

iOptron® iPolar™ Electronic Polar Scope

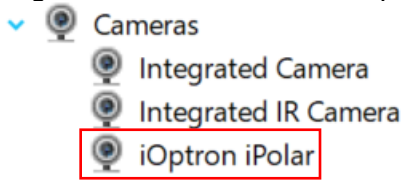
Operation Manual

Product #3339

Ver. 2.50 2021.1
iOptron reserves the rights to revise this instruction without notice. Actual color/contents/design/function of a product may differ from those described in this instruction manual.

1. Connect iPolar to a PC

(1) Connect the iPolar Electronic Polar Scope (iPolar) to one of your computer USB port;
(2) The iPolar has embedded driver. It will install the driver automatically if it is connected to the computer first time. It may take some time to install the firmware. A icon should be shown on Windows right bottom corner while firmware is installed.
(3) Check the Windows Device Manager. There should be an iOptron iPolar under Camera



2. Software Requirement and Installation

(1) This instruction is for iPolar 2.50 or later
(2) Goto www.ioptron.com to download iPolar software and save on your computer
(3) The iPolar software needs Windows 7, 8.1, 10 or later version, 32 bit or 64 bit operation system, with .NET Framework 4.8 or later version.

3. iPolar Set Up

3.1. Adjust Equatorial Mount Pointing Direction

Set the counterweight shaft at the lowest point (Zero Position). Adjust the altitude to your latitude. Roughly point the mount to the north (or south if located in southern hemisphere).

NOTE: The iPolar has a 13° field of view, FOV. Please make sure that the mount RA axis is pointing to TURE north (TRUE south) within ±6°.

3.2. Connect iPolar in Software

(1) Run downloaded iOptron iPolar software (**3339_iOptron_iPolar.exe**) to bring up the polar alignment main menu. Resize the window to fit your computer screen.



(2) Select display Language, either English or 中文(Chinese)
(3) Click on "**Connect**" button to connect the iPolar to the computer. The software will start to initialize the process if the camera is connected successfully.

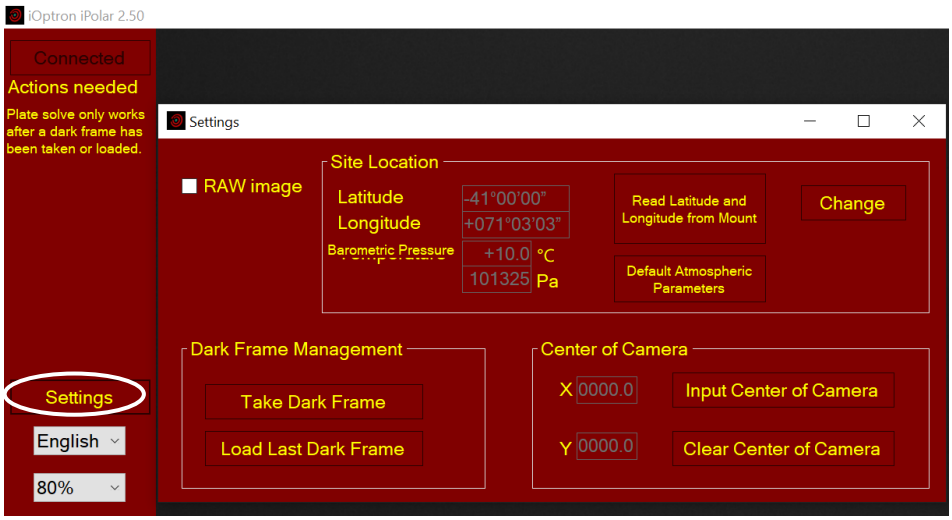




NOTE: If the software cannot connect to the camera, please check your computer camera settings. Make sure to change "camera privacy" settings to allow apps to use the camera.

3.3. Initial Settings

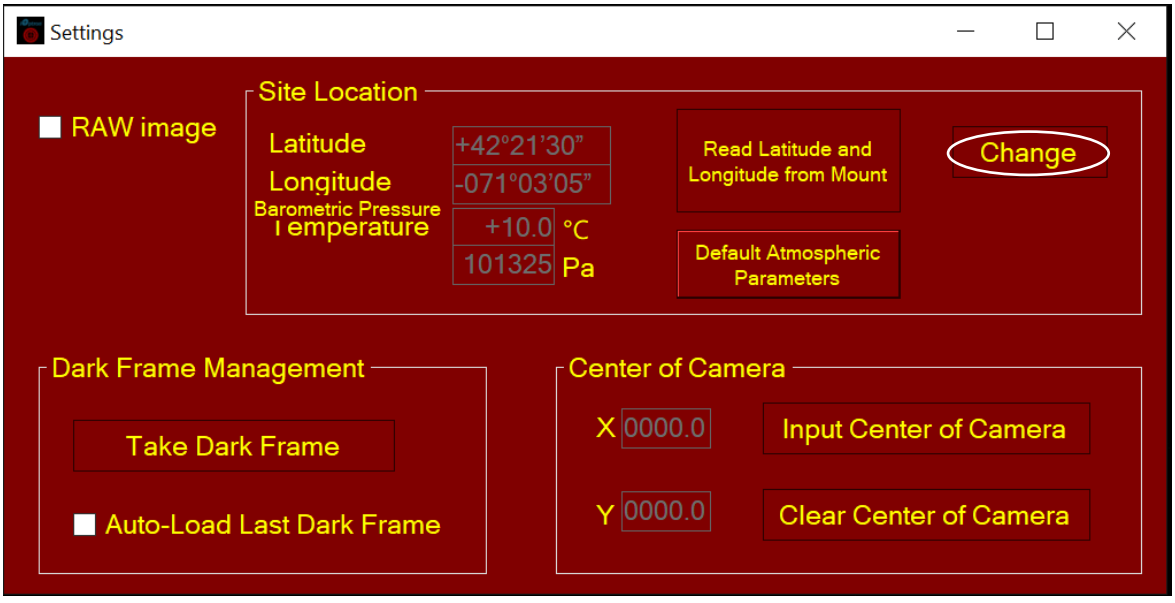
Click on **Settings** to bring up **Settings** window.



