

User's guide to the Virtual Telescope



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The Virtual Telescope Project



Enjoy the Universe from your desktop

The Virtual Telescope is a project of the *Bellatrix Astronomical Observatory* and consists in a complete, robotic observatory, remotely accessible through the Internet. Thanks to its cutting edge technologies, the assistance by professional astrophysicists and its many capabilities, it is one of the most advanced facilities of its kind in the world, but still a easy to use system.

The user has full access to the instruments, controlling them from its computer. The free RealVNC software (registered users will receive it from our staff, depending on their operative system) is used to access the remote machines physically connected to the instruments (depending on the telescope you are going to use, the Windows XP Pro and 2000 OS are available there). Once connected, the user will see on her/his monitor a "copy" of the remote desktop, showing a powerful and intuitive graphical interface, to fully control the Virtual Telescope. For this, we use TheSkySix (*Professional* edition) and CCDSOft software packages from *Software Bisque*, to slew the telescope and grab the image, respectively.

Below, the main operations and procedures are described.

1 Connecting.

NB: The description below refers to Windows users, but it is similar for others OS.

First, install the RealVNC software, then from the "Start" menu launch "*Run VNC Viewer*", available under the "*VNC Viewer 4*" directory. You will need the login data (provided by the staff to the registered users). In few seconds, the user will see the remote desktop, with the controlling software mentioned above. Then, it is possible to use the observatory remotely.

2 Controlling the telescope.

The telescope is controlled thanks to a powerful, user-friendly software: TheSkySix (*Professional* edition). It is directly connected with the Paramount ME equatorial mount. It works like an advanced planetarium with millions of astronomical objects of any kind; it is continuously updated to include newly discovered comets and asteroids. The user will select this software from the Windows bar; once done, a screenshot like the one in fig. 1 will be visible.

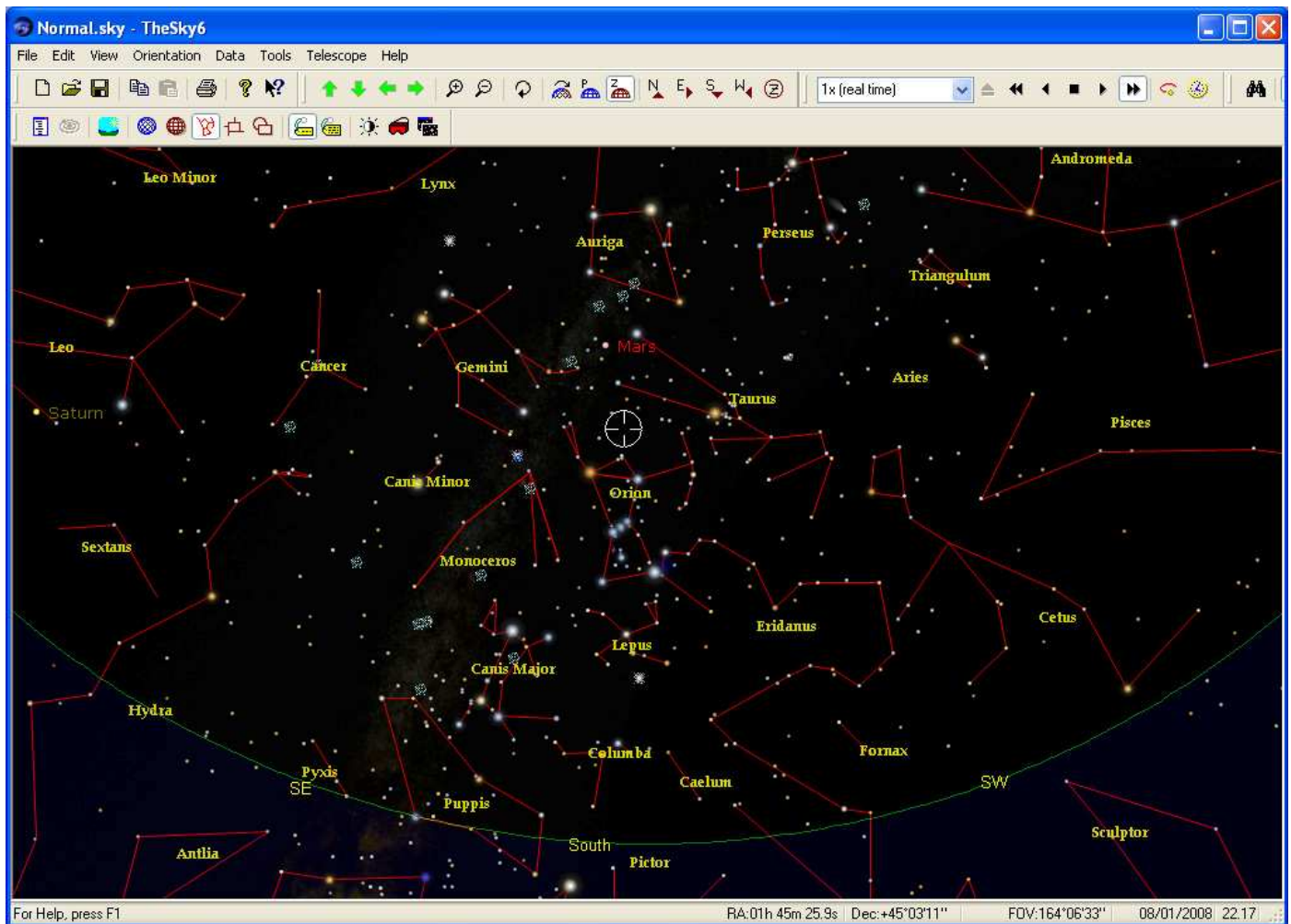


Fig. 1

In the upper part, all the main commands are available (many of them are not required), while stars and constellations are visible in the center. There is a white circle, giving the current position of the telescope in the sky.

The main command used during a typical observing session is "slew to" a given astronomical object. You can choose your object in two different ways: a) clicking on a celestial body visible in the current sky; b) using the "find" command. We suggest the b) option.

a) Once clicked on an object (the planet Mars in our example), a small window ("Object Information") will open, with basic data on the same body (see fig. 2).

