Sky-Watcher Guidescope Mount

A Review for First Light Optics by Steve Richards

Introduction

As soon as you start taking deep sky images you quickly realise that long exposures are required to get the best results. These long exposures put greater demands on the tracking ability of your mount than short exposures would so it is necessary to introduce a system for automatically correcting and errors in your tracking to avoid trailing star shapes in your images.

The solution is to use an autoguiding system and the simplest and most widely used method is to use a second telescope, guide camera and autoguiding software aimed at a test star to give feedback to your mount if the position of the test star deviates in any direction. There are other solutions like the use of an off axis guider (OAG) which intercepts a small portion of the light cone from the imaging telescope and analyses the movement of a test star in the same manner as using a separate guiding telescope.

One of the issues regarding the use of a guide telescope is that of pointing the instrument in a particular direction to acquire a suitable guide star without disturbing the pointing of the imaging telescope. Adjustable tube rings are often used for this purpose but these can be awkward to use and, because of the small area of contact, can result in movement during the imaging session and this movement results in differential flexure. Differential flexure simply means that although the guide camera appears to follow the test star accurately and corrects any tracking errors, because there is some independent movement between the guide telescope and the imaging telescope, the imaging telescope isn't guaranteed to track as accurately.

The Sky-Watcher Guidescope Mount aims to resolve both issues by providing a method of easily and intuitively adjusting the pointing of the guide telescope in both azimuth and altitude while maintaining a solid base to hold the guide telescope rigidly in place.

Specification of the review sample

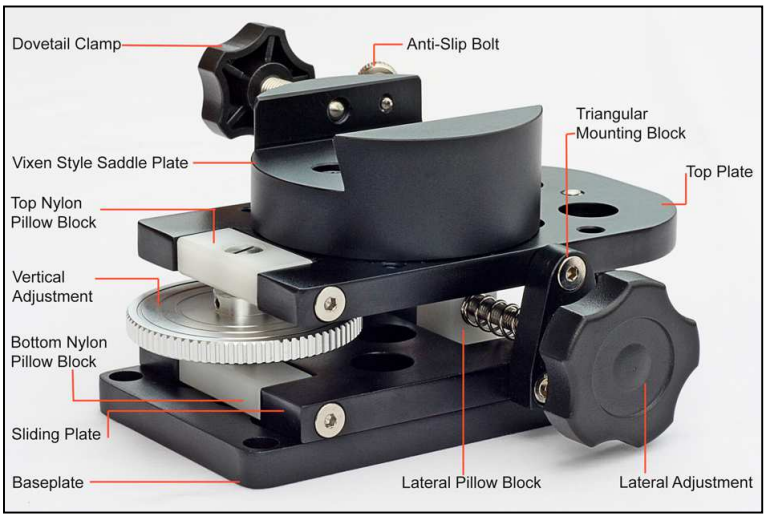
Weight:	Guidescope Mount	1038gm
	ADM Losmandy Style Dovetail Bar (optional)	482gm
Dimensions:	83.0mm(h) x 98.0mm (w) x 150.0mm (l) excl. knobs	
Price:	Guidescope Mount	£118.00
	ADM Losmandy Style Dovetail Bar (optional)	£53.00
Supplier:	First Light Optics	
Contact:	questions@firstlightoptics.com (t: 01392 826 133)	
Website:	http://www.firstlightoptics.com/guide-cameras/skywatcher-guidescope-mount.html	

What's in the box?

The Sky-Watcher Guidescope Mount arrived very well packaged in a plain cardboard box with a shaped foam interior. The unit was supplied fully assembled and included a ¼" x 20 UNC camera mount bolt and a Vixen style saddle plate.

Description

The excellent build quality and attention to detail in this product are the first things that you notice when you unpack it, it simply oozes quality. It was my intention to install it on the renowned ADM mounting system and if someone had told me that this was an ADM product rather than an Sky-Watcher one, I wouldn't have been surprised! The excellently machined components are anodised in a rich black satin finish with silver finish bolts.

