

# Commissioning the Moses Holden Telescope

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## SUMMARY

The new CDK-700 telescope at Alton Observatory, named the Moses Holden Telescope (MHT), is still in the process of being commissioned. This entails setting up the telescope in north-south alignment, then the software requires the input of the latitude, longitude and altitude of the observatory. The mirrors must all be aligned, and the telescope must be trained to point accurately anywhere on the sky.

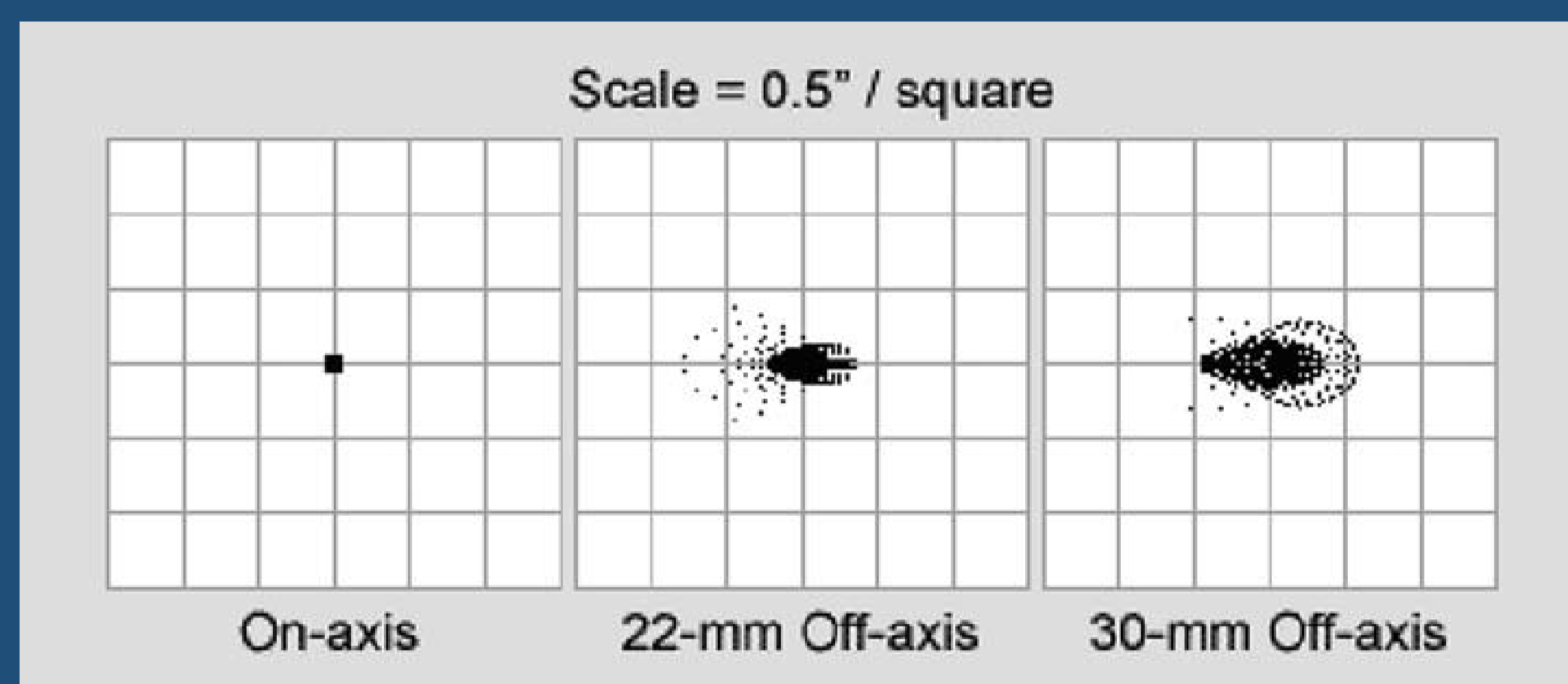
## TELESCOPE POINTING MODEL

The Altitude-Azimuth mount means that to find and track a star the telescope must move in both directions simultaneously, and to track a star accurately requires a very accurate pointing model.

To set up the pointing model it is necessary to locate many stars, one at a time, all over the sky, and to 'train' the telescope to point to them automatically.

## COLLIMATING THE TELESCOPE

The telescope must be collimated, meaning that the alignment between all of the mirrors is perfect.



**Figure 2:** The telescope point spread function after collimation. Note how even 30-mm off axis almost 100% of the light is still within 1-arcsecond square. Ref: [http://planewave.com/wp-content/uploads/downloads/2012/11/amateur\\_astro\\_57.pdf](http://planewave.com/wp-content/uploads/downloads/2012/11/amateur_astro_57.pdf)

## VARIETY OF TARGETS

The telescope can observe a variety of targets, from moons and planets, to nebulae and galaxies.

**Figure 4:** A three-colour image of Jupiter, taken with the MHT, using red, green and blue filters, co-added to make a colour picture. Note how the bands on the planet's 'surface' can be clearly seen in different colours. Jupiter is a gas giant, so the 'surface' that we see is actually the top of the clouds.

Image credit: Mark Norris.



**Figure 1:** A picture of the Moon, taken with the MHT, at the location of the terminator between the night and day sides of the Moon. At this point the shadows are at their longest, and can be used to calculate the heights of some lunar features, such as crater walls. Image credit: Mark Norris.

## TELESCOPE FIRST LIGHT

The first light image taken with the telescope was of the Moon. Since then, images have also been taken of Orion, Jupiter and other objects.



**Figure 3:** The Orion Nebula, taken with the MHT, imaged as a three-colour montage. Blue, visible and red filters are used to take three sets of exposures. These are then co-added to make a colour image. Note how the stars are actually too bright, and are over-exposed relative to the faint nebulosity, seen in various shades of red and green. This is tracing the gas and dust in the nebula, where stars are forming today. Image credit: Mark Norris.

## References

The MHT CDK-700 telescope was manufactured by Planewave, USA.

See:

<http://planewave.com/products-page/cdk700/>

[http://planewave.com/wp-content/uploads/downloads/2012/11/amateur\\_astro\\_57.pdf](http://planewave.com/wp-content/uploads/downloads/2012/11/amateur_astro_57.pdf)

<http://planewave.com/products-page/cdk700/0-7m-cdk-telescope-system/#.VwKa-E32aUk>