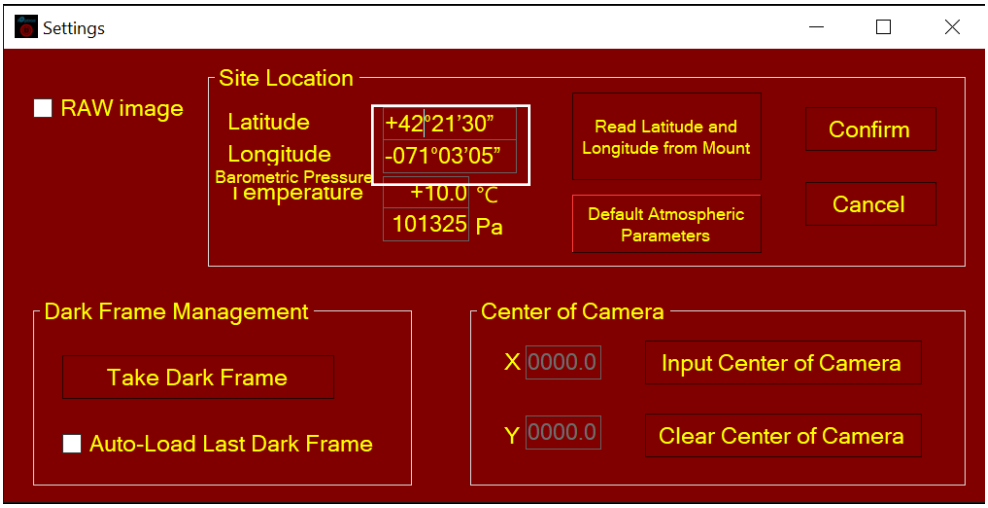
3.4. Set Location and Atmospheric Parameters

Enter Manually

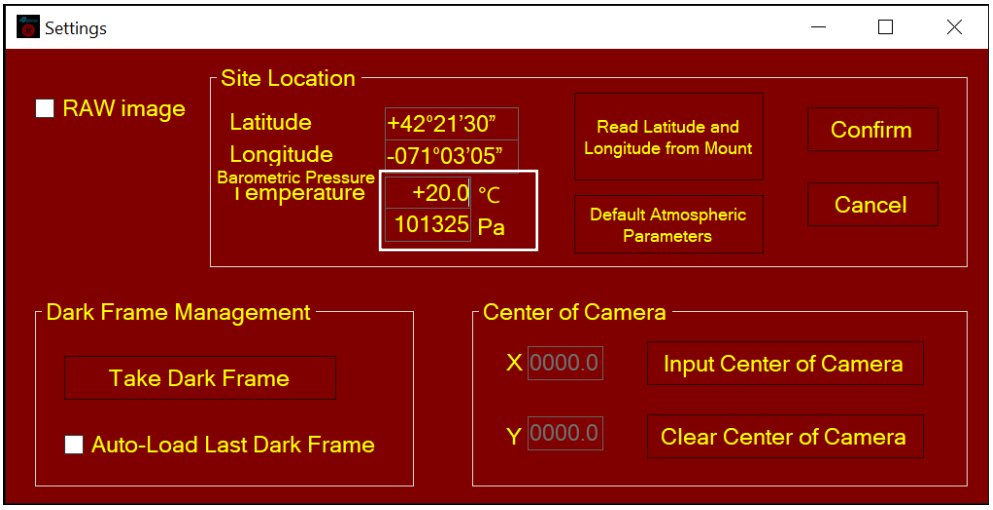
(1) Click on **Change** button



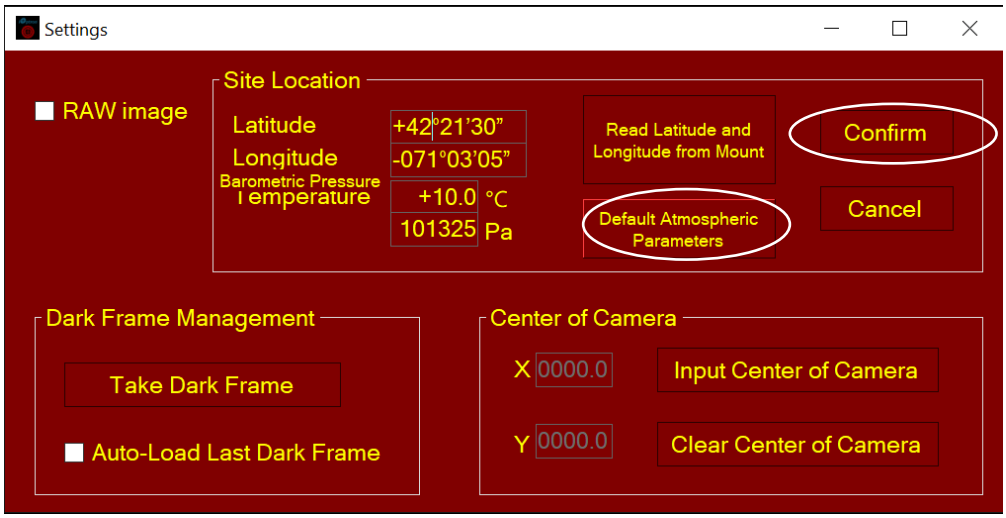
(2) Enter location info, *i.e.,* latitude and longitude number (GPS coordinates). Northern hemisphere is "+", southern "-" for latitude; eastern "+", western "-" for longitude



(3) Enter atmospheric parameters, *i.e.,* temperature and barometric pressure. If the observation site is near equators (lower latitude, N10° ~S10°), or is at high elevation (3000 meter or higher above sea level), please enter the barometric pressure and temperature as precise as possible.



Otherwise you may choose default atmospheric settings, just click on **Default Atmospheric Parameters**. The default value is 10°C and 101325Pa.

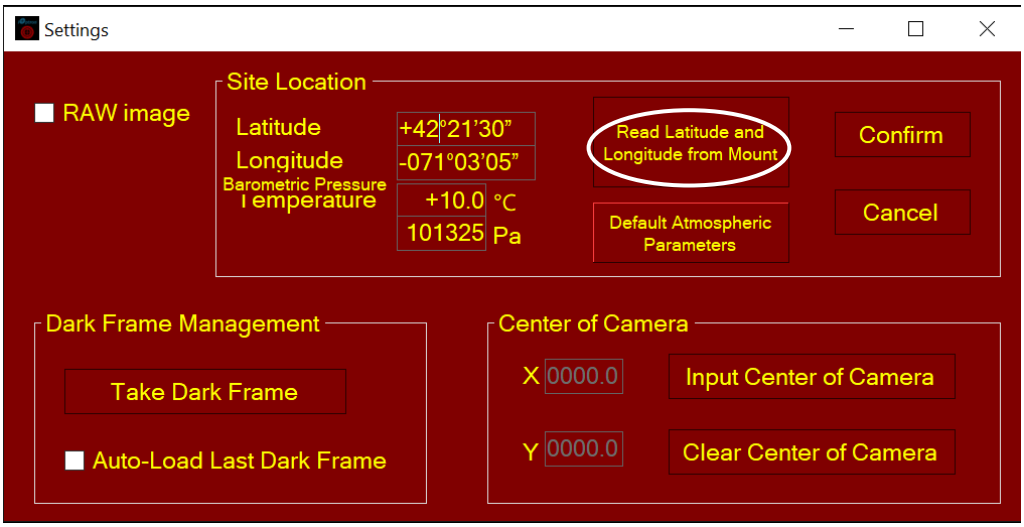


(4) Click **Confirm** to complete the location setting.

