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1.1 Introduction

The collection of webpages you will attend through this help, conforms the *Gran Telescopio de Canarias* (GTC) **Observing Management Program System** (OPMS) developed to assist you in designing your observations.

During this first semester of 2009, from March to August, the observing mode adopted by GTC will be the service mode. In addition, a priority-scheduled queue will be followed to carry out the observation requests.

This mode of observation requires each Principal Investigator (PI) to complete a simple form that describes the observations sufficiently well in order for the GTC staff astronomers to carry out the observations. Each project will be associated with an astronomer at GTC to assist with any questions or problems that might occur and to advise on the best possible use of the telescope.

For this reason during the first, and probably the second, semester of the 2009, observing blocks\(^1\) which can be executed in the queue mode, must be prepared through this php/html interface. Nevertheless, it should be taken into account that this interface is not the definite way to configure GTC-observations, since a complete and more elaborated java-tool will be delivered for future semesters.

\(^1\)See definition in §2.2
Chapter 1. GTC OPMS

The webpage hosting the OPMS tool is:


also reachable from the the GTC home webpage (see fig.1). Please note
that the tool will be opened in a popup window so make sure the navigator is
not blocking it. At any given time, a given user should open only one window
to avoid conflicts.

**WARNING:** If multiple windows are in use within the same proposal an
observing block or part of it could be overwritten or deleted.

![Fig.1: First page of the GTC-OPMS for the semester 09A.](image-url)
1.2 Logging in

Each PI will be provided with a \textit{username} and a \textit{password} to enter the OPMS, and then to create, inspect, modify or delete its own observations. The PI will also be given a contact person (a Support Astronomer (SA)) at GTC to deal with specific queries related to the observing proposal.

Please, note that not necessarily the SA that has attended the user OPMS related queries, will carry out the observations.

In case of delay in answering your queries you could always contact with the \texttt{astro-helpdesk@gtc.iac.es}.
Once you logged in, the system will show you all your proposals (see fig.3). Then, selecting one proposal you will enter to the create/modify/delete observations menu (§2.2).
Defining an observing block.

2.1 Available modes

By clicking on the selected proposal (see fig.3) and “submitting” the navigator will open a webpage (see fig.4) to operate in the proposal. In this webpage the title, the proposal code, time allocated, and the observing constraints coming from Phase I, are shown. Furthermore, the user will be able to:

i.- Create an observing block, which in turn can be:

   a. Broad Band imaging
   b. Imaging with Tunable Filter
   c. Long Slit Spectroscopy

ii.- Modify/inspect the created observing block.

iii.- Delete an observing block.

Please ensure that your observing blocks coincide with the Phase I request. GTC staff will check the correctness of each set of observing blocks at the end of the process in order to ensure that the Phase II result matches the original instrument setup and time allocation.
Please, note that in queue mode two observing blocks of the same target or otherwise linked can be executed in separate nights depending on the requested conditions. If the user wants them to be carried out together, this must be notified to the support astronomer through the readme file.

2.2 Creating an observation

An observation or observing block is the group of templates that refer to the same target and change only in few parameters in the telescope/instrument configuration (exposure time, filter, etc). The template defines one or more exposures with a given filter, exposure time, and readout mode. In a given template the user can only change the offset of the telescope.

\footnote{The readme file should be completed at the end of the process.}
2.2 Creating an observation

To define an observation the PI must complete a few fields whatever the type of observation might be (see below and fig. 5).

**Name**: Assign a name to the target. It doesn’t have to be unique but for later handling it is better if it is. (See fig. 5). Please, avoid special signs like [, ], (, ), +, =, %, ?, #, *, !, etc.

**Observing Priority**: here you assign a number between 0 to 9 (0 or empty = maximum priority, 9 = lowest priority), to the observing block. Night astronomer will attempt to execute first the OB with higher priority.

**Fig. 5**: Basics definition of an observation.

**Coordinates**: Enter the coordinates in the given format. For later scheduling coordinates are required even for non-sidereal targets. In this case enter a value close to the mean position the target will have during the period of visibility.

**Proper Motion**: If appropriate enter proper motion values in milli arc-seconds per year. This field can be left empty.

**Non Sidereal Target**: Activate this flag for solar system targets. If selected, later the user will be asked to enter a file of coordinates.
2.2.1 Broad Band Imaging

In addition to the fields commented in §2.2, to define a broad band template the user must complete at least one row of the table in the fig.6.

