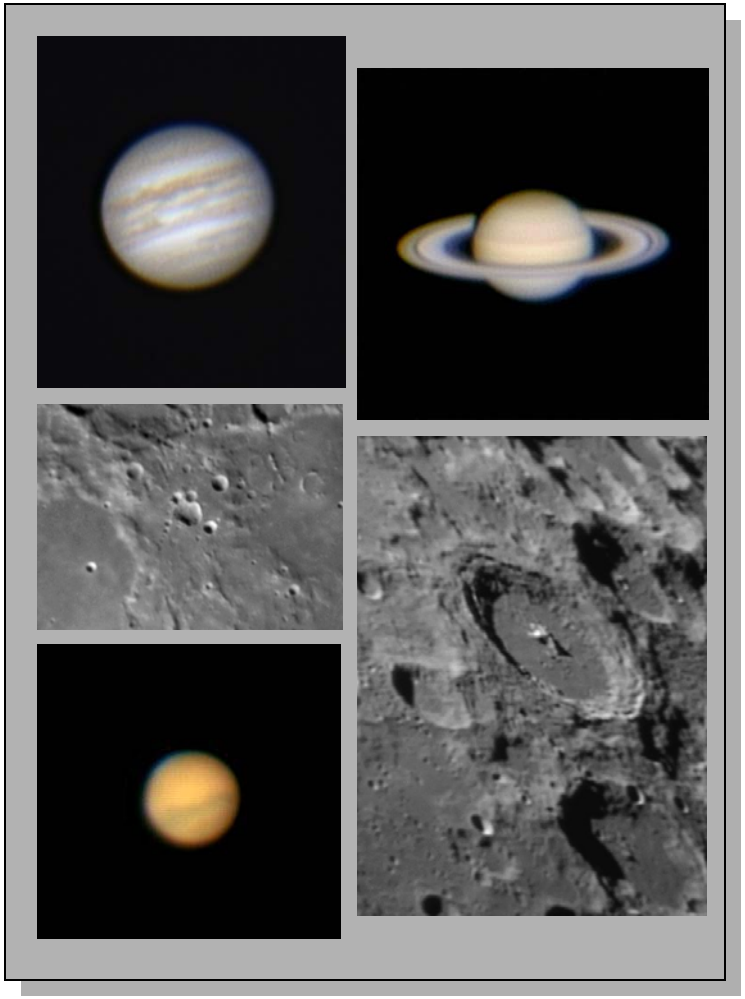
Basic Webcam Astrophotography

Rappahannock Astronomy Club

9 January 2008

Presentation Agenda

- Introduction
- Basic Tools
  - Telescopes
  - Webcams
  - Computers
  - Software
- Imaging Technique
- Image Showcase
- Conclusion



Introduction

- Webcam astrophotography is:
  - Easy
  - Inexpensive (kinda)
  - Fun
  - Anyone can do it with minimum skill
  - A great starting point to more advanced astrophotography

Basic Tools - Telescopes

- Refractors
- Schmidt-Cassegrains
- Newtonians
- Dobsonians

A motorized German equatorial mount is preferred, but an Alt-Az works too. Tip: Must be able to track in order to keep the object in the frame.

Basic Tools - Webcams

Webcams are easy to use, inexpensive, easily adapted to most telescopes. Here are some examples:

Philips ToUcam
Pro II (840k)

Philips ToUcam
Pro III (840k)

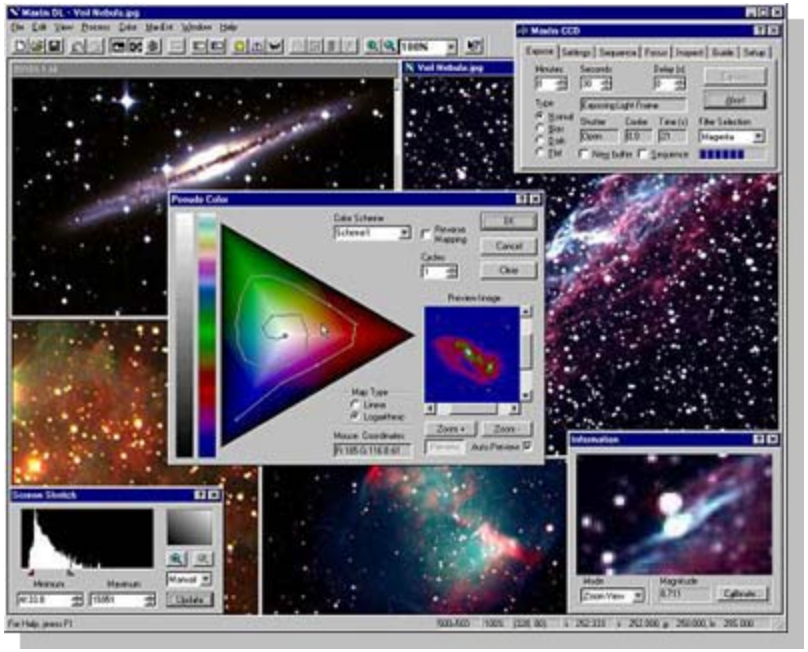
The CCD is a Sony HAD (Hole Accumulation Diode) ICX098BQ chip which is a 4.5mm diagonal (Type 1/4) interline CCD. The pixel size is 5.6um times 5.6um.

