

GTC User's Committee 17-18 September 2026

Attendants:

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General Remarks

The meeting reviewed the status of GTC science operations, the instrumentation roadmap, the archive, and the progress of the adaptive optics system.

Two priorities were identified by the GTC Directorate for the coming period: the improvement of the optical alignment and performance of the telescope, and the routine delivery of Level-1 reduced data to users.

Regarding future instrumentation, the GTC reported that a multi-conjugate adaptive optics development will be carried out at the IAC, and that letters of intent are being requested from consortia interested in participating in a new instrument providing simultaneous optical and near-infrared imaging and spectroscopy, on a 6–7 year timescale.

Most Relevant News and Activities since the Last Meeting

- MAAT achieved first light and obtained its first on-sky test results. Last technical tests are foreseen to take place at the end of October 2026.
- GRANCAIN commissioning at the telescope is ongoing, with the AO system consistently delivering diffraction-limited PSFs in K-band.
- The DRAGO system (Data Reduction and Analysis for GTC Operations) is in operation, with more than 70% of the data processed in less than two days and ingested into the archive.
- FRIDA is operational in the laboratory at UNAM and ready for verification.
- Semester 26A recorded the lowest technical downtime since the start of GTC operations (3.1%).
- The last year has been the most productive in the history of the GTC, contributing to a total of approximately 1195 papers as of September 2026.
- Long-term (monitoring) programs (one to four semesters) are now accepted.

Science Operations

Time losses and weather. Semester 26A was very good in terms of both productivity and weather, with technical downtime of ~3%. Summer conditions were characterised by high temperatures but good transparency.

Demand and pressure. Four instruments were offered. Demand decreased slightly for 26B, possibly related to the introduction of new proposal tools. The total oversubscription factor was 2.6. OSIRIS remains the most demanded instrument, with long-slit spectroscopy the most requested mode; EMIR is now second, reflecting renewed community confidence following the detector upgrade and its role as the main instrument during bright time.

Time delivered. 79% of the total data and 83% of A-ranked programmes were delivered to the Spanish TAC, with night efficiency close to 100%. Delivery levels for Florida and Mexico were maintained, and this semester produced the largest number of hours for international (ITP) programmes.

Productivity. The GTC productivity is comparable to that of other 8–10 m telescopes, with a typical publication lag of about 4 years. The contribution from communities outside the GTC partnership is increasing, with a noticeable increase in first-author papers from China.

New tools. New tools for proposal management, new Phase-1 and Phase-2 interfaces, and a new finding chart generator are being developed. A first beta version of an automatic scheduler is already being tested, with deployment expected in 27A/27B. Software developments are expected to be delivered on shorter timescales with the recent start of the GTC AI engineering team.

TAC-related issues. Oversubscription is concentrated in the RA 10–14 h range, which also competes with Guaranteed Time fields; GT usage has increased for EMIR, while OSIRIS is within the last 100 hours of its GT allocation. Regarding ToO management, more than one trigger per night is now common, and the TAC has decided that in case of conflict only the highest-ranked programme will be observed (applicable to Spanish time only); this is considered a management rather than a time-allocation issue. Monitoring and long-term programmes are accepted for A-band ranked proposals, and Large Programmes will be offered in 27A for HiPERCAM, MEGARA (IFU), EMIR and OSIRIS.

Instrumentation

OSIRIS

MAAT, the small IFU integrated in OSIRIS, achieved first light in May 2026, with good image quality and a throughput of about 80%. Further tests are scheduled for October–November 2026, and MAAT may be offered in a special call for 27A.

Regarding optical polarimetry with OSIRIS+, no news was reported from the instrument team; the data from the demonstration run have been obtained but the analysis is still pending.

EMIR

EMIR sensitivity is significantly better than before the detector upgrade, reaching deeper limits. Efforts to reduce overheads continue, including tests of faster readout modes, although the results are not yet sufficiently robust. Reliability problems have been detected in the CSU electronics at high ambient temperatures; the CSU requires about 10 minutes to be configured, and longer at high temperature, although this does not directly affect the user.

Maintenance of the instrument is expected to happen in 2027B, with a planned two-months stand down during that period.

MEGARA

Several components, including a thermal sensor, were refurbished during the summer, taking advantage of the period in which MEGARA cannot operate reliably due to high temperatures; operations were expected to be recovered during the meeting. The study of new blue calibration lamps continues, with results expected by October 2026. New AI-based algorithms are being tested to improve the data reduction. Work on the MOS mode is planned for next year.

