

# Planet Astrophotography with a Dobsonian Manual Telescope

Thanks for downloading my guide to planet astrophotography with a Dobsonian manual telescope. With this guide I hope to explain, how to end up with an image you will be proud of. However, please don't expect to end up with a super image the first time, it will take a lot of practice, patience and clear skies.

Why am I doing this tutorial? Basically help fellow Dobsonian users with the techniques I have perfected in my quest to end up with a worthy image.

## Contents

1. Equipment
2. Software
3. Setting Up
4. Sharpcap Capturing
5. VirtualDub Editing
6. Castrator Editing
7. AutoStakkert Editing
8. RegiStax Editing
9. Gimp/Photoshop Editing
10. End Result

## 1. Equipment



### Dobsonian Telescope with Finderscope

This my Skywatcher Skyliner 200P. You can use any Dobsonian you like as long as it good quality. For this tutorial I will be using the finderscope, however if you have a Telrad or similar finder you can use that.



### Barlow Lens

You will need a barlow of reasonable quality, as this will affect the results. It is best to start with a barlow of 2x magnification, as it will be easier to locate the planet on the laptop.



### Converted Web Camera

This is a Philips SPC900NC web camera. It has been modified by removing the original lens and been replaced with 1.25" nozzle adapter with an IR filter screwed on. This particular webcam has been discontinued and is fetching high prices on online auction sites. However, there are alternatives available for a reasonable price; such as the Xbox and the Microsoft Cinema HD the latter being a bit more tricky to modify. You can find tutorials online, that explain how to modify these three webcams.



### Laptop

Not much to say about this, as long as you have plenty of memory, it is not too slow and a power source if the battery is poor. Make sure all the drivers for the webcam are installed.

## 2. Software

All the software required, is available online for FREE. So click on the links provided and download the latest versions. Even though they are free, some of the websites do accept donations, if you wish to give them a few silvers for all their hard work in producing these excellent programs – go ahead.

There are other programs out there which are similar to the ones listed below. So if you are happy using others that you use already, then feel free to. I use these as I'm most comfortable with and happy with the results I achieve from them.

Sharpcap <http://www.sharpcap.co.uk/>

VirtualDub <http://www.virtualdub.org/>

Castrator <http://www.astrokraai.nl/castrator.php>

AutoStakkert!2 <http://www.autostakkert.com/>

RegiStax 6 <http://www.astronomie.be/registax/>

Gimp <http://www.gimp.org/> or Adobe Photoshop CS (not free)

## 3. Setting Up

Before you can start capturing videos of your chosen planet, you will need to go through a few checks. Firstly, make sure the finderscope is aligned with the main scope and secondly that the scope is collimated. If you are unsure how to do these, you can refer to your telescope user manual, or there is plenty of instructions around online.

On your chosen night for capturing our solar system neighbours, you will need to take the telescope outside an hour before you intend to use it. This so the whole thing can reach ambient temperature, thus avoiding any distorted images.

Whilst the telescope is cooling down, you can gather everything you need for the night. You will need a stable stand or table to place the laptop on, which will need to be positioned next to the telescope. Whilst still inside, turn on the laptop, so that if it needs to do any virus scans or Windows updates etc. they will be finished by the time you want to start capturing. Have the webcam and barlow ready to hand. Dig out some gloves, hat, jumpers and coat especially if it's a particularly cold evening.

On your laptop, go to wherever the video documents are kept and create a new file, for example, this tutorial so I shall be capturing Jupiter, so I will rename the file - Jupiter 2Feb13

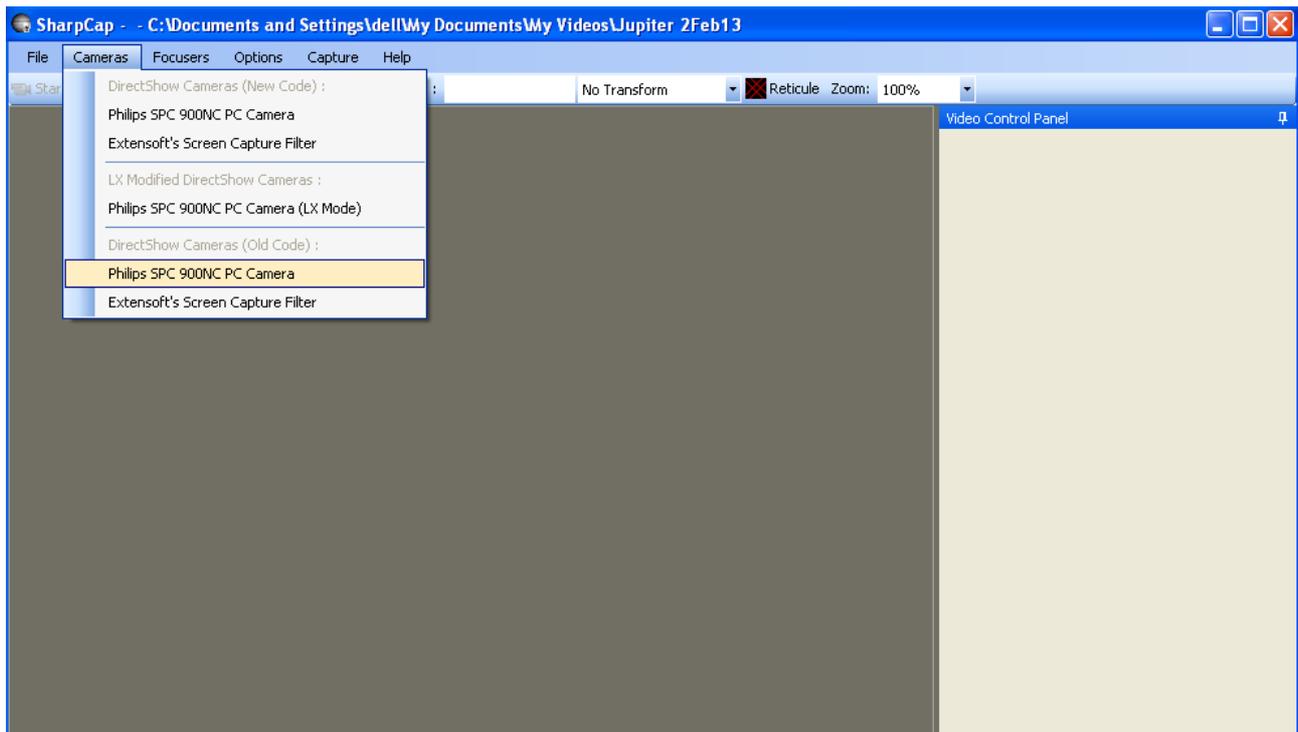


When the hour has passed you can then, take the laptop, barlow and webcam outside. Attach the barlow lens into the focuser tube and the webcam into that and plug into the laptop. Now you can begin to capture.

## 4. Sharpcap Capturing

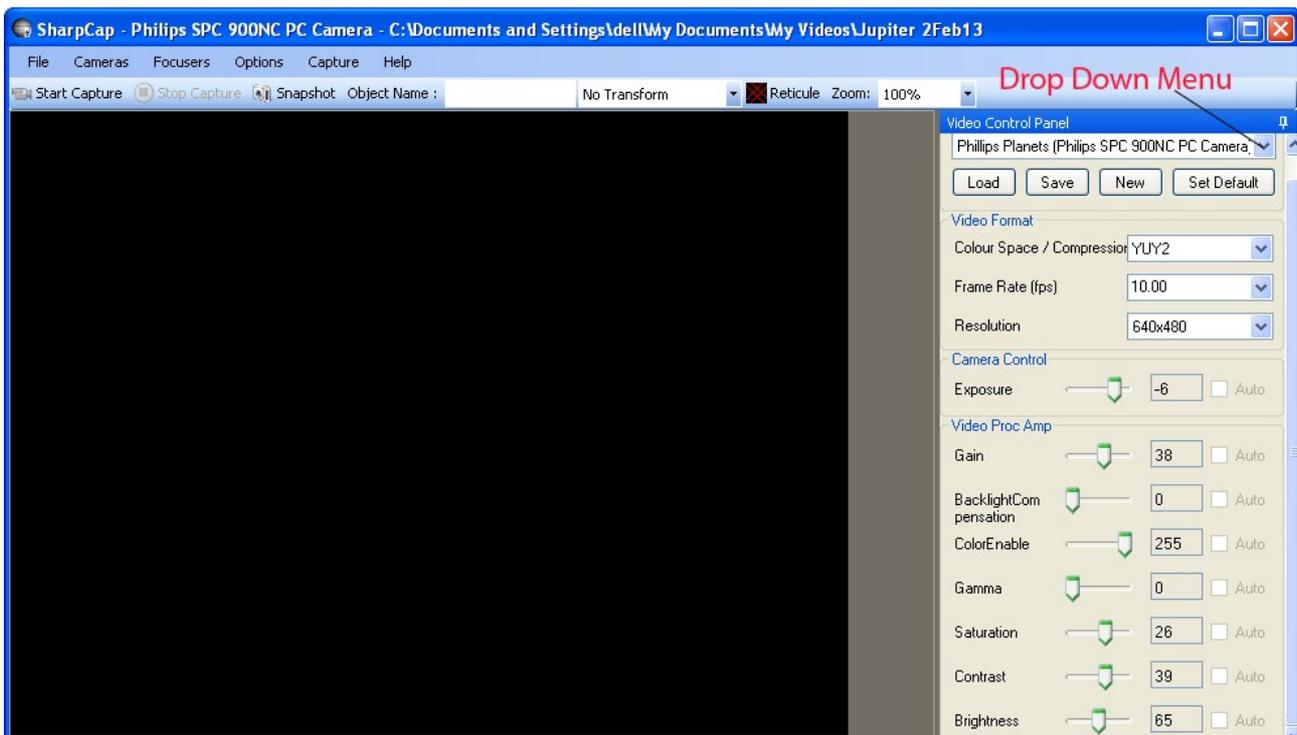
*There are tutorials on how to use Sharpcap on Youtube so I will not be going into a great detail regarding settings for this program. These guides can explain in a lot more detail than I can in this written tutorial, I suggest checking these out before progressing further.*