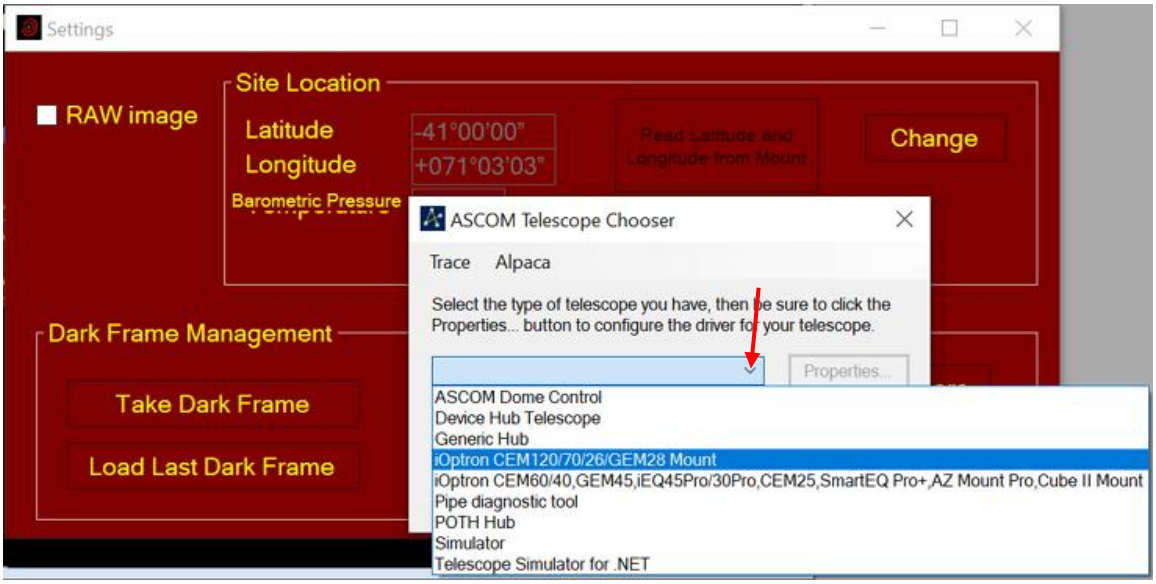
Read from an ASCOM Supported iOptron Mount for Location Info

NOTE: You'll need latest firmware and iOptron Commander, as well as .NET 4.8 and beyond. **Make sure the mount is connected to the computer via ASCOM.** Otherwise, this won't work.

(1) Click on **Settings**
(2) Click on **Read Location from Mounts**



(3) An ASCOM Telescope Chooser window will occur, if the mount is ASCOM supported and connected to the computer. Select correct mount ASCOM driver from the pull-down menu and click OK.

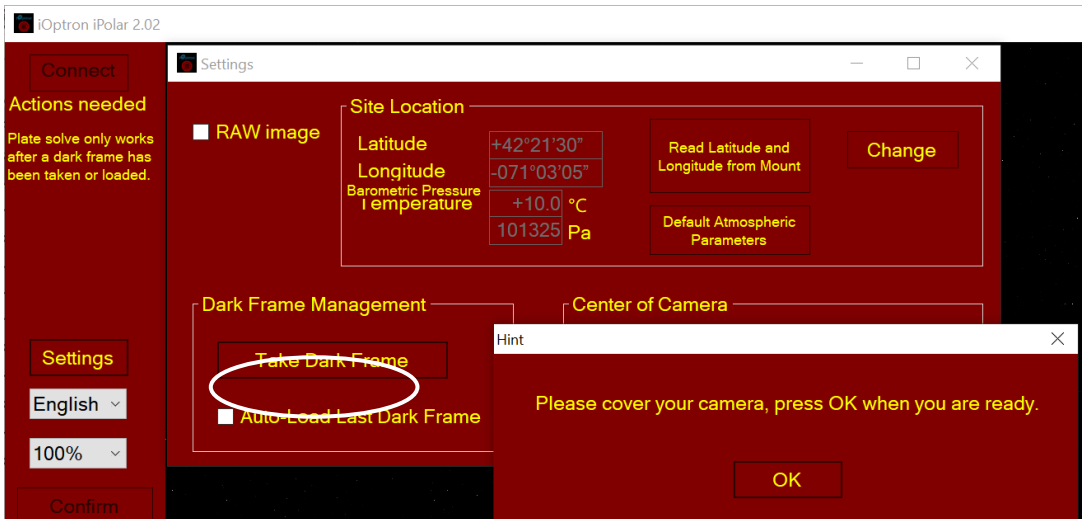


(4) Click **OK** to complete the location setting.

3.5. Take Dark Frame

Take the dark frame image of the camera. This will mark the bad pixels of the camera, if there is any, and camera dark current under different ambient temperature.

Click on **Take Dark Frame**. Follow the instruction on the screen to complete the process.

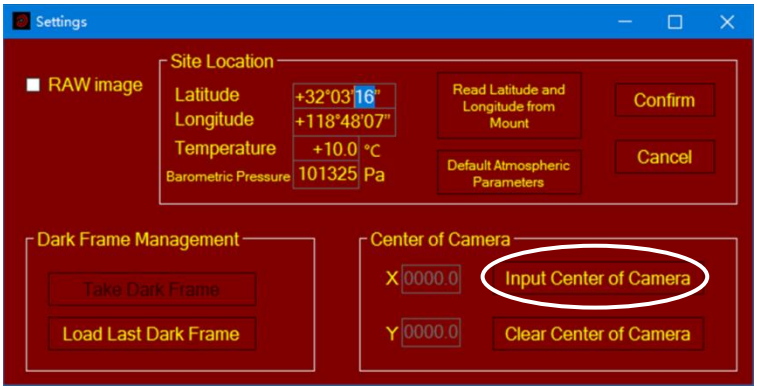


You may check **Auto-Load Last Dark Frame** box to load the dark frame automatically. However, we recommend to take the dark frame when performing polar align. If the software does not plate solve, please retake the Dark Frame.

