
PROCESSING OF PLANETARY IMAGE DATA

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INTRODUCTION

- In this project assignment, we are going to see how we are going to obtain good picture of Mars using appropriate image processing tool.
- In this project assignment , we are going to process the image by using registax6 , AutoStakkert (version 3.1.4) and Adobe Photoshop.
- Registax6 and AutoStakkert are available for free in its official websites and Adobe Photoshop is not a free application , we can get it from its official website.

SOURCE OF PLANETARY DATA

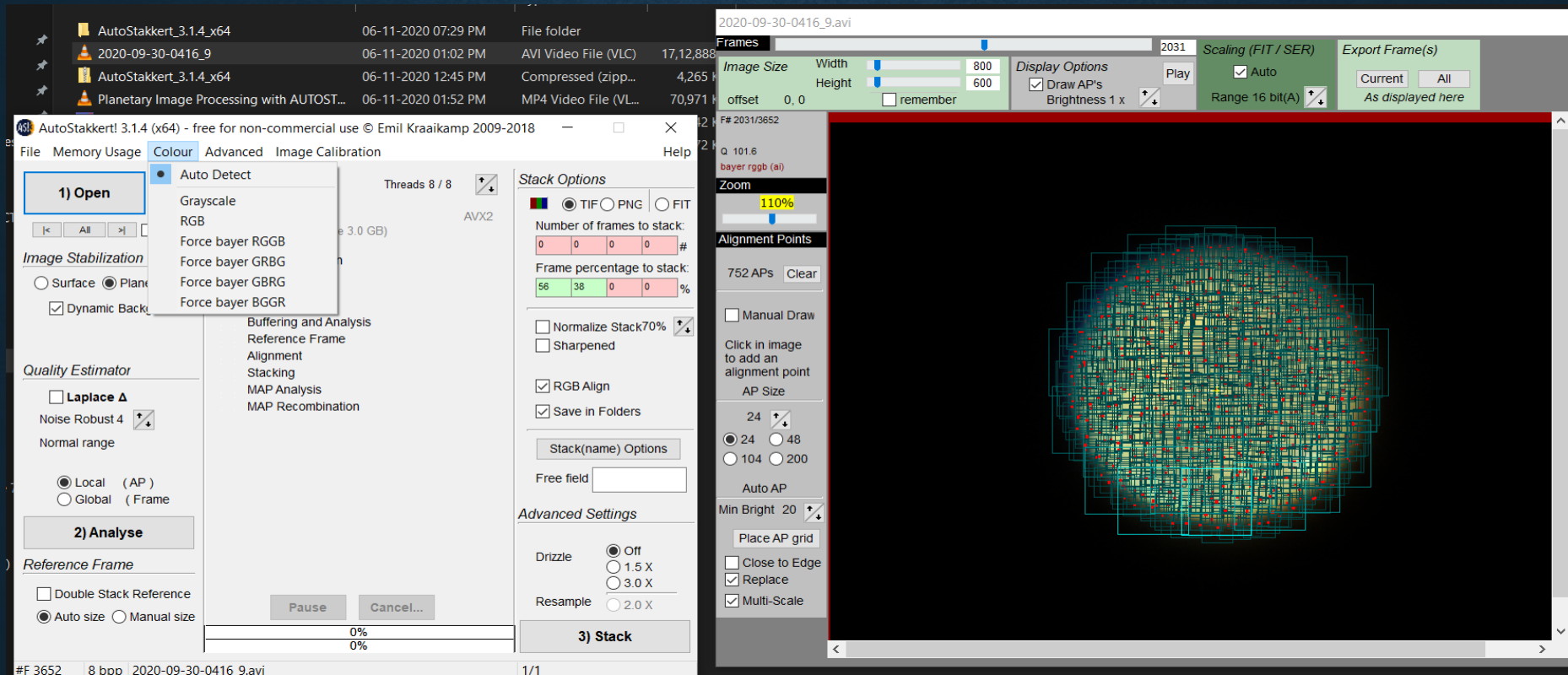
- The source of data is a live video of Planet Mars captured on Sep30,2020.
(Video size : 1.7 GB)
- The source planetary data is in RAW8 format which is captured using sharpcap.
- Sharpcap is an easy-to-use and powerful astronomy camera capture tool. It can be used with dedicated astronomy cameras.
- Telescope Used: Celestron 14" Edge HD(3910mm focal length)
- It used Televue Powermate 2x which multiplies telescope focal length twice.
- It also used ZWO ADC which is a atmospheric distortion/dispersion corrector.
- The planetary Camera used is ZWO ASI 290 MC.
- It also captured using PHD2 , which is a telescope guiding software that simplifies the process of tracing a guide star, letting you concentrate on other aspects of deep-sky imaging or spectroscopy.

INITIALLY CAPTURED MARS PLANETARY DATA

- It is the live video of Mars captured on Sep20,2020 using the instruments mentioned in the previous slide.
- With this video data, we are going to capture a frame using AutoStakkert for further processing of image.



STEP 1: STACKING OF IMAGE SEQUENCE USING AUTOSTAKKERT



- ★ The image sequence is stacked and we got output from the source video using this software and steps to be followed is explained in the next slide.