1. Open Sharpcap and select the camera from the **cameras** menu.



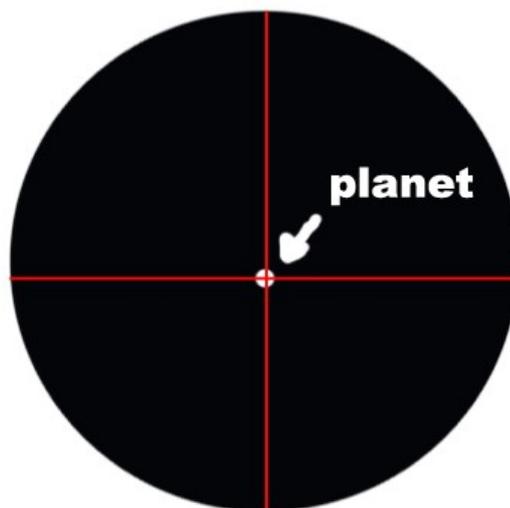
2. Select the **set capture file** from the **file** menu, this is the folder you created earlier, mine was - Jupiter 2Feb13. This is where all the saved videos will be kept.

3. Select your capturing settings from the drop down menu and load this.

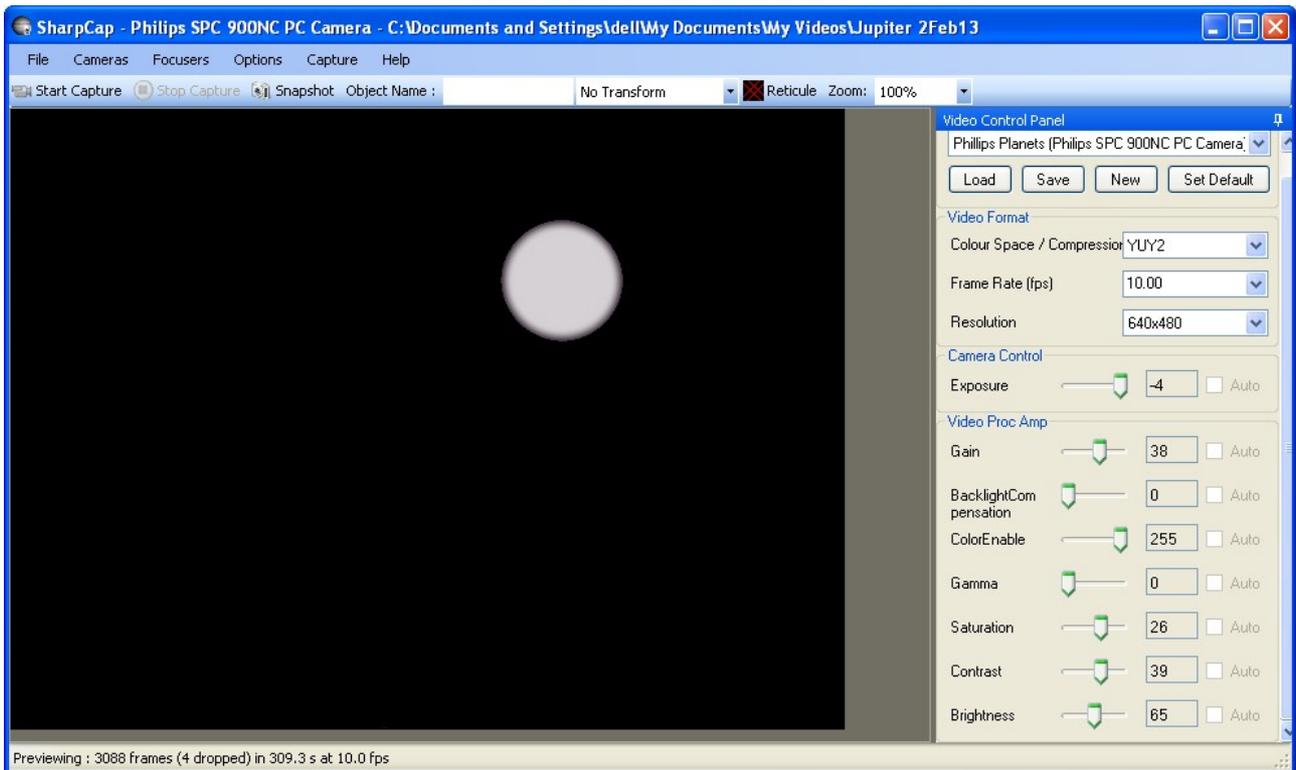


4. We want to find the planet easily on the Sharpcap screen so we need to slide the exposure setting to the lowest figure. This will make the planet a white blob, that will make it easier to find and to focus too.

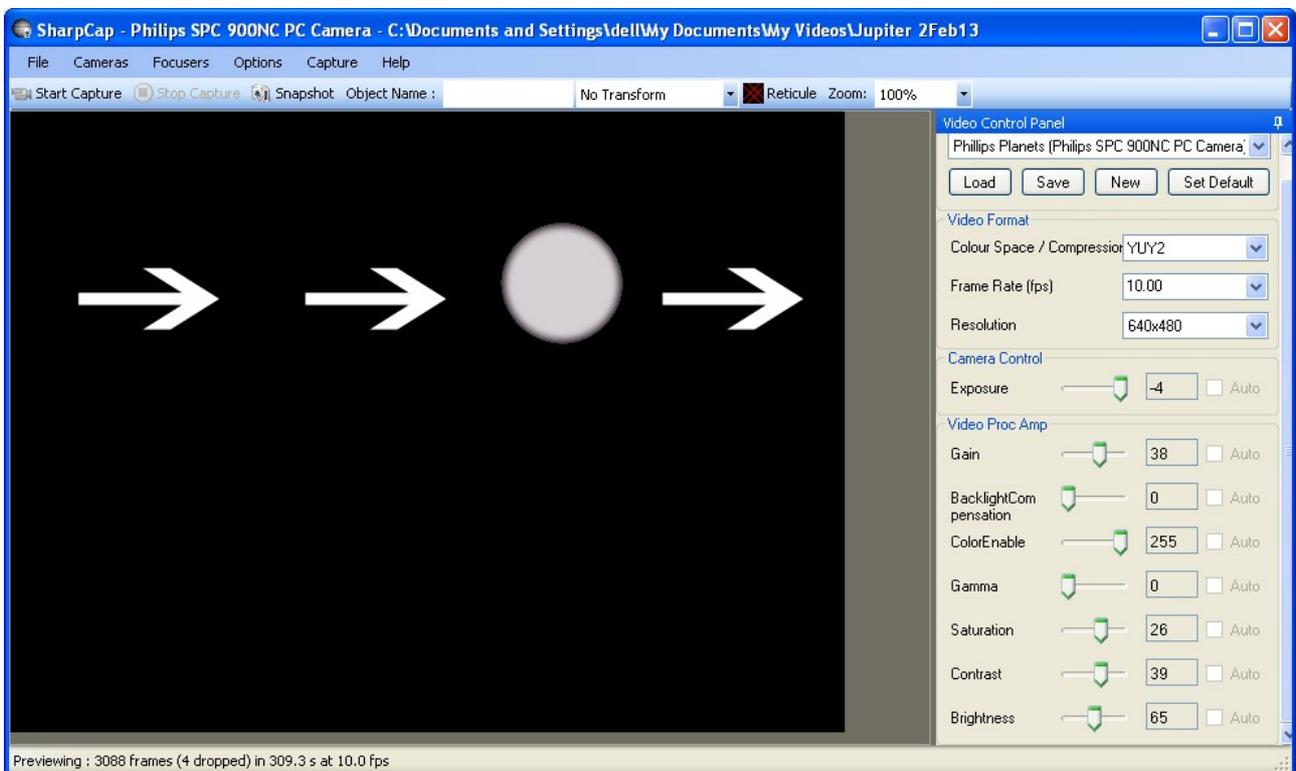
5. Providing your finderscope is aligned to the scope as perfect as you could earlier, the following should cause not too much trouble. Find the planet in the finderscope and centre it in the cross-hairs.



6. With one hand on the telescope focuser, the other on the scope and your eyes on the laptop, move the scope very, very slightly left, right, up, down etc. till you see what resembles a white disc. Once you found it adjust the focus till its nice and sharp on the screen.



