

## Part 4 - Introduction To Pre-Processing

By Pete Scully

### Introduction

One can write pages on this subject but essentially Pre-Processing is a process by which your images are brought together to produce your final image prior to the final step of Post-Processing. For simplicity, many call it "STACKING" or "Image Integration" or "Calibration".

The idea behind Stacking is to take a series of images. Lights, Darks, Flats & Bias frames and using "STACKING" software to remove/reduce unwanted noise and other undesirable effects from your images. I find using **Lights** and **Darks** are adequate to produce excellent results. We will concentrate on this only. The reason is that more recent stacking applications also include very important options like "Background Removal", "Gradient Removal", "Colour Calibration" and other Post Processing options. Hence using Flats and Bias frames are not essential.

**Lights** – These are your actual subject images. Take a minimum of 20, generally the more the better.

**Darks** – To remove thermal noise and hot/cold pixels. Take a minimum of 15 at the same ISO and exposure time of the lights. Take immediately after your lights sequence with camera in exactly the same position.

**Flats** – To remove vignette, dust bunnies. Take a minimum of 15.

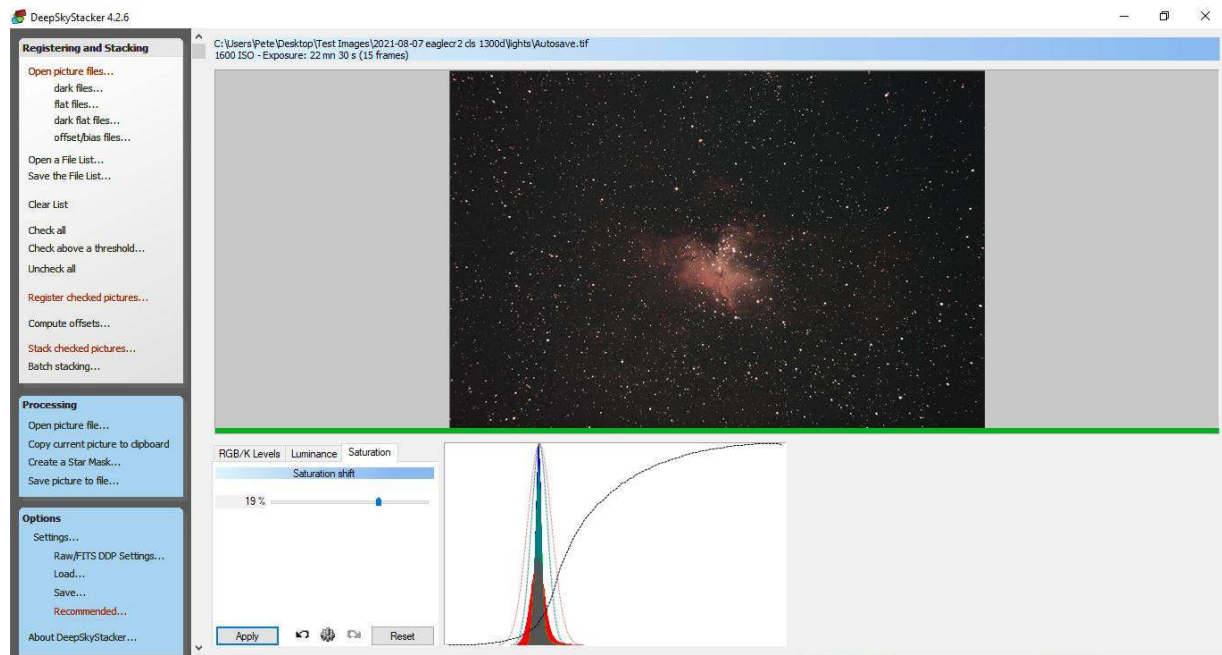
**Bias** – To remove electronic noise the sensor produces. Take a minimum of 15.



## Software.

There are very capable FREE applications available. The best known is DEEP SKY STACKER. A favourite of many. Other packages include Sequator, ASTAP, Siril, Pixinsight and more. What to use is a matter of personal preference and what POST PROCESSING options you have. Let's examine a few selected options each with pros and cons.

