Processing Wind Affected Lunar Data

USING PIPP AND AUTOSTAKKERT
David Richards

Overview

This document outlines the steps taken to process lunar data which has been affected by wind.

The Celestron C8 together with its dew shield (see left image) and similar telescopes can present a substantial barrier to wind.

Lights winds of less than 5 mph generally do not affect the lunar images captured with this equipment. Once winds are above 5 mph this will start to affect the quality of frames in the capture video.

For continuous wind, imaging can become difficult. If the wind is intermittent or gusty, there is software available which can process a video (SER or AVI) to remove affected frames.

An affected frame is one where the object of interest is either missing or partially displayed.

The Problem

A 5,000 frame SER video had been captured of Clavius and surrounding craters. The video was loaded into AutoStakkert!3 (stacking software) and the image anchor point defined (the green box).
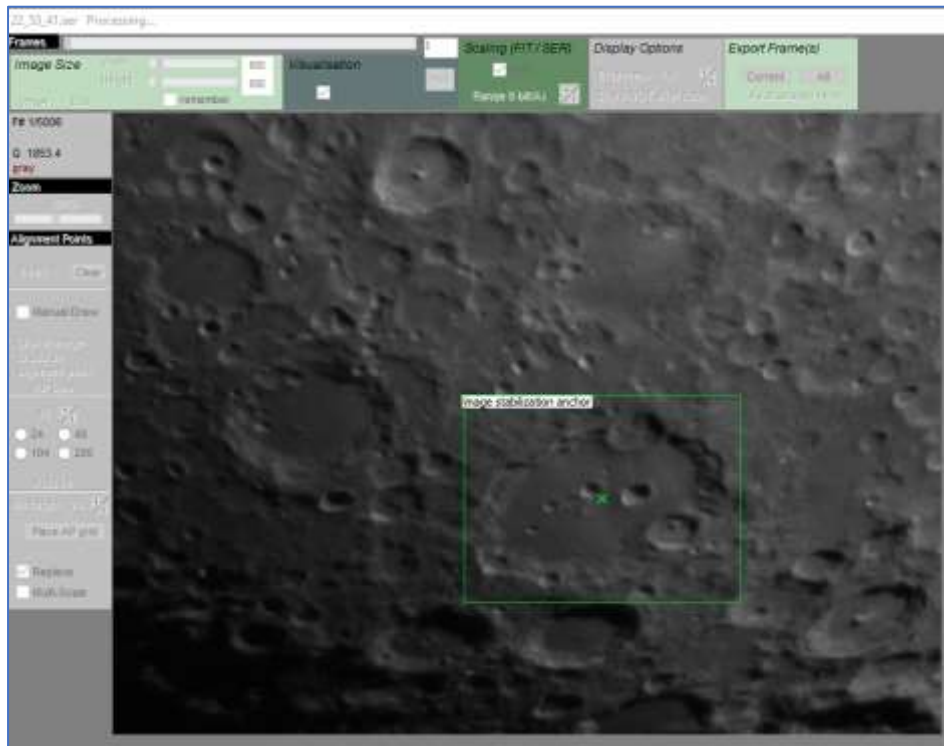
After completing the stacking process, this was the resultant TIFF file.

The wind induced juddering of the telescope had caused some frames to be incomplete and affect the quality of the final stack.

The Solution

The freely available software PIPP was used to process the video -stabilise the frames and remove incomplete frames. The outline steps are:

1. Load the lunar video into PIPP.
2. Select appropriate processing options.
3. Select the output format (SER or AVI).
4. Process the video.
5. A new video is created.
6. Stack the new video using Autostakkert!3.

Links to software and documentation:

- PIPP: https://sites.google.com/site/astropipp/downloads for 64-bit or 32-bit operating systems.
- Autostakkert: http://www.astrokraai.nl/software/latest.php . Use version 3 for 64-bit or version 2 for 32-bit operating systems.
- PIPP documentation: https://sites.google.com/site/astropipp/example-uasge/example8 has the full documentation for using PIPP's image stabilisation features.

Both applications have been written to run under Windows. Both applications will also run under WINE on Linux.

Note that SER is the preferred format for lunar video as 5,000+ frame captures can result in large files of 10Gb or more.