Did you see which direction the planet was drifting across the laptop screen? We want the planet to drift from left-to-right on the screen.



7. To do this, loosen the webcam in the barlow lens and get the planet visible on the screen again, let go of the scope and turn the webcam until the planet drifts left-to-right and re-tighten the webcam in the barlow lens.



8. Get the planet onto the laptop screen and look through the finderscope and make a mental note of where the planet is positioned. This is the critical point you want for the arc of the planet to drift into. For example as detailed below.

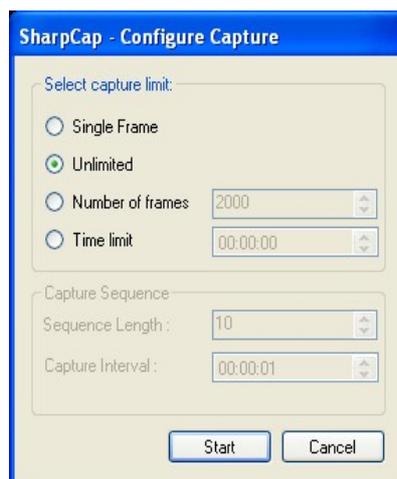


9. The next bit is really trial and error until you find the correct path. Looking through the finderscope, point the planet at the critical point then move the telescope so the planet is slightly right and up from the critical point. Let go of the telescope and look through the finderscope and watch the planet drift towards the critical point, once it reaches the critical point, take a look at the laptop screen. Does the planet appear? If not, you will have adjust the drift path so it hits the critical point dead on. This will take a long time to master, it took me many evenings just to get the hang of it – some evenings even now, it just doesn't happen.



10. Set the planet drifting across your screen, and quickly adjust the SharpCap settings. Reduce the exposure so you can see planet details and adjust the other settings if need be, till you are happy with the on screen image. You may need to drift a few more times till the settings are complete.

11. Click on the **start capture** button and use these settings when the window pops up. Don't press start just yet.



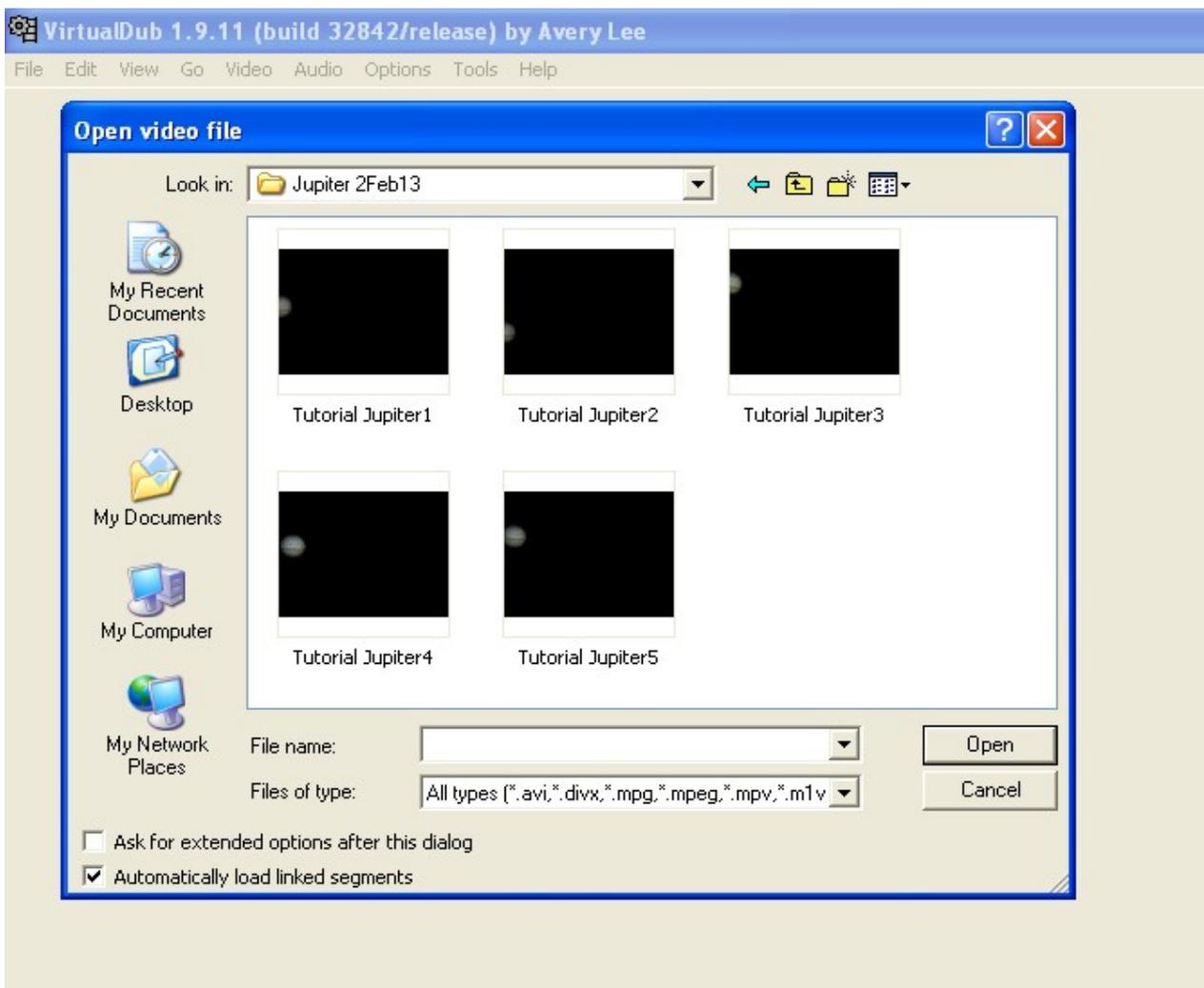
12. Set your drift path and once the planet appears on the screen, hit **start**. MAKE SURE THE PLANET IS 100% VISIBLE, EXCEPT WHEN IT IS ENTERING AND EXITING THE SCREEN. Once the planet leaves the screen on the right hand side, click **stop capture**. Repeat this process and aim to capture at least 15 good videos. Don't touch the telescope whilst you are capturing. When this is done, bring all the kit back inside.

## 5. VirtualDub Editing

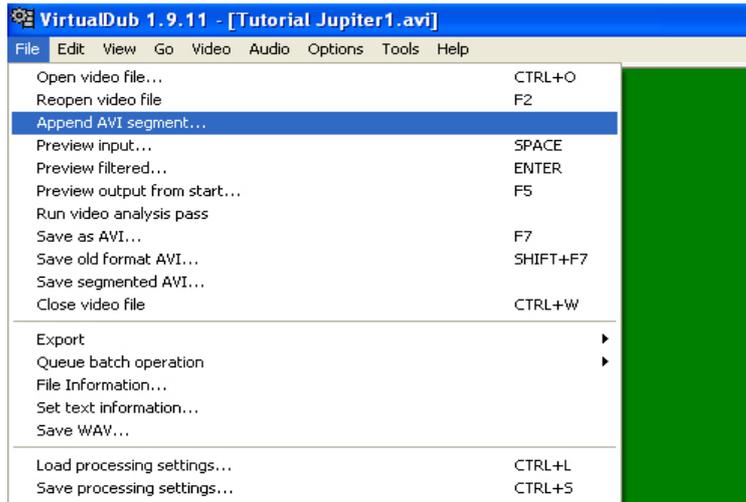
1. Open up the VirtualDub software and click **file**, then click **open video file** and find the video folder that you created earlier, where all the Sharpcap videos are stored and click on that.