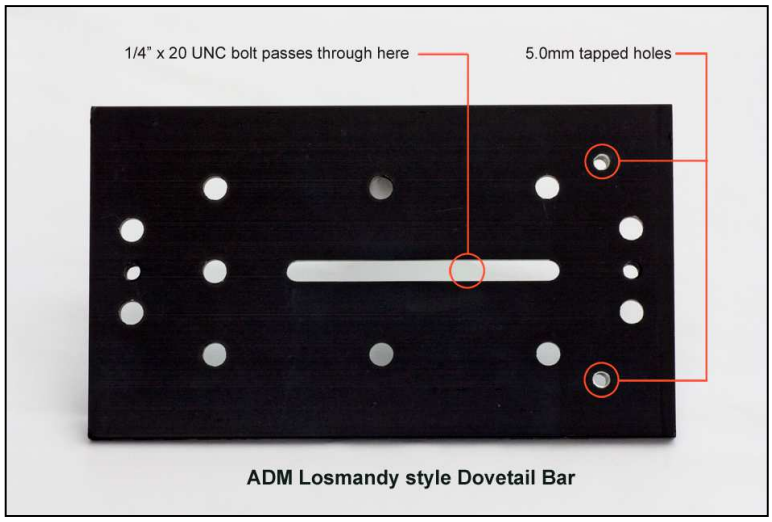


The guidescope mount comprises a baseplate CNC machined from 10.0mm aluminium block onto which a sliding plate of the same thickness is bolted using a single bolt as a swivel point. A nylon pillow block is also attached to the baseplate and this is drilled and tapped to take a spring-loaded lateral actuating bolt with a hand wheel at one end. The lateral actuating bolt is retained in place by bearings set into two triangular mounting blocks attached to the sliding plate such that turning the bolt with the hand wheel pulls the sliding plate laterally through a total travel of 12°. The two triangular mounting blocks have bearings at their apexes that support one end of a third 10.0mm thick plate that moves laterally with the sliding plate and vertically at the opposite end.

Vertical movement is achieved by turning a large knurled thumb-wheel, 61.0mm in diameter, attached to a threaded rod. This vertical rod is attached to the sliding plate and the top plate by two further nylon pillow blocks located in bearings to allow for the minute angle change of the rod at different height settings.

The Vixen style 32.0mm high x 76.5mm diameter saddle plate is bolted to the top plate and this can be removed if you want to bolt the guide telescope directly to the mount. The advantage of direct attachment to the top plate is that the height of the telescope above the baseline can be reduced and another potential flexure point can be taken out of the equation.

The baseplate has a single ¼" x 20 UNC camera mount threaded hole for attaching the unit to the top of a Sky-Watcher tube ring where a camera mount is normally located but this would not be my preferred method of mounting. If you want to use a piggy-back mounting solution, a better approach would be to attach the guidescope Mount to a piece of aluminium bar and attach this bar to the top of both tube rings. Although this would be more stable than attaching to just one tube ring there remains the fact that there would still only be a single point attachment to the base of the guidescope mount which is less than ideal. The solution to this is to use a 100.00mm wide plate as this would allow attachment using the ¼" threaded hole and two outer holes forming a triangle of location points. The ¼" threaded hole in the base of the guidescope mount can be seen in the photograph above along with the four corner holes which are plain bored.



