iOptron® iPolar™ Electronic Polar Scope
Operation Manual

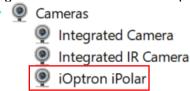Product #3339

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 when it is connected to the computer first time. It may take some time to install the firmware. An 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 Cameras

2. Software Requirement and Installation

(1) This instruction is for iPolar 2.60 or later
(2) Goto www.ioptron.com to download iPolar software and save on your computer
(3) The iPolar software V2.60 needs Windows 7, 8.1, 10 or later version, 64 bit operation system, with .NET Framework 4.8 or later version.
(4) If you have a 32 bit Windows system, please use iPolar V2.50.

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°.
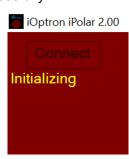
3.2. Connect iPolar in Software

(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 initializing the process if the camera is connected successfully.
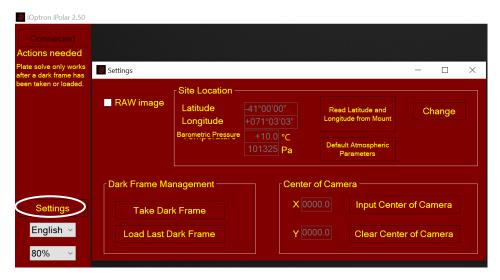

2

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.
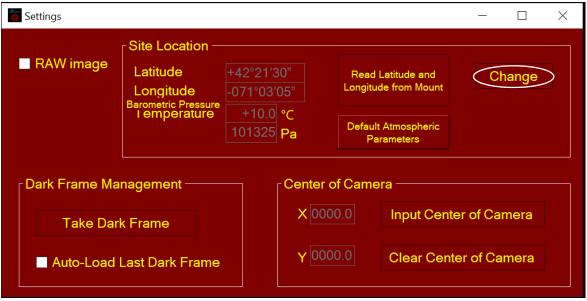
3.3. Initial Settings

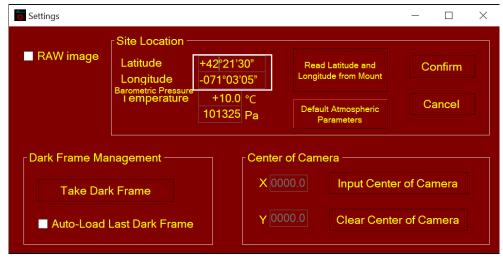Click on **Settings** to bring up **Settings** window.

3.4. Set Location and Atmospheric Parameters
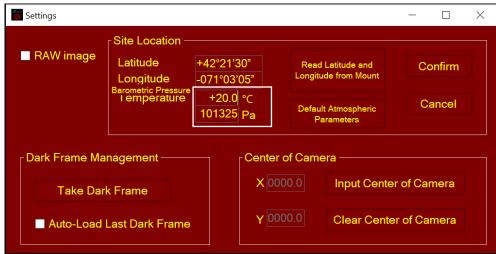
<u>*Enter Manually*</u>
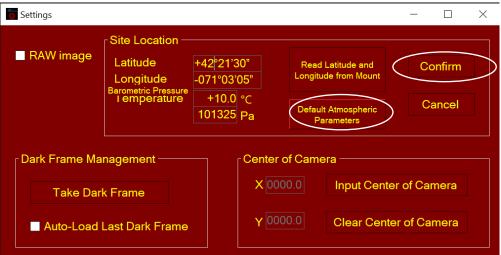
(1) Click on **Change** button

(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.
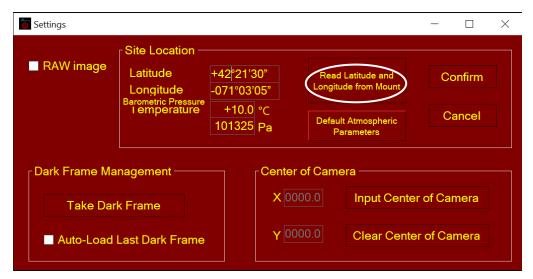

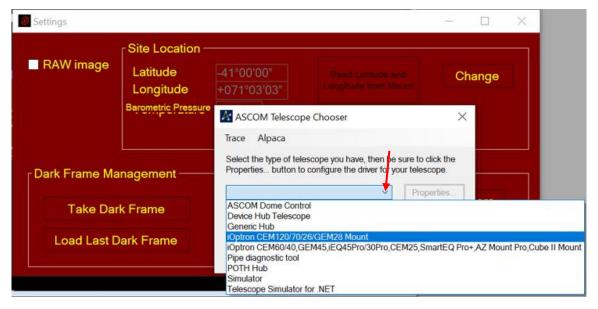(4) Click **Confirm** to complete the location setting.