2. Double click the first video - that will open up in the VirtualDub screen.



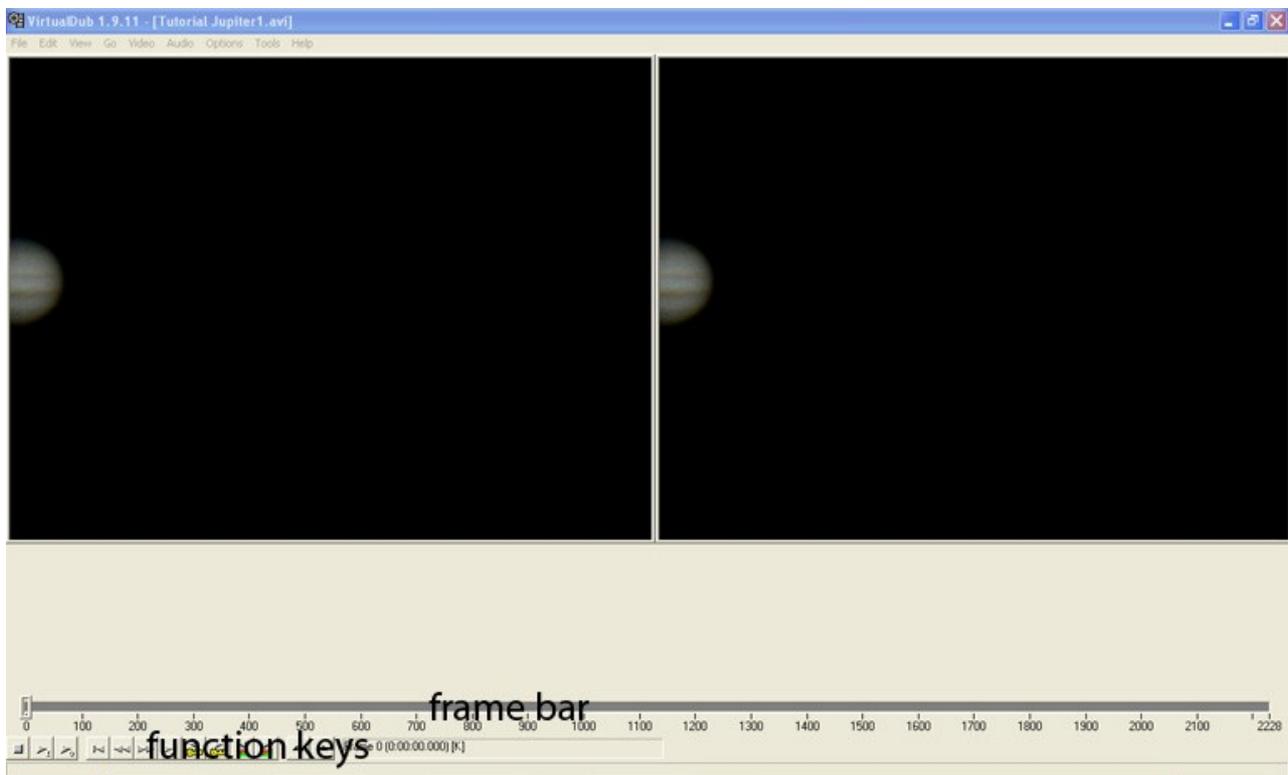
3. Next, you need to add on the second video to the back end of the first. To do this, click on **file** and click **Append AVI Segment**.



4. This will bring up the video folder again, so double click on the next video and this will be added to VirtualDub. Repeat this for all the remaining Sharpcap videos.

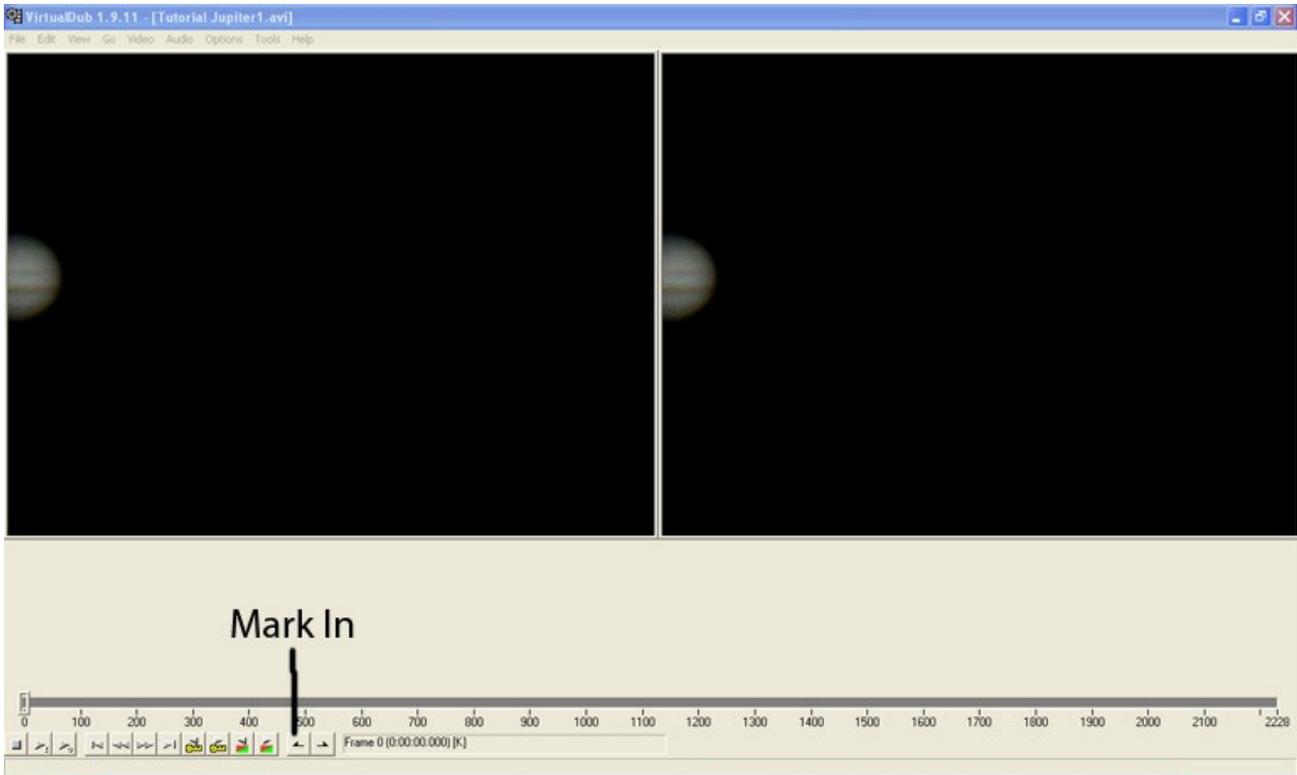
Once you have added all the Sharpcap videos to VirtualDub, you can now begin to edit them. This is so you can remove frames where the planet is not 100% visible on the screen and any bad ones, from poor seeing, cloud etc.

At the bottom of the screen you will see a line stretching right across, this is all the frames from the videos you have loaded up. Underneath, are the function keys.

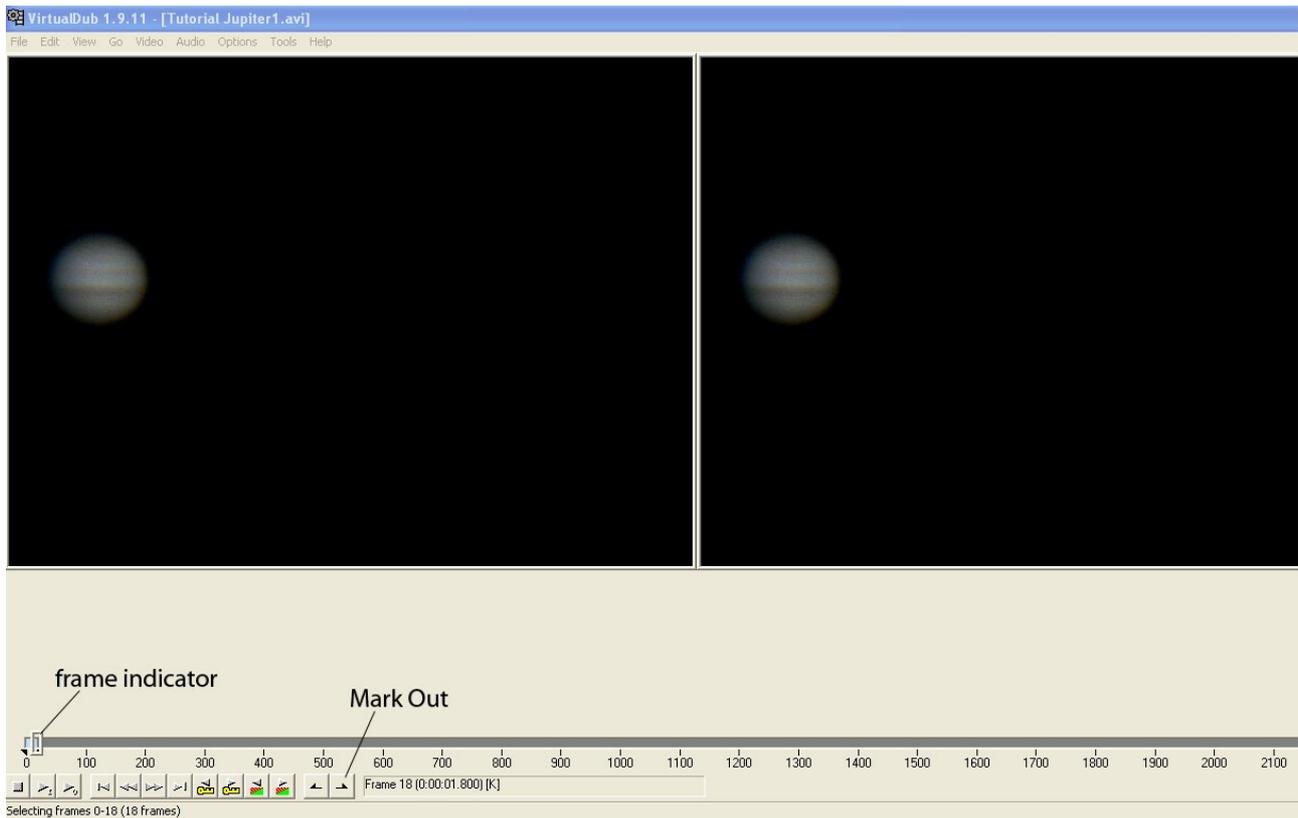


As you can see from the above screen, Jupiter is half visible on the screen, this is the first frame of the first video we loaded up. This is no good, we want the planet 100% on the screen at all times, so we need to delete this section out.