Basic Tools - Computers

Just about any type computer can be used – even that old Pentium 4 desktop you stuck away in the closet.

Basic Tools - Software

- Proprietary SW that came with the camera
- Free downloadable, purpose built Astronomy software
  - Registax
  - K3CCDTools
- Astronomy imaging SW
  - MaximDL
  - CCDSoft
- Image processing software
  - Adobe Photoshop
  - Corel Paint Shop Pro



Imaging Technique

- Image Capture
  - Proprietary SW
  - TOA130 (5.1”)/G-11, polar aligned & tracking
  - ToUcam Pro II
  - 1104 frames

  @ 5fps

Imaging Technique – File Select

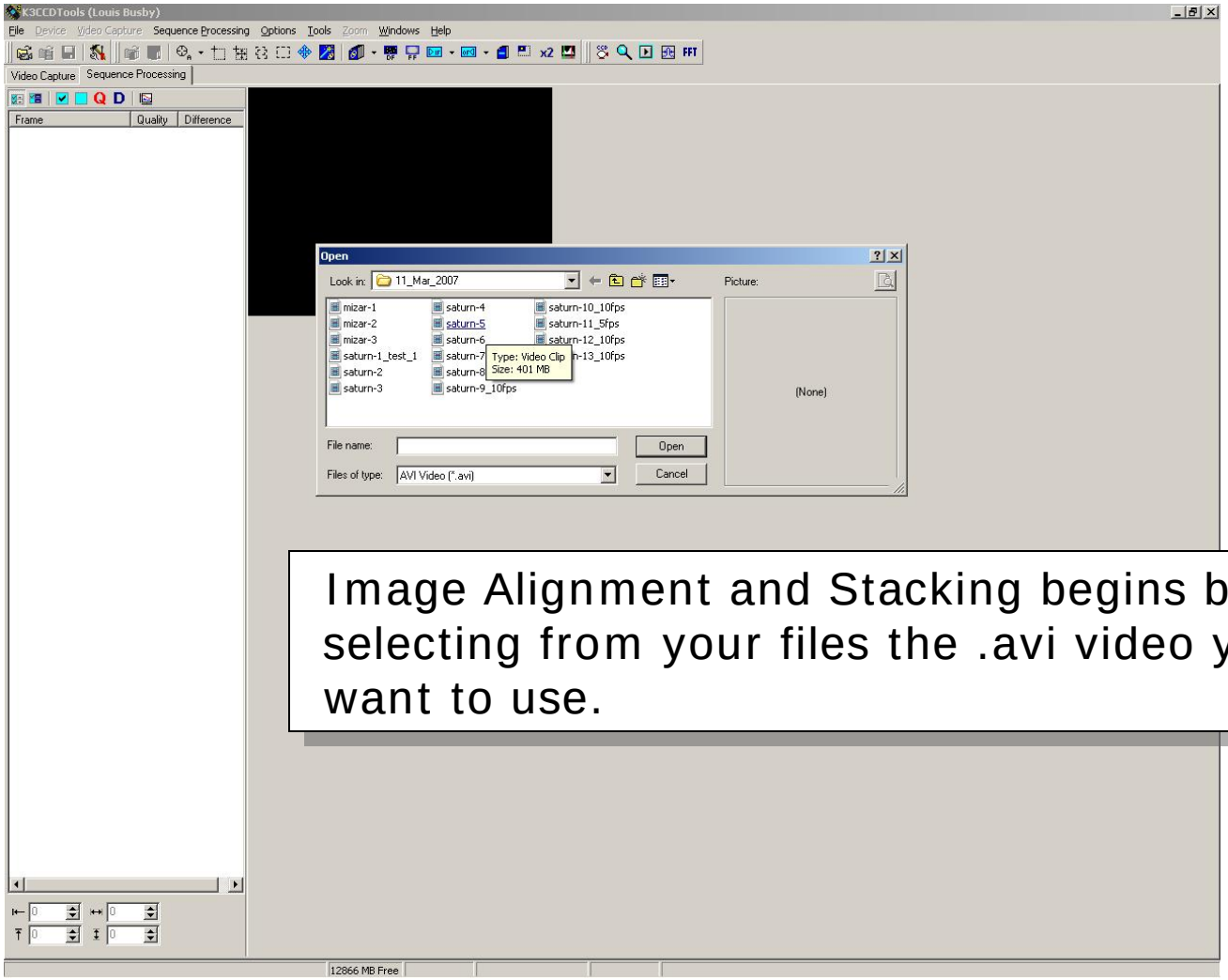
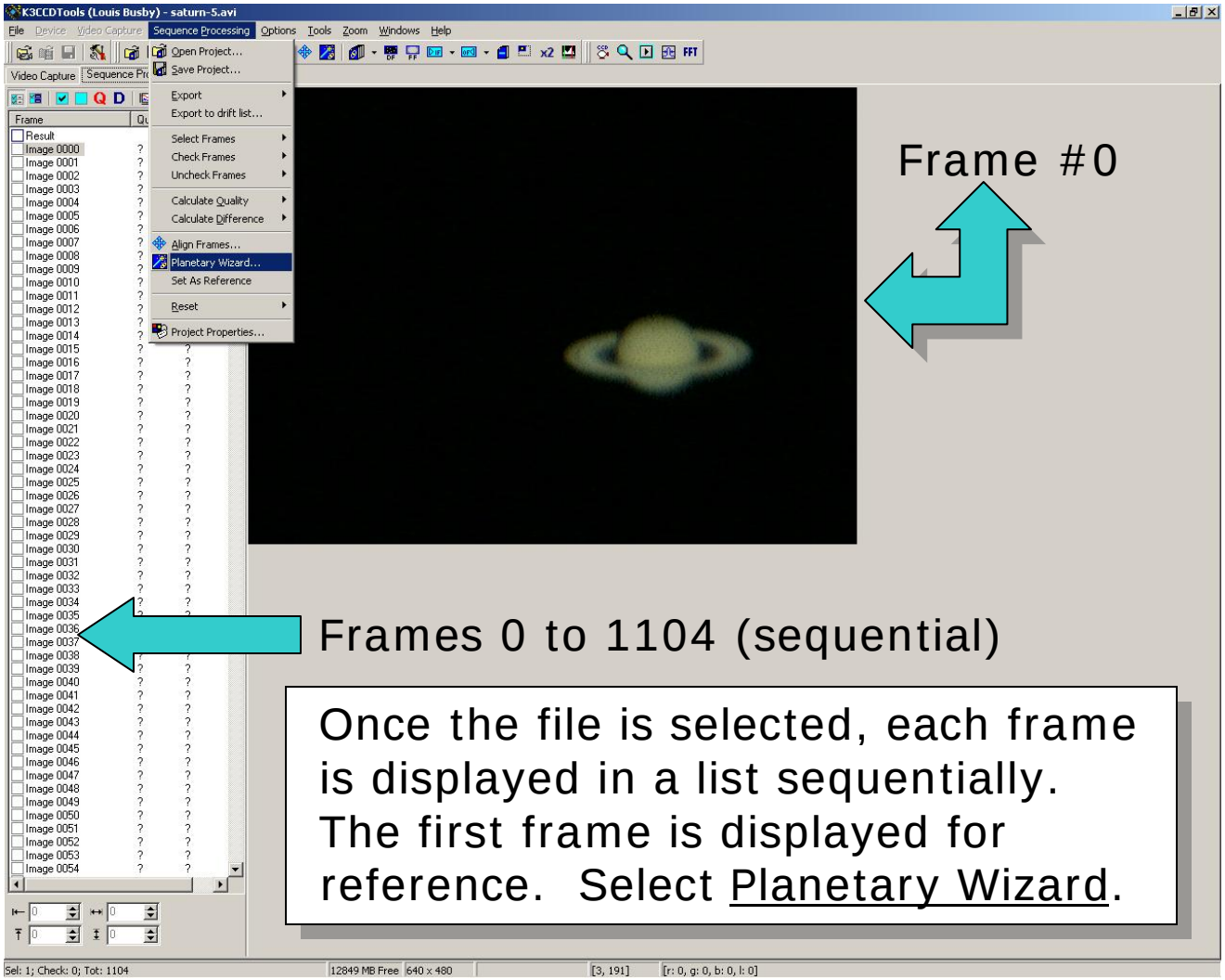
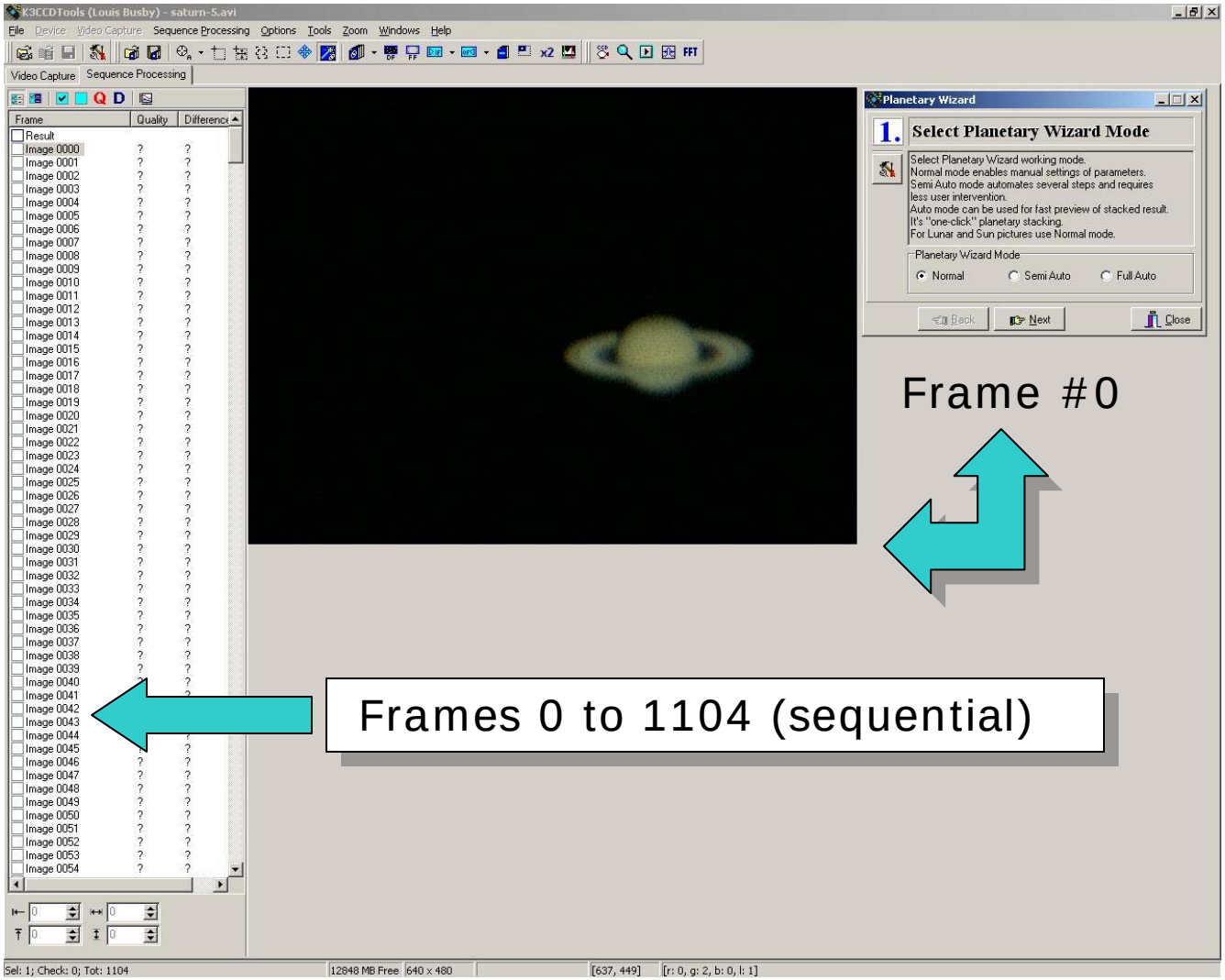