HiPERCAM

Work is ongoing to secure funds for a polarimetry mode, as well as for covering the operational costs of the instrument from March 2028 onwards.

MIRADAS

The process remains stalled, with no news since the last meeting. Technical issues preventing its use persist, compounded by administrative difficulties.

FRIDA

The instrument team reported substantial progress. The high background detected in April 2026, when the science detector was installed, had decreased by June, and improved cooling in July–August brought the dark current to $0.1\text{--}0.2\text{ e}^-/\text{s}/\text{pix}$.

A loss of spatial resolution in the IFS has been confirmed and is currently the top priority. 1-2 of the 30 IFU slices may be unusable, but these are not located at the center of the field.

On the software side, the IAC has delivered and integrated a significant number of components in the past six months, which UNAM is testing jointly with the IAC. The Inspector panel, the instrument layer and the ETC are still missing, and all are required to start commissioning. However, the system works in command mode. The remaining software needed for commissioning is expected from the IAC between March and July 2027, and the data reduction pipeline (UCM) is being held up by defects and design changes.

The laboratory functional acceptance testing, with a GTC team travelling to UNAM, is scheduled for 23–29 September 2026; this is a functional and not a science verification. Shipping is expected in early 2027.

The GUC acknowledges the efforts of the teams and is encouraged by the progress achieved. The Committee reiterates its strong support for sustained collaboration and proactive communication between all parties, a key to ensuring timely instrument delivery.

CHORUS

The Final Design Review of the UV module was closed on 3 August 2026; the FDR of the VIS module is not yet closed. The UV module is under construction and progressing quickly. Two supply issues were reported: the Fraunhofer UV cross-dispersers cannot be shipped to China, so the use of a locally manufactured grating with subsequent on-site substitution by the Fraunhofer grating is under study; and the VIS CCD is currently held in UK customs. The delivery of the UV module has been delayed by several months, to almost 2028.

GTC Data Reduction Products

The automatic generation of data products is a top priority, now supported by funds to hire dedicated staff, with the aim of simplifying and automating the production of Level-1 data (reduced).

The DRAGO system (Data Reduction and Analysis for GTC Operations) had its first release in 25A and currently provides long-slit spectroscopy and imaging for OSIRIS and EMIR. MEGARA is the next step, and HiPERCAM direct imaging is expected to become available within the next month. The system currently works on an observing-block basis, with the combination of several OBs of the same programme foreseen for the future. More than 70% of the data (OSIRIS/EMIR) is already processed in less than two days and uploaded to the archive at CAB.

GTC Archive

The archive, hosted at CAB, is accessible both through the traditional web interface and through VO tools, and contains almost 1.7 million science files. Usage has increased, with a steep rise in both queries and science file downloads.

Several developments were reported: the ingestion and quality control systems have been modified to accommodate advanced data products, a QLA column has been added so that users can access the reduced data, and a preview capability based on Aladin Lite has been implemented.

The Table Access Protocol (TAP) has been deployed to overcome the limitations of the web interface for programmes with large data volumes, which was restricted to 100 rows per page. TAP supports asynchronous queries, allows access via scripts without the web interface, and

enables more complex queries. Efforts are ongoing to also integrate it in tools like TopCat using a data link.

The GTC footprint is now described through Multi-Order Coverage maps (MOC) and their time-extended version (STMOC), updated daily to reflect the actual contents of the archive. Searches are significantly faster following a simplification of the database, and the ingestion of HiPERCAM files has been improved.

Adaptive Optics System and Optical Performance

Optical performance. A coordinated effort involving a larger team is under way to improve the optical performance of the GTC, with synergies established with Keck and TMT. Significant improvement in optical alignment has been achieved. Static pupil speckles have been identified, as well as a possible thermal drift. Some oscillations were attributed to non-phased mirrors. Current effort is focused on improving stacking and phasing performance, with the next goal set to achieve 50nm accuracy.

GTCAO. The error budget corresponds to a promised Strehl ratio of 66% in K band, and values close to this figure are being reached. The system consistently achieves diffraction-limited PSFs with high Strehl ratio, although substantial work remains. The current field of view is 2.0 arcmin. GRANCAIN (FoV 26 arcsec) is being used as the first science instrument, to be replaced by FRIDA.

The IAC is already working on the laser guide star upgrade. GLAO and MCAO options are also under study at the IAC; MGTCAO could reach up to 80", limited in practice to 68" by FRIDA.

