

Sussex Astronomy Centre: Information Sheet

Polar Alignment

Drift Method of Polar Alignment

The drift method of alignment is used to fine tune the polar alignment of your mounting and enable successful long exposure CCD and Emulsion imaging.

With poor polar alignment it can be difficult to obtain well tracked images and the resulting images may also suffer from field rotation.

Preliminary

The mounting should already be roughly aligned. At the least, the polar axis of your mounting should be pointing at Polaris. Mounts which have a pole finding telescope built in can attain a rough polar alignment within seconds, simply by ensuring that Polaris is visible within the pole finder telescope.

The mounting tripod or pedestal should also be placed level with reference to the ground, although this is not critical and you do not need to go to great lengths to obtain a precisely levelled mounting.

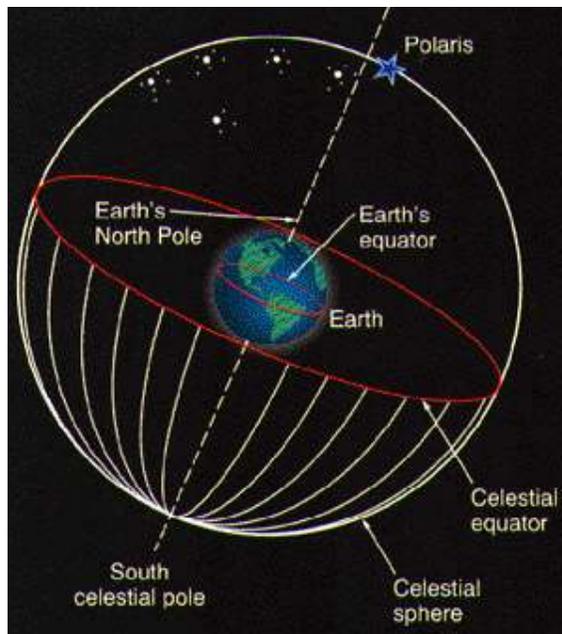
You will need an illuminated reticle eyepiece and a diagonal (not necessary for Newtonian users) and a magnification of at least 200x. You may need to use a barlow lens to obtain such a high magnification.

Theory

The drift alignment method involves tracking the telescope on TWO different stars in specific locations of the sky, and watching these stars in an illuminated reticle eyepiece. By monitoring their movement, or drift, relative to the illuminated reticle, one can determine how to adjust the mounting in altitude and azimuth to obtain a precise polar alignment.

Practice

Pick a star close to the Meridian (a circle on the celestial sphere that passes through the zenith and both celestial poles) and just north of the Celestial Equator (The Celestial Equator divides the sphere of the sky into North and South – see diagram)



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This star is likely to be due south with an altitude of approx 60 to 70 degrees.

Select a star that is reasonably bright – a good range will be stars of magnitude 3 to 5. Aim the telescope at this star – (with German Equatorial mounts make sure you place the telescope on the West side of the mount)

Rotate the diagonal so that the eyepiece is oriented such that you are standing on the North side of the telescope when looking into the eyepiece.

The Reticle eyepiece cross hairs must be aligned North-South and East-West.

Center the star in the eyepiece.

Using the mounts drive controller, move the star East and West in the eyepiece and then rotate the eyepiece such that the East-West (left and right) movement is parallel with the horizontal cross hair.

Now that the cross hairs are properly oriented place the star on the East-West cross hair and monitor it.

IF the star drifts UP – adjust your mounting in AZIMUTH so that the star appears to move RIGHT in the field of view.

IF the star drifts down, adjust your mounting in AZIMUTH so that the star appears to move LEFT in the field of view.

When you have made the azimuth adjustment, re-place the star on the East-West cross hair and continue to monitor it.

Continue to make AZIMUTH adjustments until you can detect no movement of the star off of the cross hair in 5 minutes.

Now that the mounting has been aligned in AZIMUTH turn your attention to aligning the altitude axis.

Pick a second star but this time choose a star in the EAST and about 20 to 50 degrees above the horizon and preferably a similar declination as the original star.

If you do not have an unobstructed view to the EAST, a star in the WEST can be chosen, but the adjustments described below will need to be reversed.

Rotate the diagonal so that you are now standing on the SOUTH side of the mount when looking in the eyepiece.

Orient the reticle cross hairs as you did above.

Place the star on the East-West (horizontal) cross hair and monitor it's movement.

IF the star drifts UP, adjust your mounting in ALTITUDE so that the star appears to move DOWN in the eyepiece field.

IF the star drifts DOWN, adjust your mounting in ALTITUDE so that the star appears to move UP in the eyepiece field.

As before continue to make Altitude adjustments until you can detect no movement of the star off of the horizontal cross hair in 5 minutes.

Summary

If you have followed these procedures you will obtain a decent polar alignment and improve the quality of your tracking and resultant images.

With a little practice, a decent drift polar alignment can be obtained in about half an hour with most common mountings.