

# Report on the 10th GTC Users Committee Meeting

Held in Santa Cruz de La Palma, at CALP.  
July 10th and 11th, 2014

## 1 Context and general remarks

The GTC users committee (GUC; members listed at the end) was informed of the work carried out to operate, maintain and develop the telescope and its instrumentation. A full report on the actions has been produced directly by GTC and it is attached to the GUC report.

GUC is satisfied with the positive general advances during the last semester, including a very low down-time ( $\sim 5\%$ ), the success of the MOS mode of OSIRIS, and the increase of the rate of publications based on GTC, now reaching some 40 papers  $\text{yr}^{-1}$ .

We acknowledge that several issues raised in the past report (9<sup>th</sup> GUC meeting) have been addressed and fixed up during this semester. In particular,

- GUC is pleased to know that the delivered Mexican time for the 2013B is in agreement with the Mexican share of GTC. We encourage GTC to maintain this delicate balance in future semesters too. At the same time, we request the Mexican CAT to make sure that the list of accepted proposals covers all the observing conditions in proportion to the available time for each condition.
- DDT (IAC Director's Discretionary Time) seems to be in the way to be implemented, as we urged in the past report. It will allow GTC to realize short scientifically extremely relevant observations which cannot be accommodated within CAT. We are looking forward to see the first scientific results based on GTC-DDT.
- The handling of Target of Opportunity (ToO) observations seems to be going smoothly, so that the triggering team knows on-the-fly whether the observation will be executed.
- Even though the budgetary situation remains very unstable, GTC has managed to open three Support Astronomer positions to replace previous losses, which will make the telescope operation much simpler.
- The agreement to build MEGARA has been signed, meaning that the difficulties identified in the previous report have been sorted out.
- CAT has followed many of our suggestions, in particular, trying to assign observing times as requested in the observing proposal.

On top of these positive advances, we identify a significant flaw already pointed out in the previous report but not properly addressed this semester, namely, the lack of a balanced comprehensive instrumental plans. This difficulty is again included among the recommendations, items # 2, 3, and 5.

## 2 Input from the community

GUC has collected feedback from users that can be summarized as follows:

- We received specific suggestions on how to complete the information contained in the GTC archive so as to facilitate its use. They have been passed on to the Spanish Virtual Observatory, that maintains the archive. (See also item # 11.)
- We also received suggestions for improving the Phase2 web interface including buttons to (1) *replicate* OBs from previous semesters, and (2) acknowledge that the observation was carried out as the PI expected.
- It is urgent to have a working pipeline for the MOS mode of OSIRIS, which must include wavelength calibration, extraction and flux calibration. The lack of a pipeline for this mode is currently hampering the scientific productivity of the groups that already have MOS data. See also point 3.7.

## 3 Recommendations

1. We encourage GTC to match the observing time offered to CAT with the time finally delivered to the PIs. It is good news that during the last semesters the actual observed time exceeded by some 20% the originally offered time. However, if this difference is systematic, it suggests a unrealistically low estimate of the available observing time.
2. The instrumentation plan for GTC presented during the 9th GUC meeting was found to be incomplete. Clarifications were given during the present 10th meeting, but we clearly find them insufficient. We think that the GTC community will greatly benefit from having a reliable instrumentation plan, where the time line for the different instruments is clear, the risks are properly spelled out, and a credible contingency plan is proposed. Therefore, we insist in what was said in the 9th report, namely,
  2. *We appreciate GTC efforts to revise the original instrumentation plans according to the present situation. However, we find the new instrumentation plan too vague to be reliable. We encourage GTC to complete the current plan including available resources, studying risks, and providing alternatives in case the planned instrumentation fails to reach GTC in due time.*