Image Alignment and Stacking begins by selecting from your files the .avi video you want to use.

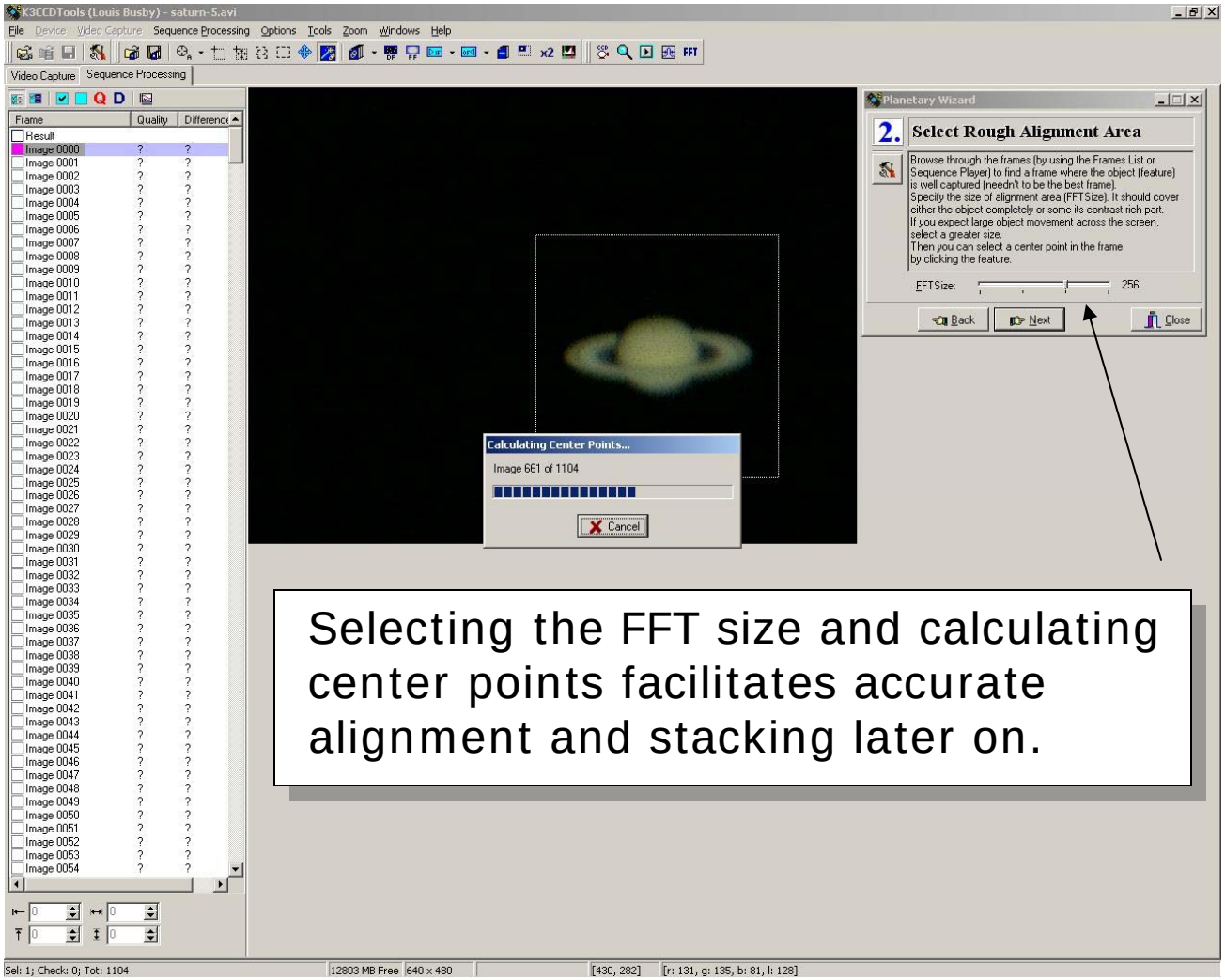
Imaging Technique – Frame Display



Imaging Technique – Planetary Wizard

