PHD Guiding – a short tutorial

INSTALLATION

Yes, I even messed this up. PHD relies on the ASCOM platform and drivers to talk to your mount. They're not included in the PHD setup package and PHD won't connect to your mount without them. You can't just install PHD and go.

PHD is a free download from Stark Labs, http://www.stark-labs.com/. *Other software is needed to make it work with your mount!* You must also download and install the following:

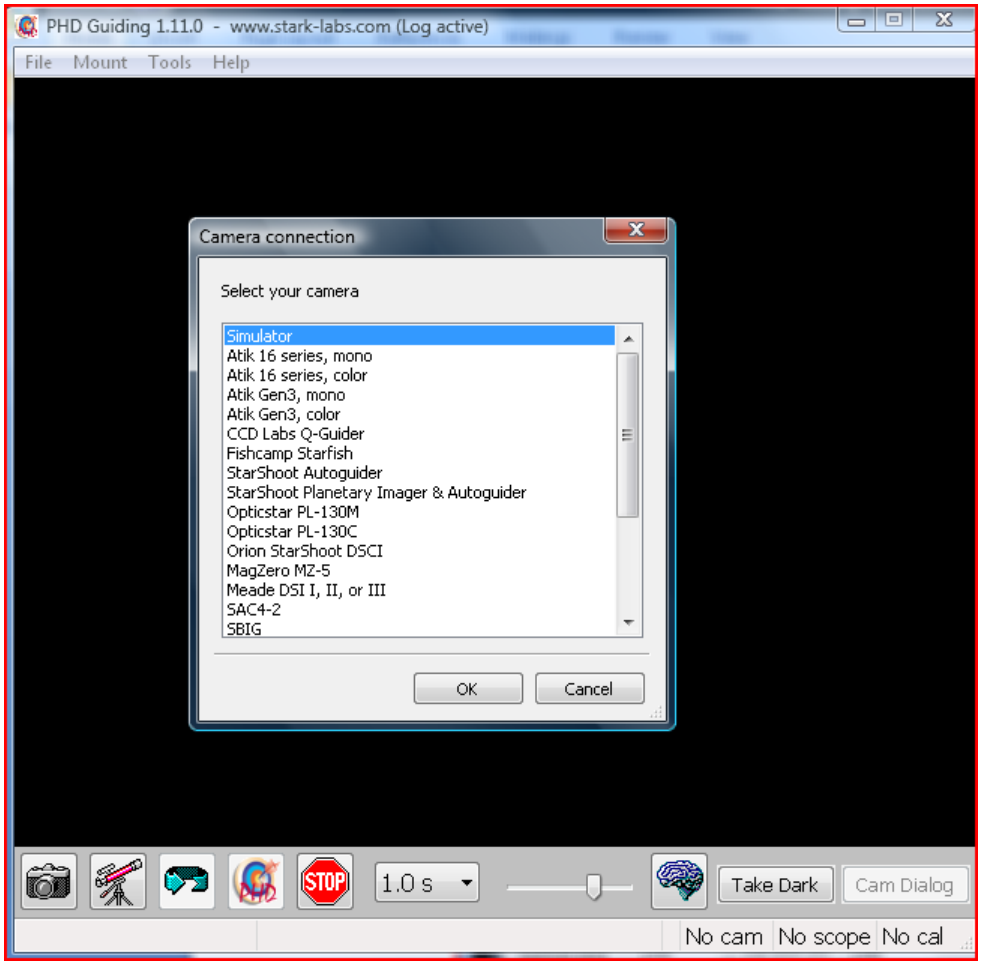
- ASCOM platform - http://ascom-standards.org/
  - The ASCOM platform download button is on the right
  - Install this first
- ASCOM driver for your mount
  - The driver downloads are below the platform download button
  - Install this second
- If the installation program directs you to install other software like .NET framework, do it.
- Then install and configure PHD guiding

ASCOM is a standard that allows programs to talk to astronomy equipment such as mounts, cameras, and filter wheels.

CONFIGURING, SETTINGS, CONNECTING

Once you've started PHD, it's time to configure a few things. I messed this up the first time too.

