

Part 2 IMAGING THE MILKYWAY

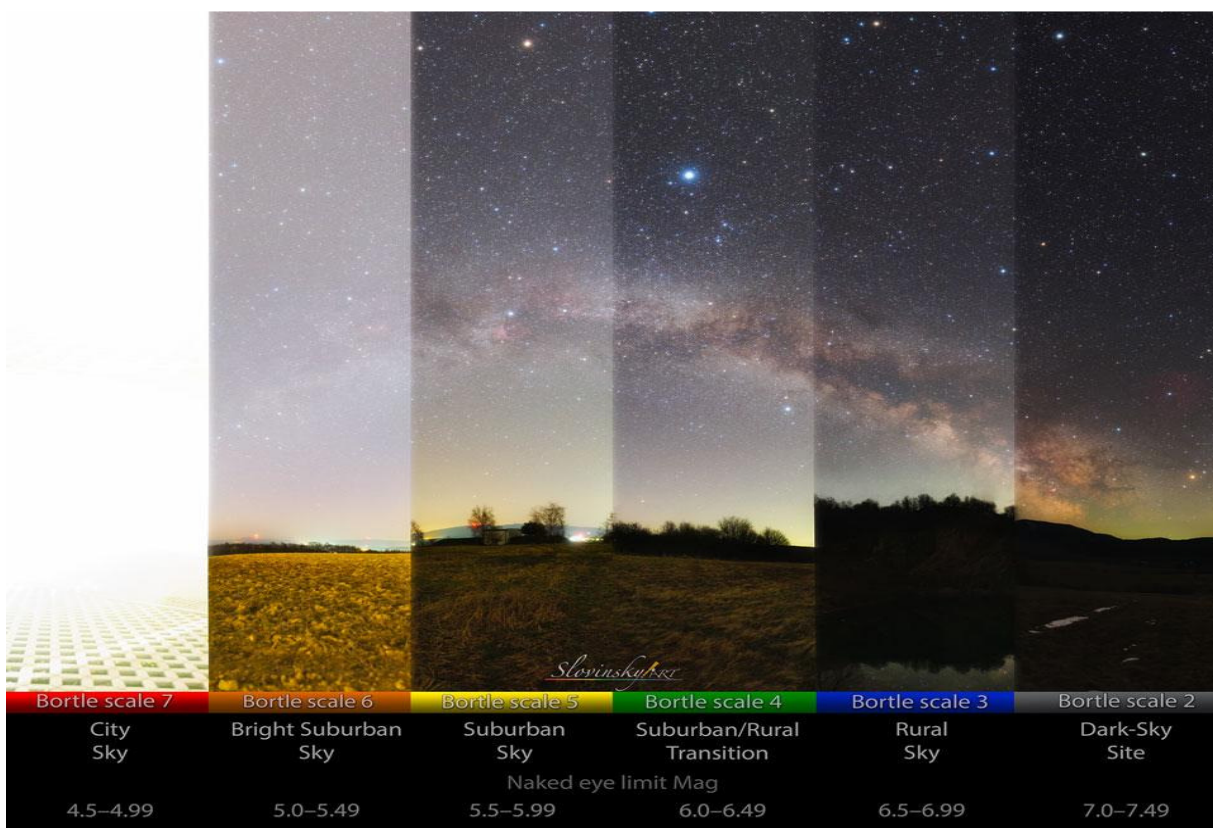
By Pete Scully

For the beginner in Astrophotography, this facet of imaging can be very rewarding, intriguing and thought provoking. Experimentation is encouraged. ***[I consider this paper a basis for astrophotography in general and as we progress with future publications. It will be unfair to “skimp” and will be an injustice to do so]***

The basics are as follows:

Sky Condition (Bortle Scale)

With all aspects of astrophotography, sky condition is paramount. We want clear unpolluted clear skies. The illustration below shows skies with varying Bortle Scales.



We want a sky with a scale of 5 or better. Away from large towns and cities.