![Table of templates to be defined](http://161.72.37.2 - OSTRIS phase 2 - Mozilla Firefox)

Fig.6: Table of templates to be defined. Each row represents a template. The group of templates defined on a pointing forms an “observation”.

**Science templates:** Each template allows the user to define a series of one or more exposures to be taken with a given filter, exptime, and readout mode, in different positions on the sky. The parameters to be configured are:

- The filter to be used.
- The exposure time in seconds.
- The number of exposures ”N exp” in the series.
- The Slow readout mode (100 KHz in imaging) is preferred for science exposure, the fast one (200 KHz) for acquisitions.
2.2 Creating an observation

The offsets between images, in arcseconds. Note that within a series, each offset will be added to the previous one, and if the requested number of exposures is greater than the number of offsets (or if no offsets at all are given) the telescope will reuse the last position as many times as needed.

At the end of each template, the telescope is always sent back to the starting position.

Example: To take five exposures of 600 in the u band, readout mode slow, in a squared pattern plus a point below the initial one of 10” dithering starting from the target position (first row in fig.6): 'u, 600, 5, slow, 0 10 0 -10 0, 0 10 0 -20'. To take a similar sequence in g and r bands over the very same positions on the sky (second and third row in fig.6):

'g, 500, 4, slow, 0 10 0 -10, 0 0 10 0'.
'r, 400, 4, slow, 0 10 0 -10, 0 0 10 0'.

Note the very same offsets are given in both templates because at the end of the first one the telescope goes back to the preset position.

To take 3 10sec exposures in z band, in a fixed position on the sky, and slow readout mode: 'z, 10, 3, slow' (note that no offsets are given)

To take 3 exposures in the z band each one with a different exposure time, the user must configure 3 templates like: 'z, 60, 1, slow' 'z, 120, 1, slow' 'z, 240, 1, slow'

In the case of needing more templates than offered check the SA.

2.2.2 Imaging with Tunable filter

Science Templates: Each template allows the user to define a series of one or more exposures to be taken with a given Tunable filter, exptime, and readout mode, in different position on the sky. The parameters to be configured are:

The filter to be used. → IMPORTANT: FOR PERIOD 2009A ONLY THE RED TUNABLE FILTER IS OFFERED.

The central wavelength in nanometers to be sintonized.

The FWHM of the passband in nanometers.

The exposure time in seconds.

The number of exposures "N exp" in the series.

The Slow readout mode (100 Khz for imaging) is preferred for science exposures, and the fast one (200 Khz) for acquisitions.
Chapter 2. Defining observing blocks

The offsets between images have the same philosophy as in §2.2.1.

Example: To take 3 exposures of 250s at 680 nm, with FWHM 1.9 nm, in dithered 20" positions on the sky, and slow readout mode (first template in fig.7): 'TF_RED, 680, 1.9, 250, 3, slow, 0 20 0, 0 0 20'.

To take four 60s exposures at 700 nm, FWHM=0.9 nm, readout mode fast, in a squared 10" dithering pattern starting from the target position: '700, 0.9, 60, 4, fast, 0 10 0 -10, 0 0 10 0'. To take two sequences like above as part of a single observing block, defines two templates as follows: '800, 1.1, 10, 3, slow' '700, 0.9, 60, 4, fast, 0 10 0 -10, 0 0 10 0'. Note that at the end of the first template the telescope goes back to the preset position, thus the first exposure of the second template is centered on the target.
2.2 Creating an observation

2.2.3 Long Slit Spectroscopy

In addition to the fields commented in §2.2, to define a long slit spectroscopy observation it is needed to fulfill:

- **Slit Width**: Select the slit width. Only one slit width per observing block can be selected. See fig.5.

- **Slit Position Angle**: Select the slit position angle on the sky, starting from North toward East, from -90 to 90 degrees. To position the slit along the parallactic angle at the moment of observations, enter "999".

- **Acquisition Image**: To center the target on the slit, a direct image of the field is taken and the target identified. Here the user can specify the exposure time, broad band filter, and readout mode to be used for this exposure. Select the lowest noise readout mode to use this exposure for science, otherwise the user might prefer the fast readout mode to save time (see fig.5). In the case the science target is extremely diffuse and/or no precise centering of the target is required, this exposure can be skipped to save time. In this case the user relies on the GTC pointing accuracy of few arcseconds.

  - First column in the template of acquisition, fig.5, is the filter to be used.
  - Second column is the integration time in seconds.
  - Third column is, then, the readout mode.