GRANCAIN. Commissioning of the instrument itself is ongoing, although the full process is not complete. The throughput is slightly worse than expected, and an excessive thermal background has been measured, 1–1.5 mag brighter than with EMIR, most likely contributed by the AO system. The image quality is consistent with expectations for bright stars; performance on fainter stars is not yet as expected, which remains a commissioning task.

Engineering Operations

Technical time losses decreased from 18% in 25B to 3.1% in 26A, the lowest level since the start of GTC operations. The high figure in 25B was dominated by the failure of M2; the chopper function is still under testing and is required for GTCAO. A large number of incidents continue to be fixed during daytime.

Current issues include: the CCD for the wavefront sensor component at Nasmyth A failure, which is very old and whose replacement is expected in October or November 2026 (wavefront sensor at Nasmyth B is being used in the meantime for the optical alignment / cophasing of the primary mirror); cracks in the dome rotation rails, whose repair requires lifting the dome; and the

obsolescence of the island generators, which causes power instabilities. Other minor problems did not result in time losses.

The reflectivity of the primary mirror stands at about 66.5%; the rate of segment recoating has been low this year due to competing priorities, and it is expected to increase in the coming months. The main tasks ahead are the MEGARA intervention, the change of the Nasmyth A CCD, and a new GCS software release. The refurbishment of the building is ongoing in parallel with operations, and a data management plan is in preparation.

CAT Report

The call for proposals for 27A is open. The format has been improved to make it easier to navigate and to homogenise the information provided. This is the second call using the new application, which now includes the possibility of specifying instrument configurations per semester for multi-semester requests, a box to specify the expertise of the team, and warnings about up-to-date information. The previous proposal system will be shut down by the end of September 2026.

The distinction between Large and Long-term programmes: Large Programmes are large in size and have strong legacy value, while Long-term Programmes are those requiring more than one semester without necessarily involving large amounts of time. Monitoring programmes were defined as those requiring repeated observations of the same objects or fields with a given cadence.

The Spanish Night CAT is currently composed of 15 members, with good gender balance (7 women out of 15 members). For 26B, 125 proposals were received, of which 67 requested GTC, mostly with OSIRIS. Only one Large Programme was submitted, requesting 150 hours over three semesters. Since April, 8 DDT proposals have been received and 3 accepted (2 OSIRIS, 1 EMIR). It was raised that the CAT deadline falls one day after the JWST deadline, and was announced only 3 weeks before the deadline (short compared with other observatories, e.g., ESO,...).

Regarding the anonymous review of proposals, the CAT indicated that a timeline will be provided once some pending fixes to the software (handling the anonymous identity) have been implemented.

The GUC transmitted several points raised by users regarding mainly data reduction pipelines.

- **Rapid response for specific grisms.** Mounting a grism on OSIRIS is not compatible with rapid response for B-rated programs. The GTC team recommends checking the instrument configuration before triggering, as in some cases the required setup can be prepared before the night.
- **Triggering.** A new interface is being developed to automate the triggering of ToO observations. Likely start of operations in 2027B.

- **Observing blocks.** The GTC asks users to contact the support astronomers by e-mail whenever a problem is identified.
 - **Mask designer and Phase 2.** Inconsistencies were reported between the mask designer and the Phase-2 tool; the GTC will look into this, noting that the Phase-2 tool is probably still using the old detector configuration.
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Recommendations from the GUC

1. **MEGARA MOS.** The GUC reiterates its previous recommendation regarding the MOS mode of MEGARA and the status of the blue calibration lamps.
2. **EMIR pipelines.** The GUC recommends that the web pages clearly state which pipeline is recommended for each observing mode and which one is used in the already available reduced data. The current still has some distortion at the edges. There are current efforts to improve this for the next pipeline release.
3. **Visibility of GUC reports and general GTC news.** The GUC recommends that a link to the GUC reports be included in the call for proposals, so that the user community is aware of the issues raised and of the responses provided by the GTC.
4. The GUC recommends that the GTC regularly circulate a **newsletter** to the community highlighting new GTC developments, decisions, and other relevant activities. Such a newsletter would provide a direct and effective means of keeping the community informed and improving the visibility and impact of the GTC's work.
5. **CAT deadline.** The GUC notes that the GTC call deadline falls one day after the JWST deadline and recommends that this overlap be reconsidered in future semesters.