5. At the start of a bad frame or section of frames, click on the **Mark In** button, this will tell VirtualDub that this is the start of where you want to edit frames.



6. Next click and hold the frame bar sliding indicator and slowly slide this along the bar, you will see that the video above, moves. When the planet is 100% visible, release the indicator square and click on the **Mark Out** button.



On the frame bar you will now see that this section is in a different colour, we want to delete this bit.

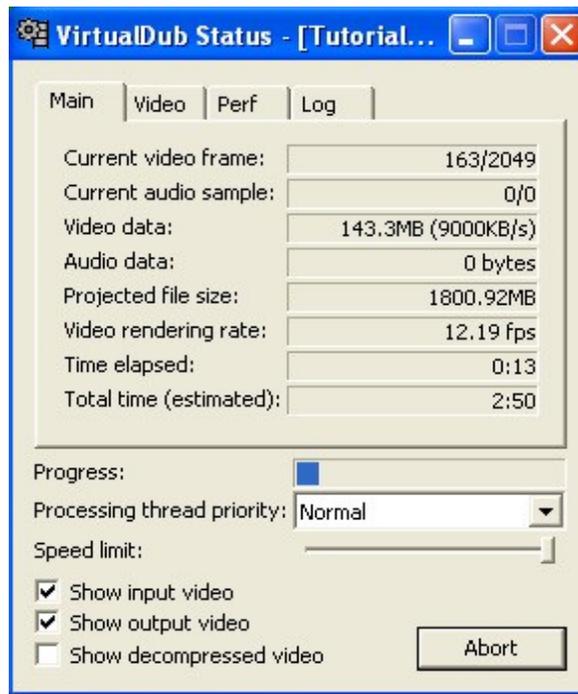
7. Go to the top of the VirtualDub screen, click **edit** and then click **delete**. That section of the video is now gone.

8. Next, click and hold the frame indicator square and slide slowly across, the video will progress and the planet will move to the right. On the last frame where the planet is 100% visible, click the **Mark In** button and slide the indicator until the planet reappears on the left (commencing the second video). Continue sliding till you see 100% of the planet and click **Mark Out** and delete that section as before.

9. Repeat this process for the remainder of the videos and you can use the same technique to remove any bad frames in-between too.

Once you are sure, you have removed all the bad frames and the planet is 100% visible on the screen at all times, you can save it.

10. At the top of the screen, click **File**, then **Save as AVI**. Find the video folder where you saved all the Sharpcap videos to and then name the edited VirtualDub video to what you want i.e. VD Jupiter and click save. A box will pop up like this and display all the details and progress of the save, it can take some time, depending on the amount of frames to save.

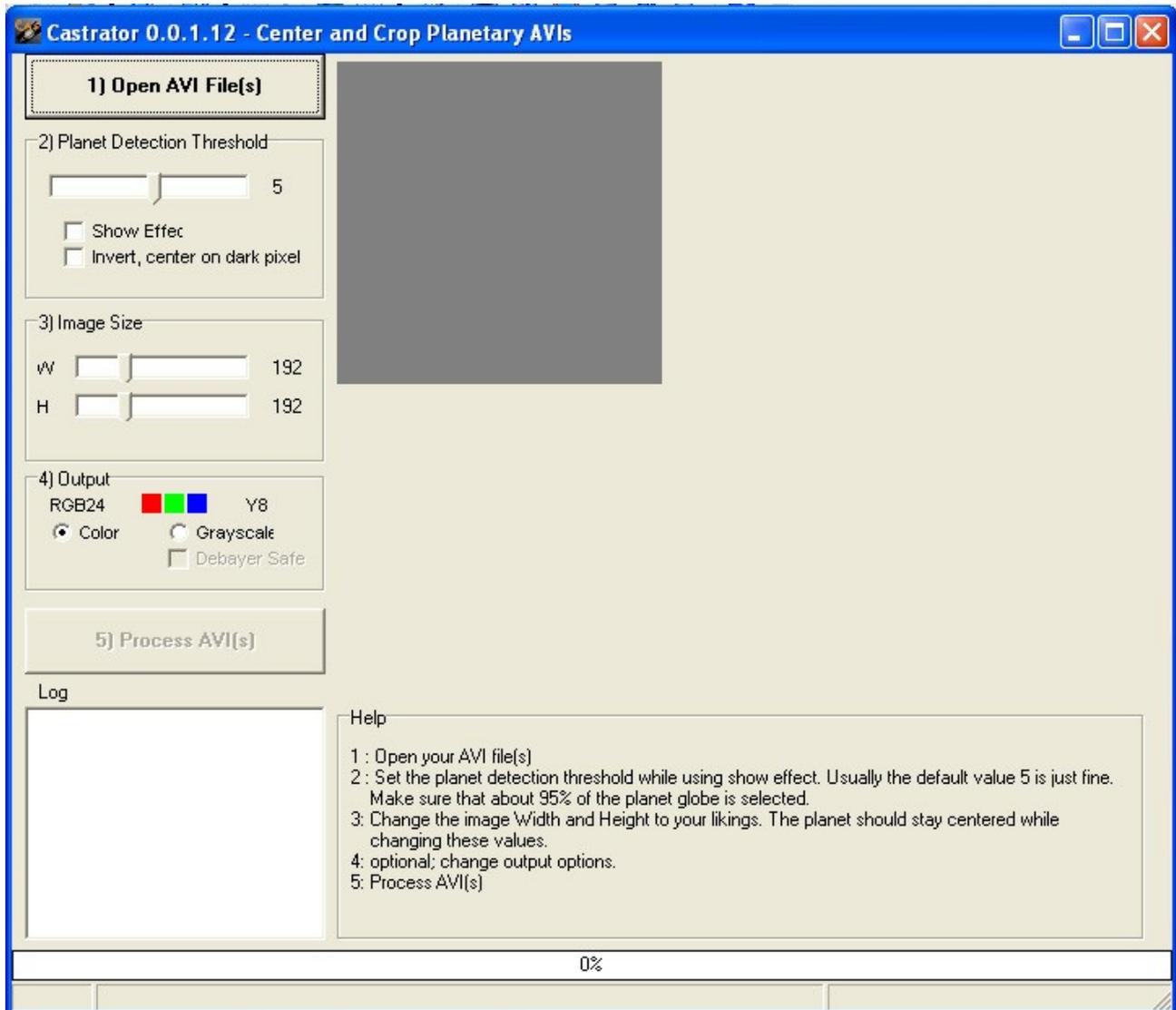


Once it has saved we can move on to the next section.

## 6. Castrator

With the planet jumping all over the place in the video, this will lead to poor stacking later on. So want to centre the planet in one place.

1. Open the program and leave the settings as they are displayed here.

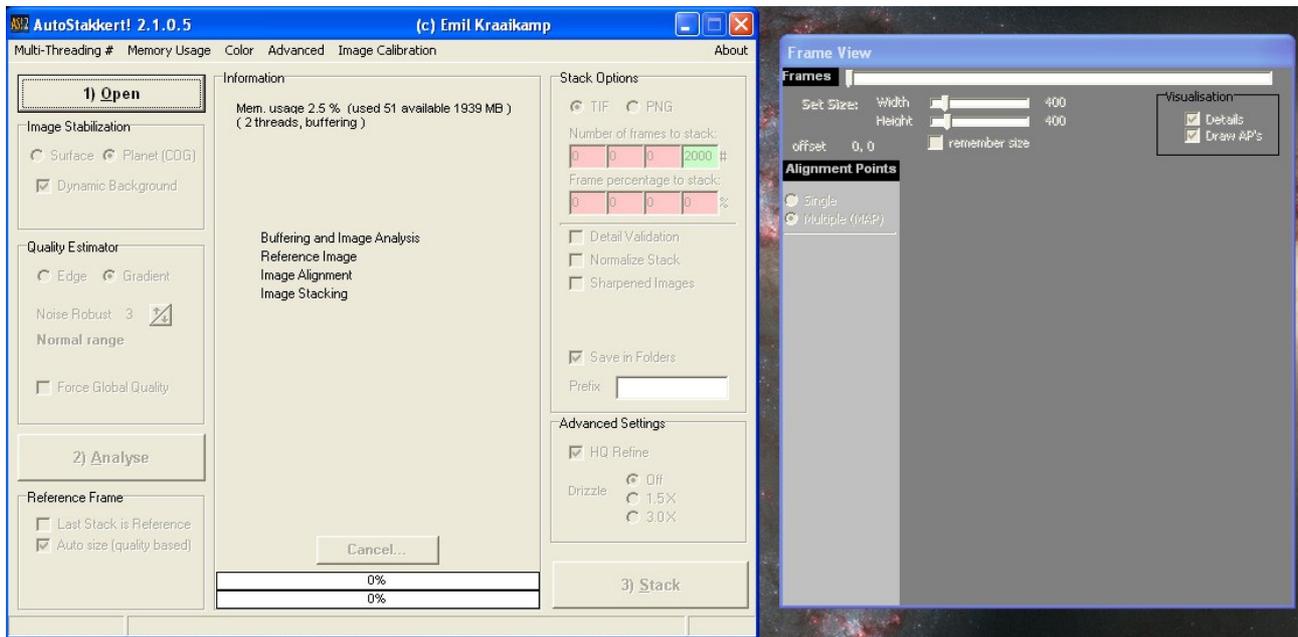


2. Click on the **Open AVI File(s)** button and find the edited VirtualDub file and open that. Next click the **Process AVI(s)** button. It will take a few minutes to complete, once done, it will automatically save a file in your folder called, for example 'VD Jupiter\_Castr'