At the PIPP download site, useful software called *SER Player* can be found. This is used for playing back and manipulating SER files. https://sites.google.com/site/astropipp/ser-player

Processing Steps

1. Start *PIPP*. Open the video via the *Add Image Files* button or just *drag and drop* a video onto the application.
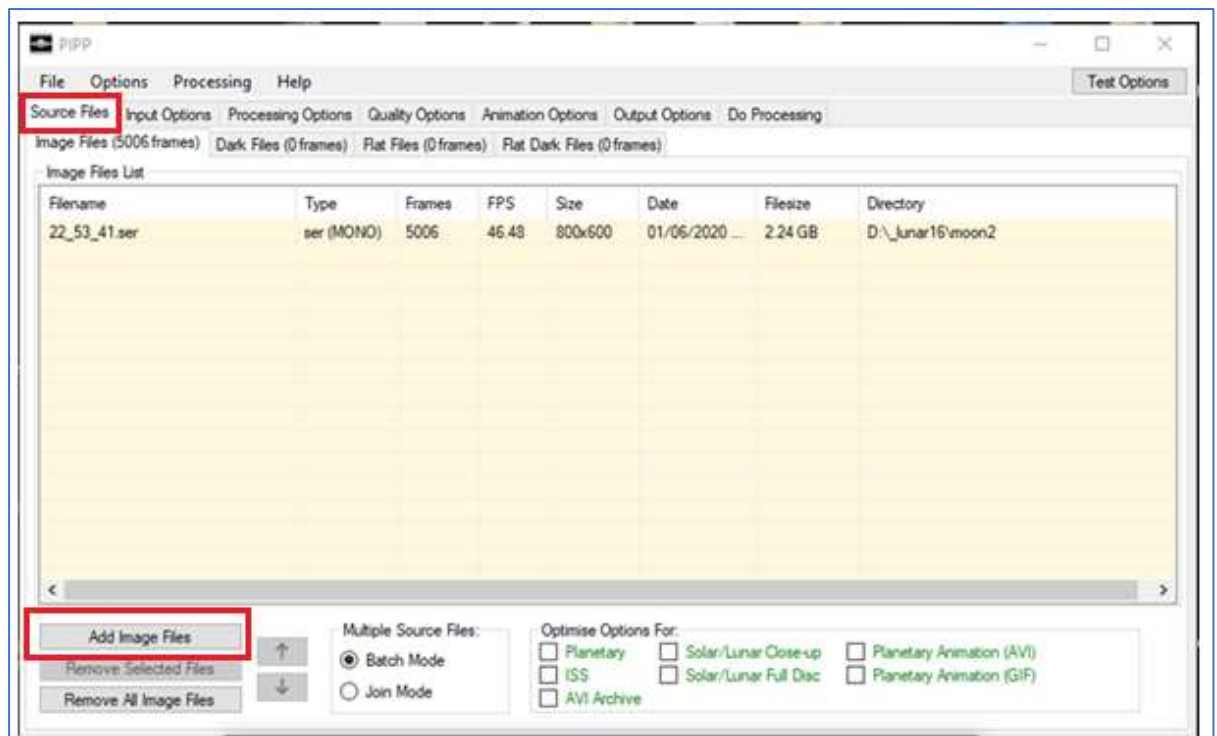

