semester.

## **CANARICAM**

A collaboration agreement between the University of Florida (UF) and GTC was signed in April 2018. The UF is developing the new data acquisition system (DAS), new mechanical interfaces to the focal station and thermal/mechanical interfaces between coldhead and dewar. GTC has completed procurement of major components and is preparing the new cabinet and its interfaces. The re-commissioning of the instrument is scheduled for January-February 2019.

Based on the current timeline for GTC instruments, the installation of MIRADAS in the GTC is expected at late 2019. CanariCam (and also HIPERCAM) will have a narrow observing window, since they both will use the same focus that will be taken by MIRADAS (Folded Cass E).

## **MEGARA**

Common-user instrument since 2018. Regular observations have already started. Although a number of problems have been identified, the instrument is fully operational. GTC is working to correct all these problems.

MEGARA was offered both in IFU and MOS modes for Semester 2018B in an observing window that also included July-August 2018 with a high time allocation success (21 per cent of total requested time for MEGARA, but 70 per cent of A-band proposals allocated with MEGARA). As for September 2018, 33 h of MEGARA data were already provided, including 7 h of Guaranteed Time.

The MEGARA Halogen lamp for tracing/flat fielding in the extreme blue, at wavelengths below 4000 Å, does not provide sufficiently strong intensity. GTC has agreed to contact the MEGARA team to discuss the possibility of replace the lamp.

## **6. Efficiency of the meetings of the GUC:**

The GUC acknowledges the time and effort that the GTC staff and instrument PIs dedicate to brief the GUC on various subjects. To improve the efficiency of the meetings the GUC recommends the following change:

- To focus the presentations of the instrument teams on the accomplishments since the last meeting of the GUC.
- To increase the length of the meetings taking place in La Palma by half an extra day.

## **7. Summary of recommendations from the GUC**

- The GUC acknowledged the enormous effort and hard work of both the FRIDA and GTCOA teams. However, the GUC was concerned about the lack of a fluid communication between the teams and encourages both teams to solve this issue to facilitate the development of the projects. The GUC kindly reminded GTC of the importance of an update of the science cases for GTCOA/FRIDA, as has been done in the past for other instruments, and to provide an updated document which would be ready prior to the next meeting of the GUC.
- Although significant progress has been made to provide in the GTC web pages updated information on the status of the current GTC instrumentation, the GUC was concerned that information regarding the capabilities of EMIR for very faint sources is still missing (limiting magnitudes/sensitivity limits). The GUC urges GTC to give high priority to notify the community of the actual sensitivity of the instrument at the faintest magnitudes and to notify users, through the web pages, on the issue regarding the computation of the ramps in long exposures. As indicated before, this issue is resulting in worse signal-to-noise ratios than those predicted by the EMIR Exposure Time Calculator. GTC should also inform on which are the observations affected by this problem.
- The GUC expressed its concern about the continuous delays in the completion of off-line data reduction pipelines. Following similar requests in previous reports, the GUC urges GTC to take leadership on the help-desk and the organization of workshops to train users on data reduction, and to work with the different instrument teams to complete off-line data reduction pipelines for all the GTC instrumentation as soon as possible.
- As pointed out before, the MEGARA Halogen lamp for tracing/flat fielding in the extreme blue, at wavelengths below 4000 Å, does not provide sufficiently strong intensity. The GUC advises GTC to give high priority to this issue and to work with the MEGARA team to replace the existing lamp as soon as possible.
- The GUC recommends GTC to change the way they contact users to gather information regarding the quality control, data reduction and progress on the analysis of their observations. Instead of sending an email asking for such information, the GUC recommends to use an anonymous feedback form. Moreover, the GUC recommends GTC to establish an online forum in which all users can add their feedback. This will allow users to share key information regarding issues in the data, data limitations/problems, which will be of great value for the analysis the observations.

*January 23, 2019*

*The GTC user's committee*