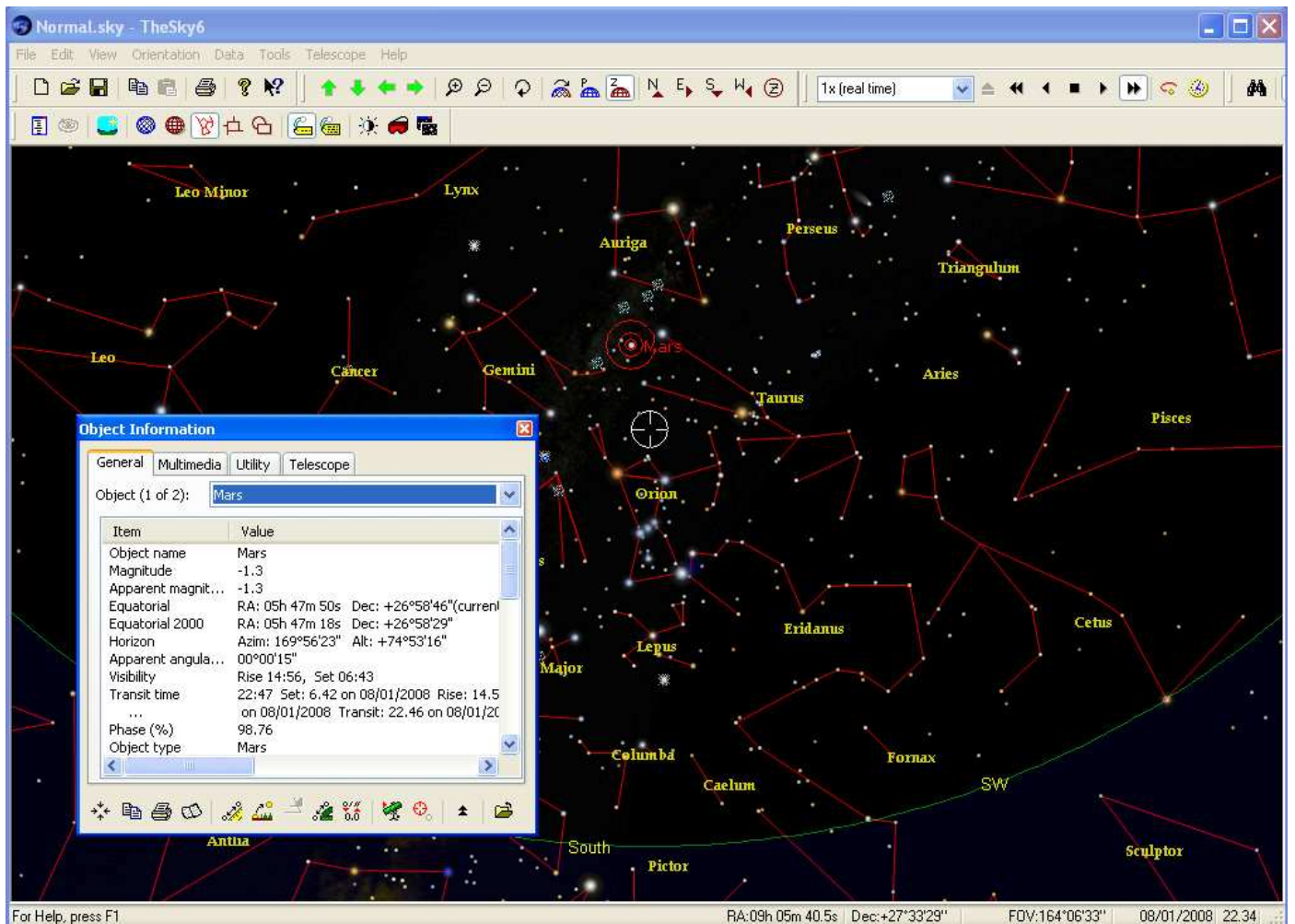


Fig. 2

While the current pointing position is still visible, the object location is shown by red circles, if enough field of view is displayed.

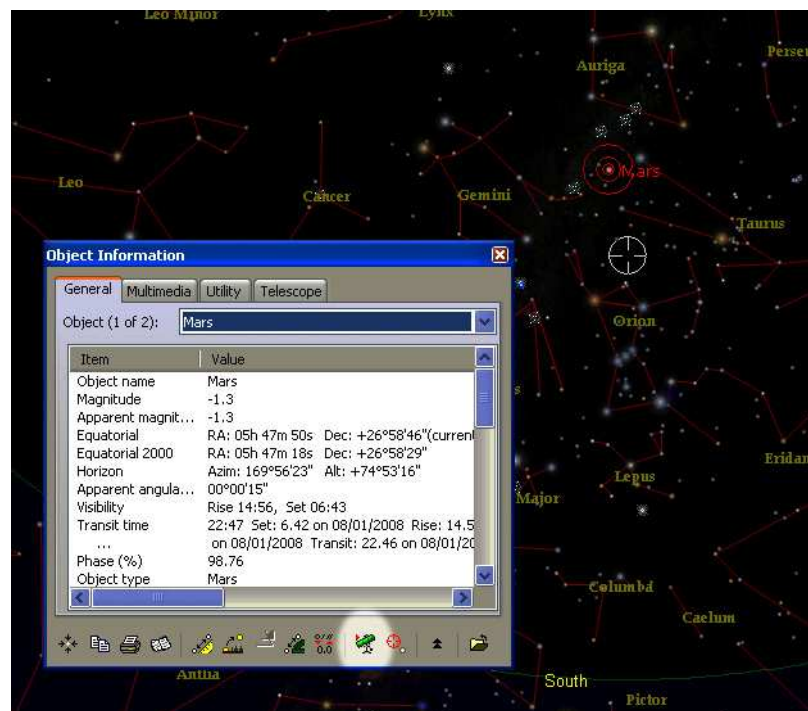


Fig. 3

If you really wish to point the clicked object, just click on the little green telescope, in the bottom of the "Object Information" window (fig. 3). The system will ask for your confirmation (fig. 4):