2. Because the video in the example is a *surface* rather than a *disc*, check *Solar/Lunar Close-up*. This will define some sensible settings within the application.
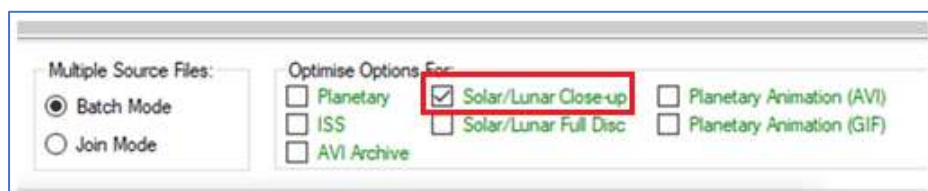
3. The first frame in the video is displayed together with a red box, the *Anchor Feature Box* or *AFB*. This feature will be used to define the point around which image stabilisation will happen.
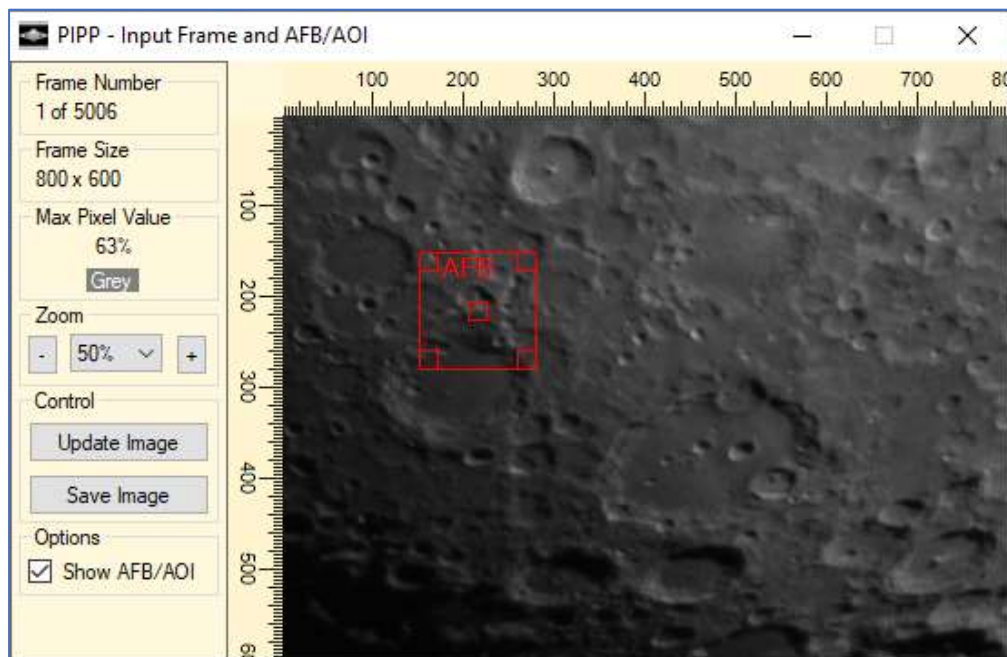