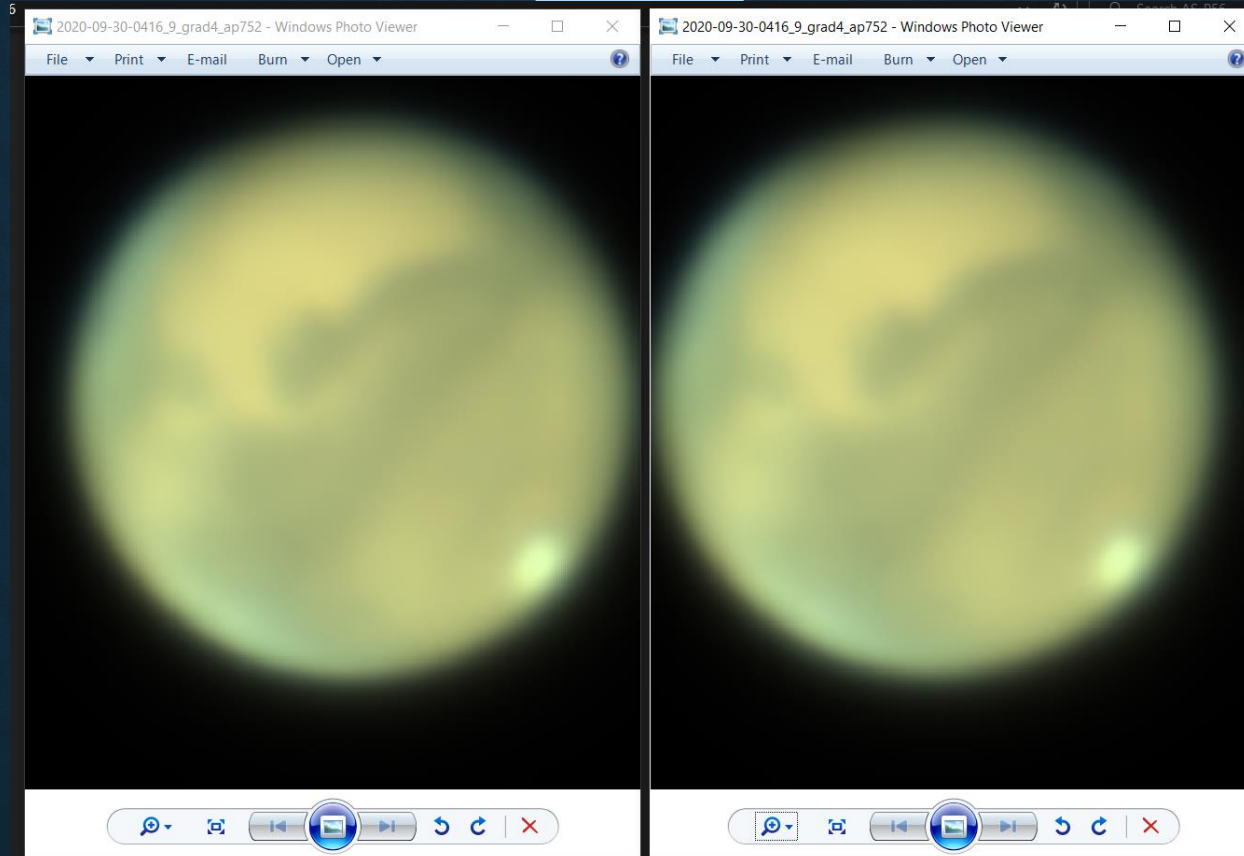
STACKING OF IMAGE SEQUENCE USING AUTOSTAKKERT

- ★ AutoStakkert is an open-source application and it is all about alignment and stacking of image sequences, minimizing the influence of atmospheric distortions. It's goal is to create high quality images of the planets without too much hassle.
- ★ Using this application, we captured a frame at 2031 which is good for further processing.
- ★ In source video Mars is in white in color but by default this application Auto-detect the color of the source planet and gives us output.

STEPS FOLLOWED IN STACKING OF IMAGE SEQUENCE USING AUTOSTAKKERT

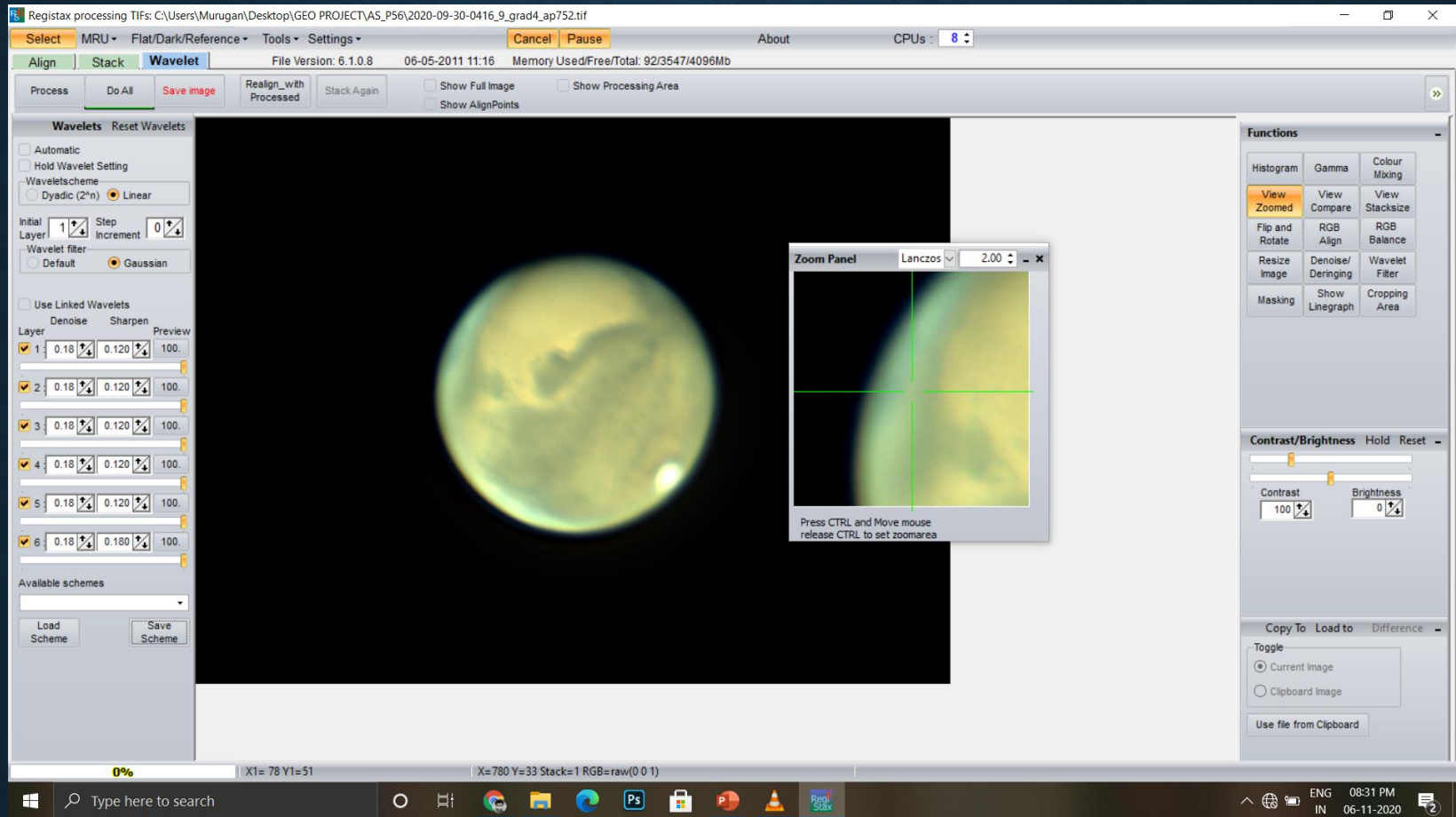
- ★ First, import our source video.
- ★ Then, with the window on the right hand side. Adjust the Frame to the correct level so that we can get the good image.
- ★ In the Color tab, I chose Auto-detect. If you aren't satisfy with it, then change it by selecting RGB.
- ★ Make sure you select Image stabilisation as planet and reference frame as Auto size.
- ★ Then enter the frame percentage to stack. Here, I entered 56 and 38 to get two outputs as TIF files. By comparing two different frame images I choose the best for further processing.
- ★ Then click the Place AP Grid.
- ★ Then click on Stack on the left hand side to get the output as TIF's.