5. *GUC understands that the instrumentation plan should detail plans for the commissioning of the different focal stations. This should include not only the foreseen schedule for the commissioning, but also the specific characteristics and supplies that each station will have within that schedule. This is crucial not only for the development and usage of the instruments that are currently foreseen, but also for possible visitor instruments.*
3. GTC Adaptive Optics (AO) is needed for forthcoming instruments like FRIDA. The responsibility to develop and construct it was transferred to the IAC, but the project seems to be stuck waiting for funds. An update on the present status of the AO should be presented at the next GUC meeting. The GTC-AO is part of the GTC instrumentation and must be included in the instrumentation plan as such (see item 2).
  4. GTC should have a clear and public policy for visiting instruments. The potentially interested parties need to know in advance what are the expectations to get GTC observing time.
  5. EMIR will use the detector originally assigned to FRIDA. FRIDA will have to use one of the three engineering grade detectors offered by the manufacturer. Plans should be spelled out if none of these detectors has the required quality (see item # 2).
  6. Create a historical archive with the materials provided to the GUC members during the past GUC meetings. It would allow a convenient access to the documentation needed for cross-checking. It would be password protected so that the access is only granted to the current GUC members.
  7. OSIRIS multi-object (MOS) is now fully operational, *and it has attracted considerable attention from the community [...] However, it will not reach its full potentials until the MOS reduction pipeline is fully operational. We were informed that the pipeline is almost ready, so, we urge GTC and the OSIRIS team to finish it up as soon as possible, and to make it publicly available.*  
 The text in italics has been copied from the previous report (item # 10), and still remains as an important recommendation.  
 In case OSIRIS pipeline becomes fully operational during this semester, the good news should be properly announced to the GTC community.
  8. As we mentioned in the general remarks, ToOs are working well. Just as a minor improvement, we suggest adding an automated email reply acknowledging the triggering of the ToO. In addition, a manual notification should be added indicating if and when the observation was completed.  
 CAT proposals requesting visitor mode but approved in queue mode: the SA should try to contact the PI to agree on the details of the observation.

9. The hiring of three new SAs will relieve part of the stress on the personnel related to the operation of the telescope, and this is a very good news indeed. We highly encourage GTC to keep on with this personnel recruiting as budgetary and legal restrictions permit. In particular, to level off the staff in charge of the maintenance of the telescope and its instrumentation. This shortage of technical personnel is particularly worrisome keeping in mind the advent of EMIR next year, and the need to repair the shutter of the dome (item # 10).
10. We encourage GTC to solve the problem with the shutter of the dome as planned (summer 2015), and to sort out the fact that no contractor has been found yet.
11. The Spanish Virtual Observatory (SVO; INTA-CSIC) maintains the public database of raw GTC data. We welcome and congratulate their efforts to collect and make public reduced GTC datasets as well. Individual researchers offer their reduced data to the community, which gives visibility to their own work but, more importantly, allows GTC data to be used by other colleagues. This policy, which is common in most major astronomical facilities, will boost the efficiency of GTC time. The power of this policy relies on the visibility of the database, and thus GTC reduced data is already cross-linked to important astronomy databases (ADS or VizieR). We encourage SVO to keep linking the data set with other important astronomical databases, in particular, NED (Nasa Extragalactic Database). In addition, we suggest SVO to explicitly invite researchers using reduced data to cite the original papers.
12. This issue also remains from past recommendations.
  14. *We suggest to add a search box to the webpage of GTC. It will speed up finding specific contents.*
13. A few minor suggestions to improve web interfaces are indicated in Sect. 2.

## GUC Members

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**GTC STATUS REPORT**  
**to the**  
**8<sup>th</sup> GTC USERS COMMITTEE MEETING**

La Palma, 10-11 JULY 2014

## **1. Introduction**

This is a summary report to keep the GTC Users Committee (GUC) informed on the GRANTECAN activities around the GTC. These activities are organised and presented here with the priority order at GRANTECAN: 1) science operations are the top ranked activity to maximise the science data production and quality; 2) technical operations to increase the robustness of the facility, to increase the capabilities of the current set of instruments and to develop tools to facilitate the telescope operation and data management; and 3) the development of telescope upgrades and new science instruments.

## **2. Science operations**

Along the past semester, from September 2013 to February 2014 (semester 2013B), a total of 152 nights (84.0% of the full semester) were devoted to science programs (ESO/GTC science time included), a total of 8 nights (4.4%) were devoted to the ESO/GTC technical time program, and the remaining 21 nights (11.6%) were used for technical activities, including commissioning of some OSIRIS and CanariCam observing modes.

The science time was used by observing programmes in queue-scheduled mode on 140,1 nights (92.2% of the total science time) and in visiting mode on 11,9 night (7,8%).

On average, during the time consumed for scientific observations in queue-scheduled observing mode, a 5% of time was lost due to technical faults and a 34% of time due to poor weather. A total of 689.9 hours of telescope time were delivered to the PIs in the form of 1,022 observing blocks. The overheads of this queue-scheduled observing mode (common calibrations, discarded observations, empty queues, human factors, manual procedures, etc.) consumed 188,1 hours (21.4% of real time available once corrected for weather and technical losses).