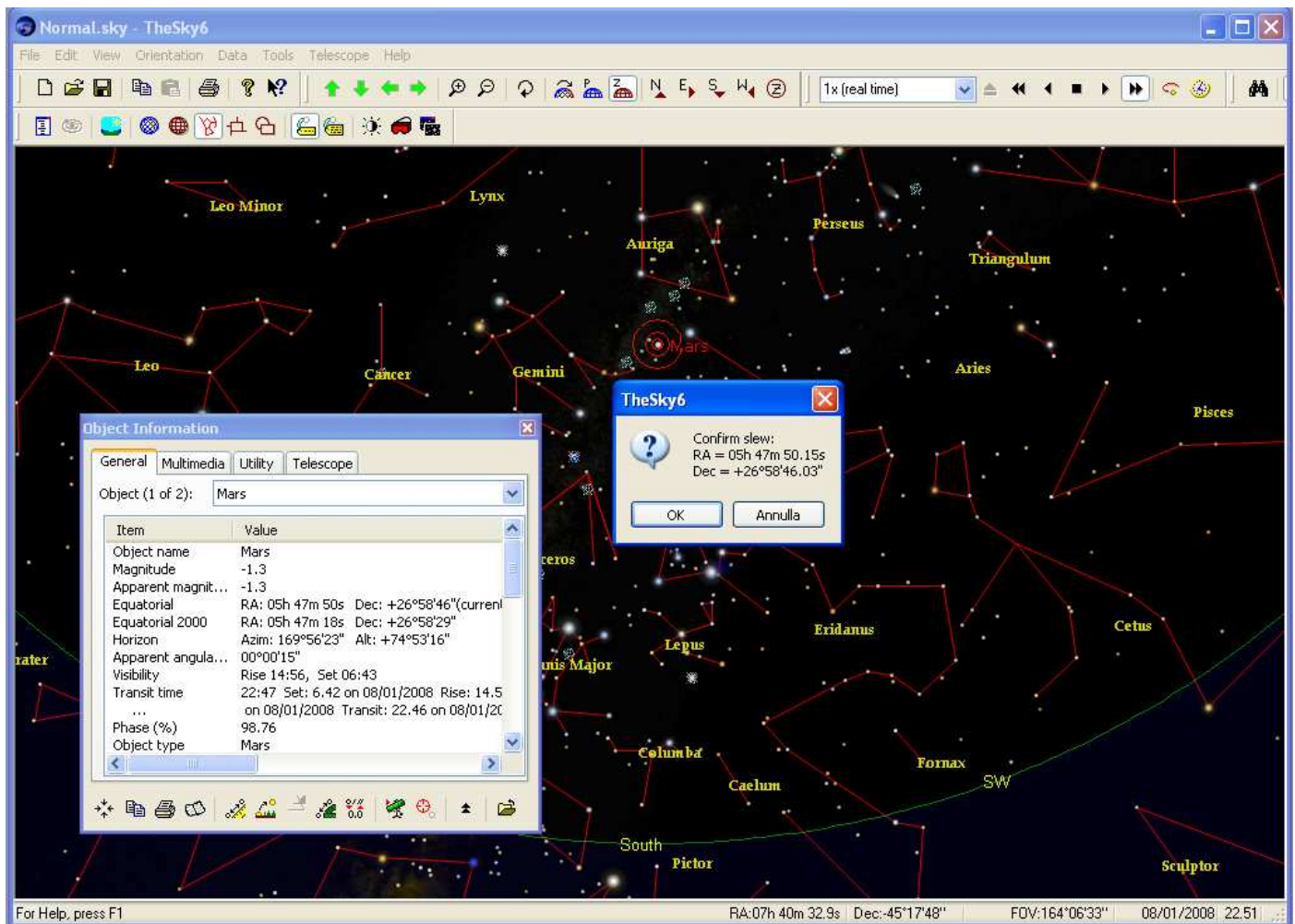


Fig. 4

Clicking "OK", the telescope will slew to the selected object (the white circle will start moving, ending over the red one when the telescope will stop). Of course, you can choose not to point the telescope.

b) If you know the name of the object you want or its catalogue number (this is the most frequent situation), just press the "f" key to show the "find" window (fig. 5). Then, you can write the object's name there and click on the "Find" button (in the bottom left of the "find" window). At this point, you will see the same situation like in fig. 3. You can confirm or cancel your request, as in the previous case.

Once the telescope is slewed, you can take an image with the CCD camera; for this, you need to switch to the other chapter. But, at this point, you may want to adjust the telescope pointing: using the "Alt" + "m" keys a pad will show, to slowly move the telescope (fig. 6).