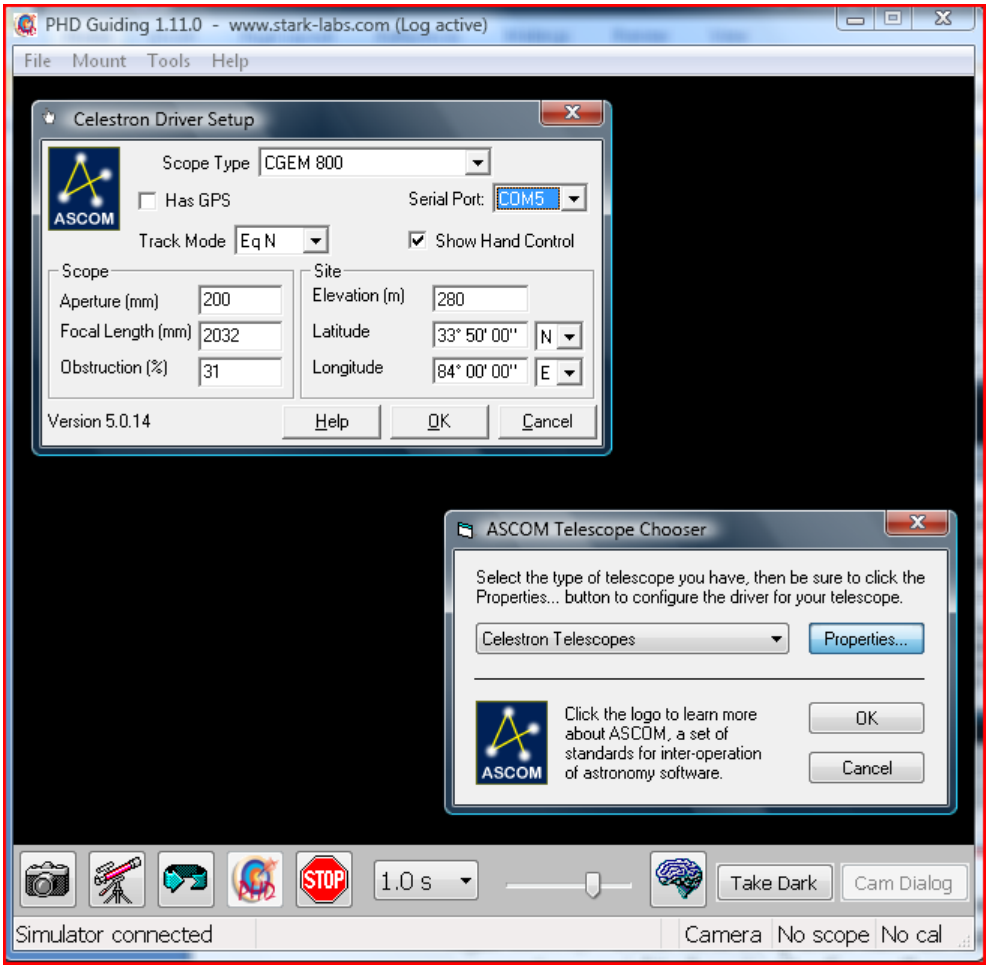
PHD should find any camera connected to your PC. PHD will need a little help talking to your mount. I usually connect the camera first. The camera needs to be connected to the PC first, via USB or fire wire. Click on the camera icon in the lower left corner of the screen. The dialog below will appear. Pick you camera. Choices for webcams, which include many planetary imaging cameras are at the bottom of the list (not shown). The software will find the port your camera's connected to.



NOTE: Most status information is conveyed in the bottom bar of the PHD screen below the icons at the bottom of the screen. Not very eye catching and in my opinion, too easy to miss. In the screen above, the status displays No cam, No scope, No cal which means PHD isn't connected or calibrated.

In the screen shot below, note the No cam status has changed to Camera and the message "Simulator Connected". When you are connecting to the camera and mount, pay attention to the messages in this area, they will tell you if your attempt to connect was successful.

Next, connect to the mount by clicking on the telescope icon on the lower left.