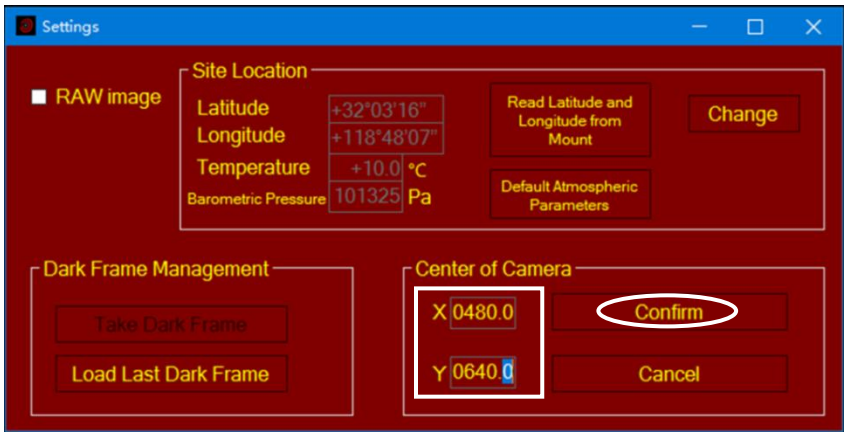
3.6. Set Camera Center

For most mounts, you **DO NOT** need to perform this step to set the Center of Camera. It is only needed if an iPolar cannot be rotated with the mount RA axis, such as SkyTracker and SkyTracker Pro.

Click on **Input Center of Camera**,



Enter 0480.0 in X and 0640.0 in Y, then click **Confirm.**



4. Polar Alignment

4.1. Check Settings

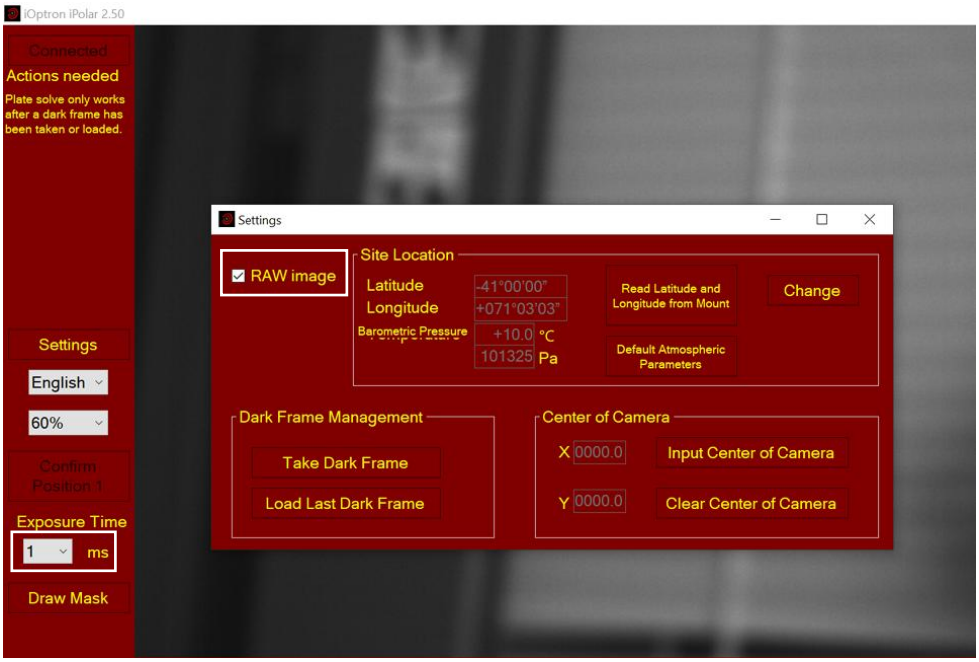
Check the iPolar parameter settings, such as GPS location and Dark Frame. The following screen indicates the Dark Frame is missing.



4.2. Check Image Display

When the mount RA axis is pointing to the pole region, the location parameters are set correctly, and a dark frame is taken, stars should be shown on the screen when the lens cover is removed.

One can check the iPolar camera during day time by viewing the RAW image. By using a short exposure, such as 1 ms and checking the **RAW image**, you should see a fuzzy reversed image when you point the iPolar to an indoor object.

