

General Information for Photographing Stars and Milky Way

Basic Photo Gear:

Sturdy tripod – most shutter speeds will last for several seconds so a steady base to capture images as star points without blur by using a tripod.

Lens – wide angle to capture a broad area of the sky and horizon. Examples:- 16mm -35mm, 24mm – 70mm, 16mm, 21mm focal length and able to have a 2.8 F Stop or lower. Can use a higher F Stop (ex. 4.0) and adjust the ISO/Shutter Speed upwards.

Camera can have a full frame or crop sensor. Should be able to make adjustments and shoot in manual mode (ex. shutter speed, ISO, white balance, lens focusing, LCD brightness adjustment, remote or timed shutter release, LENR long exposure noise reduction).

Shoot in RAW vs JPEG and consider using Neutral vs Landscape picture style to capture subtle colors.

Camera settings guidelines:

Shutter speed: depends on focal length being used in combination with the 400 rule or “Star Points Pill” in Photo Pills App. Example of 400 Rule: with 24mm focal length: $400/24\text{mm} = 16.6$ or 17 seconds as maximum length of time for shutter to be open before star points become star trails or egg shaped. If using a crop sensor (1.6x for Canon, 1.5x for Nikon, $400/1.6 = 250$, $250/24\text{mm} = 10.4$ or 10 seconds). Using Photo Pills – refer to Star Points pill and enter the camera, focal length and aperture using the Default mode to get the NPF Rule shutter speed.

ISO: Start with 3200 and move towards 6400. Take a couple of “test shots” at high ISO to check composition. Take an exposure using the 400 rule or Photo Pills exposure time and use a lower ISO than the test shot.

White Balance: 3000-4000 Kelvin. Using auto white balance may lead to missing the color of faint stars.

Aperture: start with widest setting (ex. F2.8), higher apertures (ex. F5.6, 8.0) increase shutter time but may need to be used in combination with lower ISO settings for longer exposures. Wide apertures work with shorter shutter speeds and produce less “star movement”.

Focusing: in darkness, take lens on camera out of auto focus mode, use Live Mode, zoom in on one star using the magnifier for the LCD screen and then use the lens manual focus ring until the star is the smallest point or sharp as it can be. Alternative - in sufficient light for autofocus use the minimal number of focal points to focus on a very distant object and then turn the lens to manual focus (MF) – do not move the focus ring (make a note of the focus distance, use Gaff Tape to hold the focus ring in place or a cell phone shot of the focus setting so it can be set to the same position later if the focus ring is moved). Turn the focus mode to manual (MF). Some newer lens/camera combinations may have autofocus systems that can be used in very low light or contrast. Take a test shot and enlarge the image on you LED screen to check the focus results.

Test Shot: take a photo at a high range of the ISO settings (ex. 3200, 6400) to check composition and adjust ISO to the point that the image is not blown out. Adjust setting for shutter speed or ISO to keep the histogram from being heavily bunched up to the left or right side.

Flashlight: use lower powered light to find your way in the dark and check your camera settings. Be aware of where it is pointed – at the ground and not in another photographer's camera field of view. If you have a red filter for your light, that will help with your night vision but you will also need to keep the red light out of another photographer's camera field of view.

Insect Repellent: recommend that you have insect repellent and dress to cover yourself