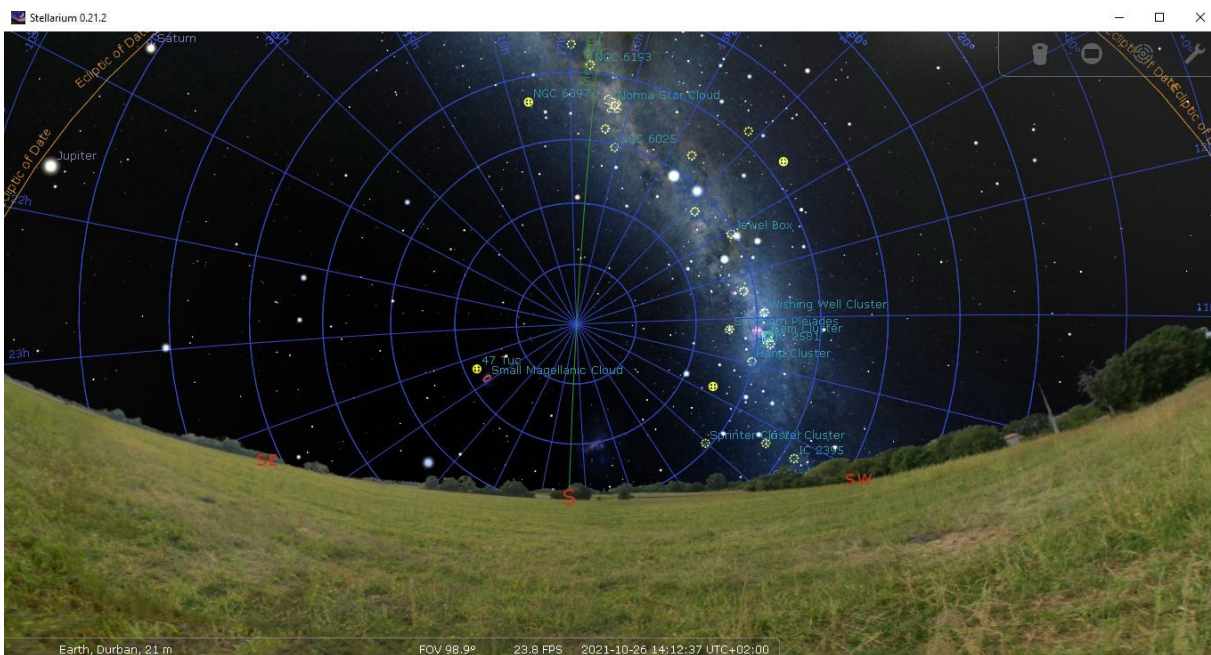
Equipment/Software Required/Recommended

A stock DSLR camera – Nikon/Canon, A suitable lens –A fast wide angle 50mm f1.8 lens – Limited to 10 second exposures. **For longer exposures a 16mm wide angle lens at f2.8 will allow for approximately 30 second exposures. This will be a better option for slightly light polluted skies and is highly recommended.**

A sturdy tripod. A manual external trigger cable, to prevent camera shake, or software controlled.



Suitable software for capturing/processing images. **Planetarium software, like Stellarium (FREE)** will be a great advantage to view the skies and shows positions of the Milky Way.



In Stellarium make sure that your location settings are correctly set. Stellarium is a must to have. It will show you the positions of all celestial objects. Even shows you artificial man made satellite orbits. Will also allow connection and GOTO options for certain telescope mounts. (FREE).

Camera control software like **APT (Astrophotography Tool)** which supports both Canon and Nikon DSLR's is recommended. (FREE)



4 FREE **STACKING** software packages are recommended. DeepSkyStacker, Sequator, Siril and ASTAP. I would recommend DEEPSKYSTACKER to start with. Experimentation is encouraged. Both Siril and ASTAP offer gradient removal.

Procedure

Set up the camera on the tripod. Camera settings:- f- stop as low as possible (f2.8). The lower setting will allow more light collection. Exposure time is dependant on the focal length of the lens. The general rule or guide line is 500/FL, White Balance to 4000k, ISO 1600/6400, RAW images and **MANUAL FOCUS FOCUS FOCUS on a star. I can't over stress this point.** A point of interest, the standard EFS 18-55mm Canon lens will allow for a 15 sec exposure without star trailing. Use the correct Focal Length in the 500/FL rule. A variation of this rule is :- $500/(FL \times 1.6) = \text{time seconds}$. Try either for best results.