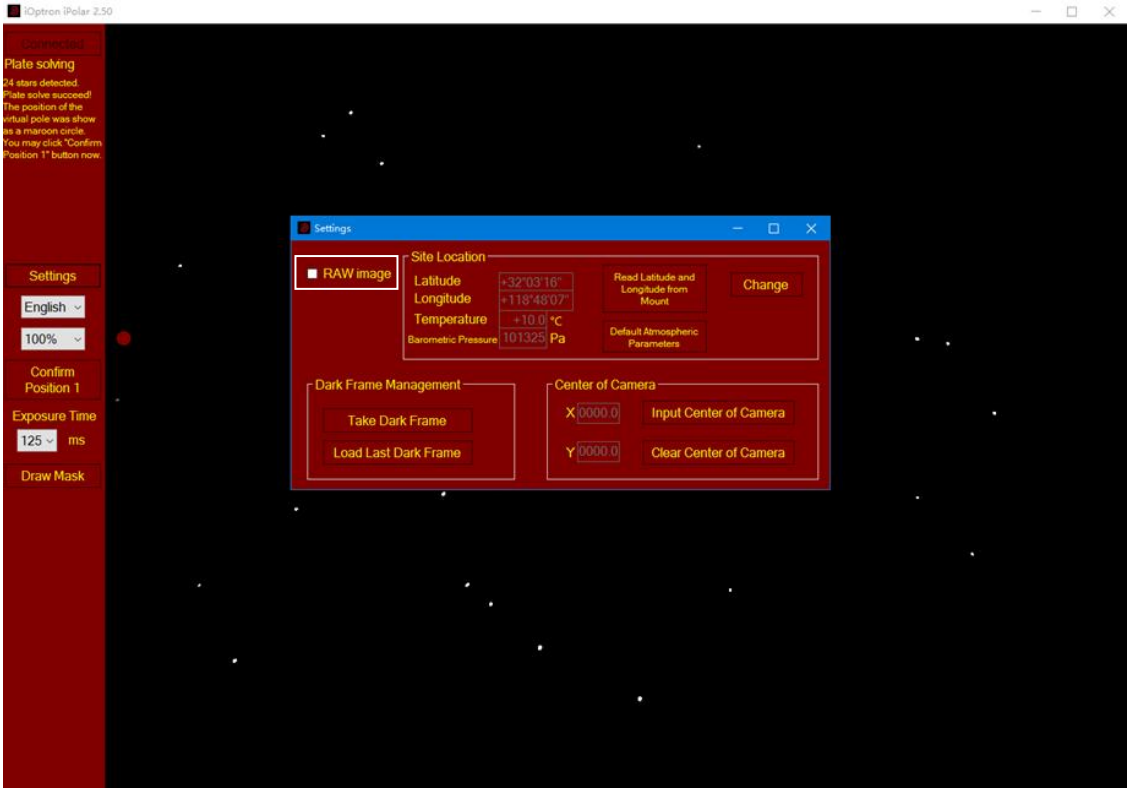


You may see stars when outside under good weather condition with a long exposure, such as 250 ms or 500 ms.

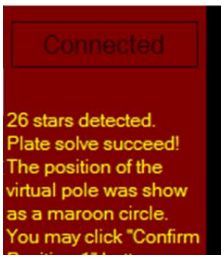


4.3. Plat Solving

After checking camera settings and status, uncheck the **RAW image**. The software will start to Plate Solving the pole region. A real time image with white dots on black background will be displayed after imaging processing.



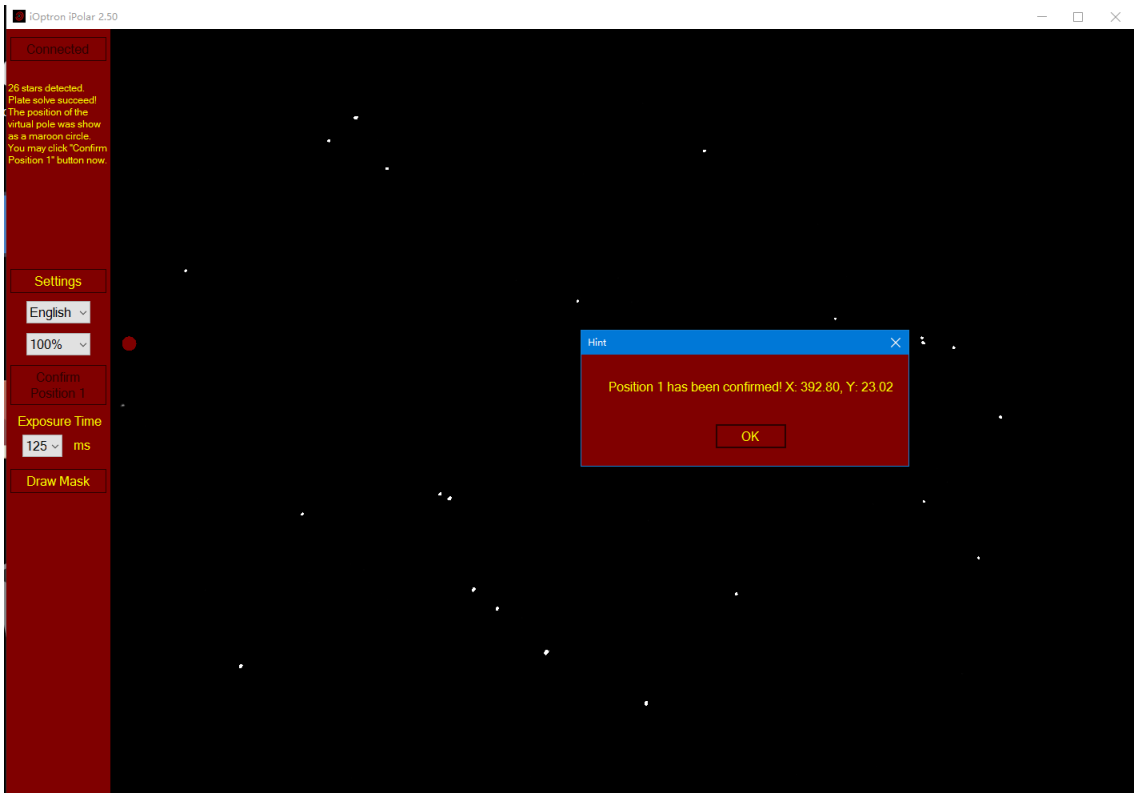
Please check the real time instruction under the **Connected** box on top-right corner. If it displays "*xx stars detected. Plate solve succeed!*" There is no need to adjust the exposure time. Otherwise, increase the exposure time if it indicates too little stars, or decrease the exposure time when too more stars displayed.



NOTE: the field of view (FOV) of an iPolar is about ±6°. So it can only cover the area of about 6° around the pole. If the mount RA axis is pointed far away from the pole, the plate solve may not be successful, or the pole will be jumping around.

