

Report of the 24th GTC User's Committee Meeting

September 14-15, 2022. Held remotely on Zoom.

GUC members:

Chair: Ismael Pérez Fournon (IAC)

Vocals: Josefa Becerra González (IAC), Rana Ezzeddine (Univ. Florida), Mar Mezcua (ICE), Fernando Moreno Danvila (IAA), Francisco Najarro de la Parra (CAB), Alberto Rebassa Mansergas (UPC), Laurence Sabin (UNAM)

1. General Remarks

The 24th GTC users committee (GUC) meeting was held remotely due to the Covid-19 crisis.

The GTC director and representatives of the science, engineering, and development divisions, as well as PIs of the new instruments teams reported to the GUC about the current status, performance and maintenance of the telescope, and plans for new developments. Some activities have experienced delays due to the Covid-19 lockdown. This report summarizes the most important issues presented and the topics discussed during the meeting, including the recommendations from the GUC. More details on the status of GTC and its instruments can be found at <http://www.gtc.iac.es/gtc/guc.php>

This report does not cover the impact of the La Palma volcanic eruption on GTC observations, operations and developments, that will be discussed in the next GUC meeting and report. The GUC would like to express our solidarity with GTC staff and the people of La Palma in these difficult times.

2. Funding situation and most relevant news

The GTC Director is pleased to announce an increase in the GTC funding and personnel.

The main news since the last GUC meeting are:

- 1) The Cassegrain focus station has been integrated and tested. OSIRIS was dismantled and prepared for reinstallation at the Cassegrain focus. The maintenance platform was about to be received at GTC. OSIRIS installation and commissioning was expected to start at the end of 2021.
- 2) The MIRADAS development is close to end.
- 3) There are no news about the GTC 2021-2024 Strategic Plan presented to MICINN in March.
- 4) There are no news about the 2022 budget but there is some progress in the negotiations between the Spanish National and Canarian Governments to define the GTC 2021-2030 funding plan.
- 5) The PDR of the GTC High Resolution Spectrograph (HRS) has been further delayed. HRS is expected at GTC in 2025-2026 but the schedule for its development is not clear.
- 6) The conference "VII Science with the GTC" is being organized by the University of Florida.

The GUC appreciates the hard work of GTC staff and the instrument teams to carry out the many and crucial activities in 2021-2022, that include the installation of OSIRIS at the Cassegrain focus, new OSIRIS and EMIR detectors, maintenance work and fixing of hardware failures, MIRADAS arrival at GTC, installation of HiPERCAM with a new derotator, etc. The main worries are the lack of news on the long-term funding, in particular for the next generation instruments, and the delays and budget shortfall of FRIDA.

3.- Update on science operations and instrumentation

GUC members were given very detailed reports on the telescope, instruments, science productivity, etc. The presentations can be downloaded from the GUC pages (<http://www.gtc.iac.es/gtc/guc.php>). In the following, a summary of the most relevant information is presented.

Three instruments (EMIR, MEGARA and HiPERCAM) were offered in the standard 2021A Call for Proposals. OSIRIS and HORuS were not offered due to OSIRIS migration to the Cassegrain focus. However, the migration was delayed and a special announcement of opportunity offered 250 hours of OSIRIS and HORuS from April 1st 2021 to July 31st 2021.

For the 2021B semester, EMIR, MEGARA and OSIRIS were offered, OSIRIS on a shared risk basis after installation at the Cassegrain focus. The oversubscription factor in 2021B was 2.2, small compared to > 4 in 2019B, likely due to the status of OSIRIS, that is the most demanded instrument, followed by MEGARA and EMIR.

About 75% of the proposals in the queue get data but the fraction of completed programs varies with priority band: 82%, 40%, 30% and 67% for band A, B, C, and D (filler programs), respectively. The reasons for not completing A-band programs include technical, instrumental, visibility, and restrictive conditions issues.

On the scientific productivity, by September 1, 2021, the number of published papers using GTC was 677. Most of these papers (589 out of 677) are based on OSIRIS data. The number of observation hours invested per publication varies with the proposal type: 6, 12, and 24 hours for DDT/ToO, ESO-GTC, and regular TAC proposals, respectively. CAT and the GUC want to remind users that DDT proposals can be submitted at any time. DDT time is also available to the Mexico and Univ. of Florida communities.

The Remote Visitor Observing mode has been enhanced with new functionalities, providing direct access to data and telescope status. During S21A up to six different users tested this observing mode with a very positive feedback.