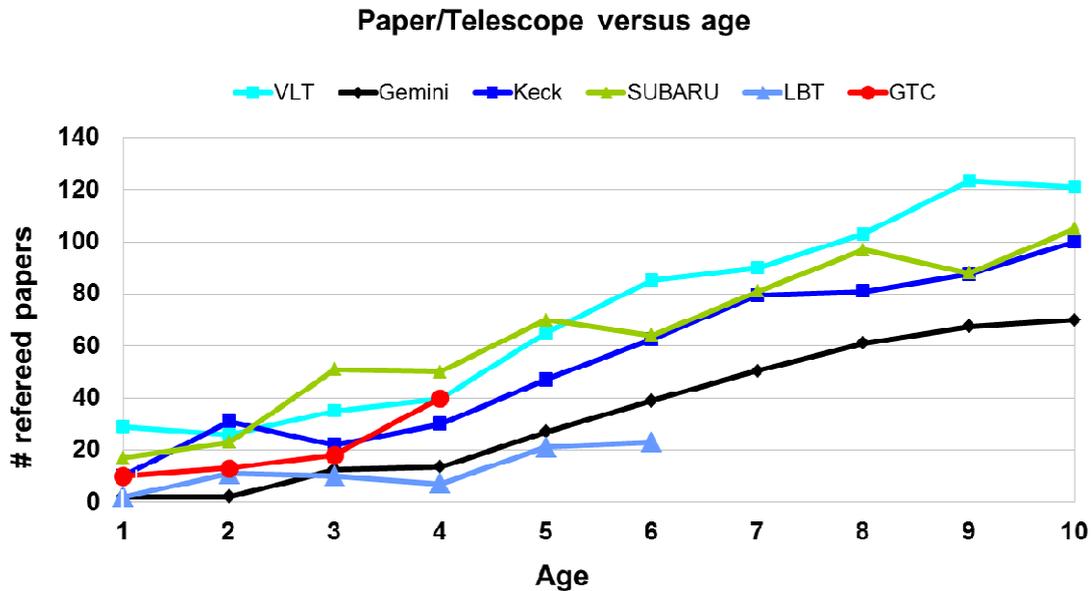
The science time was consumed by TACs programs (75,1% of the total science time), ESO/GTC science programs (14,3%), CCI International Time Programs (3,3%) and OSIRIS and CanariCam Guaranteed Time (7.3%).

Along that semester, 67 TACs observing proposals were attended and got GTC data. Up to 31 (46.3%) of them were completed.

Observing programmes are ordered in the queues and executed following the priorities fixed by the TACs. The Spanish TAC now publishes program ranking in terms of quartile blocks to facilitate a better understanding of the relative priority

of each observing program.

Some 100 publication in refereed journals have been published since the beginning of GTC operations in March 2009 up to June of 2014.



For the coming semester, 2014B, it is expected to devote 80% of the time to science programmes and to offer the broad-band imaging, including the SHARD filters, RTF, BTF (between 450 to 650nm), long-slit spectroscopy, MOS, Frame transfer and Fast Photometry modes of OSIRIS, and low resolution spectroscopy, low resolution spectropolarimetry, imaging and imaging polarimetry with CANARICAM.

The Spanish CAT has decided to give continuity up to three semesters to proposals classified in the first cuartile.

### 3. Technical operations

Technical work is focused with maximum priority to the following items: a) to improve the robustness of the system with the aim to reduce the average fault rate; b) to increase the utilities and tools available for night operations and quality control to reduce the observing overheads and increasing the volume and quality of delivered data; and c) to complete the remaining observing modes of OSIRIS and CanariCam and to correct the dome vignetting issue.

Some actions have been initiated along this semester to reduce the time required to setup the figure of the primary mirror after segment changes and to put it in phase and to increase robustness of the control of the primary segments. The first one is the development of a software tool that speed-up the process to align the primary segments after a change of segments after coating them. The second

one is part of the process to update the GTC Control System due the obsolescence of some of its elements. A migration to Linux has been initiated and the migrated parts have given the system a major robustness. Some primary mirror phasing routines are gaining stability and the initial results are promising. We expect good results in a short time scale.

The study of alternatives of improvements for the dome shutters contracted to IDOM was completed. It has permitted to identify the solution to be adopted to improve this system. The process to identify and contract a company to provide that solution has been initiated. Its signature is expected to be done before the end of this year and the completion of the work to be done by summer of next year. The work of IDOM has permitted to do since now some improvements on the upper shutter that permit to do observations without vignetting up to 80° of elevation.

