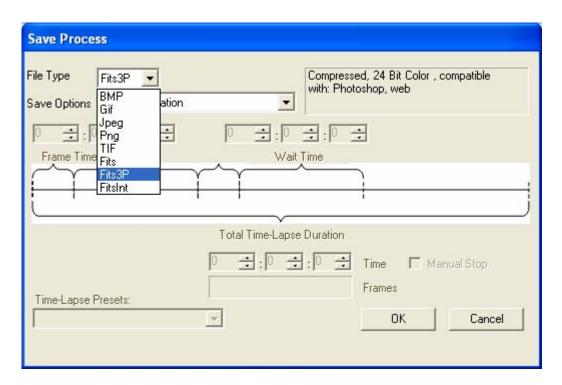
## **Astrophoto Processing Steps**

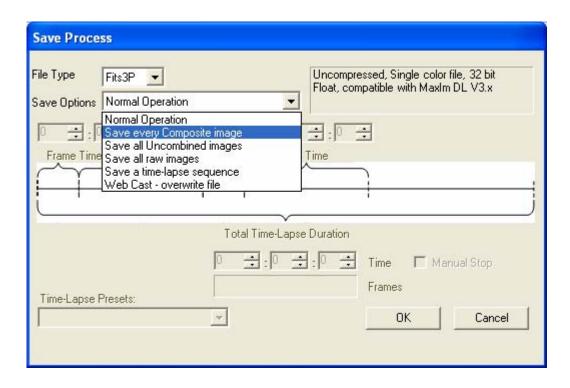
## Part 1

First, before we can process the images we need to know how to capture them properly. If you have not done so already, take the time now to take a series of dark frames. We will need these to remove the noise from each image. Once you have these images, select deep sky from the main window, not drizzle, we will do that step later.

Using the Meade Envisage software set the "Save process" settings to the following:



Choose Fits3P as the image format.



Choose to save every composite image.

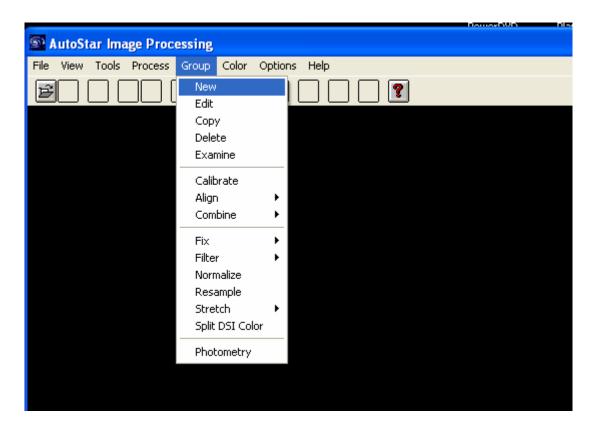
Then in the main window, set your min quality setting to 0 and your evaluation count to 1. Check the dark subtraction check box to subtract the noise from each image. Also leave the combine check box on this page unchecked. The actual image minus the dark frame will comprise the composite image referred to above. Do a preview and adjust the histogram sliders to be sure the image looks the way you want it. Check for excessive noise, sky glow, etc. As long as the dark subtract is checked, the preview should have most of the noise removed. Once you have it right, that's it. Take your images for as long an exposure as you want given your setup. The noise will be subtracted from the final image before it is saved.

Now that you have taken your shots and have the final raw files ready, let's look at how to process them quickly to get some nice quality proofs for editing in Photoshop.

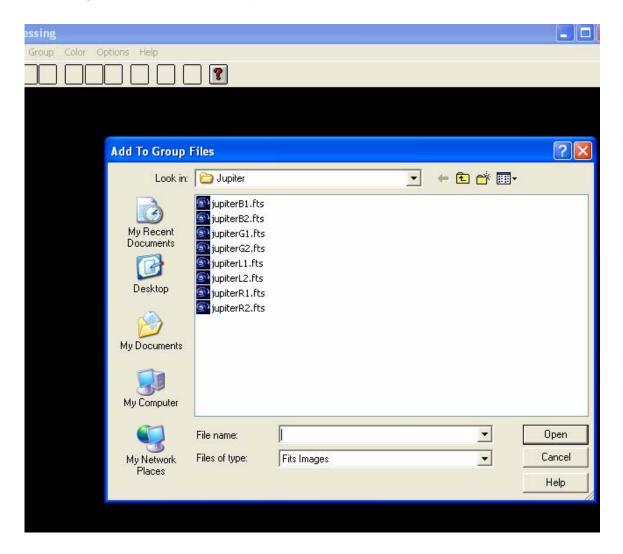
In this first part we are going to start by cleaning up the image and aligning each image to the others.