4. Grab the *AFB* with the mouse and drag the red box over the required part of the image. The size of the box can be adjusted by dragging the small rectangles with a mouse. In this example, the large crater Clavius is chosen as the anchor point.
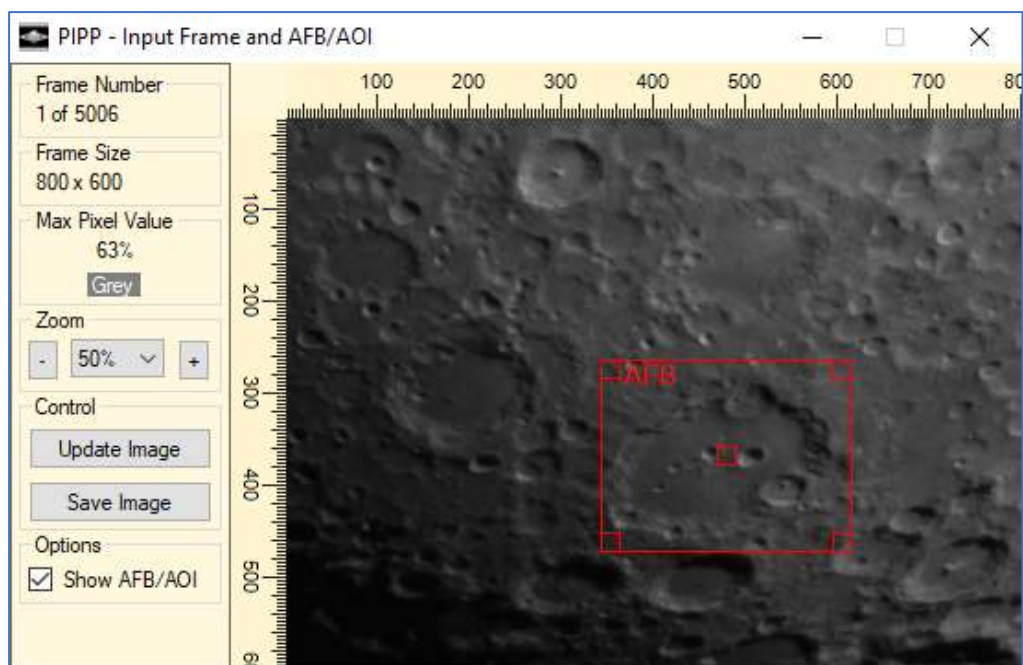
5. Move to the *Processing Options* tab. Observe that *Surface Feature* has been selected and options in the *Surface Stabilisation* section have been populated. At this point, check *Enable Area Of Interest (AUI)* box.
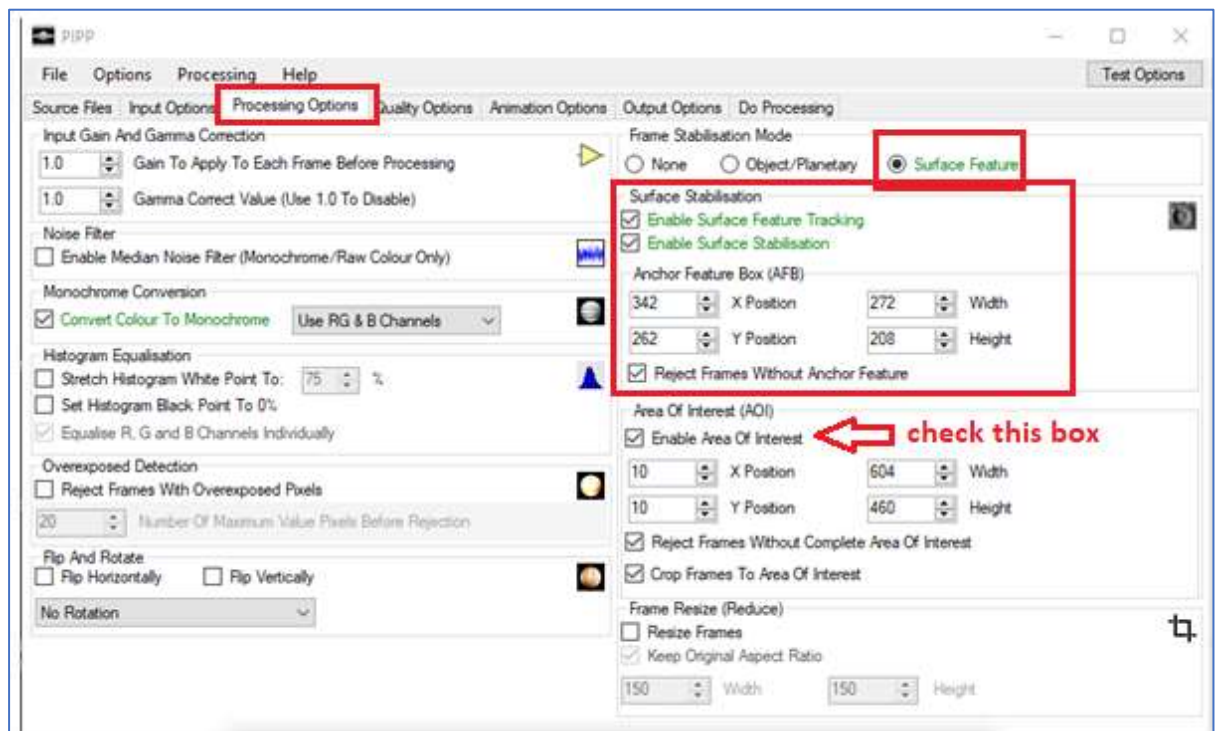