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.
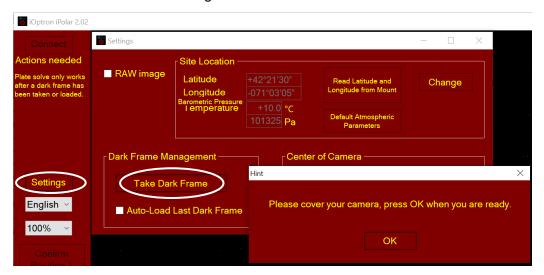

(4) Click **OK** to complete the location setting.

3.5. Take Dark Frame

After connecting the camera, Take Dark Frame will starting 20 seconds count down. Take the dark frame image of the camera after count down ends. This will mark the bad pixels of the camera, if there is any, and camera dark current under different ambient temperature.

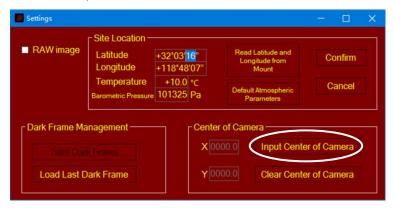Click on **Take Dark Frame** when covering the camera.

You may skip Take Dark Frame by click on Load Last Dark Frame if the camera was disconnected short while ago. We recommend to take the dark frame when performing polar align. If the software does not plate solve, please retake the Dark Frame.
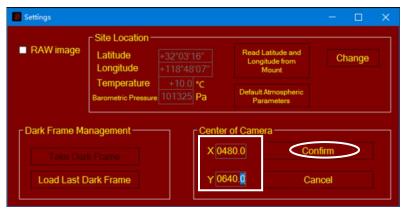
3.6. Set Camera Center

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.**
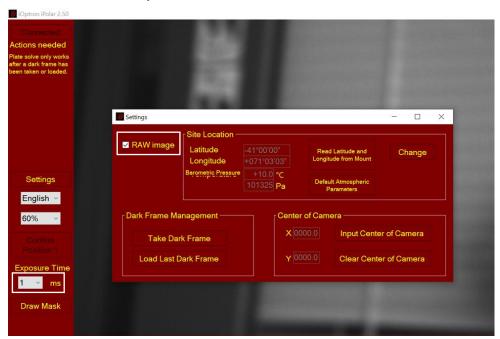

6

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 seen 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.
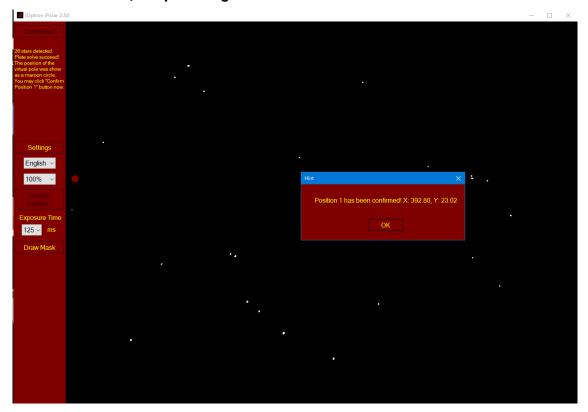

Please check the real time instruction under the **Connected** box on top-left corner. If it displays "*xx stars detected. Plate solve succeed!*" There is no need to adjust the exposure time. Otherwise, increase the exposure time if it indicates too little stars, or decrease the exposure time when too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