- **Through slit image**: After placing the target on the slit, an image of the target is taken with the slit in position (but without inserting the grism) to further improve centering. Here the user selects the filter, exptime, and readout mode of the exposure (See fig.8). Values can be set different from the ones used for acquisition. In the case the science target is extremely diffuse it is difficult to improve the centering achieved in the previous step, so this exposure might be skipped. The meaning of the columns is the same as in acquisition.

  - **Blind offset**: For faint targets the user can provide a blind offset from a known well defined celestial position. The user might acquire on a bright target and then blindly offset the telescope to place the science target on the slit. Here is the place where to give the required offset in arcseconds (leave empty if no blind offset is required). Positive values in RA and Dec are toward East and toward North respectively. Note that this offset is applied after the through slit image, therefore this step cannot be skipped.
Chapter 2. Defining observing blocks

Fig. 8: Selecting the mode of observation.

**Filling the templates**: Each template allows the user to define a series of one or more exposures to be taken with the selected slit, a given order separator filter, exposure time, and readout mode, in different positions on the sky. Then, the parameters to be configured are:

- The grism and the order separator filter to be used.
- The exposure time in seconds.
- The number of exposures "N exp" in the series.
The offsets along the slit between images, in arcseconds. Note that within a series each offset will be added to the previous one, and if the requested number of exposures is greater than the number of offsets (or if no offsets at all are given) the last position is re-used as many times as needed. At the end of each template, the telescope is always sent back to the starting position.

**The readout mode:** Slow readout mode (50 Khz in spectroscopy) is preferred for science exposure, and fast one (100 Khz) for acquisitions.

**WARNING:** Although they show the same names “SLOW” and “FAST” these readout modes are different to those of the imaging.

Example: To take 3 exposures of 600s with grism R500B, without order separator, in 3 dithered positions of 5" below the slit center (obviously along the slit), on the center, and 5" above the slit center, and everything in the slow readout mode (first row in fig.8): `{R500B, none, 600, 3, slow, -5 5 5}`

To take the same sequence as above but in a fixed position on the sky with the f802/51 order filter `{R500B, f802/51, 10, 3, slow, -5 5 5}` (note that no offsets are given)

### 2.3 Closing an observation

To finish any of the modes commented it will be needed to upload a finding chart. This finding chart should be an image in .jpg or .gif format with a maximum size of 1 Mb.
Chapter 2. Defining observing blocks

Fig.9: Dialog chart to uploading the finding chart.

Within this image the target object as well as the North and East directions should be clearly marked. If possible, please give us the scale of the pixel (in the readme file or with a symbol within the image), and/or the size in arcseconds of the whole finding chart. It would be also useful for us to know the filter in which the image has been taken.

If the chart is not provided the observation block will not be considered as complete. In this case, returning to the page after selecting the proposal (fig.4) the user can check the existence of the object and its red-coloured name indicates that its preparation is not complete. But, the finding chart can be always provided later when modifying/inspecting operations taking place on the “observing block”.

Once the user provides it, the webpage shown in fig.10 will be reached

![Congratulations, your OB is complete](image)

Fig.10: Dialog chart after uploading the finding chart.

This service will cover a wide range of necessities in a simplified way. However the user might encounter a lack of information or some limitations in the design. Please contact your SA for further information.
CHAPTER 3

Managing the observation blocks

3.1 Modifying or inspecting an OB

As can be seen in fig.11 the observing blocks created are shown now in the main page of management of Phase II tool.

Note how the information is shown. Each row in table of fig.11 contains:

i Number of the observation\(^1\);
ii Name of the object/target;
iii Right ascension and Declination;
iv Mode of observation (Spectroscopy = osiris_LSS, Tunable Filter imaging = osiris_TF, and Broad Band imaging = osiris_BB);
v If a Finding Chart (FC) has been provided;
vi If the object is a Non-sidereal target;
vii If an Ephem. text file has been provided;
viii Length in seconds of the observation;
ix The priority of the observation; and
x If the definition of the observation is complete.

\(^1\)It might not be consecutive because of intermediate changes made by the user.
Then, for each observation demanded you can check whether a finding chart is provided or the approximate length of the observation in seconds, etc. If the definition of the observation is complete the system will inform the user by putting ‘yes’ at the end of the row. If no, please, check whether all the information and files (Ephem for Non-sidereal objects, finding chart for all, etc.) needed to carry out the observations are attached.

A line above the table informs the user about the total time that will be spent to complete the program. If this time exceeds the time granted, the system will warn the user with a red indication at this line.

