Report of the 17th GTC User's Committee Meeting

February 21-22, 2018
Held at IAC, La Laguna, Tenerife

GUC attendees: Silvia Mateos (IFCA; chair), Ascensión del Olmo (IAA), Carme Gallart (IAC), Jesús Gallego (UCM), Jian Ge (UF), Pablo Rodríguez Gil (IAC), Daniel Rosa González (INAOE), Montserrat Villar Martín (CAB)

1. General Remarks

The GTC user's committee (GUC) was informed on the status regarding the operations of the observatory, as well as progress on the maintenance and development of both the telescope and its instrumentation since the last meeting in August 2017. This report summarizes the most important issues discussed during the meeting, and the recommendations from the GUC.

Funding situation

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

A FEDER-MINECO agreement (85 per cent FEDER funds and 15 per cent GRANTECAN or MINECO) has been signed to cover the following projects: a) buying a new detector for OSIRIS; b) refurbishment of CanariCam; c) buying 3 probe arms to complete MIRADAS; d) optimizations of operations; e) obsolescence control. Moreover, GTC has been able to incorporate 4 junior engineers thanks to funds from the Cabildo de La Palma.

In spite of this, the GTC continues suffering a severe lack of resources and staff in all departments including astronomers, technicians and administration personnel. The budget has not changed since 2015 and only covers telescope operations. The situation for 2018 is still unknown. These circumstances continue increasing delays in the development, and completion of projects and it makes very difficult to attract and retain highly qualified personnel. Since August 2017 a Support Astronomer and a Senior Software Engineer have left GTC.

Agreement with China

GTC signed a formal agreement with the National Astronomical Observatories of China (NAOC) in September 2016. 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 Preliminary Design Review (PDR) of the instrument started at the beginning of 2018.

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 through regular updates to the GTC web pages. The GUC welcomed the efforts made by the GTC to keep an updated instrumentation plan available to the community and to revise any outdated material.

The GUC encouraged the GTC to continue their plans to assist with the reduction of observations taken with different instruments. Since semester 18A the GTC is dedicating one member of the staff to a "data reduction helpdesk" to provide support with the reduction of observations from OSIRIS, EMIR, CanariCam, HiPERCAM and MEGARA as well as to help with user's requests on data management.

The GUC was informed that there are plans to organize a school in Garafía (La Palma) at the end of summer 2018 to train users on the reduction of data from EMIR and MEGARA.

The GUC recommended GTC to find new ways to improve the outreach activities of the observatory and to build a good repository of material for outreach. GTC informed that the new visitor center would open in early 2019.

New GTC instrumentation plan

The present GTC instrumentation plan will be completed by 2020. To define the future generation of GTC instruments and, thus, the role of GTC beyond 2025, in the era of the Extremely Large Telescopes, the GTC needs to start working on a new instrumentation plan. The process should involve the whole GTC community.

A call for ideas for science instruments has been issued on the 6th of April 2018 to collect information and foster activity. Concept papers should be sent to GRANTECAN by November 2018. Submitted concept papers will be discussed in a special session during the "VI Science with the GTC" meeting that will be held in Valencia from the 10th to the 14th of December 2018. Final versions of the Concept Papers should be submitted to GRANTECAN by February 28th 2019. An appropriate external panel (the GTC Scientific and Technical Advisory Committee or an ad-hoc panel) will then evaluate proposals. A decision on the instrument(s) to be developed will be taken by the GTC Steering Committee (CSUG) in its summer 2019 meeting. A search for funding will then immediately start, followed by a tendering process to adjudicate the development of the selected instrument(s).

Full details on the timeline of the process and on the structure of the Concept Papers can be found in the GTC web pages.

