

Cell phone app

Photo pills about \$20 – when you are checking out a site, use Photo pills. It uses the phone's camera and overlays an image of the milky way, showing where it will be at any given time and date.

PC/Mac software

Photo editing software – I use Photoshop Elements.

Sequator – sky stacking and processing software (free on PC) (most important app)

Atmospheric - Allows you to know how clear the sky will be on any give day. (free)

Stellarium – allows you to predict where and when the milky-way will rise and set (free)

Other

Moonset times

Weather by hour (weather network is fine)

Need a place pointing south / south-west, that has an **interesting foreground** with access to the horizon.

Gear

Tripod

Release shutter

DSLR/mirrorless camera

Flashlight

Bug spray

Camera settings

If is very dark so know how to adjust your settings by feel ****

Shoot raw not jpg

Manual focus and no stabilization

No in camera noise reduction of any kind

ISO 5000 possibly 4000

White balance about 4000k

Focal length you can use 12 or what ever you need to get the all the sky and foreground you need keep it < 18

Aperture wide 1.8

Shutter speed (see 500 rule below)

Example: I use a 17mm lens on a Canon crop (1.6)

Here is the math $500 / (17 \times 1.6) = 18.5$ secs max. I usually use 15 seconds

Where to focus:.

Hyperfocal distance See <https://www.photopills.com/calculators/dof>

Example: If the foreground is 7 meters away, focus on it. If aperture is 1.8 and focal length is 12 mm then everything from 4.2 meters away to infinity will be in focus

Taking the shots:

Shoot about 12 identical shots of the sky

Then one to properly expose the foreground.

Settings – same aperture, start with the ISO at 1200. Adjust the shutter for the exposure. It may be as much as 4 to 5 min.

Processing:

I take all the sky images and process them in a group with all the exact same settings and save them as TIF files. Do the same with the foreground shot.

I use Sequator to merge, align and denoise all the sky shots.

<https://www.youtube.com/watch?v=ODMMVrL8OrI>

I then use Photoshop. I take the aligned sky shot and layer on the foreground.

It sounds like a lot, but once you go through it a few times it is not that complicated, It just takes an hour so.

THE 500 RULE is a simple formula to calculate proper exposure time / shutter speed with a [particular lens](#), full frame and or crop sensor camera. This formula, if done correctly will produce those pin-point, razor sharp stars with out no trailing in your Milky Way photos or images of the night sky.

HOW TO USE THE 500 RULE

It's fairly a very easy thing to remember and pull off. You take the number **500** and then divided by the focal length of your lens = the longest exposure before stars start to trail or blur. For example; let's say your taking a shot with a 16mm lens on a full frame camera. $500 / 16 = 31.25$ seconds, which you can round to 30 seconds. I'll always run down to the nearest zero.

(NOTE WHEN USING A CROP SENSOR CAMERA YOU HAVE TO MULTIPLY THE CROP FACTOR FIRST BY THE FOCAL LENGTH OF THE LENS BEFORE DIVIDING THAT NUMBER BY 500.)

So obviously if you caught on to the trick by now every lens will have a different length of time you can shoot before you get that unwanted star trailing in your photo