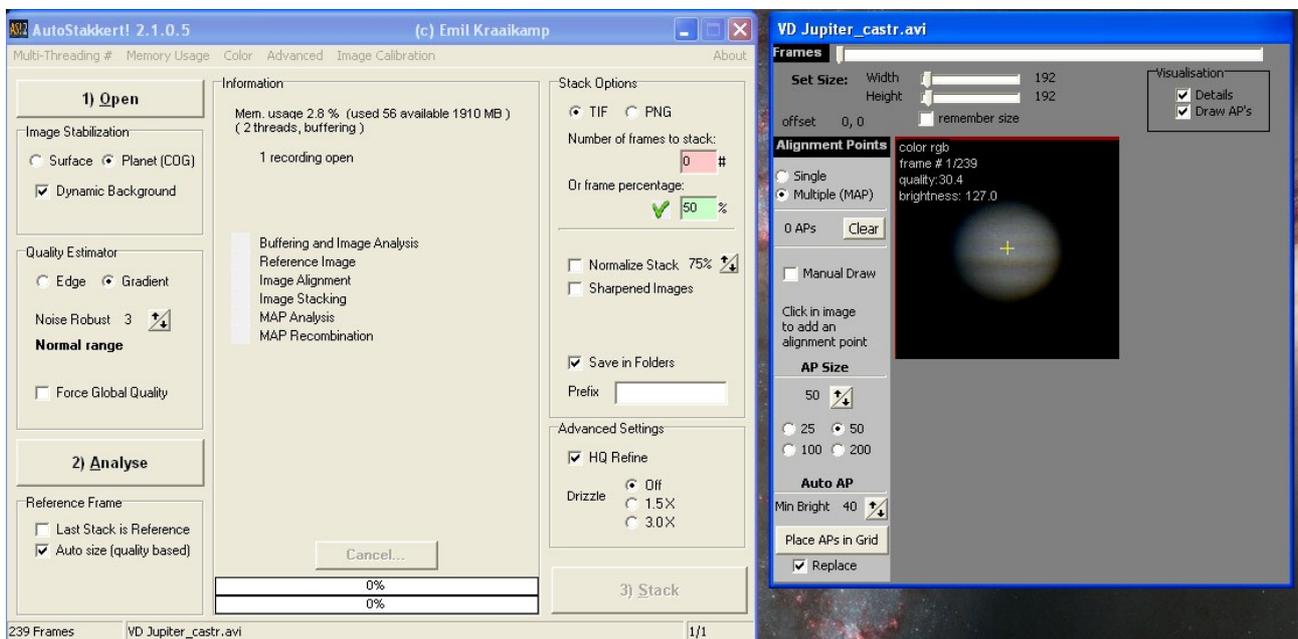
If you want, you can open this file in Windows Media Player or whatever you use to watch videos and look at what Castrator has done. It is also useful to see if there is any missing or bad frames you may have missed earlier in the VirtualDub editing.

## 7. AutoStakkert Editing

1. Open up the AutoStakkert program, you will see two separate boxes pop up as below.



2. Leave all the settings alone for now and click on the button that says **Open** and find the file you created in Castrator earlier – open the file up and the screen will now change to something like this.



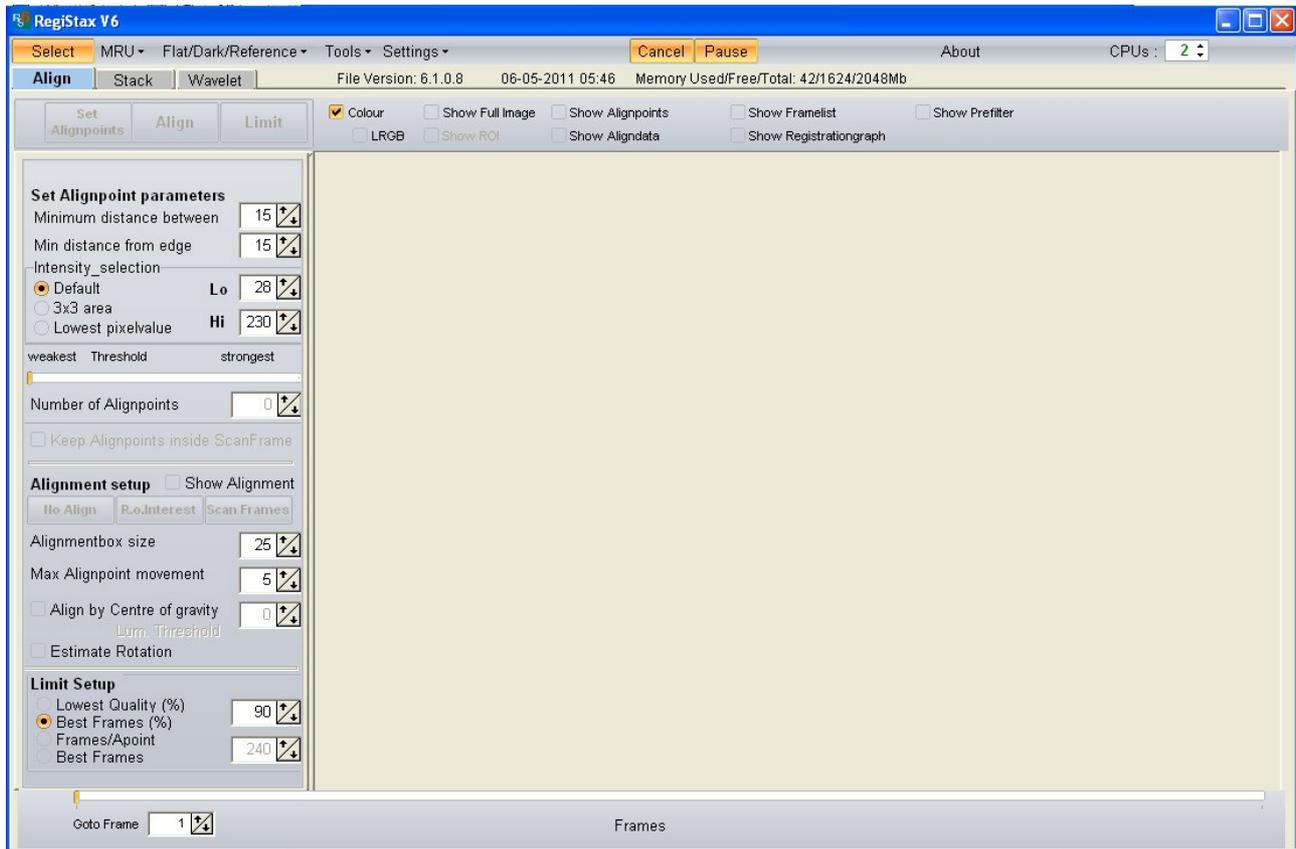
3. Click the **Analyse** button and it will take a few seconds, depending on the size of the file. Once completed, it will say 100% on the progress bars at the bottom of the left hand window.

Next, look at the screen shot above and make sure your settings are the same (you can play with these as you become more confident).

4. On the right hand window, click the button that says **Place APs in Grid**, then click the **Stack** button on the left hand window. This will now take a few minutes to process and once completed, it will automatically create a file in your folder – along the lines of 'AS\_p50\_multi'