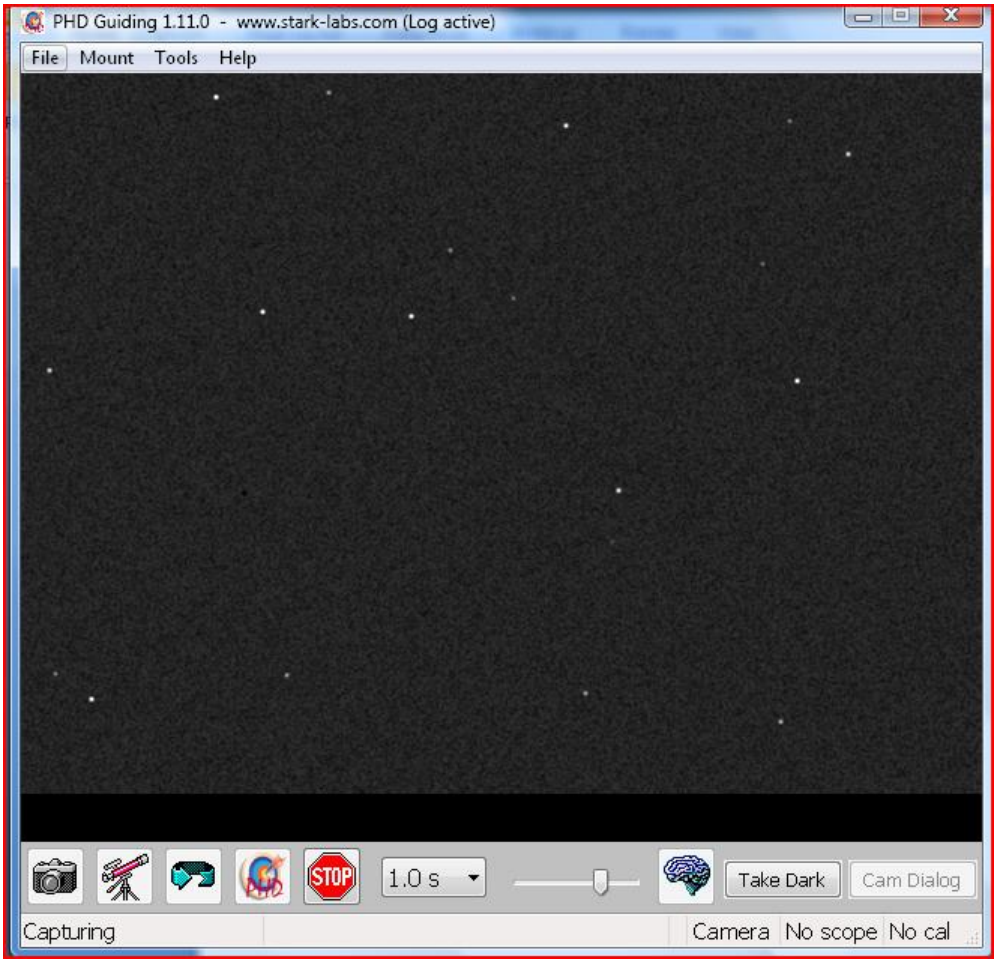


Select your scope from the ASCOM Telescope Chooser dialog that appears (lower right above). Then click Properties and the driver setup dialog for your scope will appear (upper right above). Configure the mount type, serial port connection, hemisphere, and check hand control if you want to move the scope around from inside PHD. Correctly setting the COM port is essential to connecting to the telescope. Verify the status bar confirms successful connection to the mount.

Before you start capturing pictures and guiding, click on the brain icon on the lower right and view the available settings. The purpose of each setting is explained in the help. Read it! It will come in handy later.