### 3.1.1 Modify/inspect an OB

At this moment the user will be able to modify/inspect or delete the objects created. To modify just click on the observation and press “modify/inspect OB”.

---

**To start creating an Observing Block**

**select an observing mode:**

- Broad band imaging: ○
- Imaging with Tunable Filter: ○
- Long slit spectroscopy: ○

---

**Existing Observing Blocks (Total Used Time: 2.99 hours)**

(Incomplete Observing blocks shown in red)

<table>
<thead>
<tr>
<th>Num.</th>
<th>Target</th>
<th>RA</th>
<th>DEC</th>
<th>Mode</th>
<th>FC</th>
<th>non-Sid</th>
<th>Ephem</th>
<th>Length (s)</th>
<th>Priority</th>
<th>Complete</th>
</tr>
</thead>
<tbody>
<tr>
<td>0001</td>
<td>Fantastic</td>
<td>10:10:00</td>
<td>25:47:32</td>
<td>osiris</td>
<td>yes</td>
<td>no</td>
<td>no</td>
<td>2136</td>
<td>1</td>
<td>yes</td>
</tr>
<tr>
<td>0002</td>
<td>Wonderful</td>
<td>10:10:00</td>
<td>25:47:32</td>
<td>osiris</td>
<td>yes</td>
<td>no</td>
<td>no</td>
<td>4034</td>
<td>1</td>
<td>yes</td>
</tr>
<tr>
<td>0003</td>
<td>Marvelous</td>
<td>10:10:00</td>
<td>25:47:32</td>
<td>osiris1</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>4616</td>
<td>1</td>
<td>yes</td>
</tr>
</tbody>
</table>

---

**To delete an Observing Block enter its number (like 0001) and press delete**

**Once you are satisfied with the Obs, you must complete one final form**

---

Fig.11: Observing blocks defined.
The user can check the values entered as well as the finding chart, and the ephemerides, if any, associated to the OB.

**WARNING:** in the case of either the finding chart or the ephemerides text file, has been uploaded more than once, the user should make sure that the navigator is not displaying an old version of them from the local CACHE.

In this case the user must know that if resubmitting the observing block, the existing finding chart will be dropped. Without resubmitting, if the user only inspected the data and then clicks back in the navigator, the existing finding chart will be kept in use. Confirm it using “reloading” in your web navigator tool (firefox/explorer/konqueror/opera/safari...)

To delete an observation, and for safety reasons, the user must write down the number of the desired one you want to erase from the system.

### 3.2 The Readme file

The final step in order to complete the Phase II is submission of the readme file. At the bottom of the main page (fig.11) select the “fill README file” button. Please, note that this step is very important for the night astronomer to understand the purpose, method and objective of the observations. In this part, see fig.12, the user will be asked in checkboxes for

- Time critical
- Non-sidereal
- Special calibrations
- Comments

Below each one of the aforementioned questions, a text space is reserved for justifying/commenting them (see fig.12). In the fourth one the user can detail the purpose and special features of the whole observation request and some particulars for an observing block.

---

If it is needed use the reload button from your navigator
Fig. 12: Time-critical, non-sidereal... text area.

Here the user can ask for the observations to be accomplished together or in a specific mode, or declare an observation as a part of a series (for instance: if the user desires to observe in u, g, r bands following a sequence like u,g,r,u,g,r,g,u,... or something similar), it should be declared/clarified here (see fig.13).
3.2 The Readme file

Fig.13: Readme file text area.

Then pushing the submission button the user will reach the final page, fig.14. At this moment an e-mail will be sent to the user and to the SA in charge of the checking of the configuration for the observations. Please, avoid going back at this point, since going back and forward shall repeat the operation of mail sending.

Fig.14: Final message when the observations have been completed.

WARNING: Once the README FILE has been sent every observing block in the proposal will be locked against changes.

Once the readme file\(^3\) has been submitted, or the deadline date is exceeded, the observations will be locked. The functions of the webpages are open but it will not take effects on the observation blocks defined. To change/modify an observation in this case, contact your SA.

\(^3\)This readme file can be fulfilled in spanish.
A.1  Estimation of the time spent in overheads

According to our experience the time spent in operating the telescope and the instrument before exposing has been computed for the whole OPMS estimation as in the following table:

- 10 min for acquiring the target
- 2 min for each setup of OSIRIS (for instance to change a filter)
- 44 s slow readout mode
- 22 s fast readout mode
- 10 s for each telescope offset

It should be taken into account that some of those values are approximated because we still DO NOT KNOW the real one. This situation would be improved during this semester.