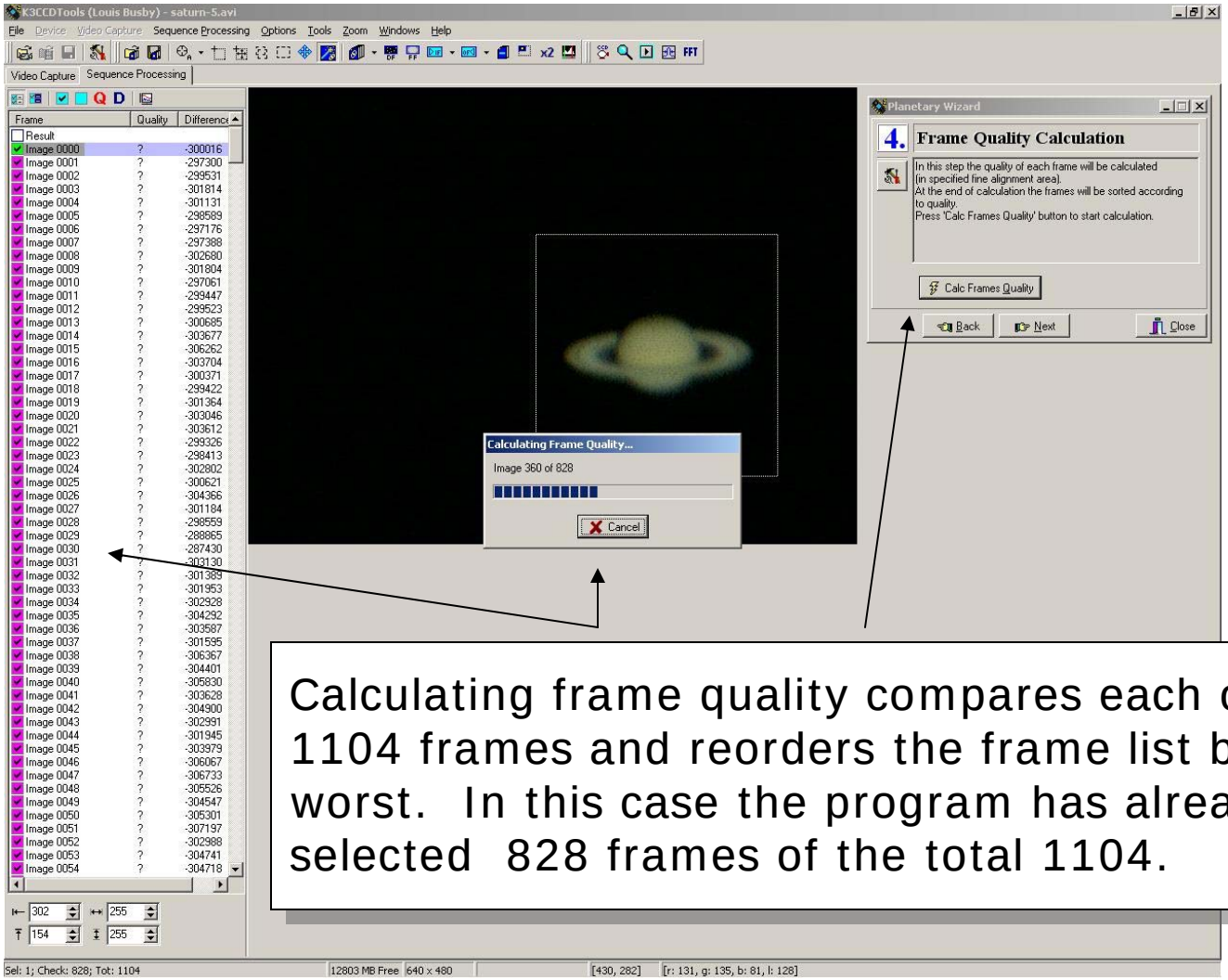


Imaging Technique - Calculations



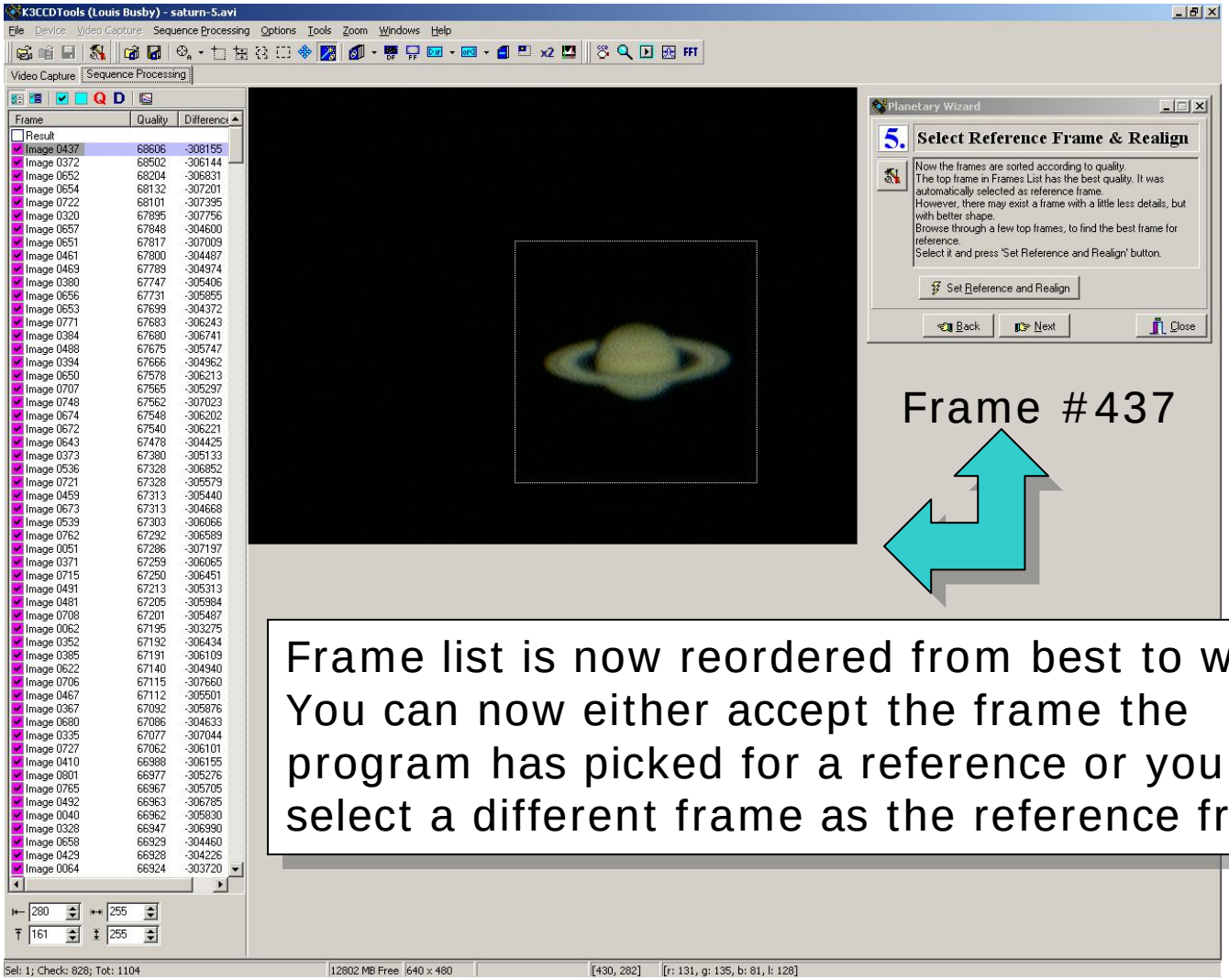
Selecting the FFT size and calculating center points facilitates accurate alignment and stacking later on.