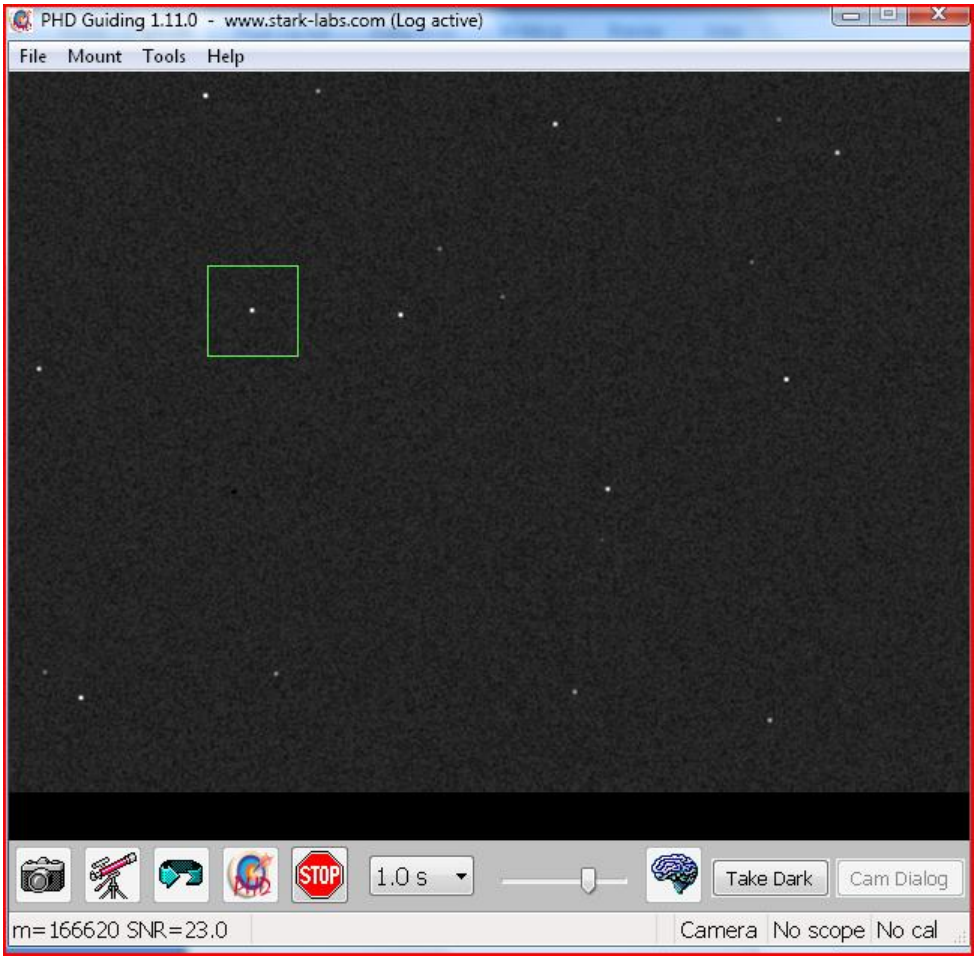
SELECT A GUIDE STAR

Now that you're connected, you can start guiding. Normally you'll point your scope at the target you want to image, get it roughly framed, and then start guiding before you begin taking long exposure images.



Now that you've connected the camera and scope, how do you start capturing images? It's that looping arrow to the right of the telescope icon. Click that and the guide camera images will start displaying on the page. You should have focused the camera during daylight on a distant (more than 1000 yds) target, so you should be able to see any bright stars in the field of view. Don't expect to see more than one or two. Even for targets in the Milky Way, I rarely see more than one or two stars on the guide chip. If you don't see any, increase the duration of the guide image using the drop down selection to the right of the stop sign. Fine focus once you see some stars.

Mouse over one of the stars. As the cursor moves over the screen, it turns in to cross hairs that help you center the cursor over star you want to guide one. Click on the guide star. The status line at the bottom of the screen will show the signal to noise ratio of the star. Less than five has significant risk of being lost later in the guide session. Increasing the exposure duration will raise the SNR.



CALIBRATION

I messed this up too! And this is the easiest guiding program available.

After clicking on the guide star, a dashed box appears around the star. Once PHD gets a good lock on the star, the dashed line turns solid and green. To start calibration, click the guide icon. That's the target icon to the left of the stop sign.

Now PHD will send movement signals to the mount and learn how the star moves on the chip in response to East, West, North and South direction commands. Remember that status line on the bottom of the screen. PHD displays the signals being sent to the mount. Until the status line message changes from Calibrating to Guiding, you're not ready to start imaging. Many users, including myself, didn't pay enough attention to the status line and were quite alarmed to watch the guide star dance around the screen, certain that guiding had failed.