The plans for the 2021B semester were to dedicate about 70% of time for science. It was planned to install MIRADAS and start the commissioning as well as to migrate OSIRIS from the Nasmyth to the Cassegrain focus. EMIR (imaging, long-slit, and MOS) and MEGARA (IFU mode only) were offered as well as OSIRIS at the end of the semester on a shared risk basis. No Large Programmes were offered for S21B due to the high number of GT proposals (EMIR/MEGARA) that need to be allocated (also recovering from the lack of observations during the Covid-19 shutdown).

For the 2022A semester, the plans included about 80% of time for science and several activities: EMIR maintenance stand-down, OSIRIS commissioning at Cassegrain and

preparatory work for GTC AO installation. It was expected to offer OSIRIS (shared risk), EMIR, and MEGARA (IFU mode only).

OSIRIS was expected to be operative at a new focal station (Main Cassegrain) at the end of S21B after a new maintenance platform is installed. The OSIRIS new detector is expected to be received by late 2021, to be installed and commissioned in 2022 and to be available for observations in 2022A.

The development of MAAT was approved by the GTC Steering Committee in July 2020 in the following terms: 1) the MAAT instrument team must obtain the funds, 2) GTC staff support would be kept at a reasonable level (of about 100 hour/year), and 3) MAAT must be provided with an acquisition and data reduction pipeline able to produce scientific quality reduced data. MAAT's instrument team has secured 80% of the total 1.3M€ budget and additional funds have been recently requested via European Recovery Funds. MAAT's schedule aims for on-sky commissioning in 2023.

EMIR, that has been a common-user instrument since 2017 at Nasmyth A, will be upgraded with a new H2RG detector with funds approved by the Canarian Government. EMIR with the new detector is expected to be operational before June 2022. GTC staff and the EMIR instrument team have been working to solve flexure problems and the degradation of the CSU reliability and performance.

An incidence with the MEGARA pseudoslit affected normal operations in S21A. The component was replaced definitely in July 2021. However, this prevented the use of the MOS mode as the pseudoslit was fixed in IFU mode. The new component produced some diffuse light that needed to be corrected. A possible thermal enclosure for MEGARA is being discussed.

HiPERCAM was offered in S21A, and installed in May 2021 (with some delay due to Covid-19 restrictions with UK). It collected > 130 hours of data in S21A very successfully. HiPERCAM is very useful for variability studies and also for deep, multi-band imaging, with a limiting surface brightness of about 31 mag/arcsec² in 2.25 hours. The plan is to install HiPERCAM permanently at GTC by mid-late 2022.

HORuS suffered several problems that could not be fixed and observations were finally cancelled. Funds have been requested via European Recovery Funds with the aim to fully upgrade the instrument: new CCD camera, cooling system and grism. It is under discussion to make HORuS available at Nasmyth B after OSIRIS migration to Cassegrain. Compatibility between HORuS and GTC AO is being studied for a possible use of HORuS by late 2022.

The MIRADAS development is close to end. It was planned to install MIRADAS at the end of 2021 and start the commissioning.

The presentation on GTC AO described the status of the project and the plans to provide a new, provisional, NIR AO camera, GRANCAIN, that will operate from 1 to 2.5 μm using a Hawaii-2 PACE Teledyne (2k x 2k) detector and a limiting magnitude of about $K = 20$ in 20 minutes and a resolution of 50-70 mas in K-band. It is expected that GRANCAIN AIV will be completed in the lab in mid 2023.

FRIDA is making progress despite the many Covid-19-related restrictions in Mexico. IAC has ordered a new H2RG detector, expected to be delivered by the end of 2021. It is expected that FRIDA will be delivered to GTC by the end of 2023. The main issue is that FRIDA has developed a budget shortfall of 335k€, needed for post-delivery

payments. GTC and the FRIDA instrument team are actively working to solve this funding problem.

4.- Time Allocation Committee (CAT) summary for semester 2021B

The Spanish CAT received 64 proposals for S21B, less than in previous semesters, likely due to the OSIRIS migration to Cassegrain. No GTC Large Programs were offered for S21B.

The CAT encourages GTC users to request Visitor Mode and Remote Visitor Mode observations, and to submit DDT proposals. DDT time is available to the three GTC communities.

5.- Summary of recommendations from the GUC

- The GUC encourages GTC to keep on the work on MEGARA to make it fully functional, including the MOS mode.
- The GUC proposes that GTC provides information on the expected instrument changes in the following semesters with the Calls for Proposals and in the GTC website.
- The GUC advises GTC to try to improve the fraction of band A programs that are finished.
- The GUC encourages GTC to improve the communication with the users (e.g. using mailing lists or a newsletter).