Imaging Technique - Calculations



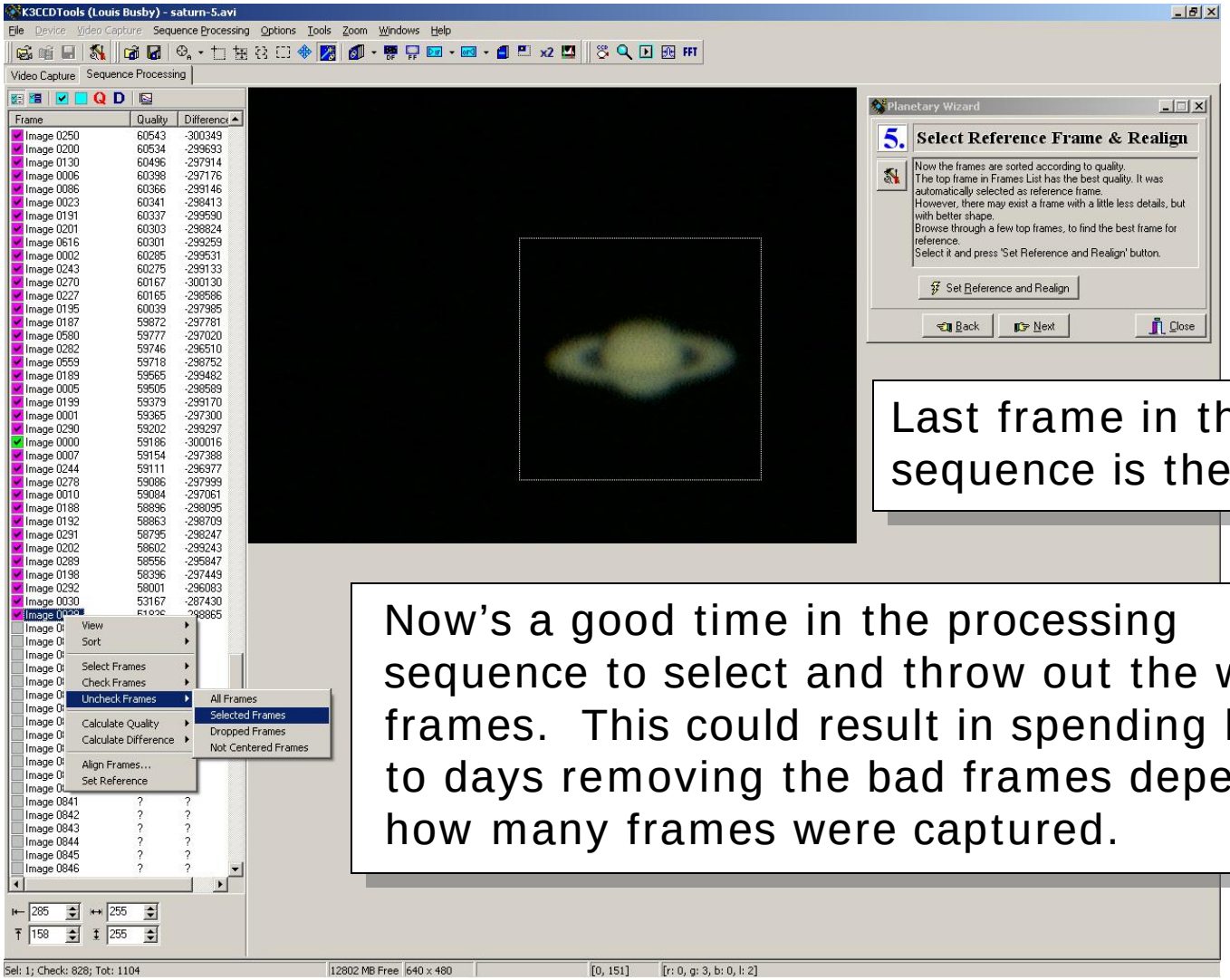
Calculating frame quality compares each of the 1104 frames and reorders the frame list best to worst. In this case the program has already selected 828 frames of the total 1104.

Imaging Technique – Reference Frame



Frame list is now reordered from best to worst. You can now either accept the frame the program has picked for a reference or you can select a different frame as the reference frame.