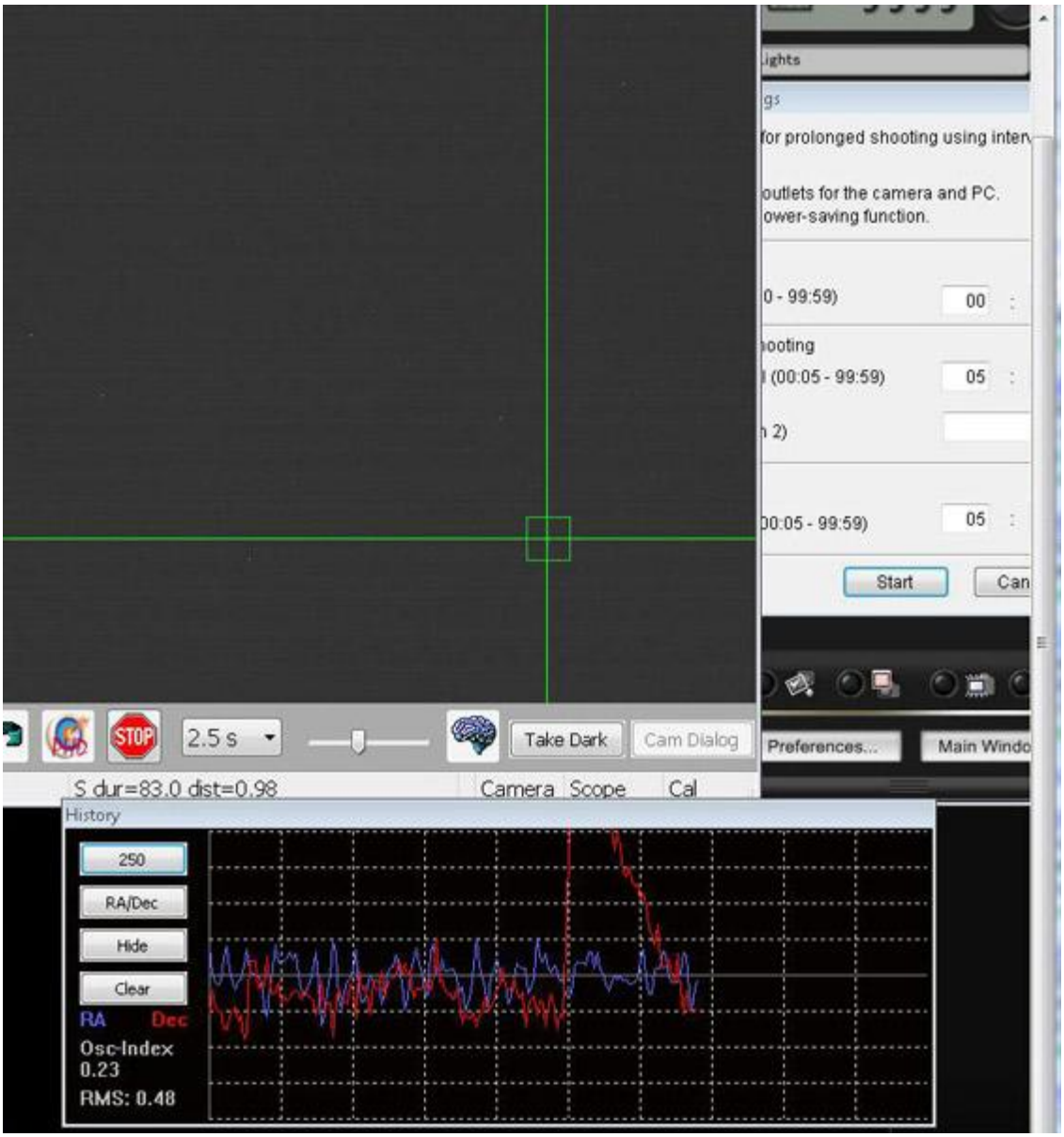
Calibration can take a few minutes.

Once calibration is completed, the mount will automatically start guiding. If you need to move the mount to reframe the image or touch the mount for any reason, click the stop icon! Even a small movement will move the guide star and PHD will try to issue a correction. You will be working at cross purposes with PHD, likely messing up your framing or guiding or both. Yep, I'm speaking from experience.

NOTE: The stop icon stops guiding AND image capture. You have to click capture to get up to date images before resuming guiding. Yes, I've messed that up to.

TOOLS

So how well is your guiding working? The guide graph will help you figure that out.



The guide graph will plot two horizontal lines showing the guide star drift in RA and Dec from the position PHD is trying to hold the guide star at. A big Dec excursion is shown above, usually caused by a problem in or at the mount. As PHD issues corrections to the mount, hopefully you will see the horizontal lines return to the solid line at the center of the graph. Each dotted horizontal line represents a one pixel deviation of the star on the guide camera. Whether this is going to harm your

image depends on the image scale (in arc-seconds per pixel) of the guider and the imaging camera.

If the guide graph looks like a seismograph after an earthquake or your images have squiggly or oval starts, you can enable the guide log and plot the errors and correction signals in a spreadsheet. I've learned a lot from these graphs that helped me improve guiding performance.

This is just a short tutorial to get you over some of the usability challenges I encountered while learning to use this otherwise easy guiding program. I recommend you examine all the menu options and read the help files in detail.