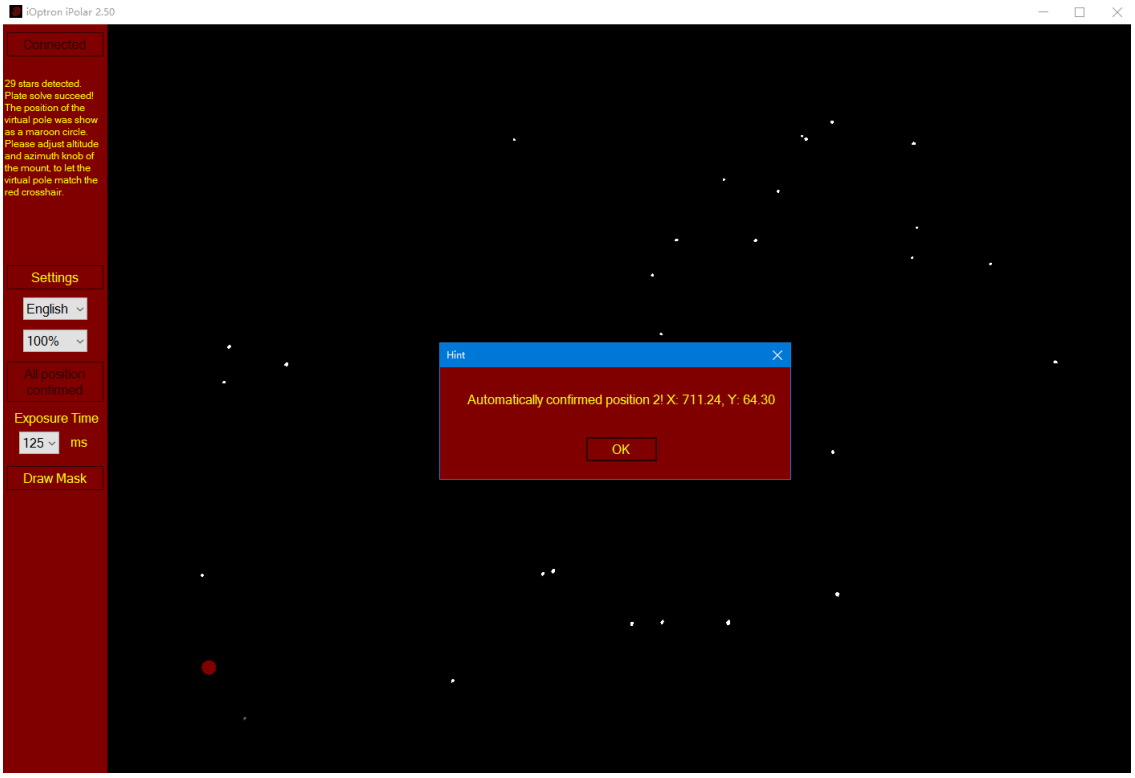
4.4. Confirm Position 1

As shown in aforementioned picture, if the Plate Solve succeeds, click on "**Confirm Position 1**" button. A confirmation window will be popped up. Click on **OK** to confirm. Do not adjust the tripod or mount ALT/AZI position after confirming position one. Otherwise, the polar alignment will be failed.