ADM Losmandy style Dovetail Bar

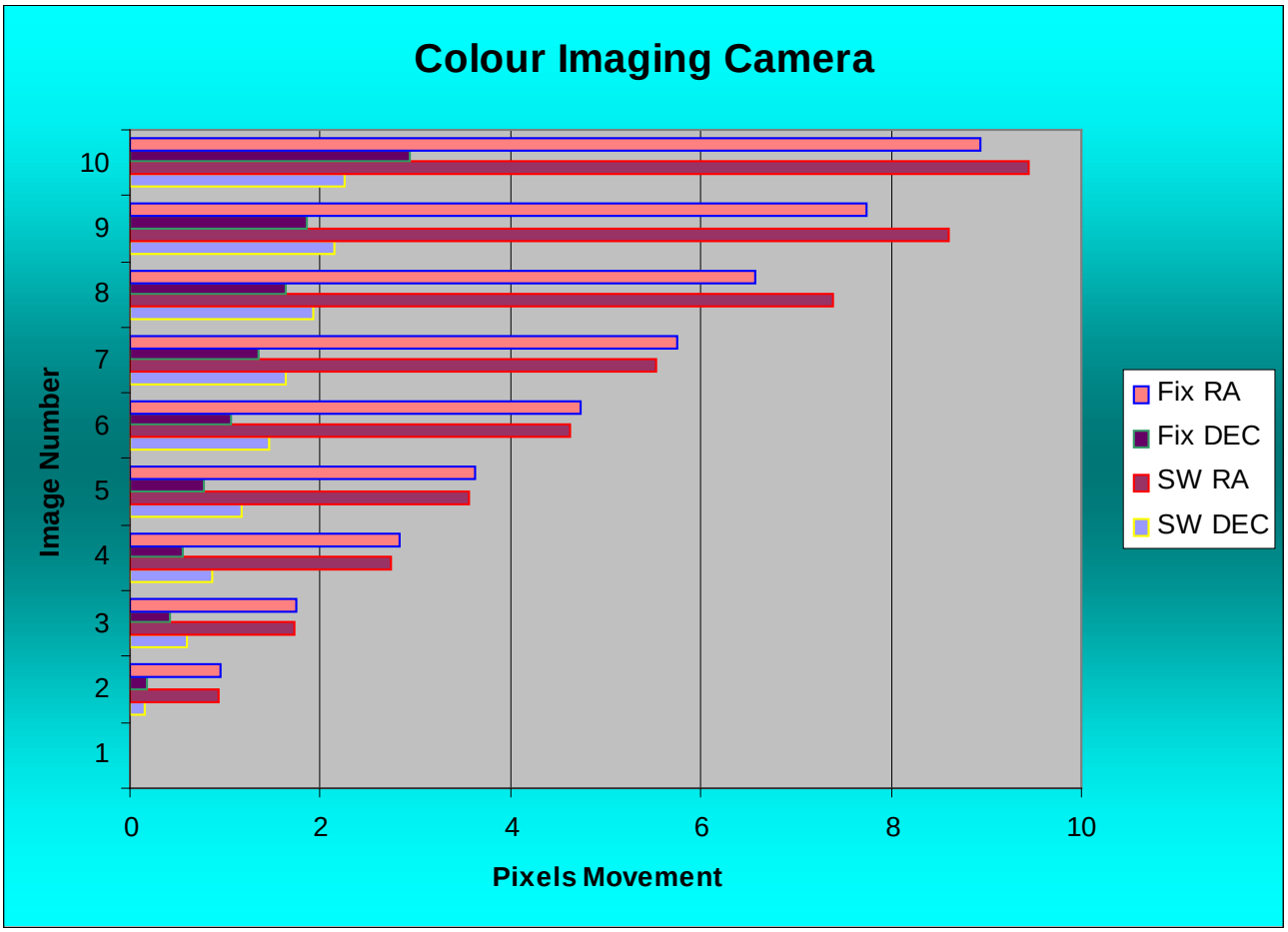
The solution that I settled on was to use an ADM side-by-side bar and attach the guidescope mount to an ADM Losmandy style dovetail bar as shown in the photograph on the left. To do this, it was necessary to drill and tap two 5.0mm threaded holes in the dovetail bar to match those in the corners of the mount's baseplate and then make use of the existing ¼" threaded hole in the mount itself. This makes for a very substantial mounting with easy attachment and removal from the side-by side bar. When installing the guidescope mount on the bar, it is important to ensure that the altitude adjustment bolt has clearance below the bottom plate as at low altitudes it will protrude below the bottom of the plate. I arranged for this projection to fit just inside the far end of the fixing slot in the dovetail bar. This method makes for a very substantial mounting that even looks the part as can be seen in the photograph below! Note the knurled knob underneath the ADM bar, this is a safety stop that ensures that the bar cannot slide out of the saddle plate by mistake.