Response by the GTC director to the GUC recommendations from the previous meeting:

- **Offering of MEGARA in semester 18A**: the GUC congratulates the GTC and the MEGARA instrument team for this achievement and acknowledges the hard work of both teams. The GTC director communicated to the GUC the intention of signing the preliminary acceptance letter for the instrument within days after this GUC meeting. The GUC hopes that the current indefinition of the status of the instrument is resolved as soon as possible. MEGARA will be offered both in IFU and MOS modes for semester 18B in an observing window that also includes July-August 2018.

- **AO+external evaluation of FRIDA**: the GUC acknowledged the enormous effort of both the FRIDA and GTCAO teams to bring GTCAO/FRIDA to its current stage. However the GUC has already expressed in previous reports a serious concern about the continuous delays of GTCAO/FRIDA, which might question the scientific competitiveness of the instrument. This issue was not properly addressed with the technical evaluation of the instrument presented in the last meeting. The GUC was pleased to hear of the verbal commitment of FRIDA's PI to start discussions with the instrument science team to revise the main science cases for GTCAO/FRIDA and to provide an updated document which would be ready prior to the next meeting of the GUC. The GUC also expressed its concern about the lack of a fluid communication between the GTCAO and FRIDA teams and encourages both teams to solve this issue to facilitate the development of the projects.

- **Prompt completion of the commissioning of the EMIR/MOS observing mode:** the GUC was informed that the commissioning of the EMIR MOS observing mode will be carried out in March-April 2018 and that, if all goes according to plan, the instrument will be offered with all observing modes in semester 19A. The GUC appreciates the careful work carried out by GTC

and the EMIR instrument team to correct the tilt of the detector with respect to the focal plane to an acceptable level (80 per cent correction; further improvements are expected throughout 2018), a serious problem that was affecting both imaging and spectroscopic observations.

2. Maintenance

EMIR has gone through a big maintenance process during semester 17B (2 months and 10 days) and is now in operation conditions at Nasmyth A.

There have been no major problems since MEGARA was integrated and it has been kept in operating conditions (cold).

The Cassegrain Focal station will have to be integrated on the telescope at the end of 2019. Preparations for the installation of the Cassegrain focus started in 2017. Proposals from companies were submitted by September 2017. A contract was awarded to IDOM in October 2017.

The project "Atmosportal", a database and web interface providing all the relevant information on the atmospheric conditions in the ORM, is now finished (atmosportal.gtc.iac.es). By accessing the web interface, users can know where the telescope is pointing in real time. The final documentation of the project is still in progress.

The tertiary mirror, M3, was dismounted to be re-aluminized in October 9th 2017. In total 18 segments were re-coated, increasing the reflectivity of M1+M2+M3 to approximately 62 per cent at 650nm, a value much closer to the 68 per cent optimum level of past years.

After visual inspection of the M3, a major problem was encountered in the Support System. Science operations had to stop from the 11th of October to the 23rd of November 2017 (44 nights). After correcting for weather losses, the total time lost for scientific observations during the repairs of the M3 was 3 weeks (approximately 200 hours). Two more nights were lost in January 2018 to correct the misalignment of GTC optics, an issue that has been affecting the telescope since 2012.

3. Telescope operations

The GUC was encouraged by the news that, during semester 17A, queue overhead losses continued being below 1 per cent and the telescope operated at 99 per cent efficiency. The remote control room at CALP, expected to be ready by March 2018, will further increase the efficiency of the operations of the observatory.

A total of 184 proposals were received for semester 17B, of which 57 per cent requested GTC time (118 proposals, 1810 hours). OSIRIS in long-slit mode was the most demanded instrument (55 per cent of the allocated time) followed by EMIR. During semester 17B, 80 per cent of the time was dedicated to scientific observations. However the efficiency of the telescope was significantly affected by technical losses and exceptionally bad weather conditions: 298.2 hours (17.6 per cent of the available time) were lost due to technical problems (mainly associated with the repairs of M3) and 691.7 hours (40.7 per cent of the available time) were lost due to bad weather.