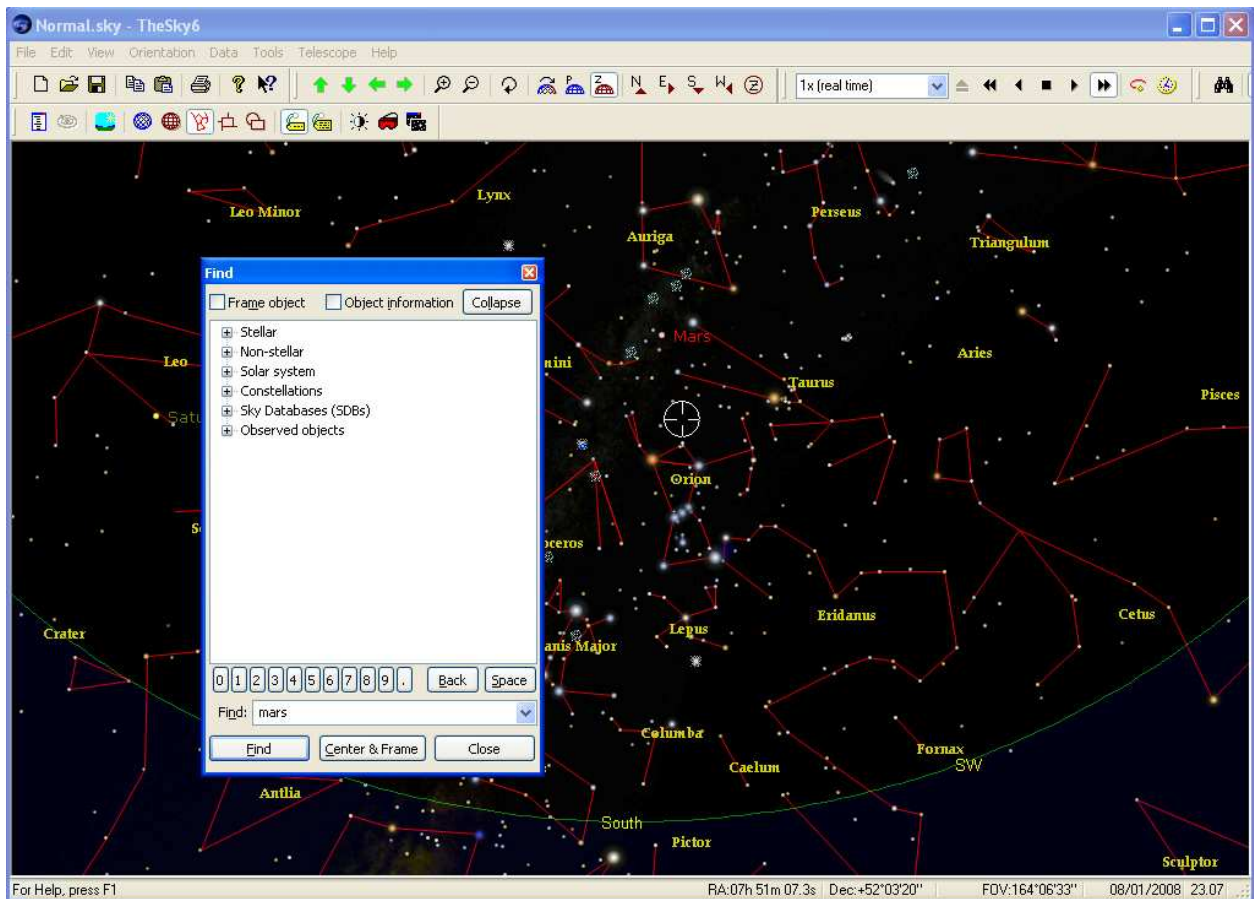


Fig. 5

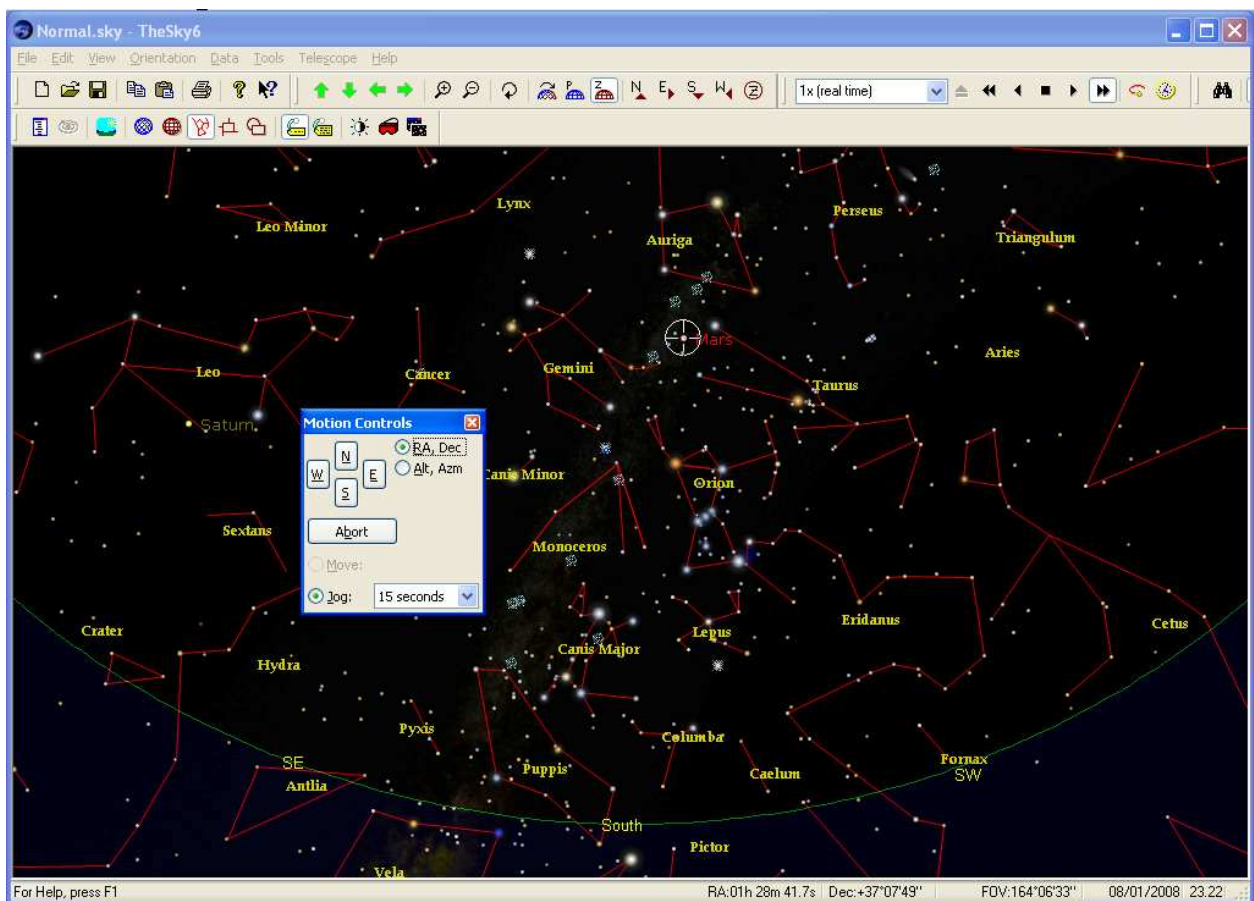


Fig. 6

2 Taking images.

Once the scope is pointed, you can take an astronomical image. You just need to switch to the CCDSoft software, which will show a screenshot like in fig. 7.