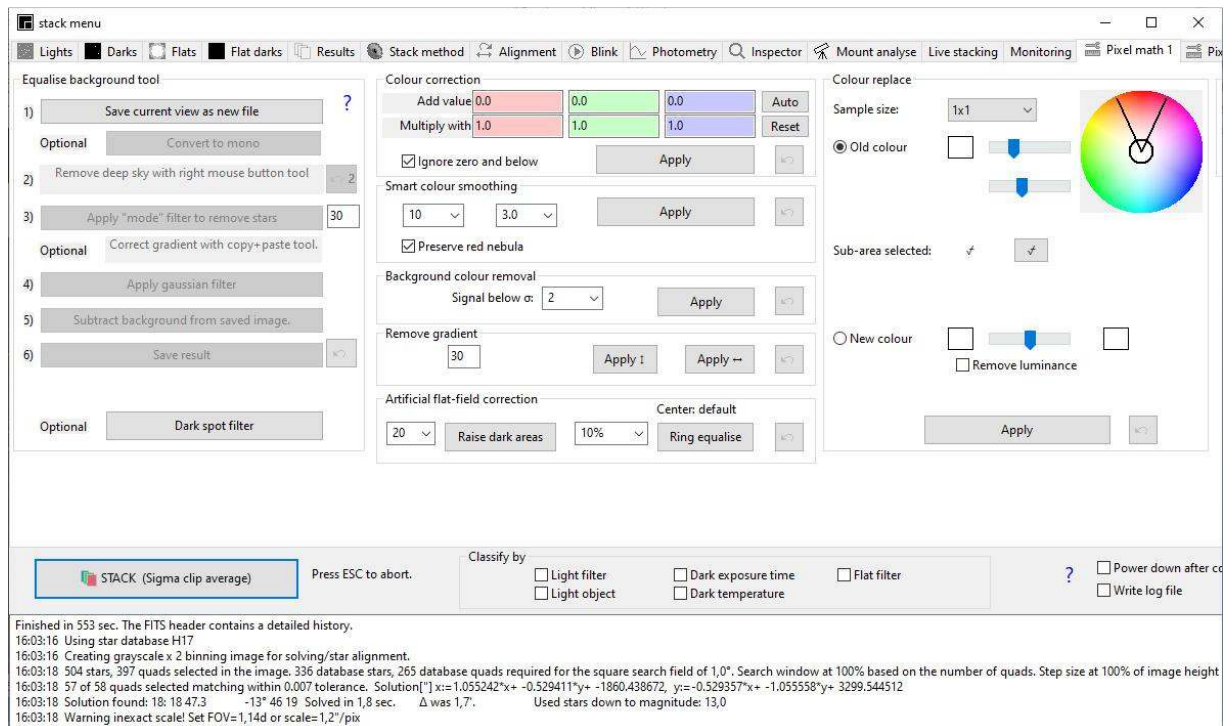
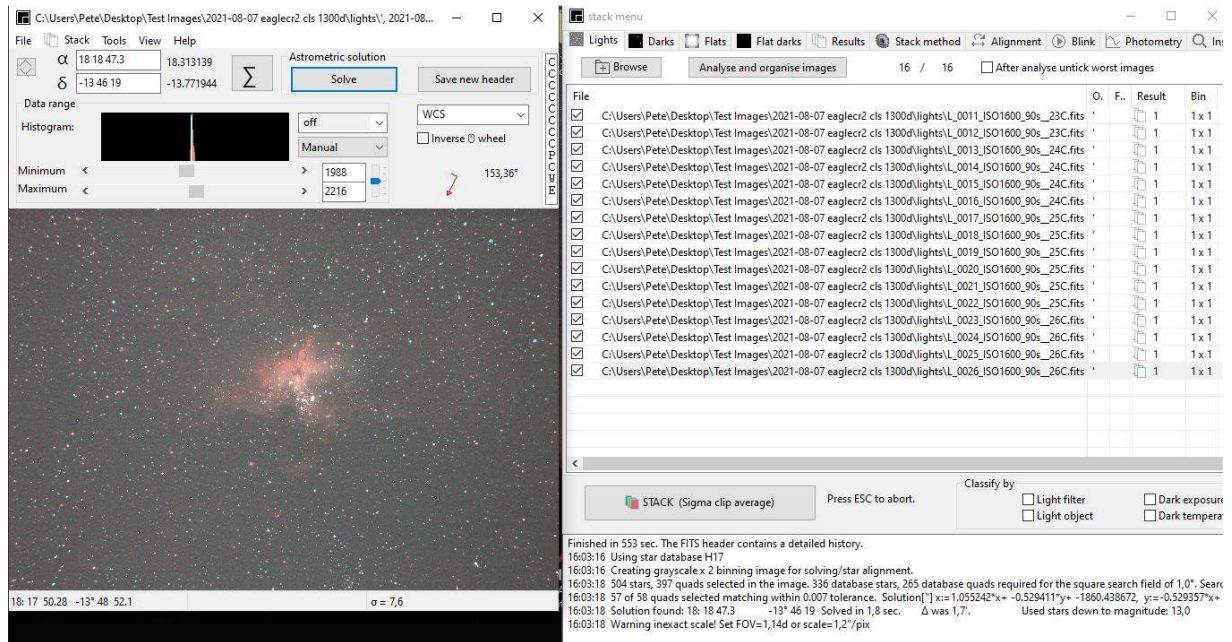
**DEEPSKYSTACKER (FREE)** <http://deepskystacker.free.fr/english/index.html>