For longer exposure times, a motorised star tracker will be required. These allow for tracking of the night sky to takes exposures of several minutes. SkyWatcher and Optolong trackers are recommended. The Skywatcher Star tracker can handle a load of 5kg, allowing for a small telescope to be attached.

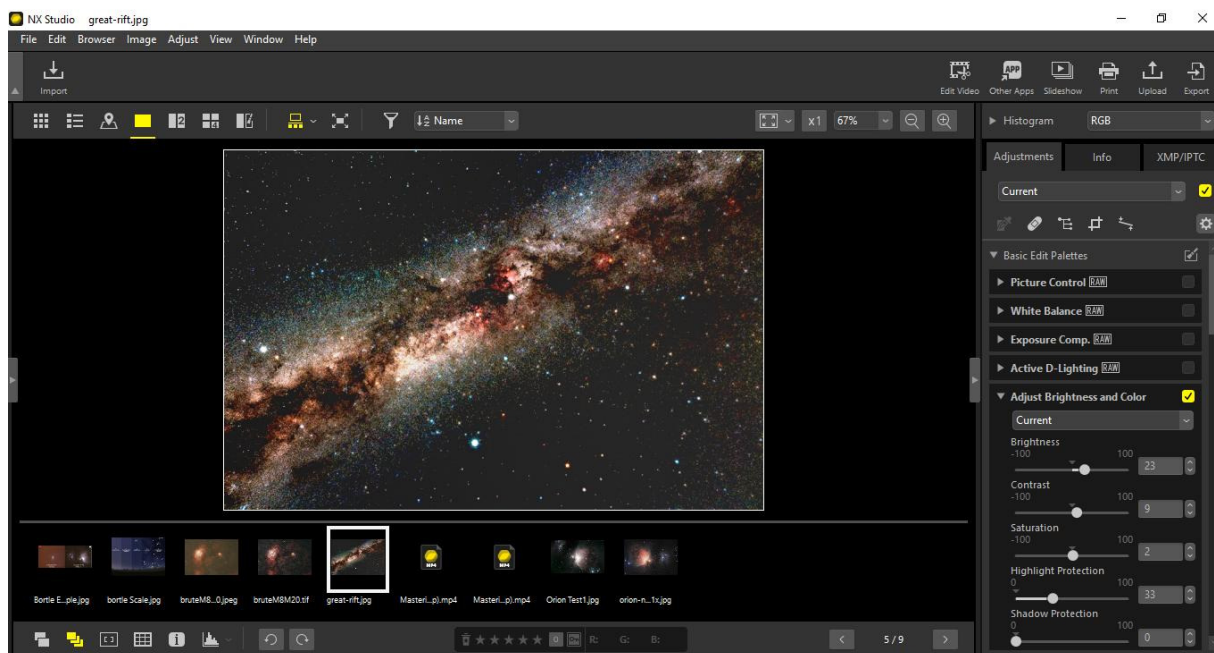
Select your camera control method and start exposing. Take 10 to 20 exposures. Single images can also be taken with very acceptable results. Remember higher ISO's will result in more noise. We will STACK these later. Stacking many images helps reduce high ISO noise.