## 8. RegiStax Editing

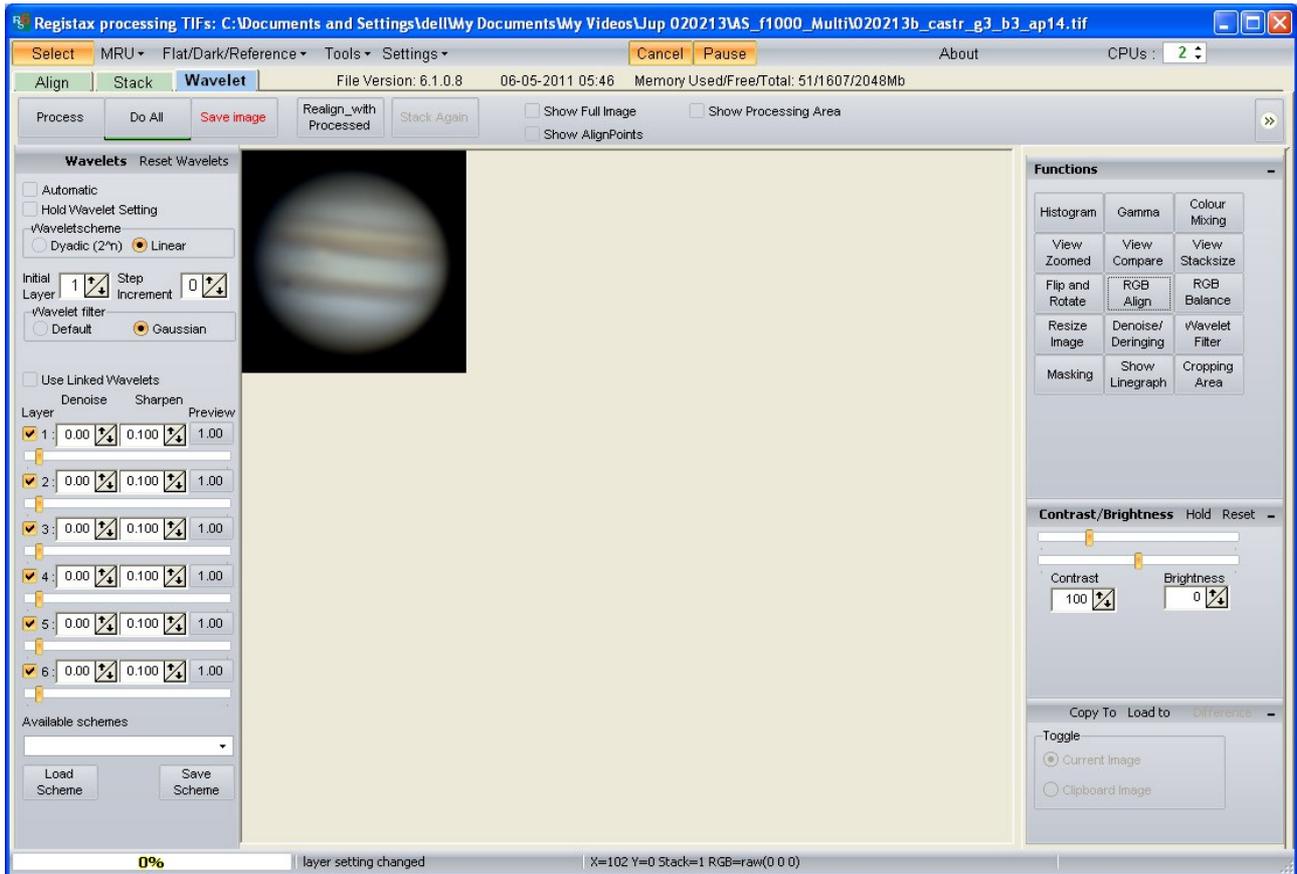
1. Open the RegiStax program and you will be presented with a screen like this.



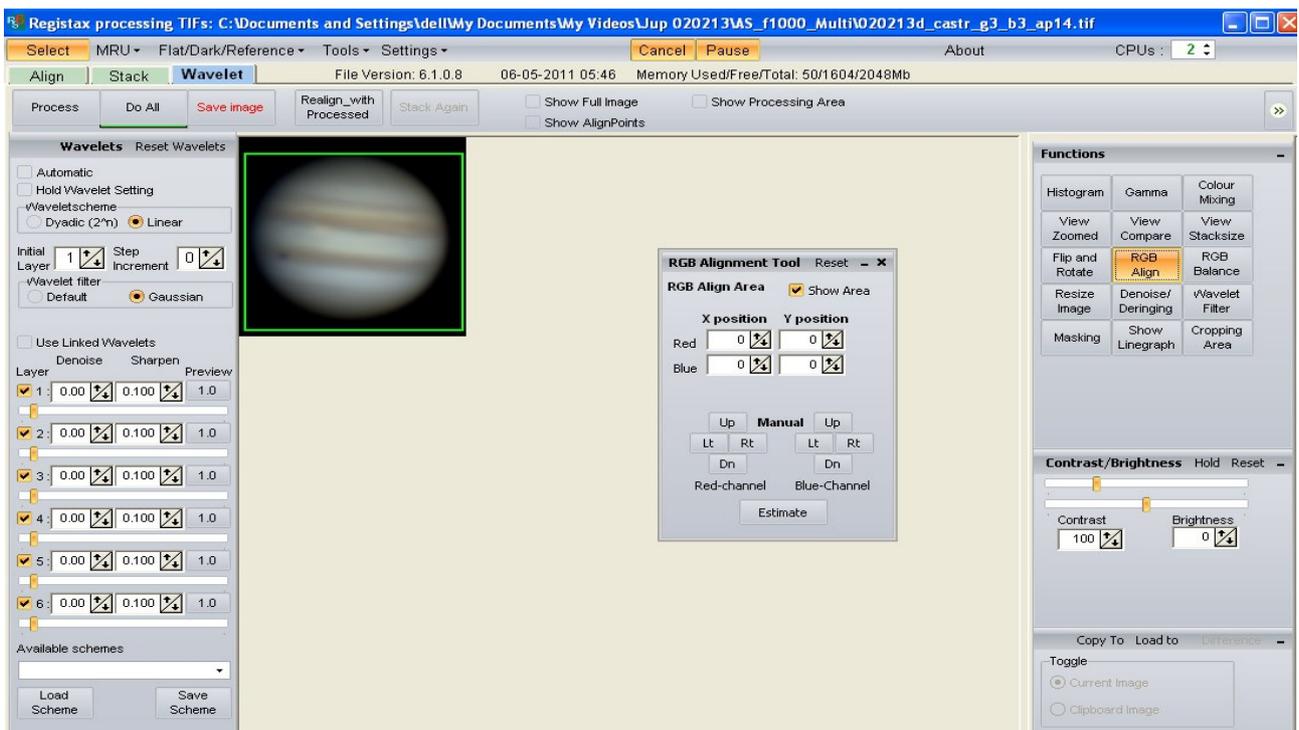
2. Click on the **Select** button and find the file you created in the previous AutoStakkert section and open it. You will be presented with a box that says this. Click yes.



The screen will now change into this.

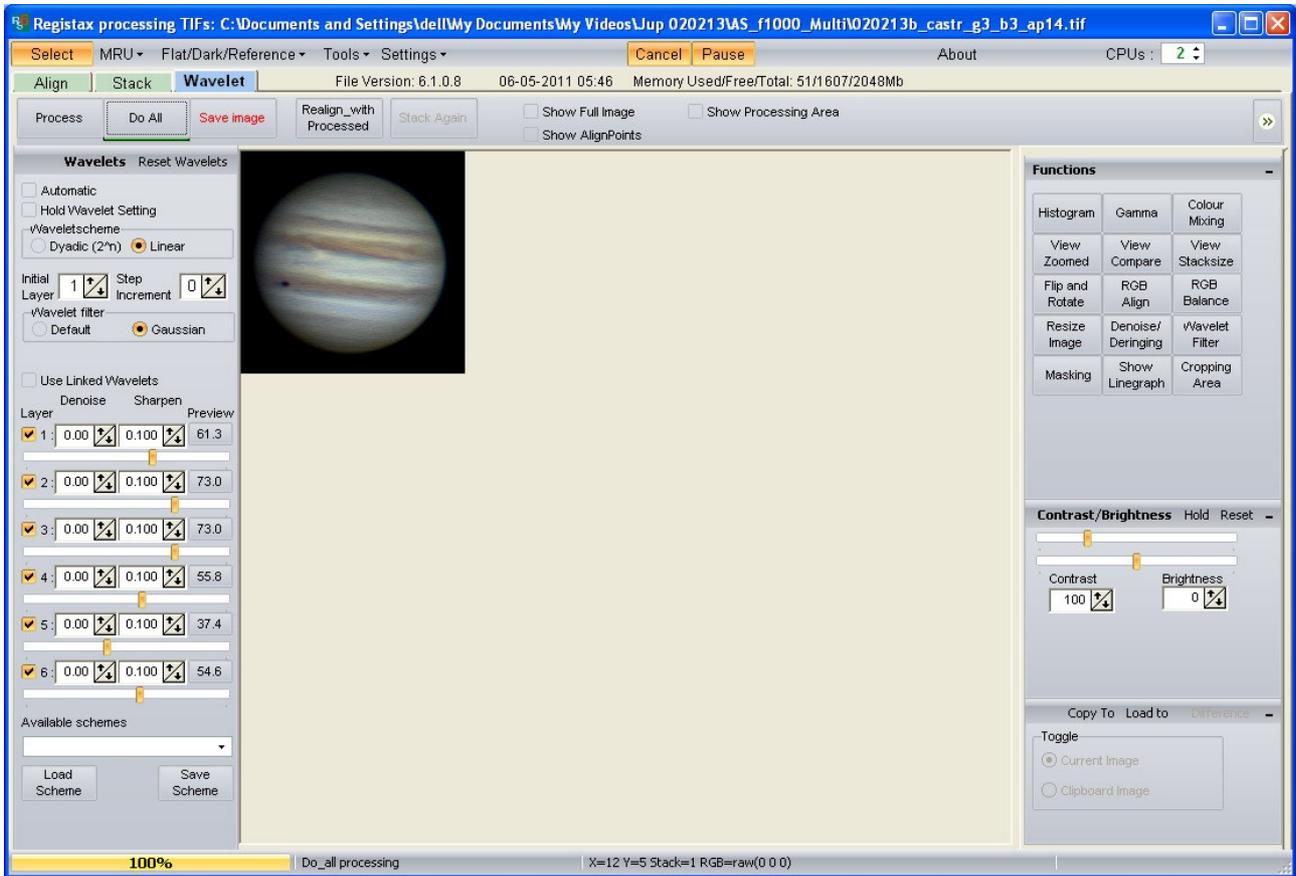


3. On the right hand side you can see a grid of boxes, select the one that says **RGB Align**. A small green square will appear on the image of the planet. Resize this square by clicking & dragging on the corner of the green square, so that the planet is completely inside and click **Estimate** on the pop up box. Once this has completed we can move on to the wavelets.