COMPARING AND SELECTING THE AUTOSTARKKT OUTPUT FOR FURTHER PROCESSING

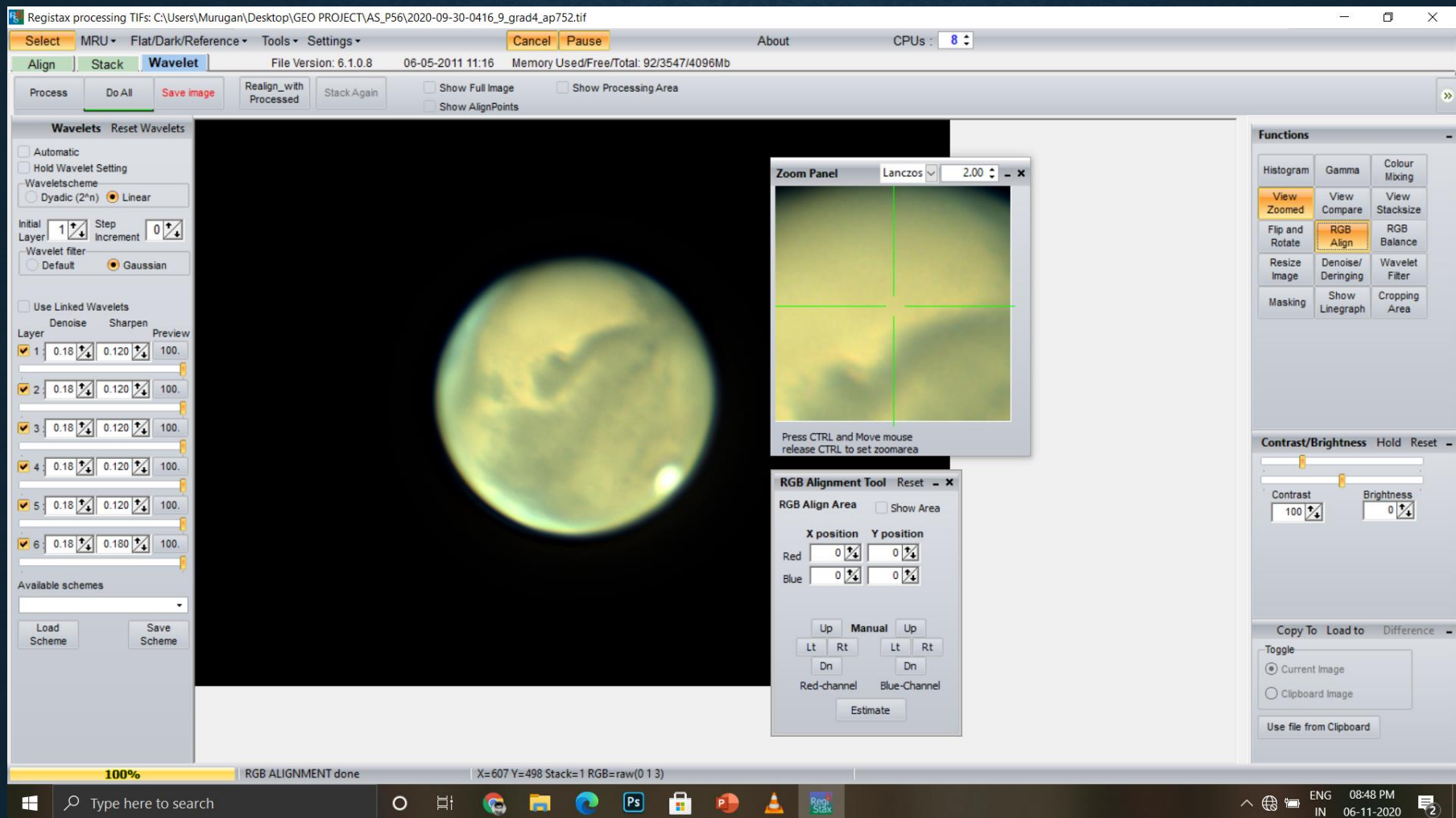


By comparing the two different outputs we exported, I chose to go with the one with frame percentage 56 for further processing because it is sharper and also having good details than another one.