This is a very capable stacking software. Very easy to use. Will handle most image formats including DSLR RAW formats. The default settings are more than adequate. There are many YouTube tutorials available to get more acquainted. Limited to stacking only and minor adjustments. Images can be saved with applied or embedded adjustments for final post processing.

**ASTAP** <https://www.hnsky.org/astap.htm>

ATAP is more advanced than DSS. In the pixel maths 1 panel, it allows for Gradient Removal and Background Extraction. Even more exciting, it can do Plate Solving. The star catalogues are downloadable from the site. Below is M16 stacked and plate solved.

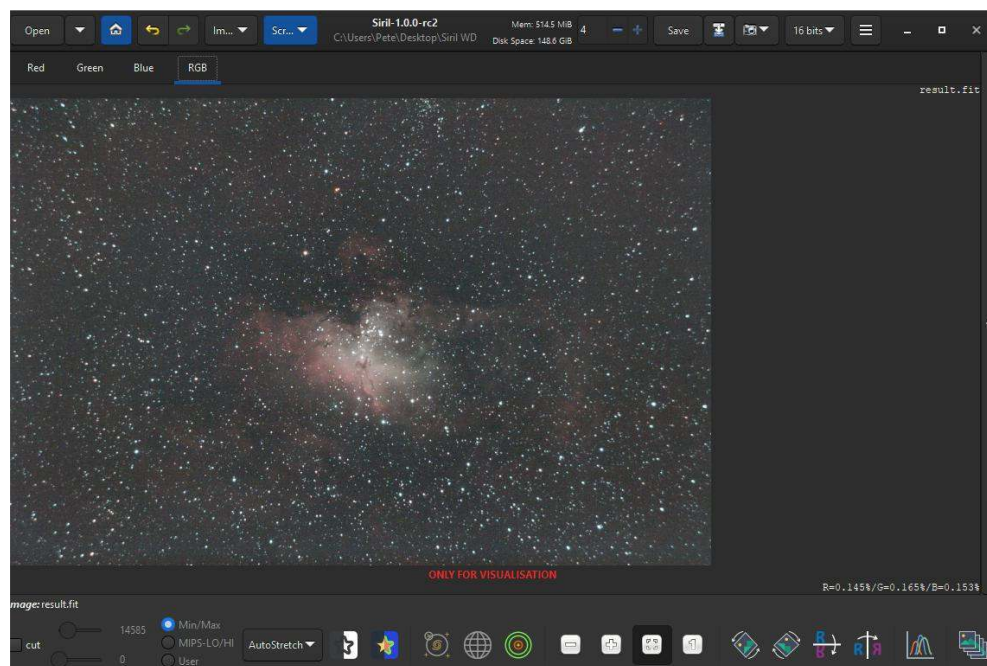
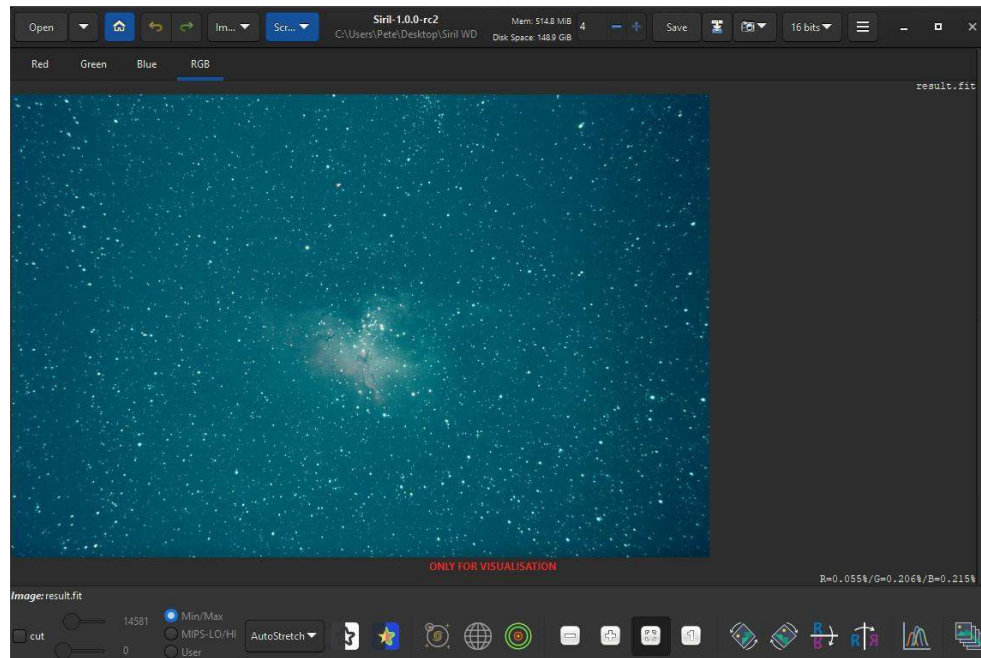


