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Very Large Telescope

VIMOS GuideCam

User Manual

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1 Acknowledgment

The first version of this document was written under the supervision and in collaboration with Jean Gabriel Cuby.

2 Introduction

This document describes the Guidecam tool delivered to VIMOS users for the preparation of imaging and MOS observations. VIMOS is a wide field instrument located at the Nasmyth B focus of UT3 (Melipal). Although in many cases it is possible to find a guide star such that the Telescope Guide Probe does not vignet the instrument field of view, there are situations where some vignetting takes place. The user might want to control at least the position, if not the amount of the vignetting introduced in the field of view. This is what Guidecam is here for, to help users to visualize the geometry of the VIMOS field of view and of the Telescope Guide Probe and to select a Guide Star accordingly.

3 Release Notes

The information provided in this document applies to the ESO Period 82 only.

4 Policy

Pre-imaging is mandatory for VIMOS MOS programs. The choice of the guide star is therefore to be made at the time of pre-imaging. The information regarding the guide star (coordinates and guide probe position) is stored in the pre-image headers, and subsequently propagated by VMMPS [1], the VIMOS Mask Preparation Software, into the Aperture Definition in Pixel (ADP) files. At the time of the MOS acquisition, this information is extracted from the ADP files and the same guide star as used for pre-imaging will be re-used for the MOS observations.

ESO applies the following policy regarding guide stars:

- The selection of a Guide Star for VIMOS observations is now **mandatory** for imaging and pre-imaging alike. When the guide star is selected, the coordinate should be properly entered in the acquisition template, together with the position of the guide probe, and the guide star option have to be selected properly (see 4.4). **If this is not done properly your OB will not pas validation and will not be scheduled for observation.**
- In case of observation involving offsets, it is the responsibility of the user to check with guidecam that the chosen guide star does not produce unacceptable vignetting in any of the frame produced by the execution of the OB. **ESO will consider as executed within specification an OB producing vignetted frames, implicitly assuming that the vignetting was already verified by the user.**

- In case the selected guide star turns out to be not usable during the observations (because of change in the conditions), the telescope operator will try to select an alternative one and use it for the observations, even if the selected guide star produce vignetting. **ESO reserves the right to charge to the time allocated to the run the time spent in identifying and setting up the alternative guide star.**
- The use of the guidecam tool is mandatory also for the preparation of the finding charts. The finding charts should clearly indicate the guide star to be used.

5 Using Guidecam

5.1 Getting started with Guidecam

Using Guidecam is fairly simple:

- Start Guidecam by issuing the command `guidecamLite` after installation. This opens up a skycat GUI with a specific `Guide-Probe` pull-down menu. Figure 1 shows the main Guidecam panel.
- Select the `Settings` option of the `Guide-Probe` menu. This opens up the `Guide Probe Settings` panel which is represented in Figure 2
- Enter the coordinates of the target in the 'Telescope' section of the panel. Note that the coordinates have to be in J2000, and the format should be as indicated. The default value of 90 degrees for the rotation angle on sky **should not be modified** unless a waiver is requested (see the VIMOS User Manual [2]).

  When pressing the **Apply** button, Guidecam will download from the ESO archive the DSS image of the field and open a panel `USNO at ESO` displaying the USNO star catalog of the field. This panel is represented figure 3. **Allow for a few seconds to a few tens of seconds for the image to be downloaded**.
- At this point on, it is possible to position the Guide Probe on the available catalog stars and to evaluate if vignetting occurs.

5.2 The main 'Guidecam' GUI

The Guidecam GUI (figure 1) displays:

- the image of the field
- the projected shadow of the Telescope Guide Probe (yellow) onto the telescope focal plane
- the VIMOS field of view (green), with the arrow pointing to the N
- a circle of 11 arcminutes radius (green) corresponding to the unvignetted telescope focal plane. Beyond this radius there is vignetting by the tertiary mirror of the telescope