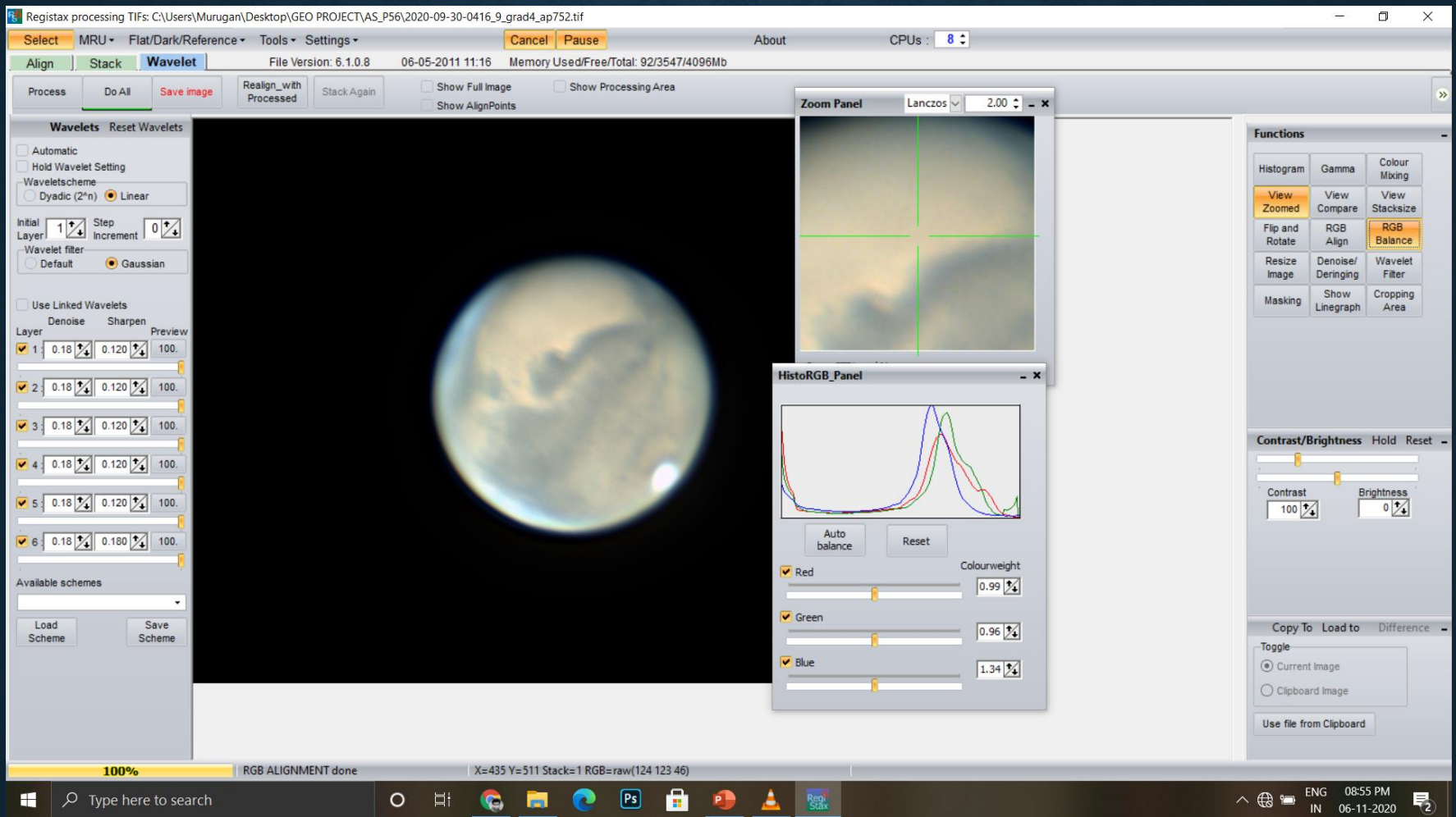
STEP 2 : PROCESSING USING REGISTAX



1).First, using Registax to improve the sharpness with some noise reduction, I slide the slider to 100 on the Layer on the left side and choose the values that is best for further processing. The values I gave on the layers produces good results for me so I proceeded with that.