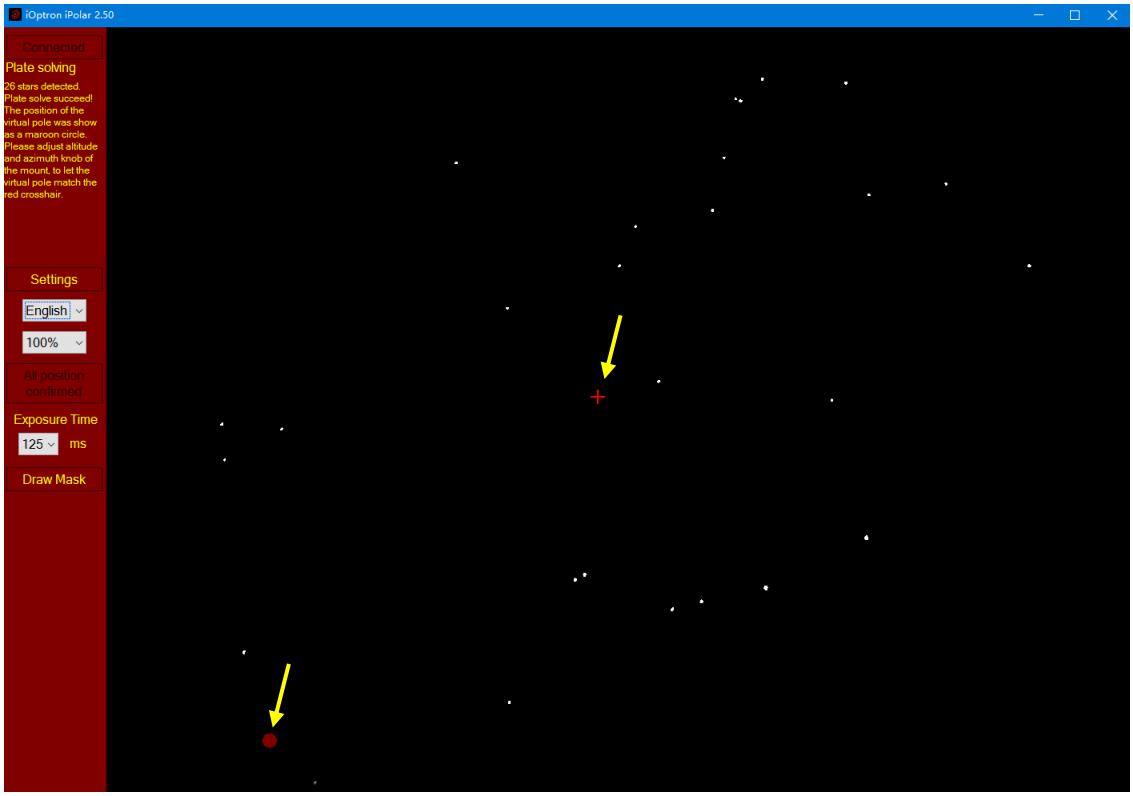


4.5. Rotate RA Axis and Confirm Position 2

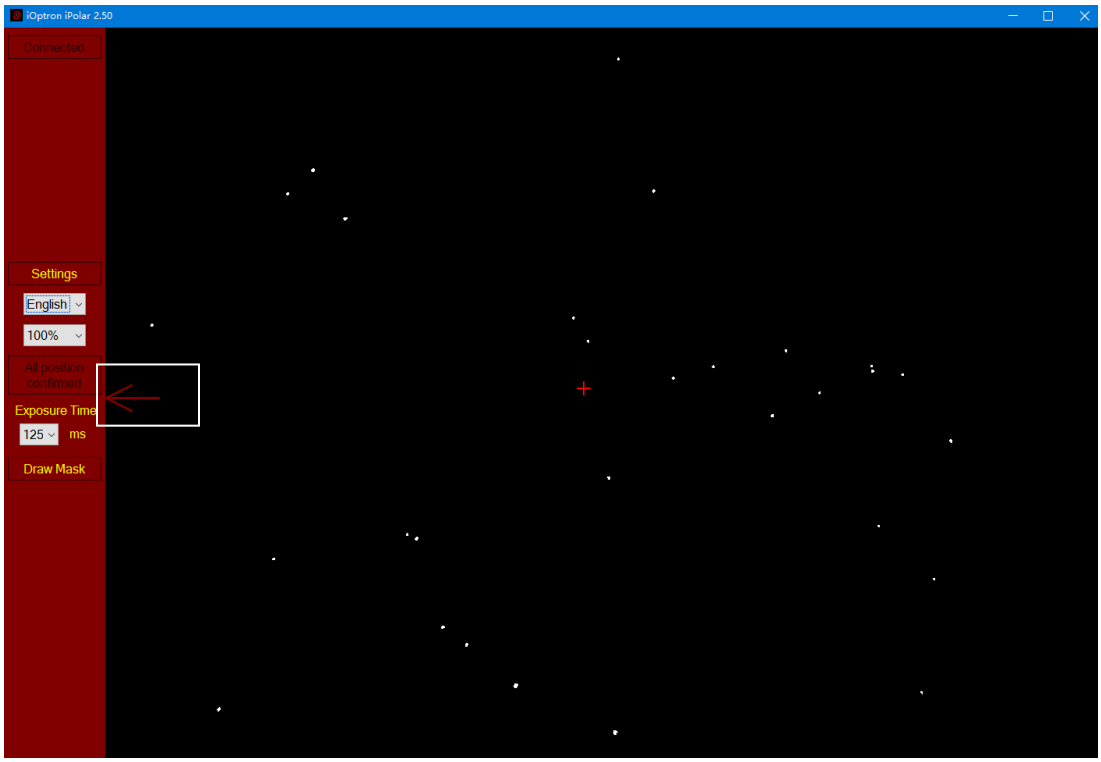
Use hand controller or iOptron Commander to rotate the mount in RA. The software will confirm the position 2 automatically during rotation. The closer the RA axle is to the polar axle, the smaller the rotation angle. Click **OK** to close the position 2 confirmation window.



The software will display the virtual pole with a maroon circle and camera center a red cross.



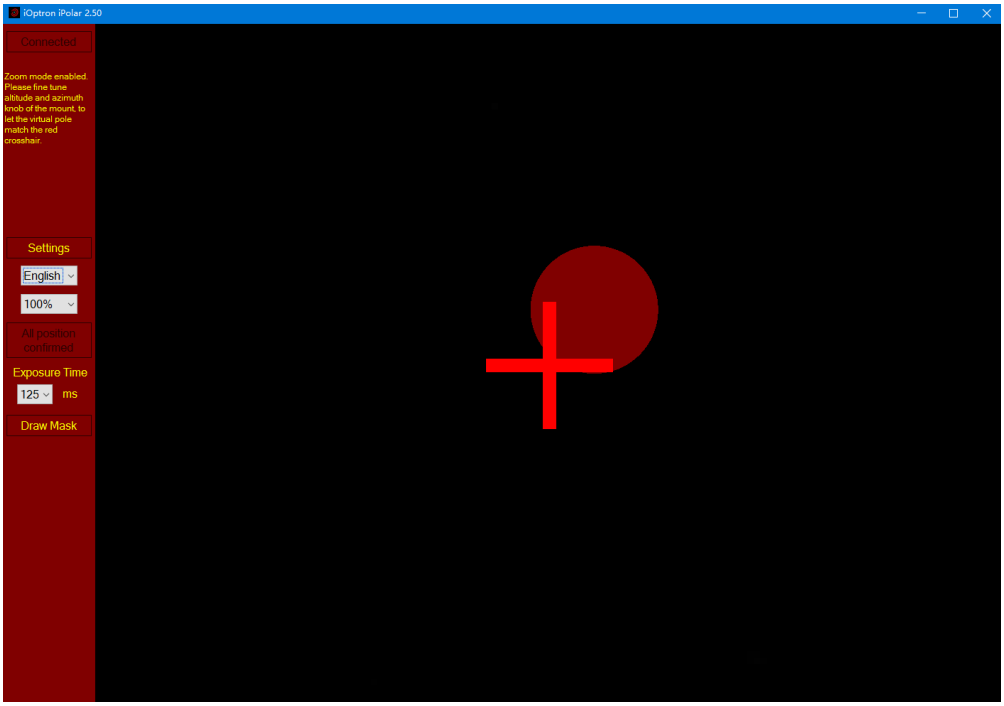
If the virtual pole is away from virtual pole and not in the iPolar FOV, an arrow will show where it is located.



4.6. Adjust Mount RA Axis

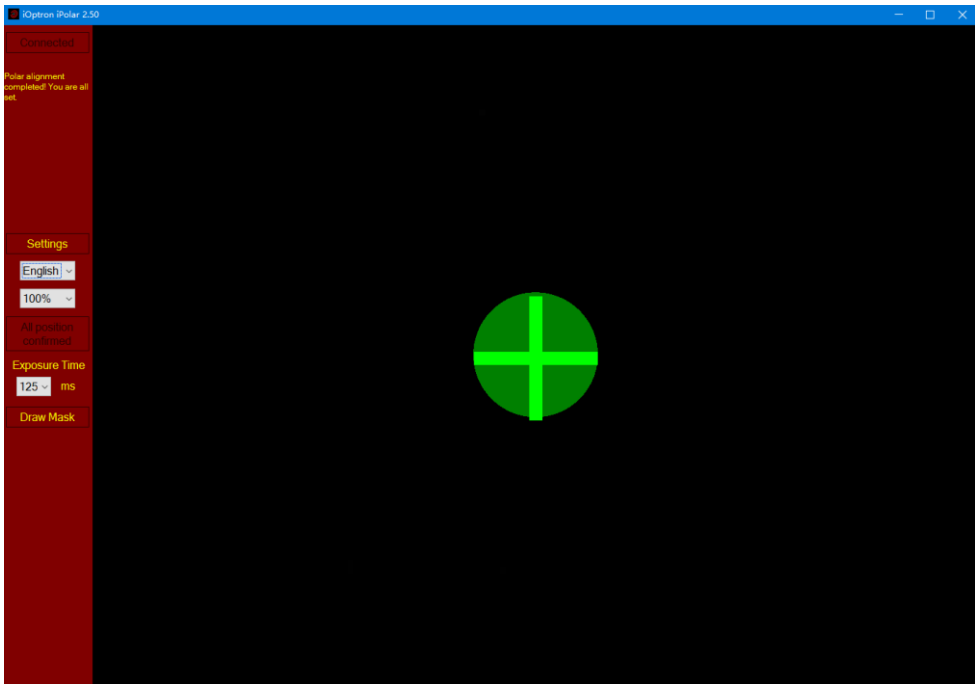
Adjust the mount using altitude/azimuth adjustment screws to move the virtual pole (maroon circle) towards the center of camera (red cross). When they are close enough, the software will be in the zoom mode for easy adjustment.