Let's see how this is done...

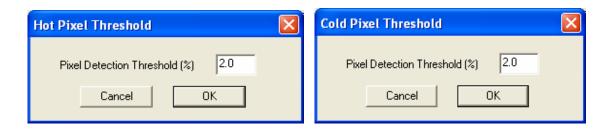
First, open the Autostar image processing software. Then open a new group as seen below:



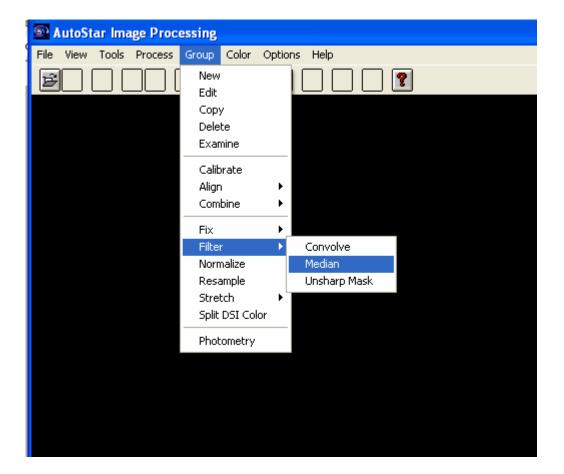
## Select your files and hit Open:



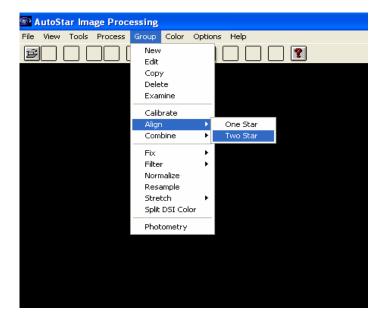
Now it is time to process the group files to clean them up. Start by doing a "fix hot pixels" and a "fix cold pixels" from the "Group->Fix" menu. Do both at 2.0%



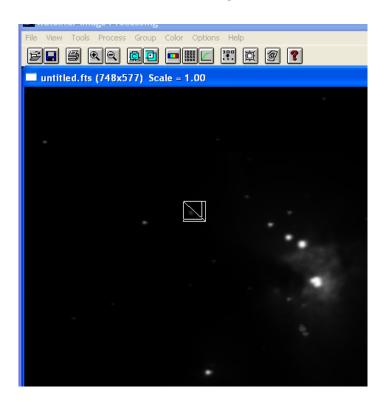
Then perform a median filter:



Next we need to align all images so the stars line up with each other. Do this from the Group->Align menu. You can do a 1 or 2 star alignment but if there are a lot of stars in the image a two star is more accurate.



It should look something like this:

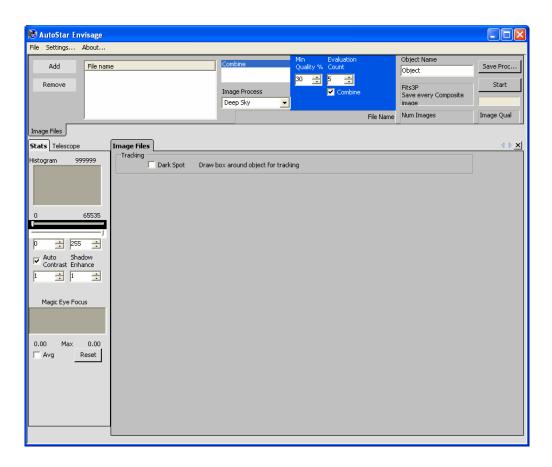


You may notice the stars are duplicated all over the place. This is normal. Pick a grouping that you know is all from one star and highlight the whole group. The software will use this to align the images so that all the stars line up as one. Try to pick a set of stars near but not at the center as this will improve accuracy. In the example above the center of the image is the brighter nebular area at the lower right. The image was cut down to fit here.