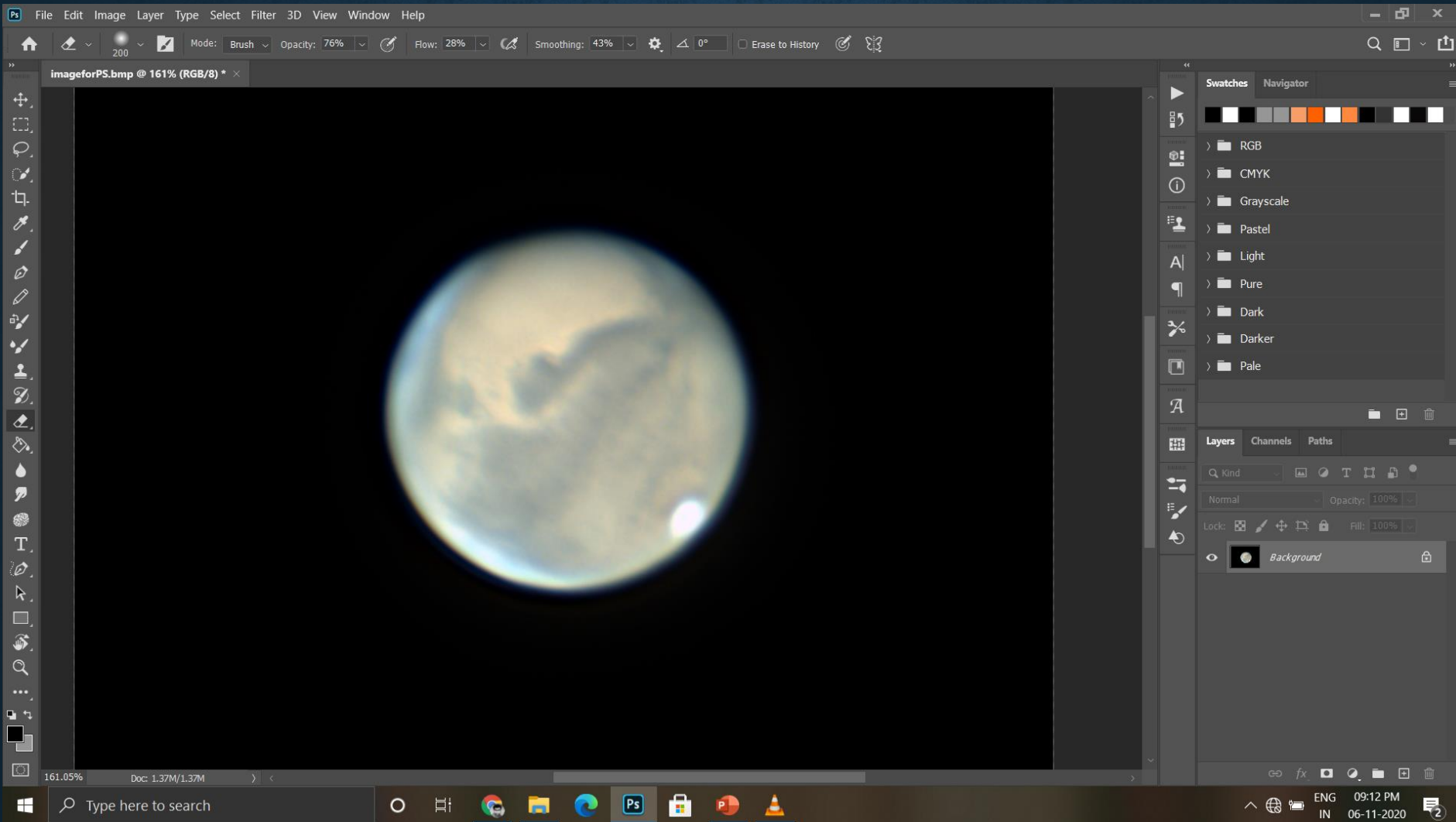
2). Then we are doing some RGB Alignment in RegiStax by clicking on RGB Align on the Right side and Click estimate. If the X and Y position of Red and Blue changes we want to change it manually with the arrows provided. But in our case it is zero. So we can further proceed with our next step RGB Balance.



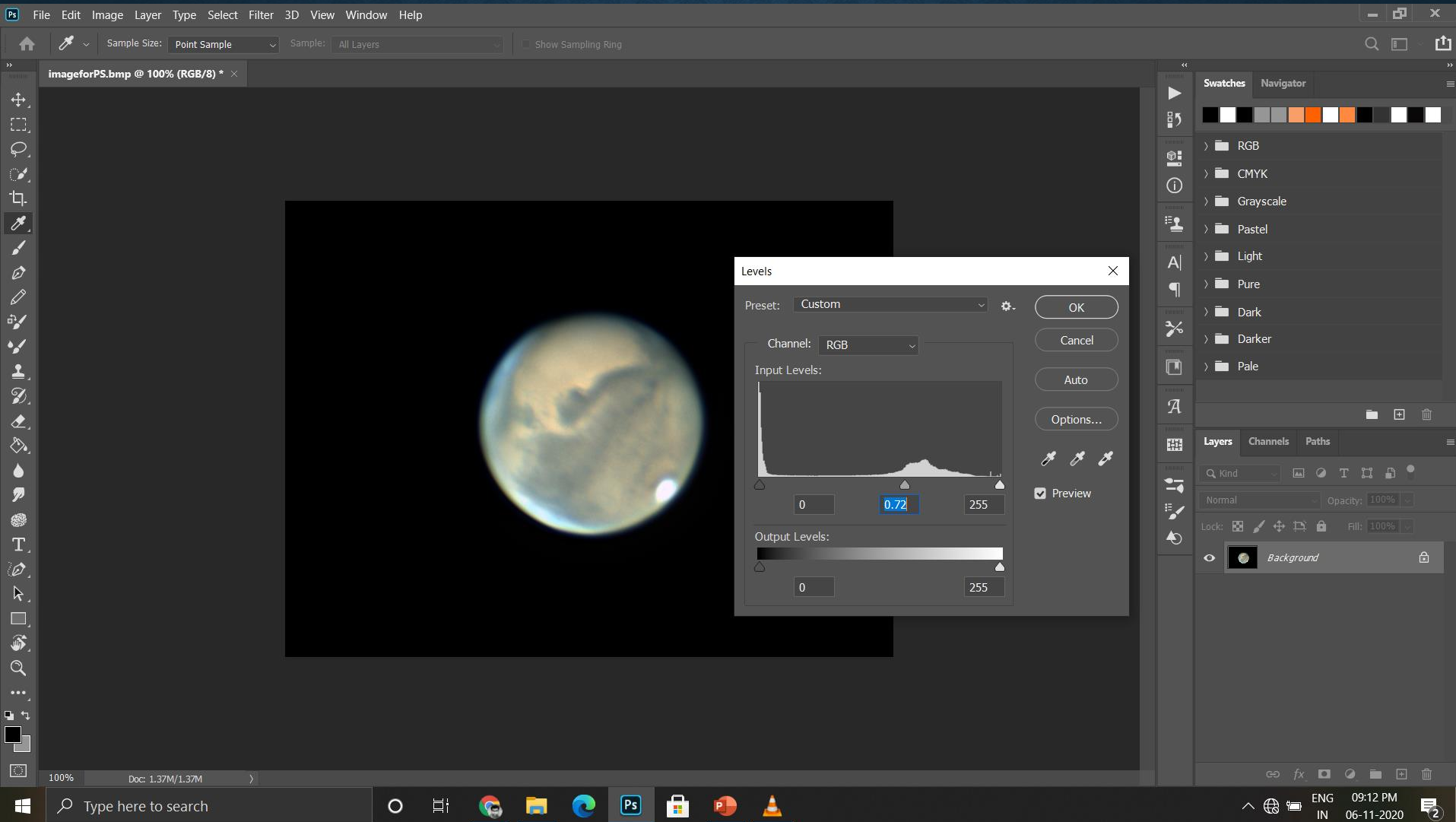
3). In this step select the RGB Balance and select the Auto Balance. Then save the result and we use the result for further processing with the powerful image processor Photoshop.(You can also use Lightroom if you're familiar with)