Although intended only for guidescope mounting, I pushed it a little further as I wanted a method of collimating my two imaging telescopes that make up my dual imaging rig. I mounted a William Optics FLT98 with a one shot colour CCD camera on one of the ADM saddle clamps and a William Optics Megrez 72FD to the guidescope mount on the other saddle clamp. The Megrez is a dual use instrument here as it has an Off Axis Guider (OAG) with a guide camera plus a mono CCD camera and filter wheel attached to it. At 3.4Kg, this combination is much heavier than a typical ST80 and guide camera that weighs in at around 1.9Kg so it was a hefty test for the guidescope mount.

The guidescope mount was a joy to adjust and it made the task of collimating the two telescopes to align with the same point in the sky a very simple task. There was a little bit of backlash in the azimuth adjustment but none in altitude. I felt that this unit was a big step up from using guidescope rings as it was so intuitive and quick to use. My imaging system has always suffered from some differential flexure so I was keen to see if the guidescope mount added substantially to the problem.

After I had completed the dual scope imaging run with the guidescope mount in use, I selected the first 10 x 5 minutes subframes and carried out a star position analysis on a star close to the centre of the field of view in both the FLT98 and Megrez. I noted the centroid position of the star in each subframe to 3 decimal point accuracy.

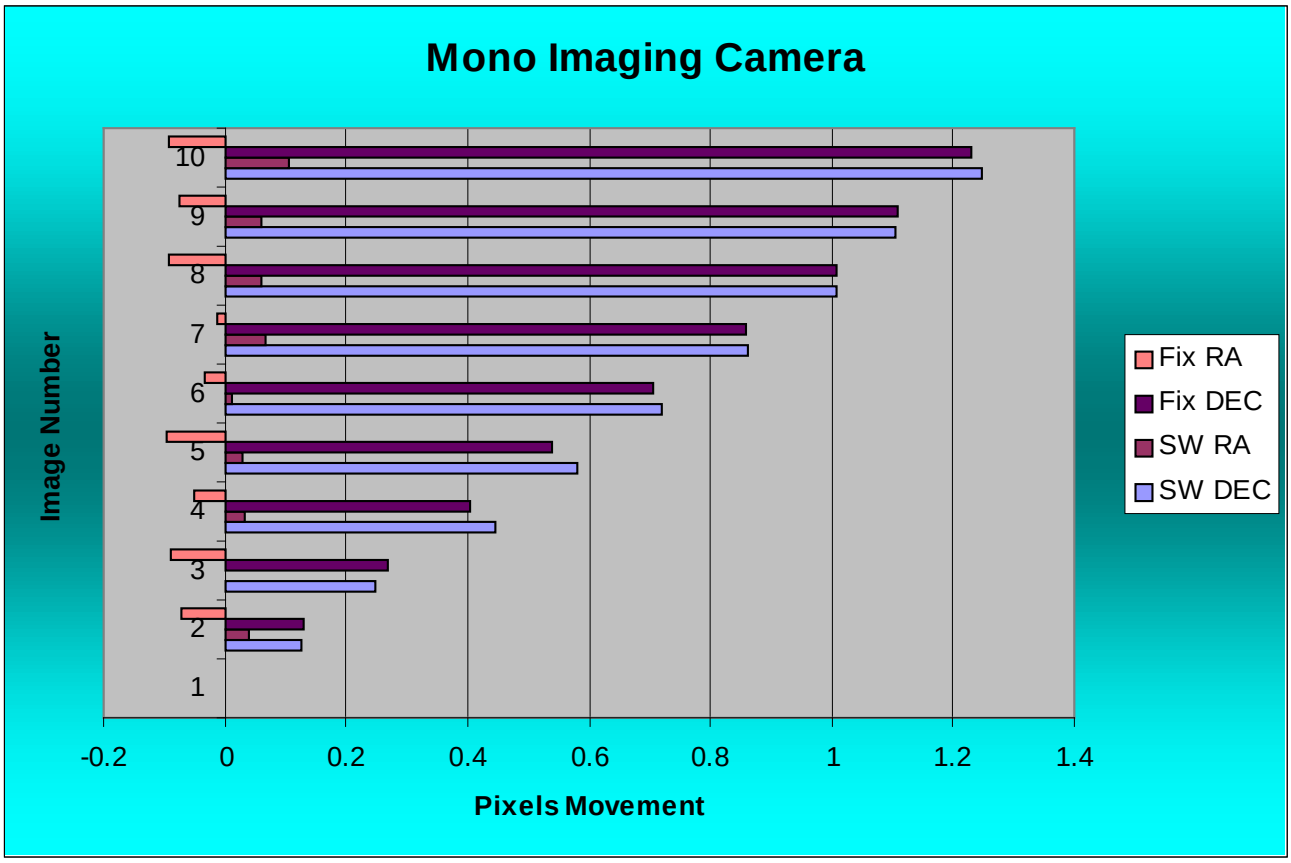
The next night (yes, I know, two clear nights in succession has been a rare event recently!) I repeated the exercise but with the Megrez attached directly to a Losmandy style dovetail bar. I normalised the results by giving the RA and Dec position of the star in the first image of each set a value of 0 (zero) and adjusted the other measurements in a linear manner. The SW plots in the following graph show the flexure errors when using the guidescope mount and the Fix plots are those achieved with the Megrez attached directly to the Losmandy style dovetail bar.