Once you have the right number of stars selected the images will be auto aligned. Now you are ready to add them together. It is possible to use the Autostar image processing software to combine but I find that the Envisage software has some added benefits and can be used to reprocess the final shots somewhat.

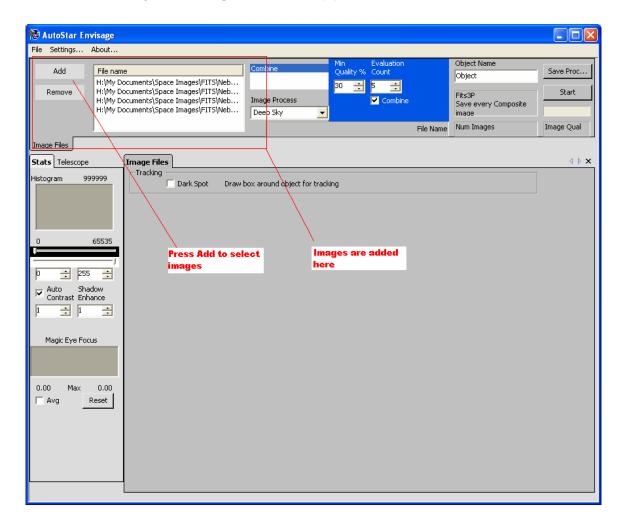
Let's now see how this works shall we? ...

This step can be done without the imager plugged in. We only need the imager if we are actually taking the photos. The rest can be done later without the need for the camera. When you open Envisage without the camera plugged in it will look like this:

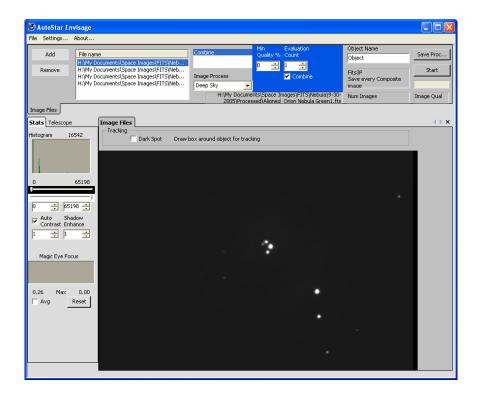


As you can see the imager tab is not there and we can't do dark frame subtraction here but we CAN process the photos like when we are taking pictures. However in this case the process is slightly different.

To start, add your images to the upper left window like so:

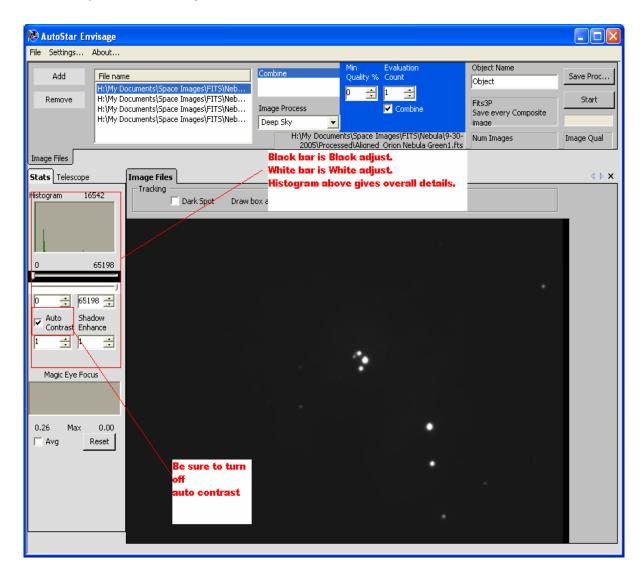


Then select one image, usually the first so we can see it.