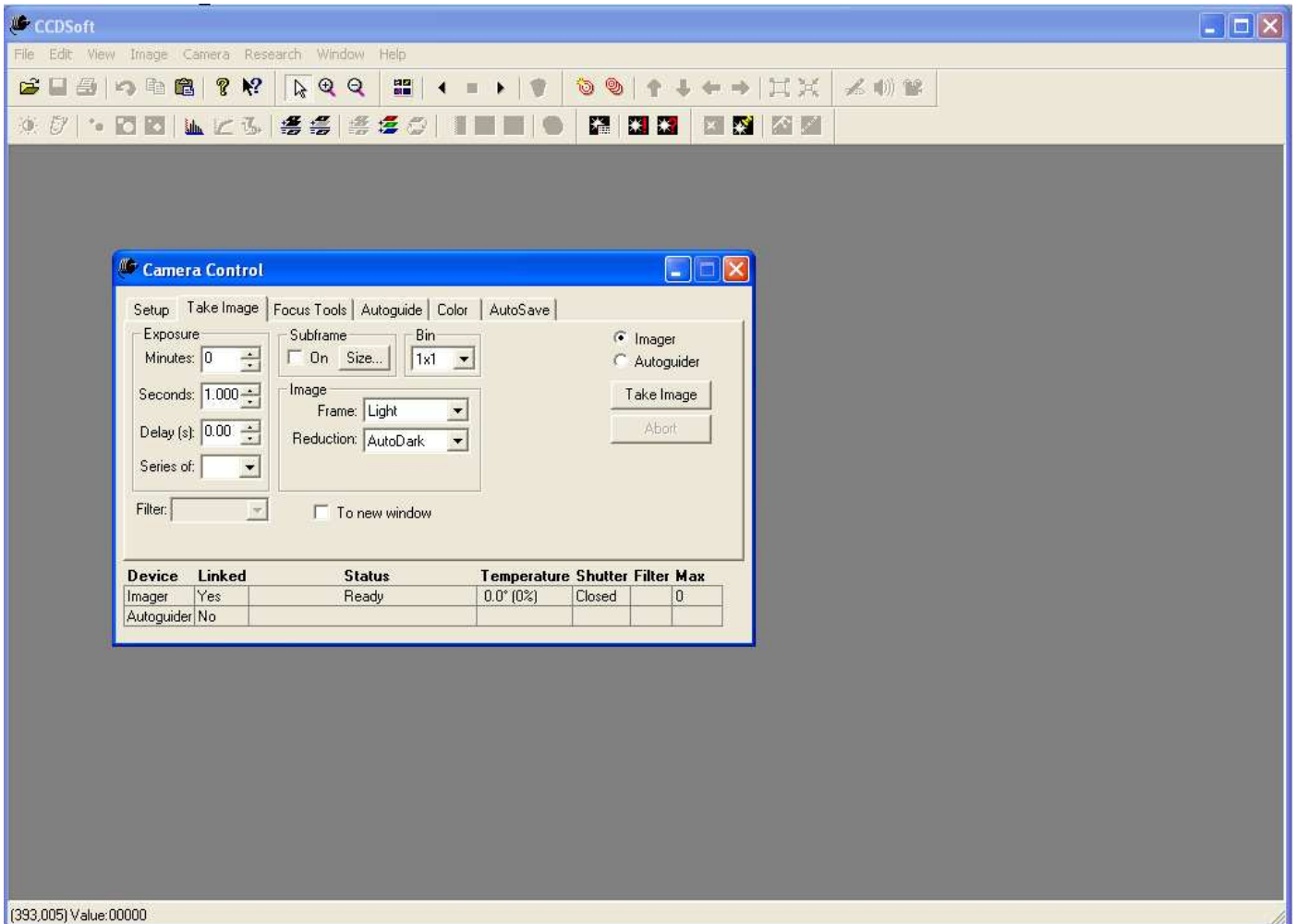


Fig. 7

The "Camera Control" window shows all the commands you need. Many of them will not be used by the typical user. Soon after the pointing, you may want to check the position of the object in the frame: for this just enter the "Focus Tools", clicking on its name, in the upper part of the "Camera Control" window (fig. 8).

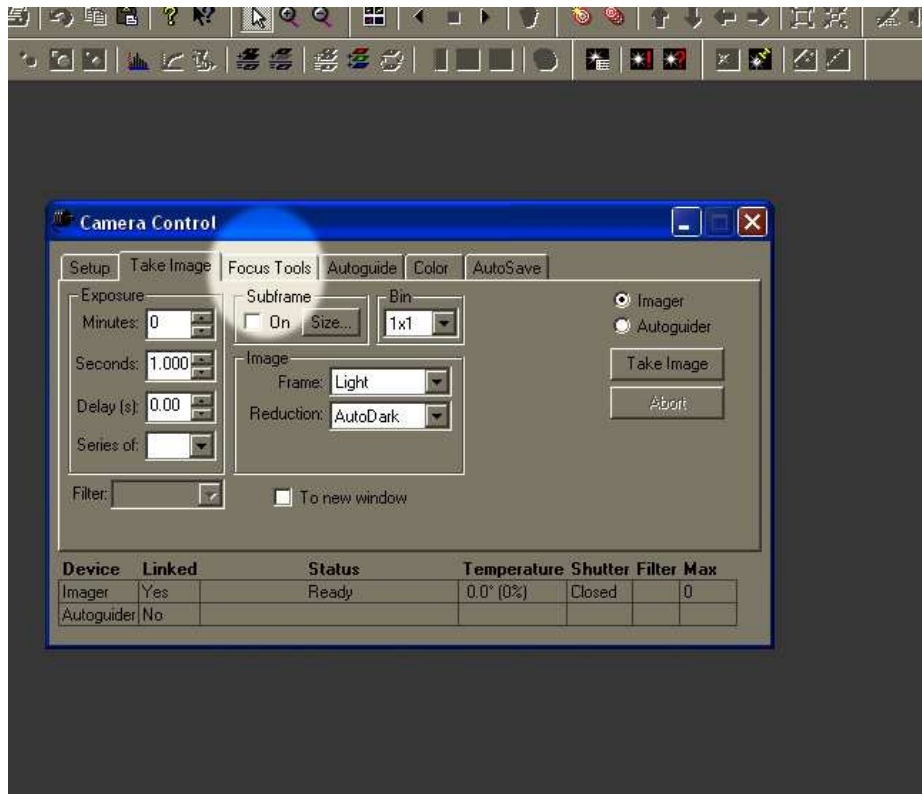


Fig. 8

To check the presence of the object, just choose a short exposure time in the "Exposure" box (fig. 9) - 2-5 seconds will be enough to see even a faint galaxy.

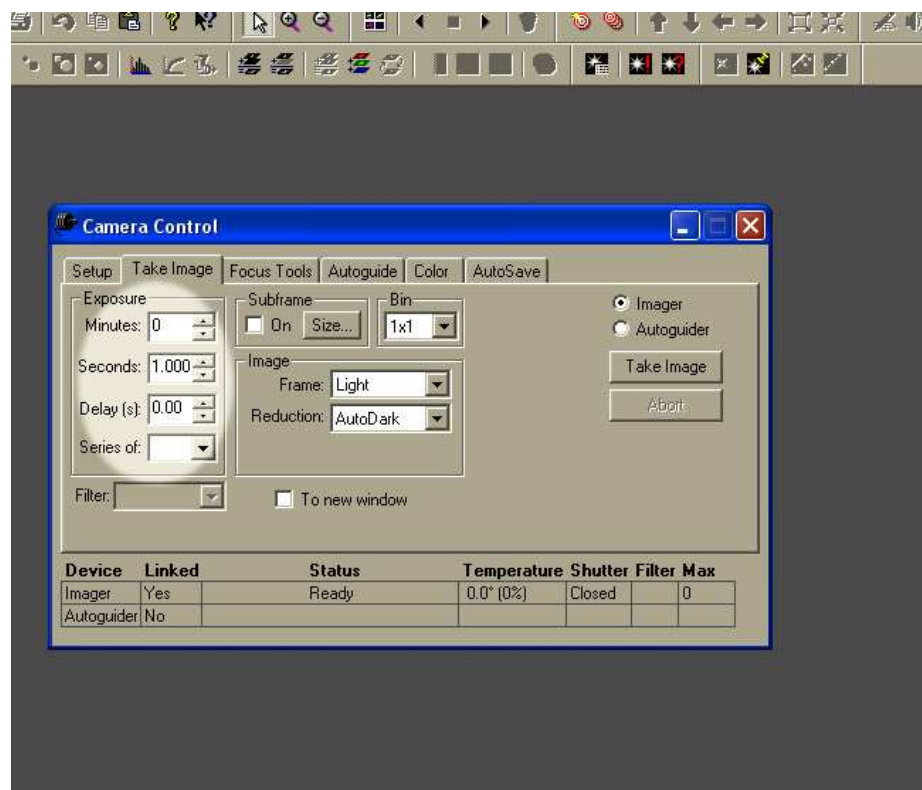


Fig. 9

Then, click on the "Take Image" button on the right (fig. 10):