ASTAP has many useful options. Relatively easy to use and actively updated. Many YouTube tutorials available.

**Siril** <https://siril.org/>

This is one of my favourites. A very advanced stacking package. Not only a very competent stacking package but also some advanced post processing options. Can use Manual Stacking or Scripts. Scripts are included and additional scripts are downloadable.

Images/calibration frames are placed in a “working directory” – lights, darks, flats, bias. If only lights are available, a specific script is used. In the image below lights and darks are used with the required script.



A very useful operation with Siril is “Photometric Colour Calibration”. This requires an Internet connection.

**Although this introduction is primarily aimed at Pre Processing, it is sometimes difficult not to touch on POST PROCESSING. In many instances, Pre and post processing are intertwined.**

The image below was taken with a SVBony 305 Pro. (25 x 60sec). **STACKED and Post Processed in Siril**. Minor Tweaks were done in Photoshop. Star spikes were inserted using “Astro Panel Pro” Plug-in. This Plug-in can be downloaded FREE from <https://godownloads.net/astro-panel-pro-6-0-for-photoshop-free-download/>. Spikes may be a bit kitschy for some.



The Background Extraction Tool in Siril is extremely efficient and is comparable with DBE offered in Pixinsight.

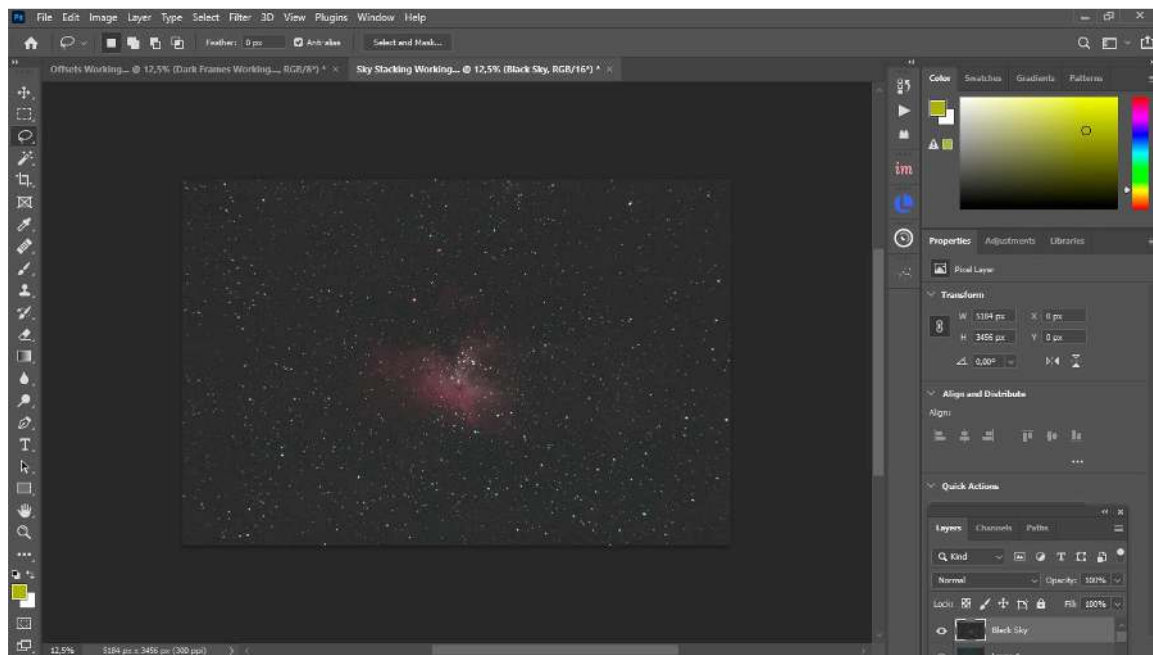
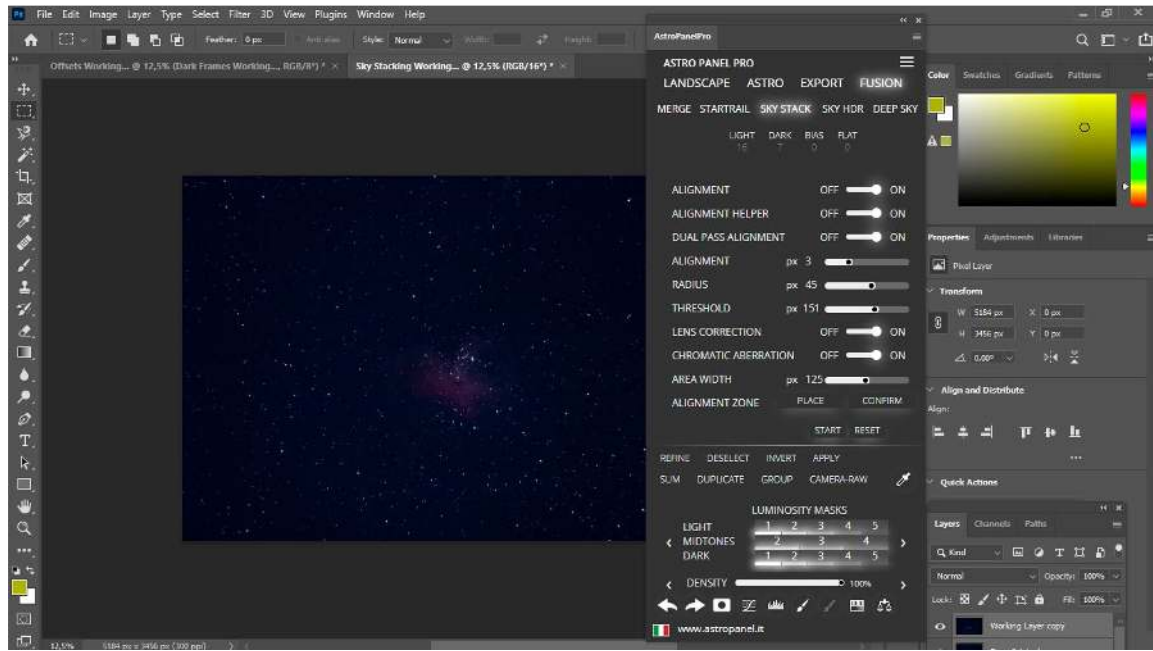
As with most images, debayer of RAW images usually produces images with a green background. This is because of the makeup of the colours in the image. For DSLRs the pattern is RGGB, For CCDs the pattern can be GRBG. In all cases two of the four blocks are Green. Siril offers a Green Removal option to handle the above scenario.