Pre-Processing / Post-Processing

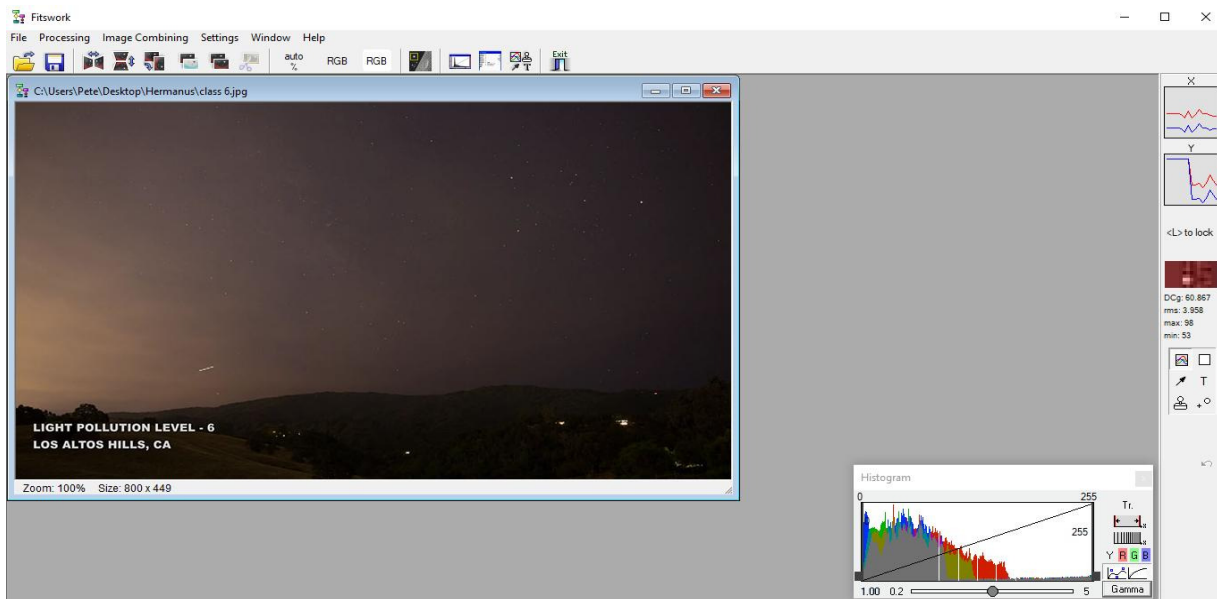
Load your images into the stacking software and Stack. Do any post processing that the software permits within reason. If only one image taken – no need to stack.



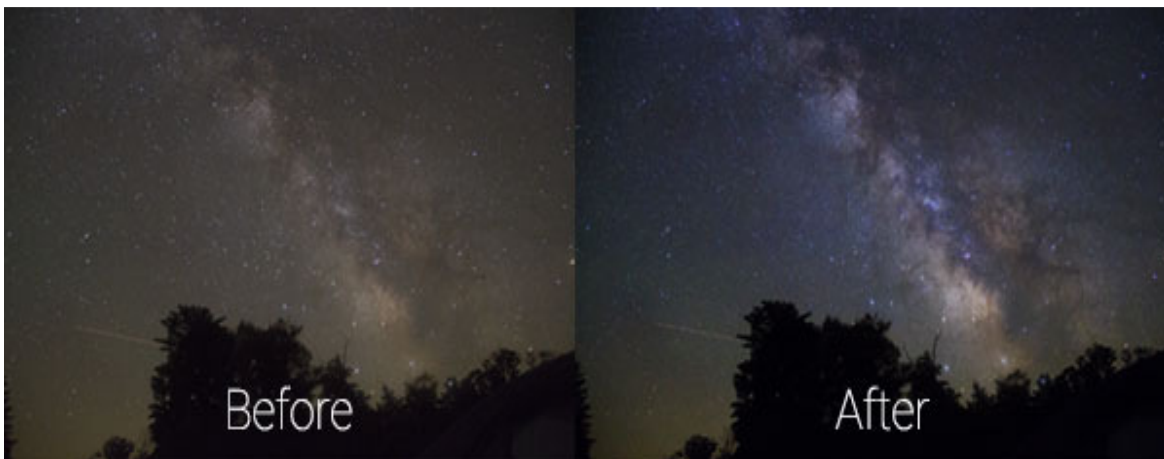
For final Post-Processing, **Photoshop**, **GIMP**, **NX Studio** can be used. The latter 2 are FREE. Or any other software of your choice.



Not very well known but extremely useful and efficient is **Fitswork**. After stacking this software has a very effective manual and auto gradient removal tool. **ALSO FREE**.



Make adjustments to levels, curves, colour tweaks, contrast to bring out the Milky Way details and darken the background sky.



A typical processed Milky Way image captured under Bortle 5 skies is shown below. (6 25sec) with a 16mm lens at f2.8



End of Part 2.

Part 3 in the series will be selecting and using hardware.