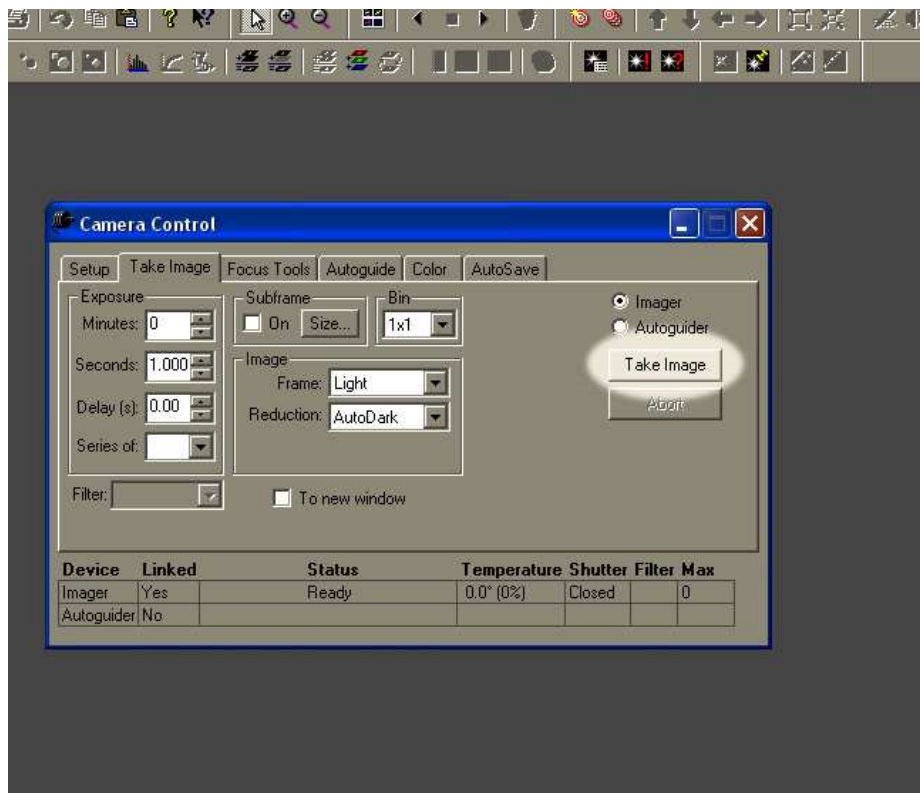


Fig. 10

You will see a countdown while the system will take the test image (fig. 11):

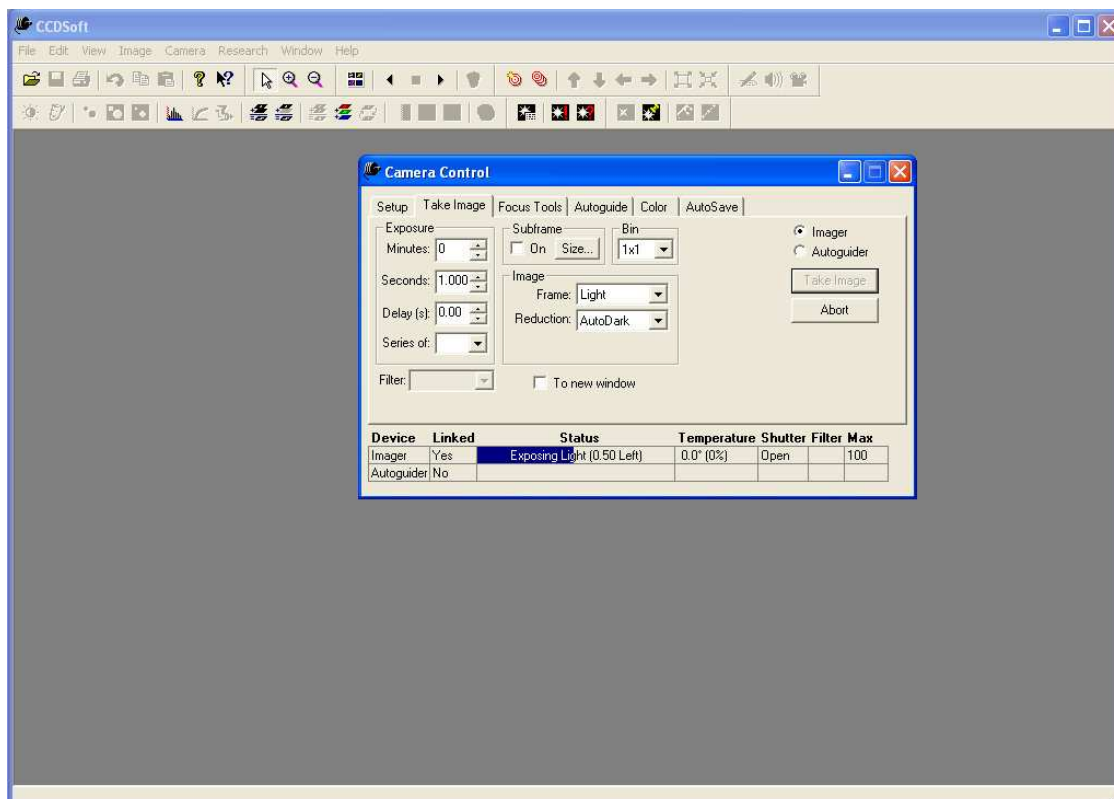


Fig. 11

Finally, it comes the test image (fig. 12)!