NOTE: It is suggested to set the mount to Zero Position so the virtual pole movement direction corresponds to the alt/azi adjustment.



4.7. Complete Polar Alignment

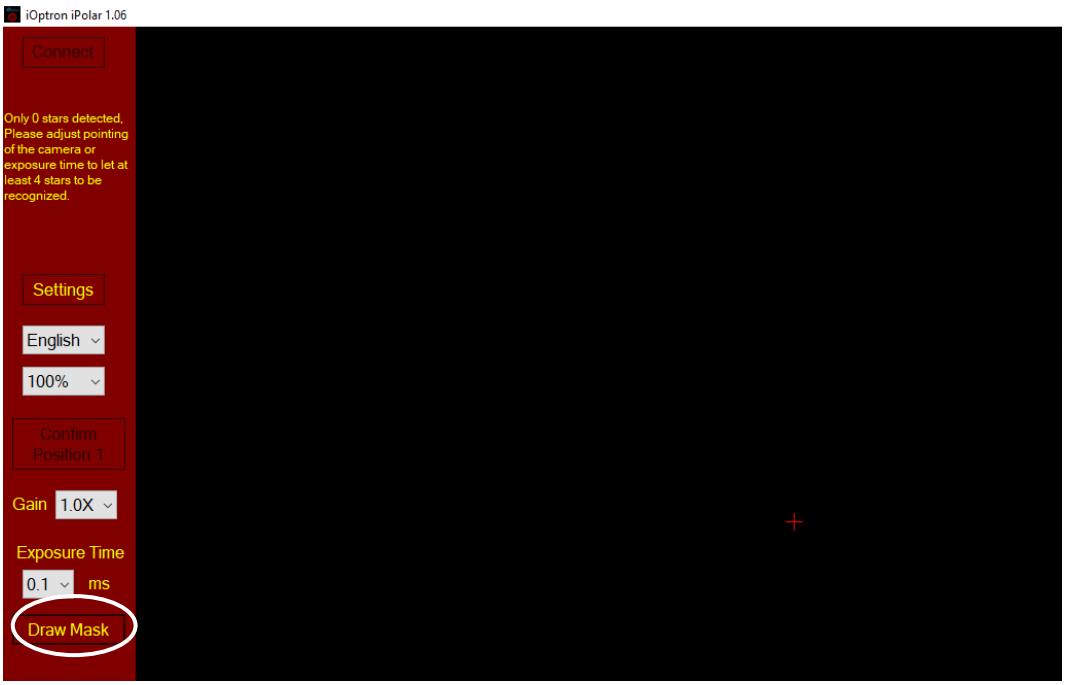
When the circle overlaps the cross, they will change to green and the polar alignment is completed.



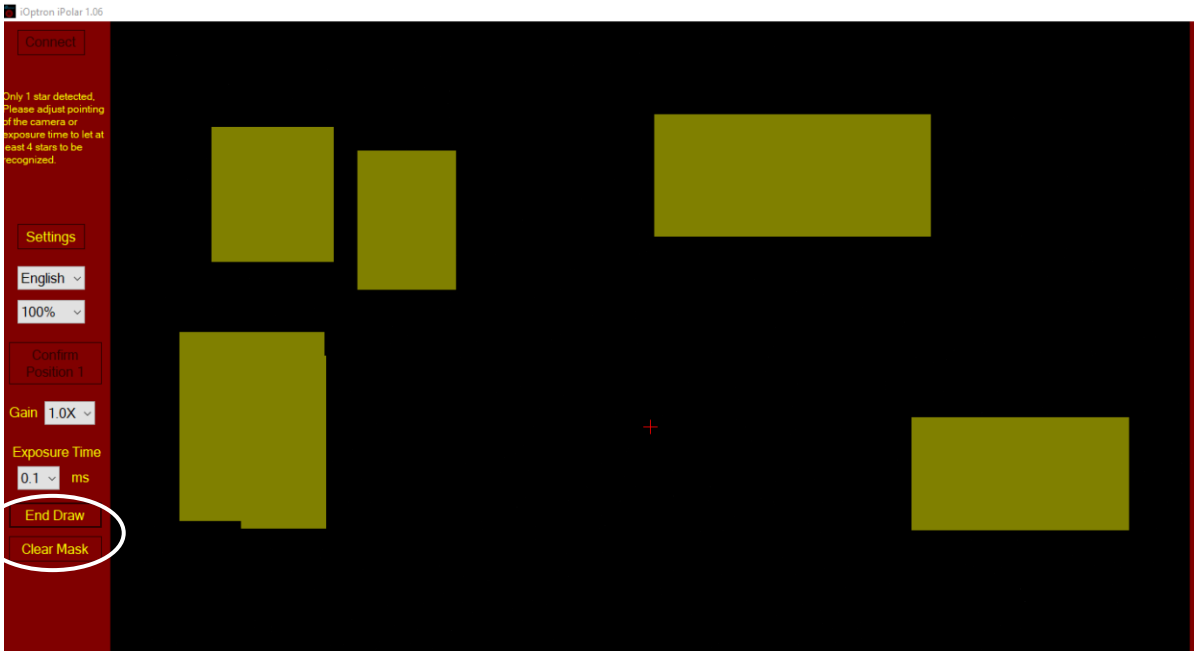
5. Draw Mask

If there are some tree branches or part of the building get in front of the iPolar camera (click on **Settings=>RAW image** to check), you may use the **Draw Mask** function to cover those part from plate solving (***uncheck RAW image before masking***):

(1) Click on **Draw Mask**



(2) Move the mouse cursor to the starting corner of the area that you want to ignore, click the mouse button
(3) Move to ending corner and click the mouse. A green rectangular will show on the screen.
(4) Select another area as needed.
(5) Click on **END Draw** to confirm, or **Clear Mask** to clear all the masks.



Specifications

Field of View (FOV)	~ 13 degree
Resolution	30 arcsec approx.
Alignment Precision (Max.)	30 arcsec
Chip	1/3” CMOS
Pixel Size	3.75µmX3.75µm
Pixel Number	1.2MP (1280X960)
Interface	Mini USB2.0
Software	iPolar Software
Operation System	Windows 7/8.1/10, 32bit or 64 bit, with Microsoft .NET Framework 4.8 installed
Warranty	One year limited

The device specification may change without notice. Actual device may differ from this manual.