

STAR 'CRAWLING' WITH ASTRONOMICAL BINOCULAR

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The following pages detail how I use my astronomical binoculars and a mounted camera to orient myself when doing Variable Star Observations. My Binocular has a 1.75" FOV so I have difficulty finding exactly where I am at times, especially if it is a rather obscure or dim star. I have used it a few times and found it works pretty nicely although I do admit it is a bit gadgety. Those of us who use one of the many fine astronomical binoculars usually utilize them to observe the moon or wide field stars or object. A year ago I became involved with AAVSO and tried using my Oberwerk BT-100XL-ED. Nice image but practically impossible to locate low magnitude stars secondary to its 1.75", even when using Star Hopping. An idea came to mind...I call it 'Star Crawling' rather than 'Star Hopping'!

One evening it struck me; use Plate Solving. However first I had to determine how to acquire the same image I was viewing. Happily the Oberwerk has a red dot wide field spotting device on the top attached to a picatinny rail. I thought I should be able to attach my camera to this rail and image my FOV. But I had to locate a camera-to-picatinny rail adapter.



After some research I discovered the correct device and it worked!



This is the adaptor where it attaches to the camera



This is the other side where it attaches to the rail



Camera mounted on binocular

I use a Canon 200mm f/2.8 prime lens which, on this full frame camera, gives me an FOV of 10 x 7 degrees. It is a heavy camera and there is no way assure it is parallel to the binocular..



Star Crawling Procedure

My procedure is to first 'star hop' as well as possible to the general area of the variable object. Here is an example using V Cas, magnitude about 8.6 and at an FOV of 1.75" in an area devoid of nearby bright objects. My SkySafari revealed V Cas to be about 7" above Capk (the nearest easily acquired star). Doing simple math that means it is 7.0/1.75 or around 4 binocular FOVs from Capk. So that is how I initially moved to the general area of V Cas. But looking through the binocular and comparing it with the AAVSO chart not a thing looked familiar. Here I took off the green dot sight and replaced it very carefully with my DSLR. I had my DSLR (this time a Canon Rebel SL1 with the 200 mm Canon lens) connected to my laptop via Canon EOS. Once I obtained the image as a JPG I uploaded it into Astrometry.net. In a few minutes I had a readout of just 'where I was' (see next slide). (Note the FOV with this APS-C camera and lens is 8.5 x 3.5 degrees) I was in the right area but would have to adjust as my binocular FOV was less than the image. I found the *Bubble Nebula* and determined it was but 2" from V Cas. Essentially my target, V Cas, was at the edge of the left half of my FOV.



Keep in mind here that my binocular FOV is 1.75" and centered on this image. So my next step was to move my binocular's FOV a bit to the left and take another image and plate solve it.



I could identify 1 Cas and 2 Cas visually through my optics but was uncertain about NGC 7510. The Astrometry would not identify V Cas but by Peering intently at the star patterns I was certain I had it. So I submitted my observation.

Considerations when using this tedious technique

- 1.) Your camera image's FOV. My Canon 200 mm with my full frame camera is about 10"x 7". A large FOV is not an advantage. A heavy camera is not either; it can cause the binocular to drift as you struggle with the astrometry.
- 2.) Be certain your camera is zeroed center with your binocular. I ascertain this by taking a test photo early with a bright planet centered in the binocular FOV and compare it with the image. Centering has not been an for me issue at all.
- 3.) Mounting the camera after star hopping is a challenge at first. Hopefully your binocular mount is rock steady, and you have prebalanced the weight of the camera on the binocular, so it doesn't 'drift'.
- 4.) It can be tempting to use a longer focal length lens such as a 300mm to get a smaller FOV. The issue here is you will not have an exposure long enough to capture anything but the brightest stars.
- 5.) Have a chair to sit in!