6. A blue box, the *Area Of Interest*, appears in the frame display window. Adjust this as required to ensure the enclosed contents are in every frame. In this case, the craters Clavius, Longomontanus and Tycho are included.
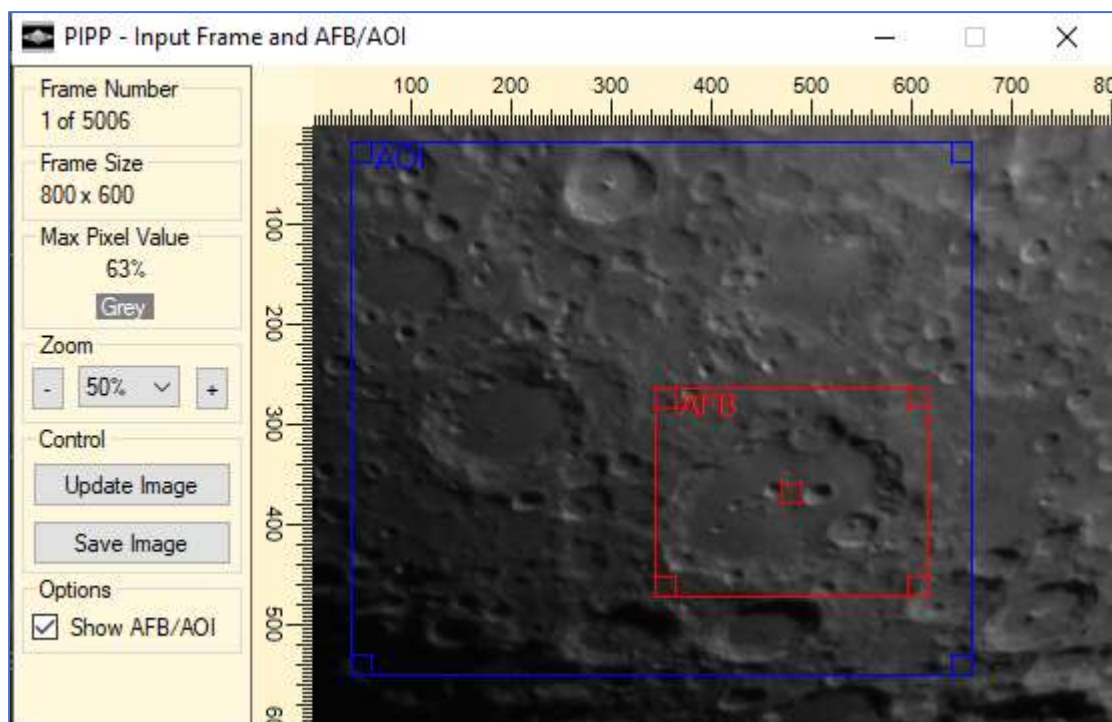
7. Move to the *Output Options* tab and change the output format to SER (or AVI).
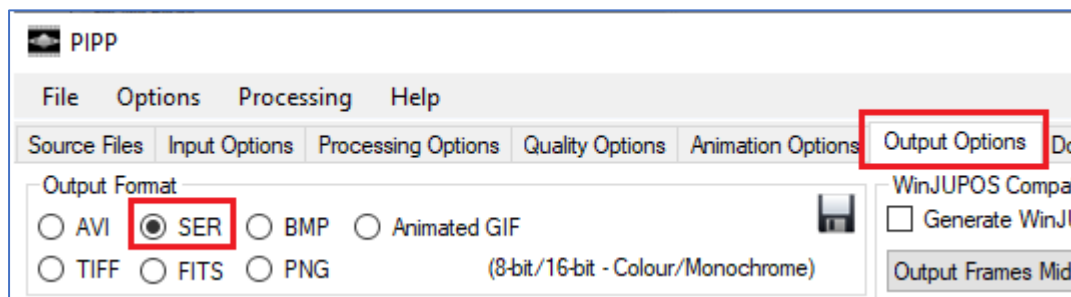
8. Press the *Test Options* button at the top right of the PIPP main window. This will validate all options set to ensure all selections are correct.
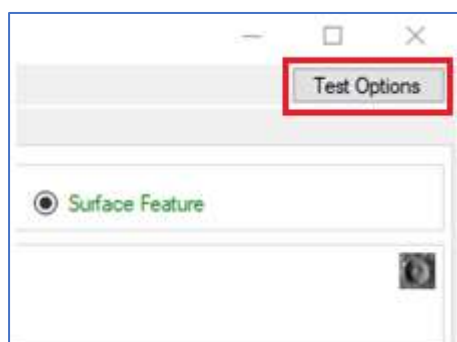
9. Move to the *Do Processing* tab and click the *Start Processing* button. In this completed example, 42 frames (out of 5006) were discarded. These would have been the frames which did not completely contain the blue AIO box.
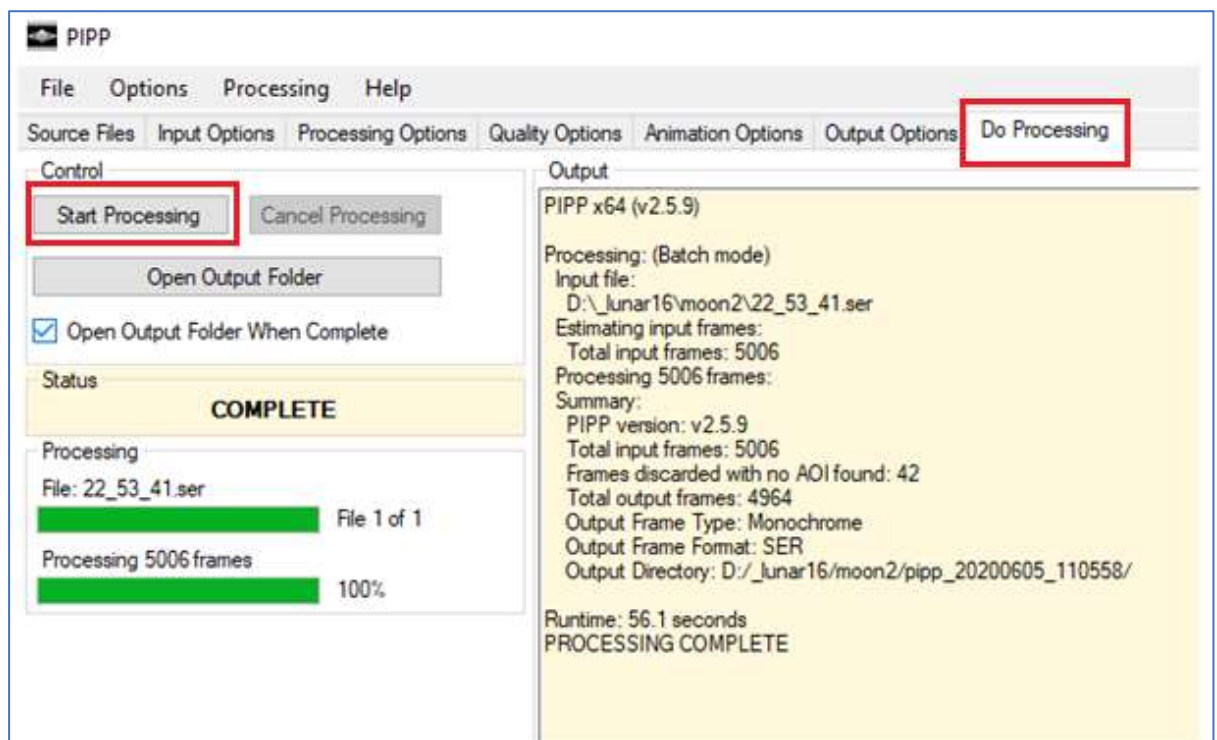
10. A new SER file is written to a sub folder with a name of the form:

    `pipp_YYYYMMDD_HHMMSS`

11. The output file can now be processed in *Autostakkert*. This is the result of the stacking process. Note that the 3 craters bounded by the blue *Area Of Interest* box are all contained in the image.

12. This is a comparison – left- hand image is without use of PIPP, right-hand image is with use of PIPP.
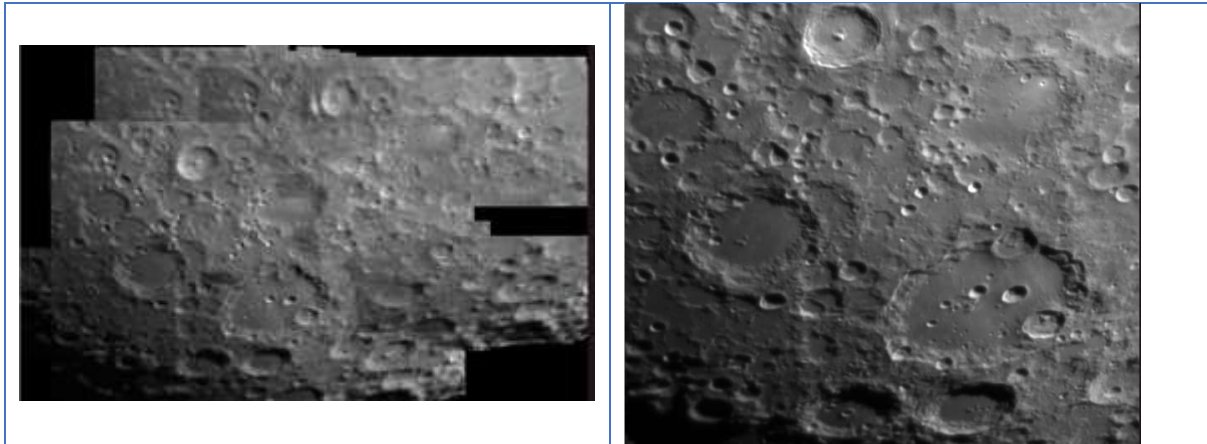
This was the final image after mild sharpening and application of contrast and gamma in GIMP.