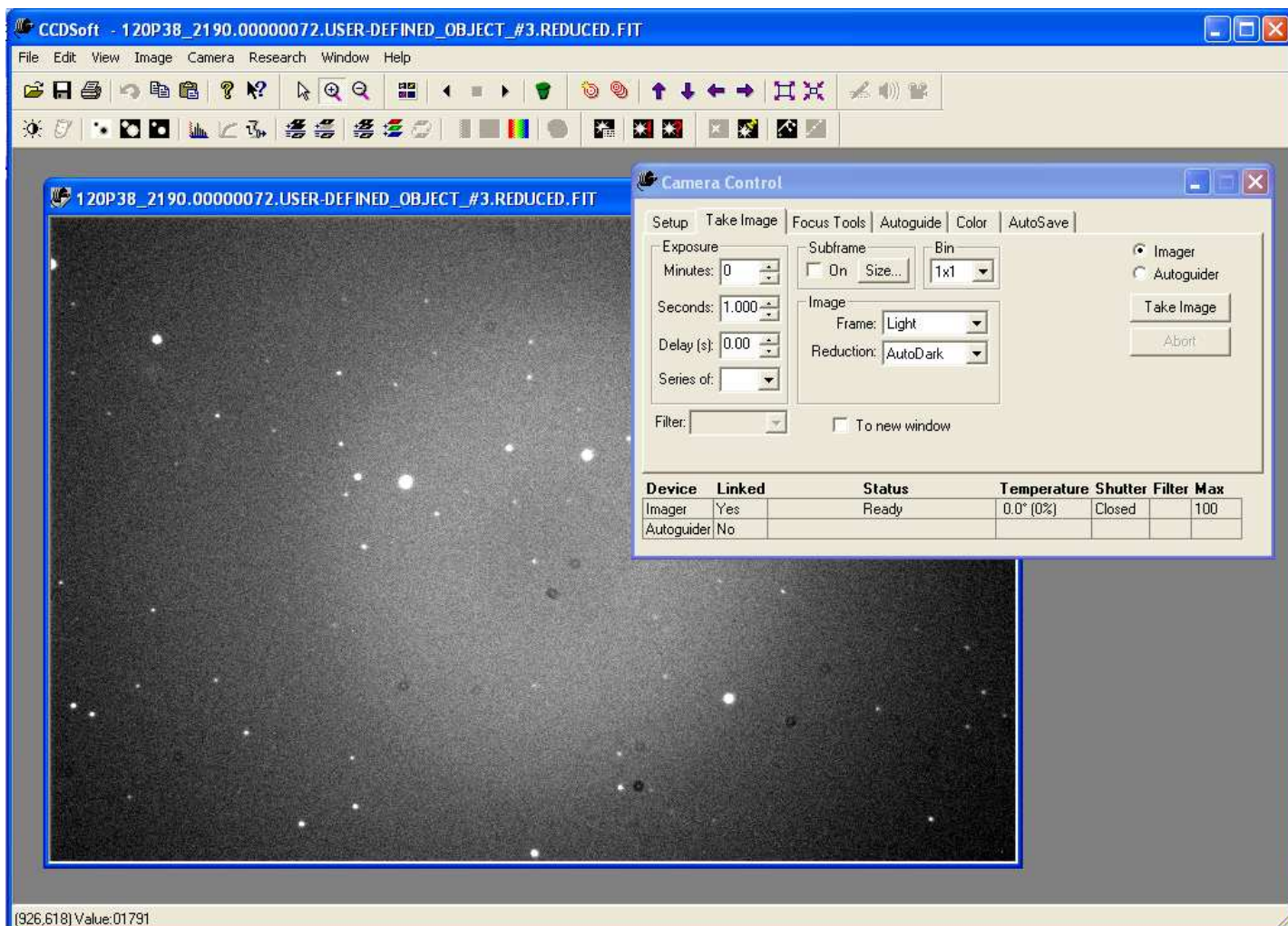


Fig. 12

You can move the telescope to better center the target, as described in the "Controlling the telescope" section, checking again the new position and so on, until you are happy. The test image can be closed and, if you need it, also saved.

At this point, go the "Take Image" tab, clicking on the upper left of the "Camera Control" (see fig. 13), to take your final image. Now, you need a reasonable exposure time for your target (ask the staff if you need suggestions). Once ready, click on the "Take Image" button (fig. 13) and the exposure will start.

At the end of the countdown (fig. 14), the image will be shown and automatically saved on the hard disk of the remote computer (ready to be downloaded).