Step 3 :

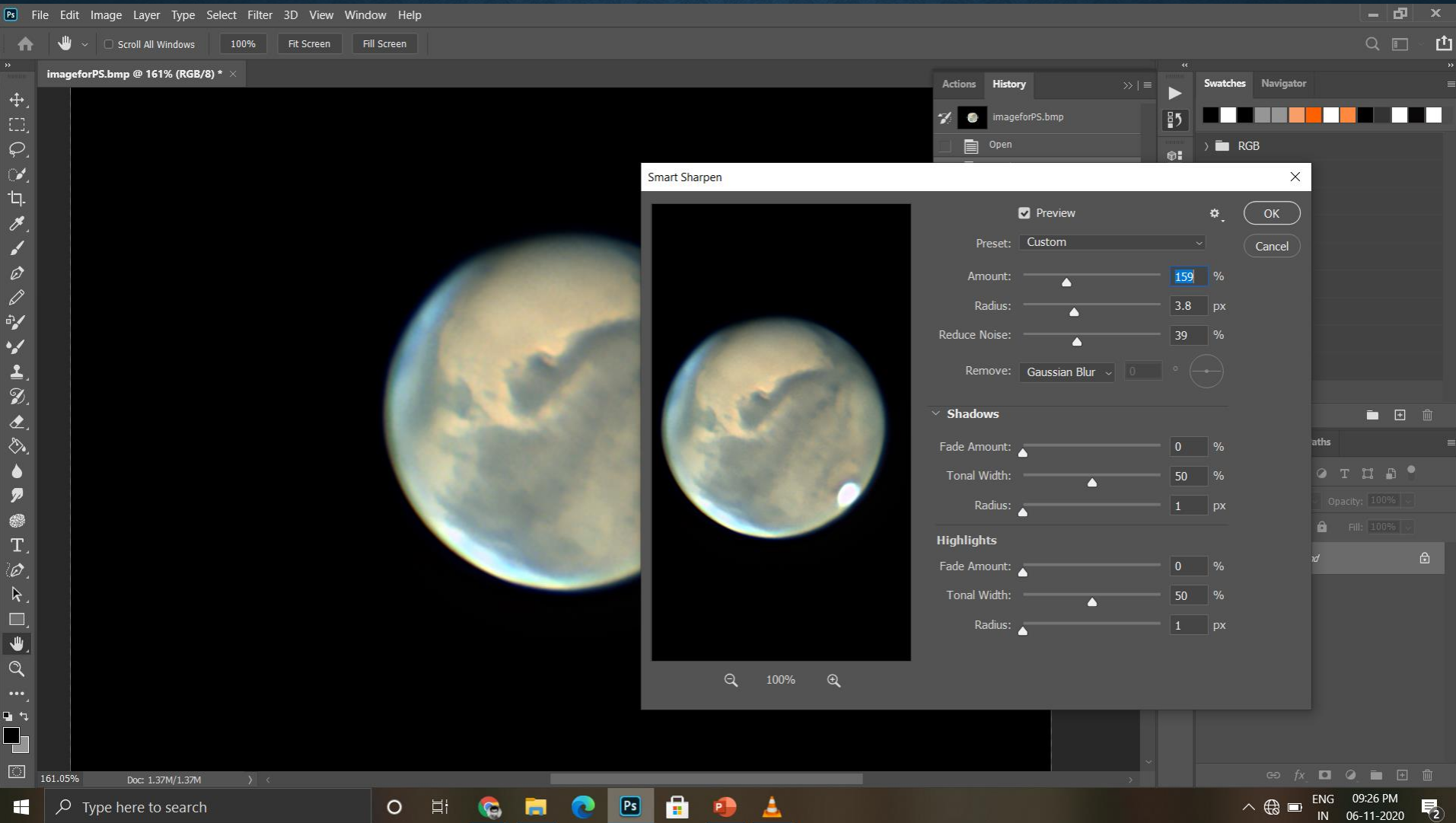
1). Open the image in Photoshop



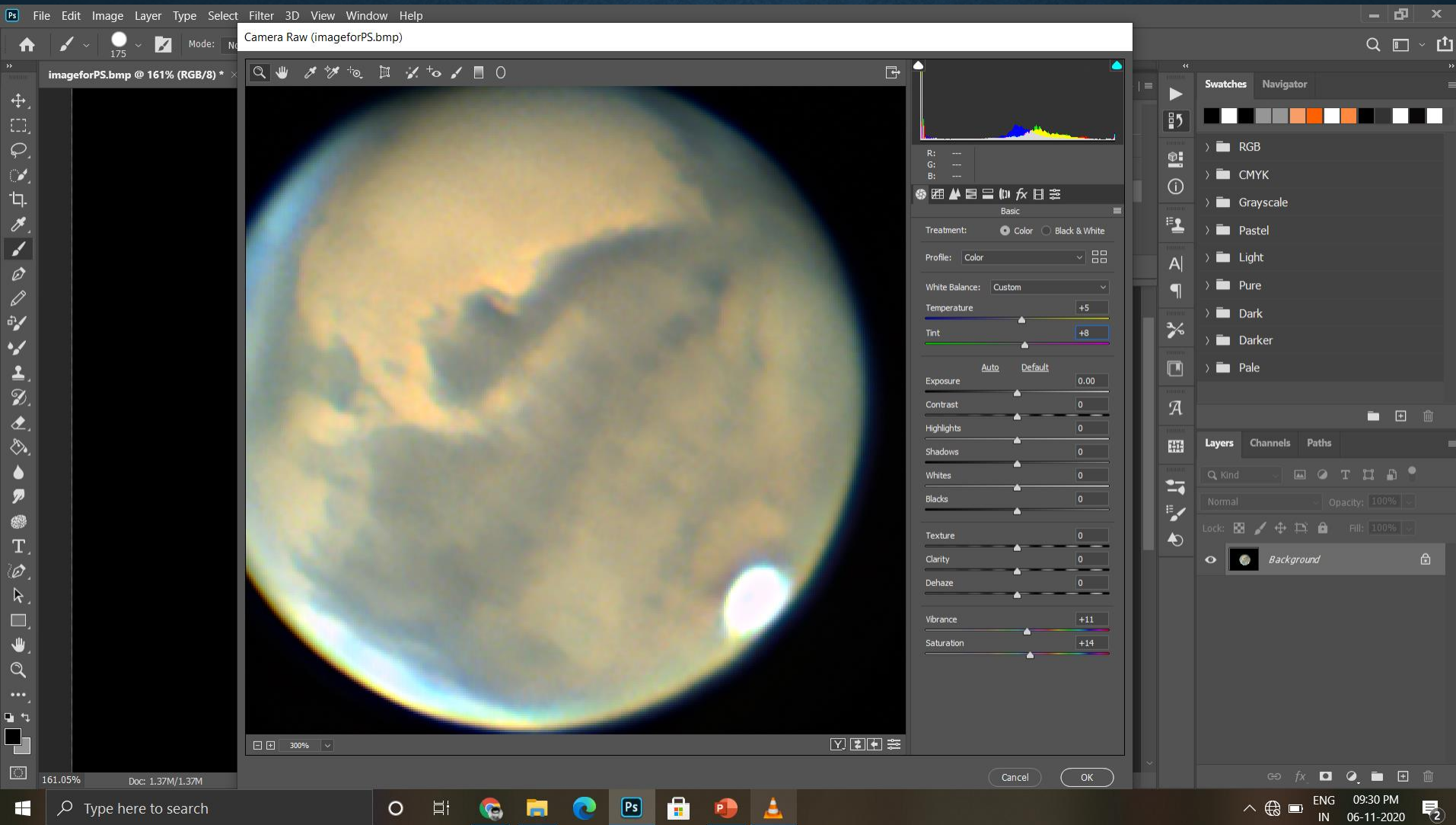
2). In Photoshop, Perform Image -> Adjustments -> Levels and choose appropriate level. For my case, I choose 0.72 because it gives me good results. (i.e. a bit darker)