The process of regular cleaning of the mirrors with CO<sub>2</sub> snow was temporally stopped at the beginning of the year to review the safety procedures and the acquisition of adequate tools. Now it is reinitiated. The total telescope reflectivity lost due to this pause is below 2% that will be recovering along the coming months.

The installation of a folded-cass rotator is progressing with some delay with respect the previous plans and is currently scheduled for September this year.

A new instrument calibration reflector has been installed in the nasmyth-B focal station (were OSIRIS is installed). It provides an improved illuminated field for instrument calibration. The previous reflector will be modified to be used in the nasmyth-A focal station as part of the EMIR calibration system.

The preparation of the nasmyth-A focal station to provide the required services for EMIR is progressing. The required changes of the Helium supply are well advance and the calibration unit is designed and some procurement is initiated.

### **3.1 OSIRIS**

The first observing science programs using OSIRIS MOS have been executed since March without any difficulty. The acquisition software has shown very handy and efficient.

OSIRIS PI announces that the OSIRIS pipeline continues being completed and tested by the OSIRIS team and announces its availability by August-September.

### **3.2 CANARICAM**

The spectro-polarimetry mode commissioned is completed. This mode will be available since semester 2014B.

The fast-guiding functionality is very advance. Some tests have been completed and the improvement in CanariCam performance is not as important as initially expected. Some additional test remains before the regular use of this functionality.

According to the current schedule CanariCam will be dismantled in July 2015 to permit the installation of EMIR at the nasmyth-A focal station. After some required modifications CanariCam will be available again in a folded-cass focal station by 2017.

## **4. New instruments**

### **4.1 CIRCE**

CIRCE is a visitor instrument from the University of Florida (UdF). It is shipped to La Palma and it will be unpacked and tested at the GTC lab. Some final elements have to be completed like the electronic rack, the final cables between the instrument and the electronic rack. Also the final tuning of the communication software between the instrument and the GCS will be done. It is scheduled to be installed in a Folded-Cass focal station in October 2014 for its commissioning.

### **4.2 EMIR**

EMIR is nearly fully integrated and its tests are well advanced at the IAC labs. The Configurable Slit Unit or CSU is under cryogenic tests and some bugs are being corrected by the provider before its final acceptance at the IAC laboratories.

According to the current schedule, EMIR will be installed at the nasmyth-A platform in July 2015 to initiate its commissioning. It is expected to be offered for general use in 2016.

### **4.3 FRIDA and Adaptive Optics**

The GTC AO System (GTCAO) that has been developed internally by GRANTECAN is nearly to be completed for its integration and test at the IAC labs. The IAC has offered to complete this system to cover the resources that GRANTECAN cannot provide now. IAC is waiting for the required funds requested to the Regional Government to initiate that work.

The GTCAO system that will use natural guide star in its initial version is scheduled to be mounted at the GTC nasmyth-B platform in 2017 before the installation of the instrument FRIDA. FRIDA is currently under construction by IA-UNAM and its collaborators. It is scheduled to install FRIDA in 2018.

But OSIRIS is currently at that focal station and it will be moved to the Main Cassegrain focal station once it is built for continuing OSIRIS operation. This is scheduled to be done not earlier than 2018.

An upgrade of the GTCAO system to use a laser guide star has been approved by the GTC Steering Committee. It will be developed by the IAC using funds from the Regional Government. The date to have that upgrade at the telescope is not yet available but it will be later that the complete commissioning of the natural guide star system.

### **4.3 MEGARA and MIRADAS**

Both represent the new generation of GTC instruments. The contract for

completion of MEGARA was signed at the beginning of May and the final design of this instrument is currently under review. The installation of MEGARA at the GTC is scheduled by December 2016 and it will be offered after its commissioning in May 2017.

MIRADAS has also passed successfully its Preliminary Design phase. A final decision on the future of this instrument is conditioned to the final availability of funds. Discussions with the UF have been initiated to close the terms of a contract for its completion.

### **4.3 HORS**

HORS is a single source high resolution (25000) visible echelle-spectrograph proposed by the IAC as a visitor instrument. It is based on some optical elements of the old UES spectrograph used at the WHT. This proposal is currently under study and it could be installed at the GTC in 2015/6.

### **4.4 Telescope upgrades**

The main upgrades ahead for the telescope are the preparation of the new focal stations required for the new set of instruments: The two Folded-Cass and the Main-Cass focal stations. The two folded-cass stations are currently under development but the main-cass is waiting for resources.

The Telescope Control System is being obsolete and a migration to Linux is progressing.