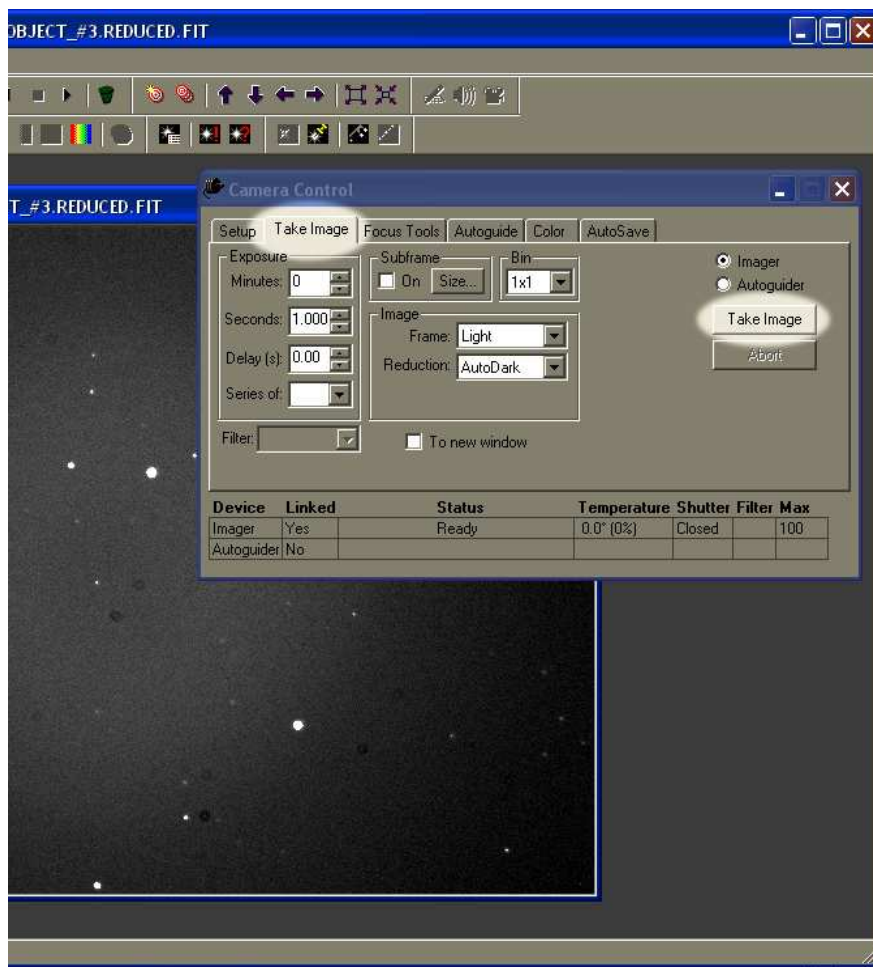


Fig. 13

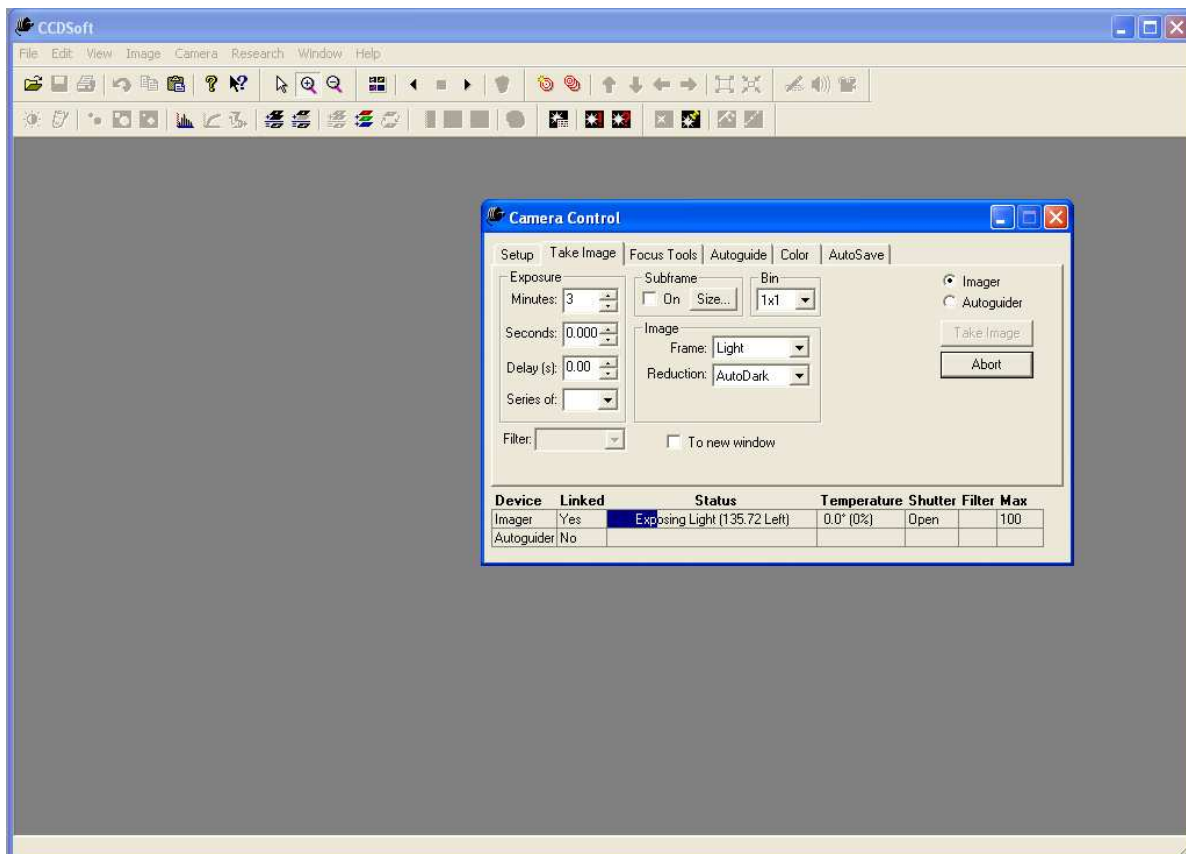


Fig. 14

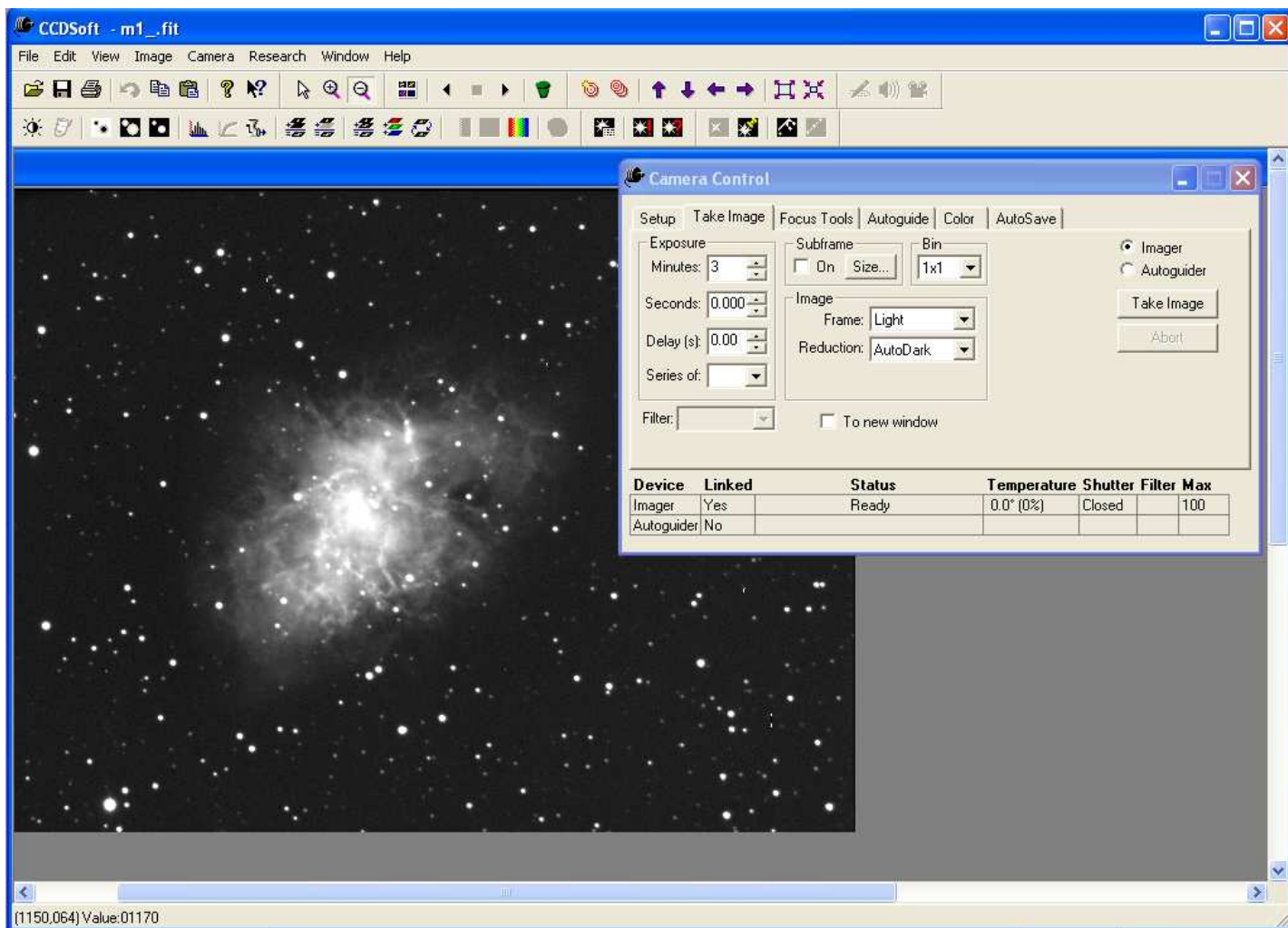


Fig. 15

3 Taking colour and filtered images.

It is possible to grab colour images, properly combining a red, blue and green (RGB) image (this is for advanced users). You can also take H-alpha, narrowband images. For details, ask the staff.

4 Receiving the images.

The images obtained during an observing session (with the calibrating frames, when needed), can be made available on our server or sent by email (depending on your choice). You can also download them during the session – for urgent measurements - but this will take some of your paid time, so you may want to use this option just when needed.

5 Conclusions.

In this document, the basic pointing and image acquisition operations are described. The system is able to respond to many different needs, fully exploiting its capabilities. You may ask the staff for any help. Also, you may want to check the manuals of [TheSkySix](#) and [CCDSOft](#), available at the URLs below.

Registered users have 1 hour of free time to take confidence with the system (the welcome rates are excluded).

5 Documents.

Frequently Asked Questions (FAQs:

http://virtualtelescope.bellatrixobservatory.org/docs/vt_faq.pdf

CCDSOFT user's manual:

<http://virtualtelescope.bellatrixobservatory.org/docs/CCDSOFT.pdf>

TheSkySix *Pro* user's manual:

<http://virtualtelescope.bellatrixobservatory.org/docs/TheSky6.pdf>

7 Contacts.

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