4. Time Allocation Committee summary for semester 18A

A total of 146 proposals were received for semester 18A, of which 58 per cent requested GTC time

(85 proposals, 1442 hours). No Large Programs were submitted for this semester. Approximately 90 per cent of the submitted proposals were accepted (Q1-Q4) including 7 filler programs and 10 ToO programs (115.5 hours). Still, the oversubscription of the telescope remains low, with a factor of 2.2 (including ToO proposals) compared to 2.4 in semester 17B.

The TAC again highlighted the success of DDT proposals. From August 2014 to February 2018, 45 DDT proposals (103.6 hours) have been approved (out of 92 submissions) and all except three were completed. However, requests for DDT time continue being low. The average number of requested hours per year (29.6 hours) is still well below the 90 hours maximum granted to DDT programs per year. The GUC was also informed that requests for international time are also below the maximum time available (80 hours per year).

The GUC was concerned on the scientific output of the telescope since the number of published papers per year is not increasing. The number of refereed publications based on GTC data has gone down from 72 in 2015 and 71 in 2016 to 57 in 2017. The time delay in publishing also continues increasing. The average time lag between observations and publications has gone up from approximately 1.5 years in 2013-2014 and 2 years in 2016-2017 to over 2.5 years in 2018 (the lag between observations and publication is 5 years at ESO).

The GUC was informed that discussions are already underway to refine the procedures to identify target duplications and thus, avoid collision between approved DDT targets and targets previously requested via the TAC. Priority policies such as defining if/when a DDT proposal can override a TAC allocated program will also be revised.

5. Observing data and GTC archive

The GUC was informed on the progress and new functionalities added to the GTC archive at CAB. A new agreement with INTA/CAB has been signed. Observing data are now sent to CAB immediately after observations, allowing visibility and detailed searches of GTC observations while preserving the proprietary period. Since January 2018 it is possible to access both public and proprietary observations (private data are password protected). The archive now includes Multi-Order Coverage maps (MOCs) for public GTC observations.

The GUC welcomed the plans to homogenize the data products in the GTC archive. CAB has developed a tool to reduce broad-band images from OSIRIS and to produce source catalogues and has already installed the pipeline Redcan for reduction of imaging and spectroscopic data from CanariCam. There are also plans to install a pipeline for reduction of OSIRIS MOS observations. These high-level data products will be available via the GTC archive.

6. Updates on instrumentation:

OSIRIS

The instrument has not had any major problems during semester 17B. The maintenance has been done regularly. The GTC has received the MINECO funds for the new monolithic 4kx4k detector of OSIRIS. The detector will be far more efficient both in the UV and the NIR ends of the spectrum and will have reduced interference fringes in the red. The replacement of the OSIRIS detector is scheduled for 2019, since it will have to be tested before removing OSIRIS from Nasmyth B.

EMIR
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 an extended semester in 17B. EMIR conducted a maintenance shutdown on 30 October 2017 that lasted 2.3 months during which the problem was corrected to an acceptable level (80 per cent correction; further improvements are expected throughout 2018). The correction of the tilt is not expected to affect the efficiency of the instrument and has resulted in a noticeably improvement in the image quality. There are plans to carry out a long exposure with EMIR in May 2018 to calibrate the actual sensitivity of the instrument at the faintest magnitudes. The GUC identified a substantial lack of accurate information on the current status and capabilities (e.g. limiting magnitudes/sensitivity limits) of the instrument. A high priority should be given to clarify and update all the information regarding the performance and actual efficiency of the instrument.

NEFER
NEFER will supply OSIRIS with a medium-resolution Fabry-Perot for 2D spectroscopy with resolution R≈20000 from 0.44 to 0.57 Å over the whole OSIRIS field of view. NEFER will work in two spectral ranges, 630 to 700 nm and 800 to 900 nm, by using up to 6 different blocking filters. Integration tests were done in December 2017 with very satisfactory results. The module can easily be incorporated in OSIRIS with no interferences with the remaining instrument functionalities. Short test images taken on sky show very promising results in terms of efficiency. NEFER will be included in the 18B call for proposals as a private filter only available to the instrument team. NEFER will be offered to the GTC community in semester 19A.