I have not mentioned Photoshop as a stacker. This is because the process is long winded and Photoshop is primarily used as a Post Processing Tool. **But with a Photoshop Plug-in “Astro Panel Pro”** – download link <https://godownloads.net/astro-panel-pro-6-0-for-photoshop-free-download/> - stacking is easy.

### **Astro Panel Pro**

This plug-in is a very competent and easy to use stacking option. In the Fusion Module, select Sky Stack and setup as shown. Prior to start, select PLACE, a small window on the image will open. Goto image – Adjustments – Threshold and adjust. Use the reading in Astro Panel THRESHOLD – 151.

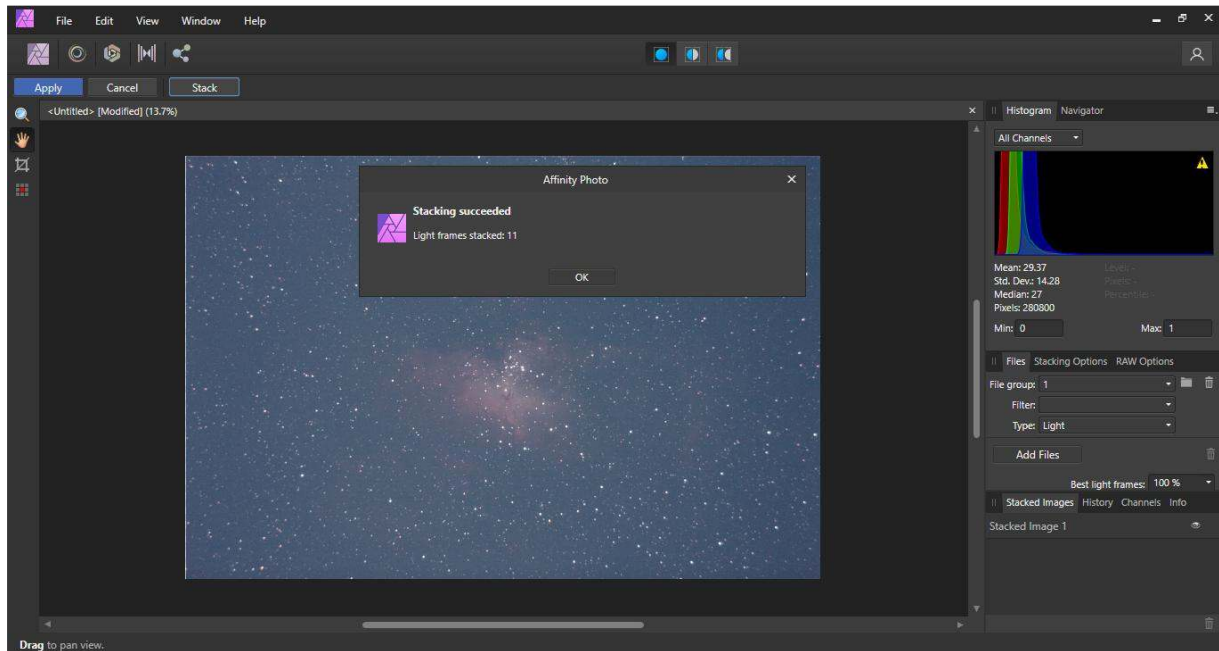
Refer below. I’m relatively new to Astro Panel, but my initial review is +++ . Warrants detailed exploration. As with most good applications, there are numerous YouTube tutorials available.



Last but not least is Affinity Photo. This is a PAID application and comparable to Photoshop

**Affinity Photo** <https://store.serif.com/en-gb/update/windows/photo/1/>

Has a built in stacking option as well as astrophotography tools. One can call it a “One Stop” Processing package.



Primarily used for Post Processing, the Stacking option performs well. To access the stacking option, select File , then New Astrophotography Stack. Will accept DSLR RAW and Fits images. Will load all calibration files.

**Once again, there are many FREE and PAID stacking applications. You are encouraged to PLAY around. My personal opinion, the 3 most worthy of trying are DSS, ASTAP and Siril. All are free and give excellent results. They are perfect for new and "old" astro-photographers.**

**The next issue will be an Introduction To Post Processing. You are welcome to contact me at [cpscully@absamail.co.za](mailto:cpscully@absamail.co.za)**