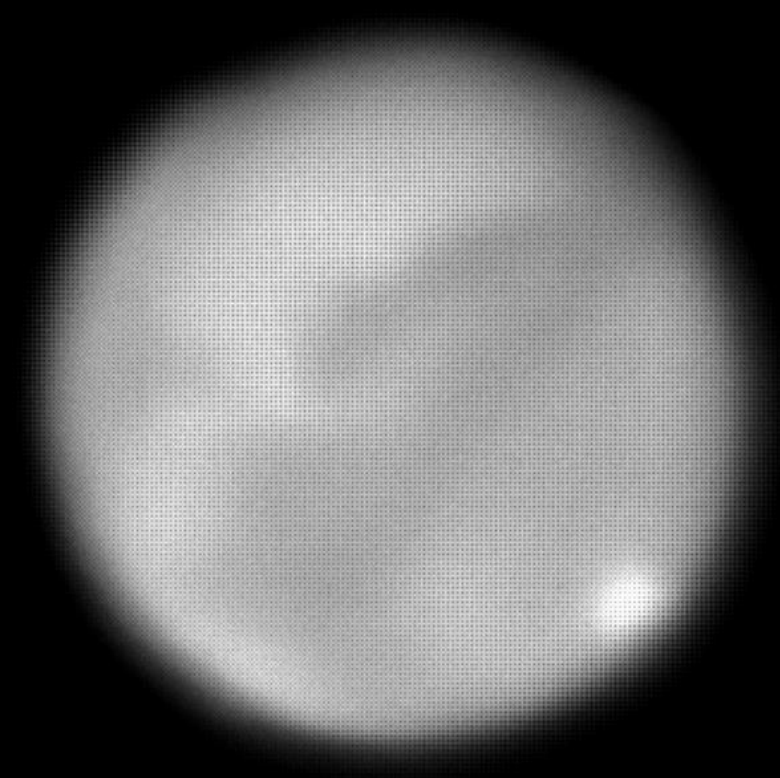
3). Then perform Filter -> Sharpen -> Smart Sharpen and choose the appropriate value that produce good results. The values I choose is in the below image. Then apply it to get the sharpen image.