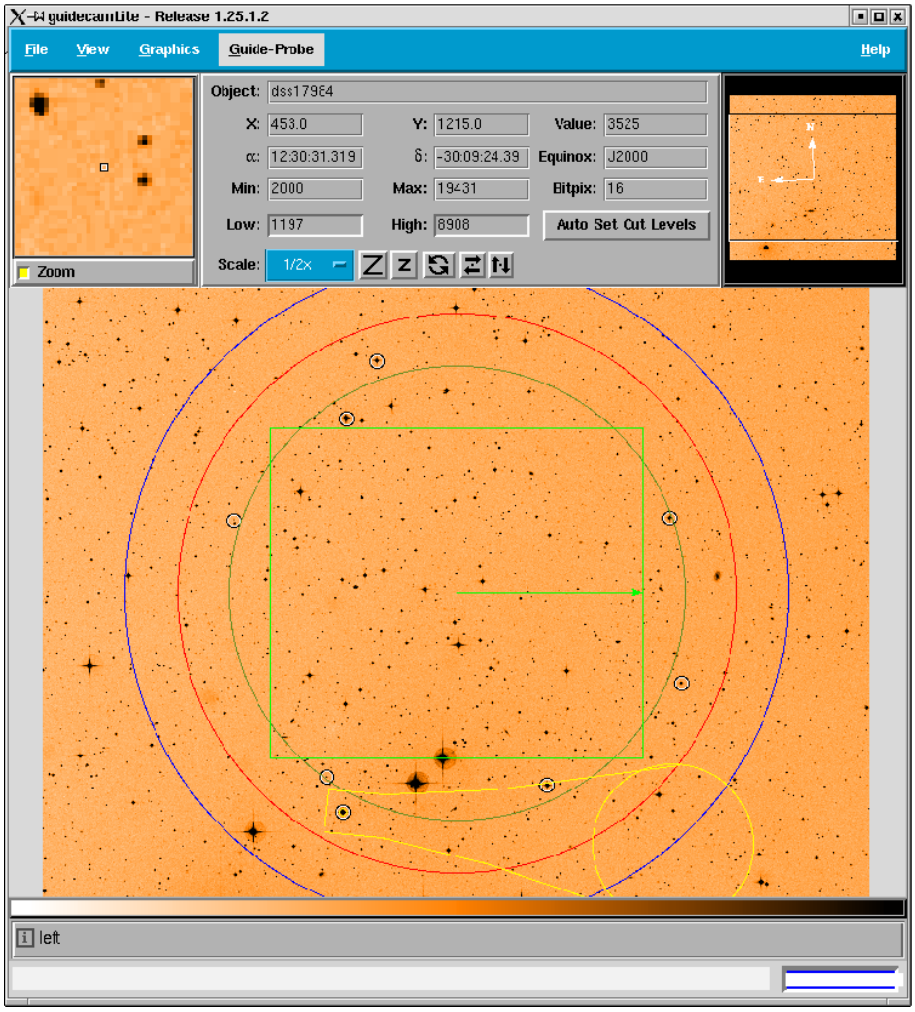

Figure 1: Guidecam: main panel (skycat). Superimposed to the DSS image of the field is in yellow the projected shadow of the Telescope Guide Probe, in green the VIMOS field of view (rectangle), and in green and red the 11 and 13.5 arcminute radii corresponding respectively to the unvignetted Nasmyth field of view and to the maximum search radius for guide stars

- a circle of 13.5 arcminute radius (red) corresponding to the maximum search radius for guide stars
- in blue the rotation axis of the Guide Probe arm
- the position of the USNO stars selected in the `USNO at ESO` panel (figure 3). The stars are indicated with white circles.

5.3 The 'USNO at ESO' panel

The `USNO at ESO` panel (figure 3) provides for the following entries:

- Search radii (min and max). The default value for the maximum radius is 12 arcminutes with a maximum permitted value of 13.5. Below 11 arminutes, i.e., within the green circle, the Nasmyth field of view is vignetted by the tertiary mirror (M3) of the

Figure 2: Guidecam: the `Guide Probe Settings panel`

telescope. Therefore the aberrations of the telescope cannot be measured with the same accuracy. In some cases, this may degrade the image quality.

- Magnitude range. The default minimum and maximum values are 11 and 13.5 whereas the minimum and maximum permitted values are 10 and 14. With the faintest guide stars, some degradation of the active optics correction might take place, depending on seeing, airmass, Moon, possible extinction by thin cirruses, and position of the guide star in the field of view (vignetting beyond 11 arcminutes). To the extent this is possible, stars brighter than 13.5 magnitude should be chosen. Too bright objects may result in poorer correction as well.

- In the “USNO at ESO” pane, the maximum number of objects can be changed to either limit or increase the number of stars to be displayed

Note : whenever a value is changed and entered a new search takes place and the results are displayed on the images while the updated list of stars appears on the `Search Results` panel. Pressing the **Search** button after changing more than one value will also start a new search and display the results.

5.4 Selecting the Guide Star

To select a guide star:

- Click with the left mouse button on one of the white circles identifying the USNO stars

- This opens a small panel asking **Move to the selected guide star?**. Pressing **Accept** will move the guide probe to the star. Vignetting of the VIMOS field of view takes place whenever the guide probe (yellow) intercepts the VIMOS field of view (green rectangle). If there is vignetting, it is possible to select another star and to repeat the operation, until a suitable guide star is found.