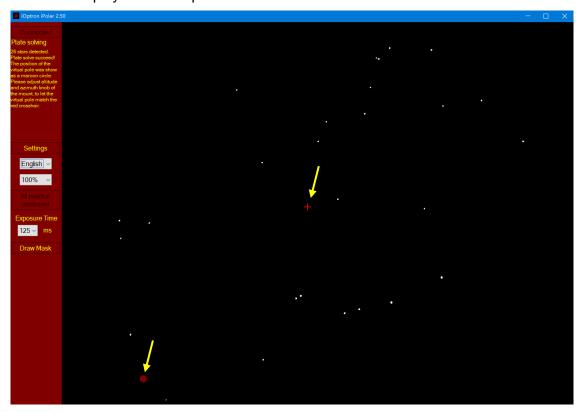### 4.4. Determine Camera Center and Locate Virtual Pole

When the Plate Solve is successful, the software will start to determine the iPolar camera center/mount RA axis and locate the virtual pole. 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.***

If you are lucky enough that the RA axis is aligned to the Pole, you'll see both the cross (camera center) and the circle (virtual pole)! Otherwise, follow the on-screen instruction to 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 pole, the smaller the rotation angle is needed. 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 far away from the RA axis and can not be displayed inside the screen, an arrow will show where it is located.
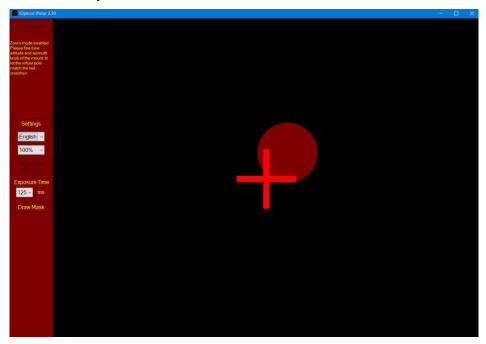
Camera Center Recalibration: In the event that the iPolar camera center needs be recalibrated, such as polar alignment result seems not accurate, iPolar was moved, or just want a fresh start, you can go to Settings menu and click on Clear Camera Center button to start over again.

4.5. 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.

4.6. Complete Polar Alignment

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

5. Draw Mask

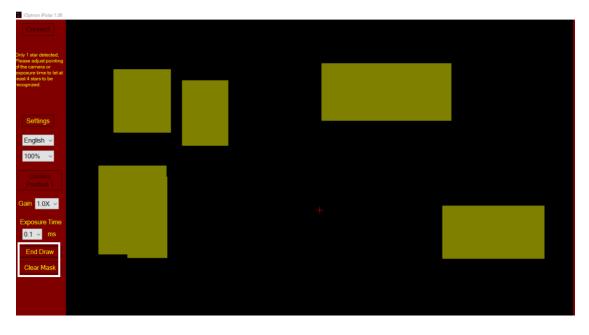If there are some tree branches or part of the building get in front of the iPolar camera (click on **Settings=>RAW image** to check), you may use the **Draw Mask** function to cover those part from plate solving (*uncheck RAW image before masking*):

(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	USB2.0
Software	iPolar Software
Operation System	Windows 7/8.1/10, 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.

Troubleshooting:

1. iPolar software does not run.
    - Check if the software is blocked by the computer antivirus software, including Windows Defender;
    - Check your Windows operation system meets the requirement if you are using a PC.
2. My camera does not connect.
    - Check USB cable and both USB port and connector;
    - Check if iPolar is shown under Windows Device Manager\Camera;
    - If you see the iPolar, but still failed to connecting, contact iOptron for a RMA# to send the iPolar for testing
3. How can I recalibrate the iPolar Camera Center?
    - Click on **Settings**, then click on **Clear Camera Center**
4. After I take the dark frame, the mount confirmed Position 1 and goes to plate solve right away. I did not have a chance to confirm the Position 2.
    - If you see the red cross (camera center), it means the RA axis is very close to the pole and the software found the camera center;
    - Should the polar alignment result not good, adjust the mount slightly off the RA axis and clear the camera center.
5. How can I know I have the necessary components for iPolar software 2.60 and latest iOptron Commander?
    - Download and run EnvironmentCheck.exe from https://www.ioptron.com/v/ASCOM/EnvironmentCheck.exe.
      You should see the following screen.

```
System architecture: 64-bit, OK.
Windows 7 with SP1 or later: OK.
.NET Framework 3.5 with SP1 is installed: OK.
.NET Framework 4.8 is installed: OK.
ASCOM platform 6.5 or later is installed: OK.
Environment check passed!
Press any key to continue . . . _
```