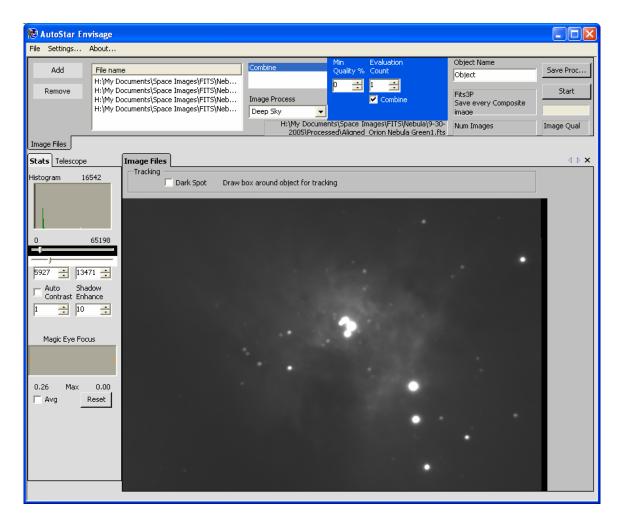


You'll notice here that the image is very dark and we can't see much detail. While we are not too worried about the amount of detail each image has right now, we <u>do</u> need to preview each image to make sure that it is of a useable quality. So how do we improve this? Let's see...

To brighten up the image to a usable level we need to use the white and black balance histogram sliders to improve the visibility of the image:



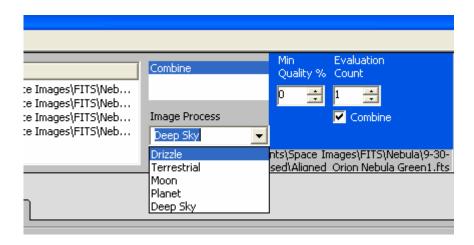
When done it might look like below:



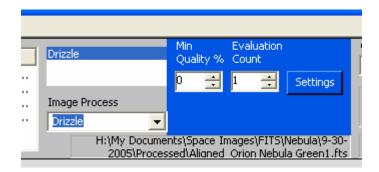
Note the shadow enhance was used to bring out more detail while keeping the center brightness at a reasonable level. Right now the center is much brighter than we might want for the final image but at least we can now see enough details to decide if each image is of a good quality or not.

What we are looking for are streaks, blurs, image ghosting or doubled stars due to image shift. Delete from your stack any such images. You might want to permanently delete them from your hard drive. They will probably never be used if they are of a low enough quality. Just remember the old adage though: once you permanently delete, you can't get them back so choose carefully.

Once you have the images you want to combine we can now set up the processing settings. First off, if you want, you can use the new Drizzle functions to improve the overall image quality on the final image. Do this by selecting Drizzle from the Image Process drop down.

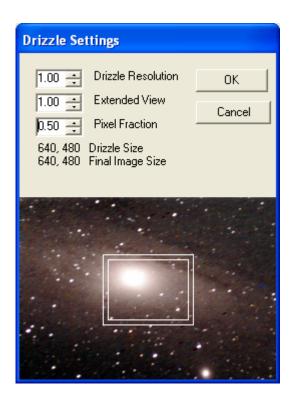


The screen will now look like this:



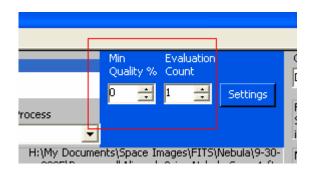
You'll notice the Combine checkbox is gone. That's because the images are combined by default.

There is also a settings button. Click it and you will get this screen:



Set your pixel fraction to a setting of at least what is shown here. Be warned that images of sufficient low quality may cause smaller settings to distort the image excessively. Setting the extended view to any higher settings will not do any good. This setting can only be used when taking images and only with an off axis guider attached. The Drizzle resolution can be used to make your image size larger than 640x480. However, I have found that setting it to higher than 800x600 can cause the same distortion as too low of a pixel fraction. This may not happen though if you apply it when taking the picture as the imager will move the scope for you during the shot. Assuming of course that you have the scope and camera connected.

Now, we need to set two other settings correctly in order to make it use all images and not drop any. The settings should be set as in the following example:



OK, last step in this process is to give our image a name. If you are processing a mono image, I find it is best to name it the object I am shooting plus the color, for example, in the pictures above I was using the Orion nebula green images. So you could say something like "Orion Nebula-Green" or some such. The Software will add a number on the end of the file name to distinguish it in case there are others there with the same name.

At this point we have our settings done right and are ready to proceed. Hit the Start button to begin making the final image.

Repeat all steps so far for each color and save the final images from each in a folder by itself. If you are using color images, reopen the Autostar image processing software and use the "split DSI colors" option on the final file. Autostar will split the four separate color channels LRGB out to individual files. These are the files you are going to import into Photoshop and use FITS Liberator to enhance and colorize to your tastes.

See Part 2 for the Photoshop lesson....