To summarise the graph results, the incremental flexure-induced movement of the star over 50 minutes of autoguided tracking (10 x 5 minutes) was 9.438 pixels in RA and 2.267 pixels in Dec. At first glance, this seems a disappointing result but it needs to be read in the context of the results from the fixed attachment method that was used as the control and this yielded results of 8.927 pixels in RA and 1.949 pixels in Dec. The differential flexure contributed by the guidescope mount was, therefore, 0.511 of a pixel in RA and 0.318 of a pixel in Dec.

NO differential flexure at all is what we should be aiming for and clearly my system has other flexure issues that I must resolve but the additional flexure induced by the guidescope mount is relatively small in comparison with the general flexure of the system.

The Megrez was also imaging throughout the test sessions and the following graph shows the differential flexure experienced in this telescope too. As expected, this was of a very small level indeed and underlined the advantage of using an OAG for autoguiding.



The results that I have shown above pertain to measurement using my CCD camera and my telescope. These figures would be different for a longer or shorter focal length telescope or with a CCD camera with larger or smaller pixels, so for reference, my sampling rate was 2.61 arcseconds/pixel for the colour images and 3.85 arcseconds/pixel for the mono images.

So much for the hard data but this is all about the actual images so we'll now have a look at those from the session in which I used the guidescope mount. Both sets of images were taken at the same time and comprise 10 subframes each with no calibration frames apart from BIAS subtraction for the Ha images. Normally I take a full set of BIAS and FLAT frames but did not have time to do this for the test session.

The first image shows the wall region of NGC7000 captured with the FLT98 and SXVF-M25C OSC CCD camera using Starlight Xpress' own camera control software. I have reduced it in size to fit the page but it hasn't been cropped.

The second image shows the same region captured with the Megrez and SXVF-H9 mono CCD camera using an Astronomik 12nm and MaxIm DL. Again, this image was reduced in size but uncropped.

Although this review serves as a test of the guidescope mount's suitability as an ordinary adjustable guiding platform, for me, this whole exercise has been about making my dual imaging system easier to align on the same point in the sky. With this in mind, I have also included a first draft of a combined image using the two sets of data. This final image was produced by aligning the colour and Ha images in MaxIm DL and reducing the size of the colour image to match and then compositing them in PhotoShop by blending the Ha data with the red channel at 50% opacity.

OSC Stacked Image of ‘The Wall’ from NGC7000

Mono Ha Stacked Image of ‘The Wall’ from NGC7000

Mono Ha blended with OSC Stacked Image of ‘The Wall’ from NGC7000

Conclusion

The Sky-Watcher Guidescope Mount wasn’t really designed for such a heavy outfit as mine but it acquitted itself very well indeed which at such a competitive price is an impressive achievement.

Used with a lighter weight guidescope and guide camera like the Sky-Watcher ST80 shown in the picture on the right, it should be completely at home.

In comparison with adjustable guide scope rings, the guidescope mount performs better and certainly makes locating suitable guide stars much easier. In addition to simplicity of adjustment, the guidescope mount provides a versatile and stable platform for mounting any suitably sized telescope equipped with a Vixen style dovetail bar.

I’m keeping this one!