HIPERCAM
During the commissioning of HiPERCAM at the William Herschel Telescope in October 2017 only minor issues were identified and they were solved by the end of 2017. HiPERCAM was successfully integrated at GTC in January-February 2018. Instrument operation has been integrated within the GTC system in a very efficient way. The instrument team conducted the science observations scheduled for Feb 2018 with minor support from GTC staff. Unfortunately, this first HiPERCAM run was severely affected by extreme weather and about 80 per cent of the allocated time was lost. The instrument is offered on a shared risk basis for the beginning of semester 18B (September-October 2018) to avoid collision with the arrival of CanariCam at the Folded Cass E station.

HORS
The commissioning of HORS scheduled for September 2017 was cancelled due to a refrigerant gas leak for the detector cooling, and later problems to recharge the compressor with such gas. GTC is considering offering a new commissioning window in April 2018. However, the refrigerant problem has not yet been resolved by the IAC.

CANARICAM
Works have started to modify the instrument to adapt it to the Folded Cass E station. Several purchases have been initiated for such modification.

7. 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 distribute the talks to the members of the GUC at least one day before the start of the meeting.

8. Summary of the GUC recommendations:

- The GUC acknowledges the strategy followed by the GTC to provide post-observational support to users beyond the standard quality control of the data and welcomes the plans to hold regular workshops on data reduction. However, following similar requests in previous reports, the GUC urges GTC to work with the different instrument teams to give high priority to the completion of off-line data reduction pipelines for all the GTC instrumentation.

- According to the current instrumentation plan, OSIRIS will be moved from Nasmyth B to the Cassegrain focus in 2020 and will not be available to the community for at least a year (despite the high demand from the community). The GUC recommends that the new detector replacement should be a high priority and that the GTC reduces the time the instrument will not be available to a minimum.

- Although progress has been made to increase the reflectivity of M1+M2+M3, it continues being too low. The GUC urges GTC to carry out a better monitoring of this issue given the huge impact in the system performance.

- The current level of definition of reserved targets for guaranteed time is not clear for GTC. To avoid possible conflicts the GUC requests GTC to work together with the science teams of all instruments to provide more clear and specific information on the GTC web on the reserved targets as well as the observations that will be carried out making use of the total available guaranteed time.

- Large Programs were offered again in the semester 18A call with the EMIR instrument and there are plans to offer also MEGARA in 19A. The GUC advises GTC to wait at least 6 months before either instrument is offered again for Large Programs until the actual performance and sensitivity of both instruments is better characterized.

- The GUC recommends GTC to continue improving transparency regarding the status of the GTC instrumentation by regular updates to both the GTC instrument web pages and instrument handbooks to ensure that this information is widely known by general users. This is especially relevant for EMIR. The GUC identified a substantial lack of information on the current status and capabilities (e.g. limiting magnitudes/sensitivity limits) of the instrument. A high priority should be given to clarify and update all the information regarding the performance and actual efficiency of the instrument. Both the GTC and the instrument team should commit to update the information a soon as possible. Moreover, GTC should ensure that the CAT receives accurate technical evaluations of observing proposals.

9. Other issues of interest to the community:

- To maximize the efficiency of the observatory and to guarantee that the observations carried out are of highest scientific quality it is important that there is a fluid communication between the GTC astronomers and the scientific community. Therefore the GUC encourages the PIs of the observing programs to fill the “GTC User Feedback Form” to inform GTC of the results of the quality control of their data.

- Requests for DDT and international time continue being well below the maximum time granted per year. The GUC explicitly encourages the community to apply for DDT and international time.

April 9, 2018
The GTC user's committee