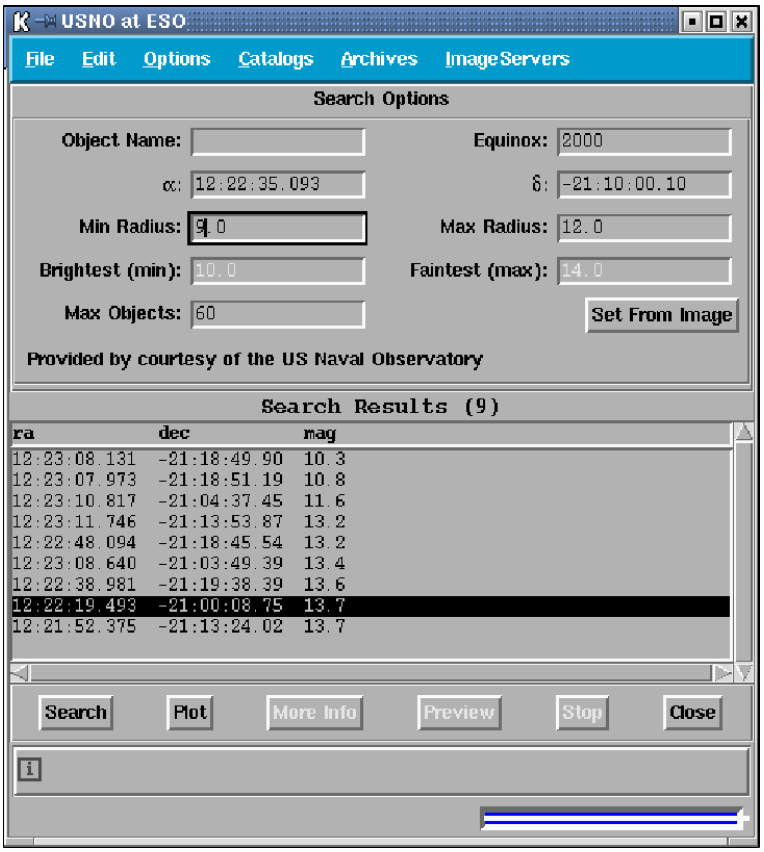

Figure 3: GuideCam: the `USNO at ESO` panel

- The guide probe can be positioned on a given guide star in 2 positions (called positive and negative (POS and NEG)). This is referenced to as **Alternate position**. By selecting the corresponding button in the `Guide Probe Settings` panel (figure 2) and pressing the **Apply** button, the guide probe will be positioned on the same star on its alternate position. This option may allow to reduce or even remove the vignetting that may be present in the other position.

- Once a suitable guide star has been identified, you can take note of its position by pressing the **Get Guide Star Coords** of the `Guide Probe Settings` panel. This pop-ups an information panel containing the RA and DEC of the selected guide star and indicating whether the position of the guide probe is positive or negative (alternate position). These coordinates, as well as the guide probe position, should be noted and further entered manually into P2PP in the corresponding fields: `Guide Star RA`, `Guide Star DEC` and `Guide Probe Position` of the VIMOS_img_acq_Preset template. Finally, the `Get Guide Star From` should be set to **SETUPFILE** (see VIMOS Template Reference Guide).

5.5 Generating Finding Charts

Guidecam should be used to generate finding charts for VIMOS imaging and pre-imaging modes. Under the `File` menu, select the `Make finding charts...` option. A new pop window will appears, to be filled with Run ID, P.I. name, and OB name(s). Click on **Draw** to obtain a preview of a finding chart compliant with the rules defined for phase 2 proposal

preparation, Then, press **Save** to produce a postscript file. Detailed and updated instructions are given at

`http://www.eso.org/observing/p2pp/P2PP-FC-cookbook.html`

References

[1] VMMPS Cookbook, v6.0 http://www.eso.org/instruments/vimos

[2] VIMOS User Manual, v4.0 http://www.eso.org/instruments/vimos

A Abbreviations and Acronyms

ADP	Aperture Definition File in Pixels
AT	Acquisition Template
BOB	Broker of Observation Blocks
GUI	Graphical User Interface
IMG	Imaging Mode
MOS	Multi-Object Spectroscopy mode
OB	Observing Block
P2PP	Phase II Proposal Preparation
TIO	Telescope Instrument Operator
TSF	Template Signature Files
VIMOS	VIsible Multi-Object Spectrograph
VMMPS	VIMOS Mask Manufacturing Preparation Software