4. On the left hand side of the screen, you will see the 6 wavelet slide bars, this where you can start to bring out the detail of the planet. There is no definite way of doing this, so you will just have to play around till you are happy with the image. Leave all the other settings alone.

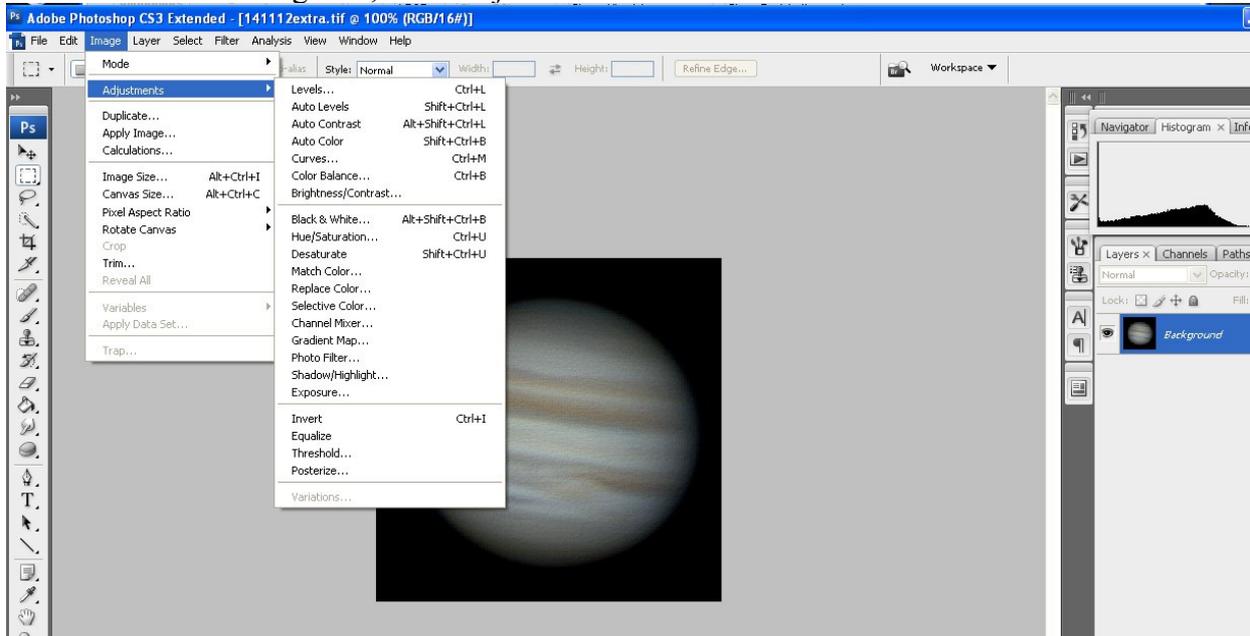
5. Once you are happy with the image, click the 'Do All' tab and then save the image in your folder.



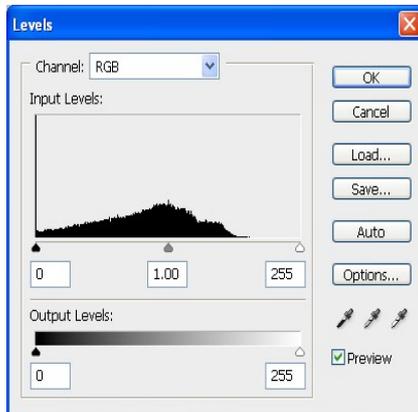
## 9. Gimp/Photoshop Editing

I'm going to leave this section a bit vague as I believe people will have different methods of doing the final editing. But I will give a quick run down on what I do in this section with **Photoshop**.

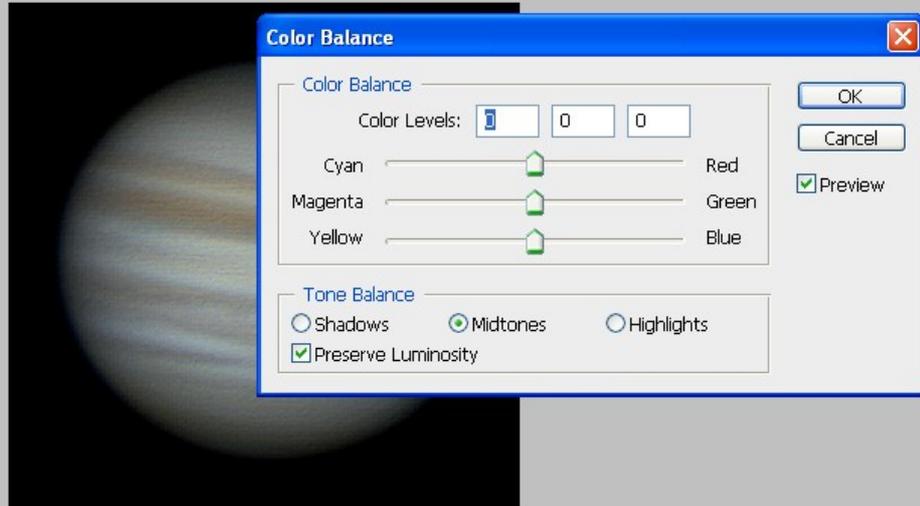
1. Open the program and select the saved image created in Registax
2. Click on the image tab, click Adjustments then levels



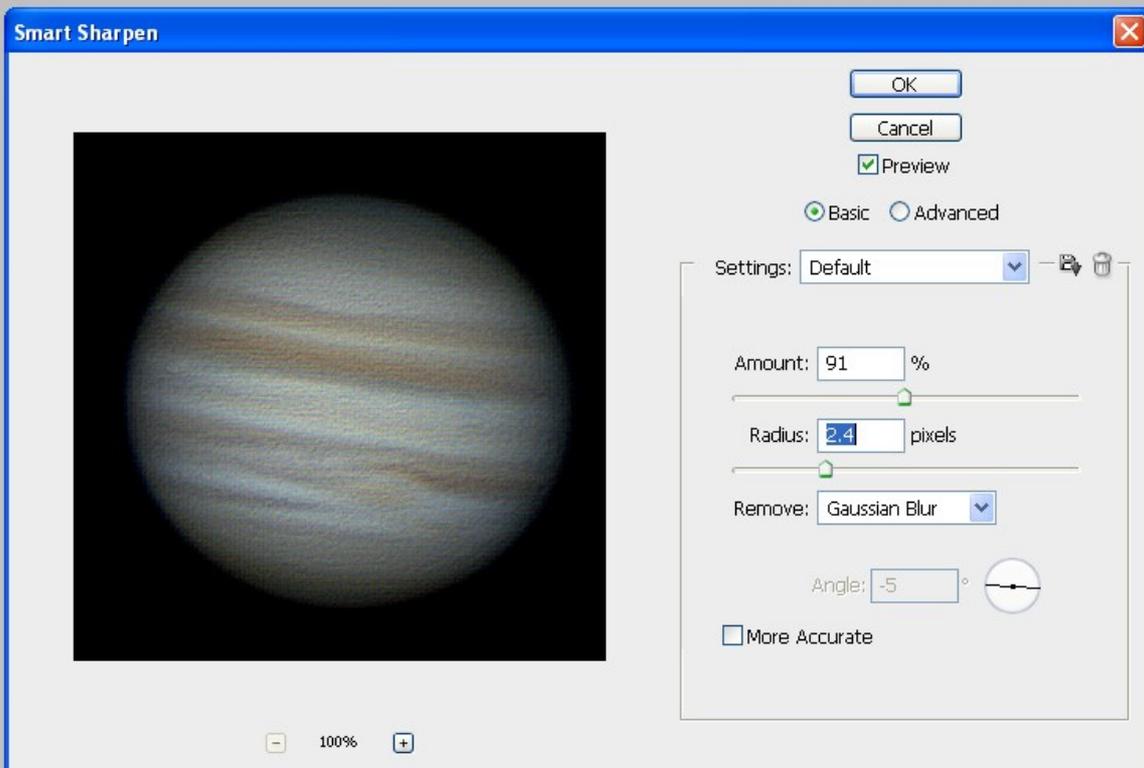
3. Slide the right hand arrow(white) on the input level graph to the beginning of the black section of the chart – click OK



4. Click on Adjustments again and alter the colour, brightness and contrast settings



5. Click on the filter tab – Sharpen – Smart Sharpen and play around with this



6. Click on the filter tab – noise – despeckle
7. Repeat with the colour and contrast etc. if required.
8. Save the final image

## 10. End Result

That's it you have created an image using a manual, push-to Dobsonian telescope. It does become easier with time and you will find that the quality of the end image will greatly improve with practice. Here are a few of my images which I have created using the techniques I have described in this tutorial. Thanks for reading, good luck and clear skies.