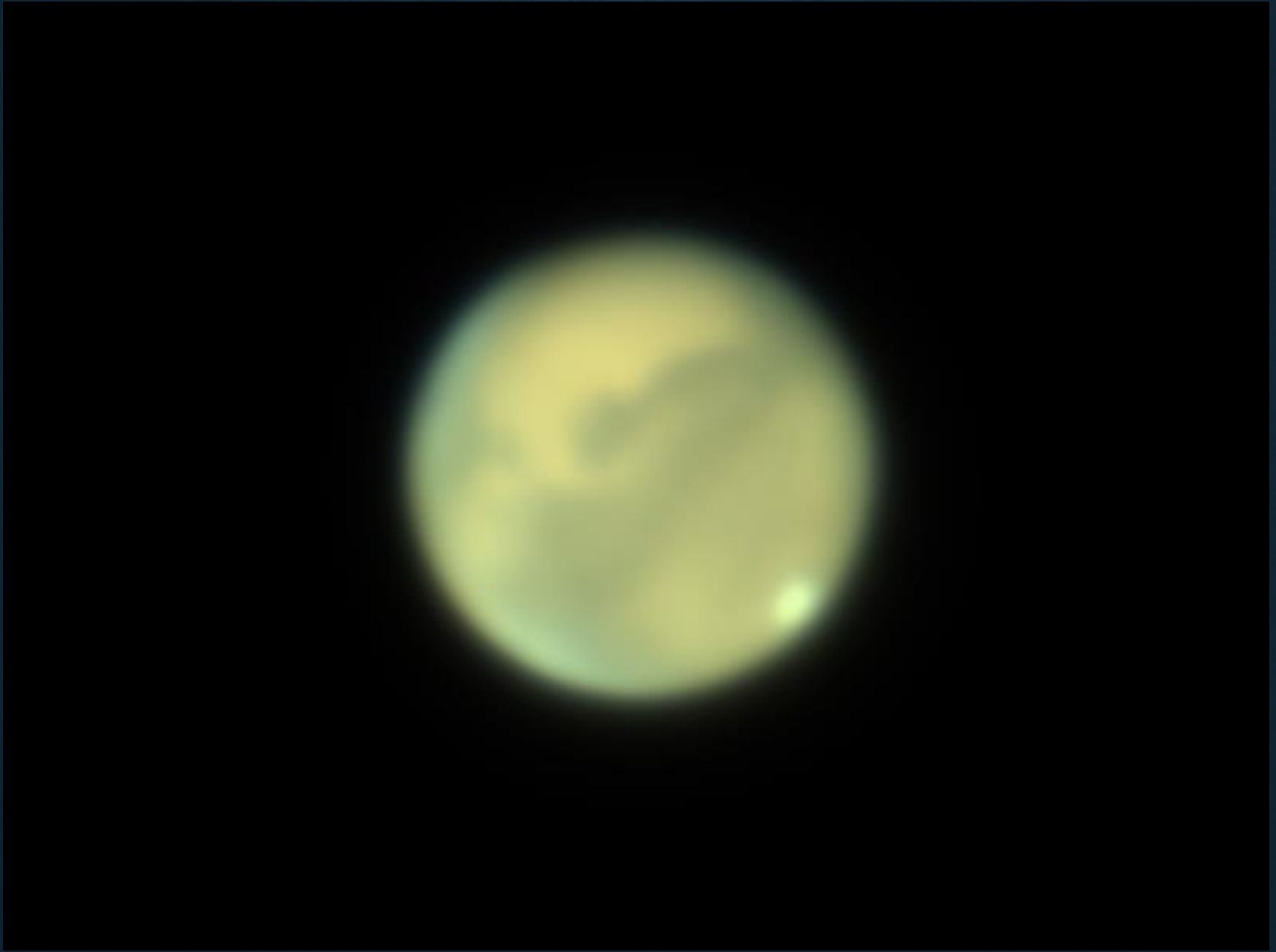
4). Finally, Perform Filter -> CameraRawFilter and then select the suitable values and apply it. The values I used is in the below screenshot.



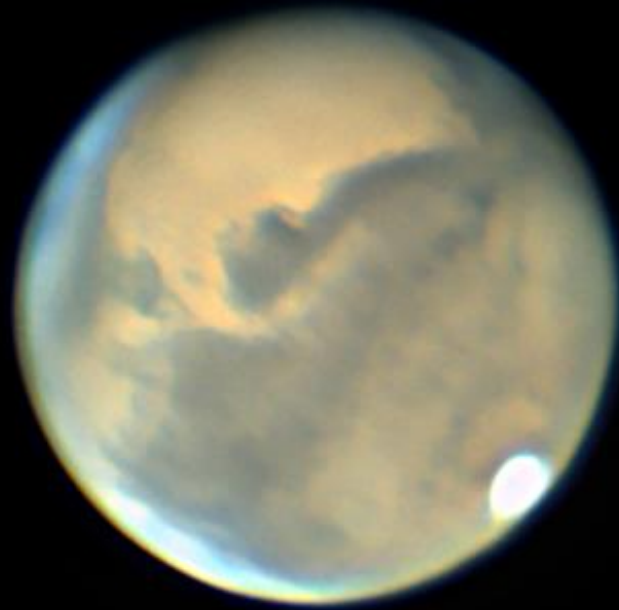
Initial Image



Step 1: AutoStakkert output



Step 2: Registax output



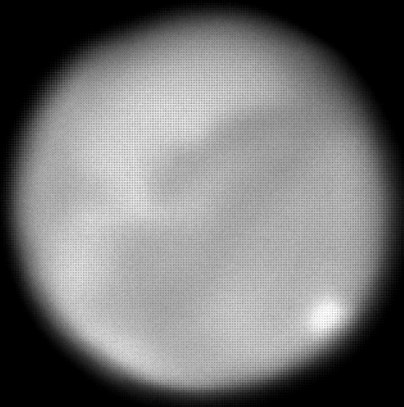
Step 3: Photoshop output



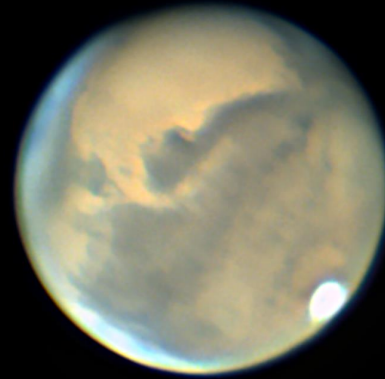
CONCLUSION

- By following the above mentioned steps we have got the required processed image of Mars.

Planet Mars



Initial image



Final output