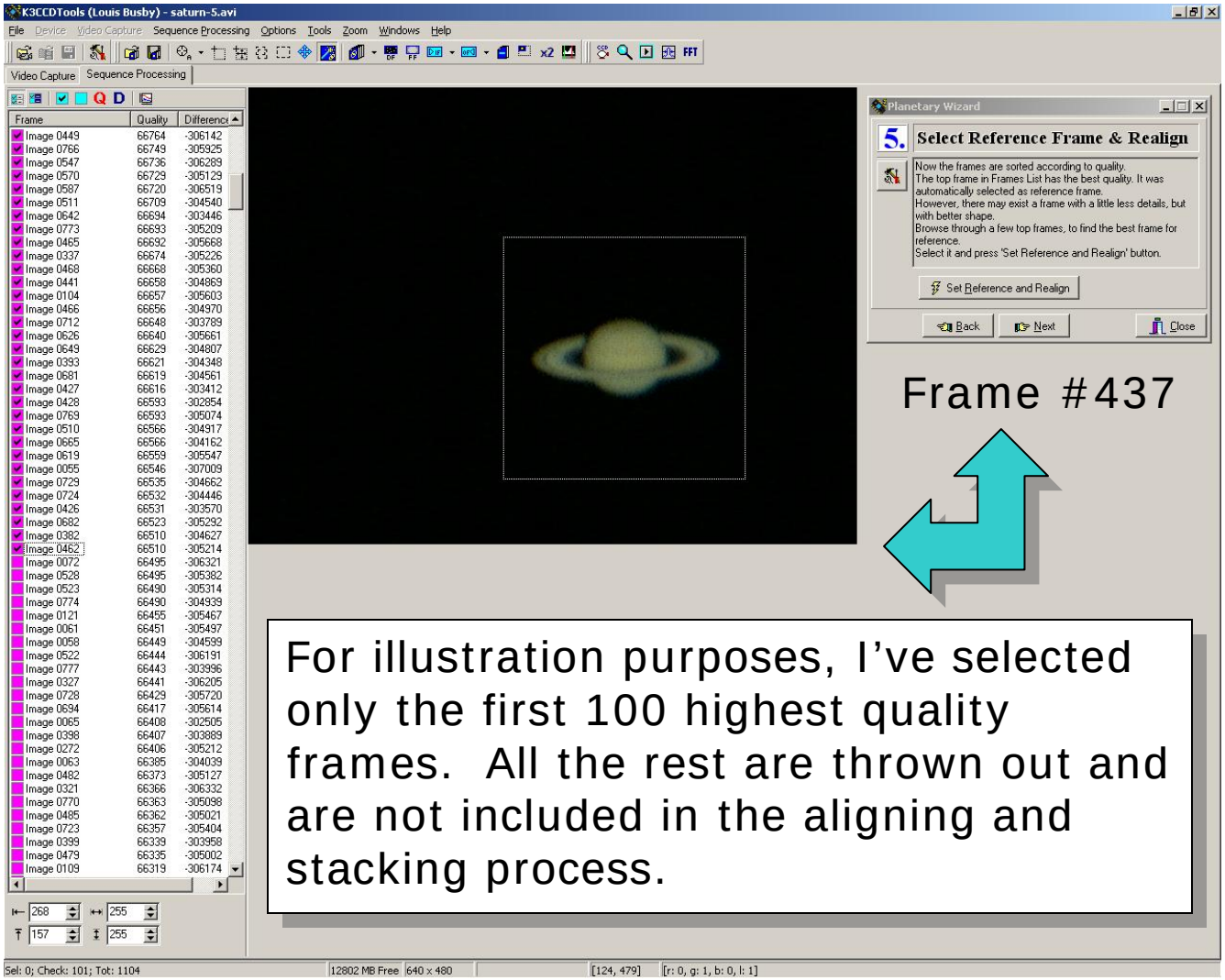
Imaging Technique – Pick Best Frames



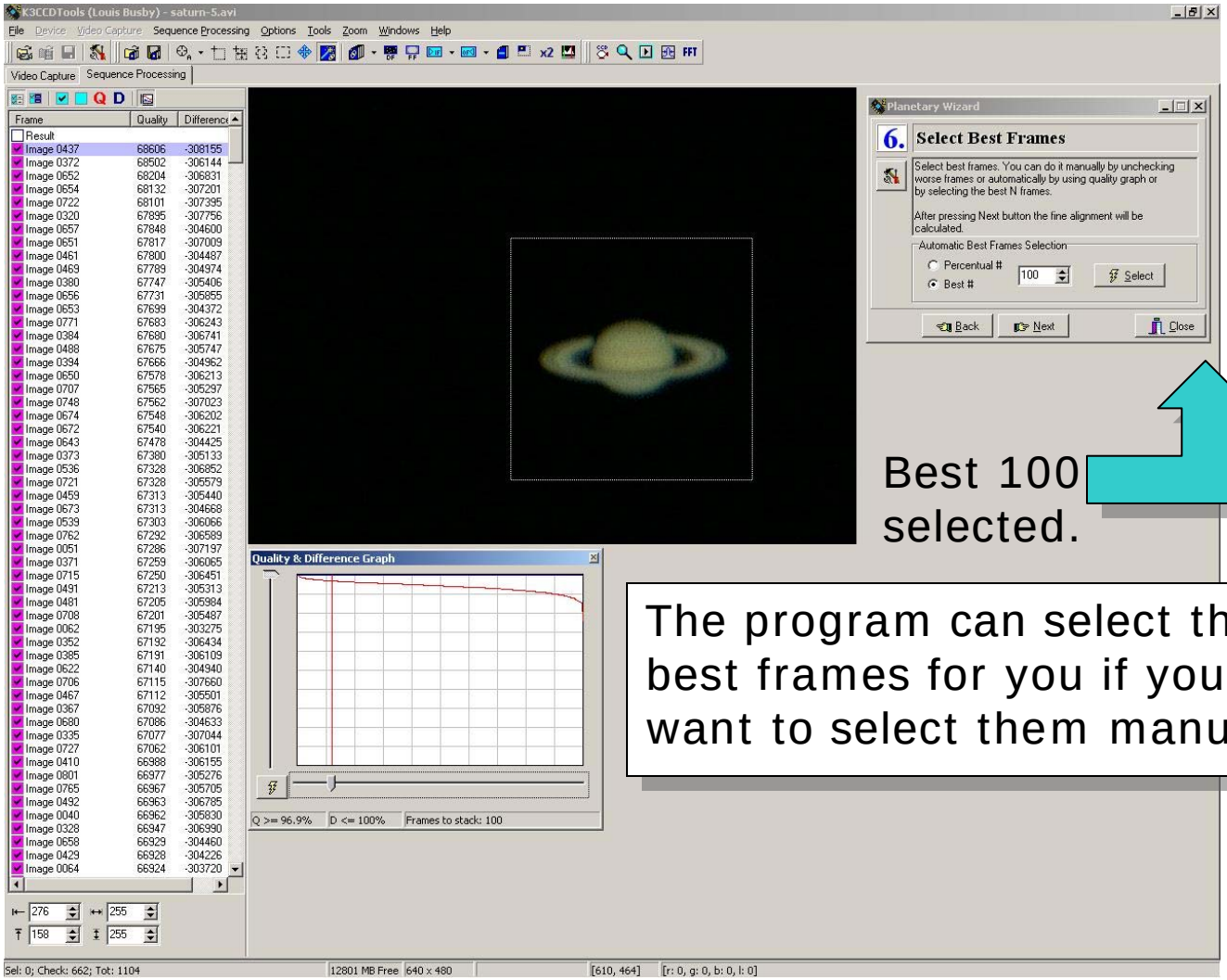
Last frame in the sequence is the worst.

Now's a good time in the processing sequence to select and throw out the worst frames. This could result in spending hours to days removing the bad frames depending how many frames were captured.

Imaging Technique – Pick Best Frames



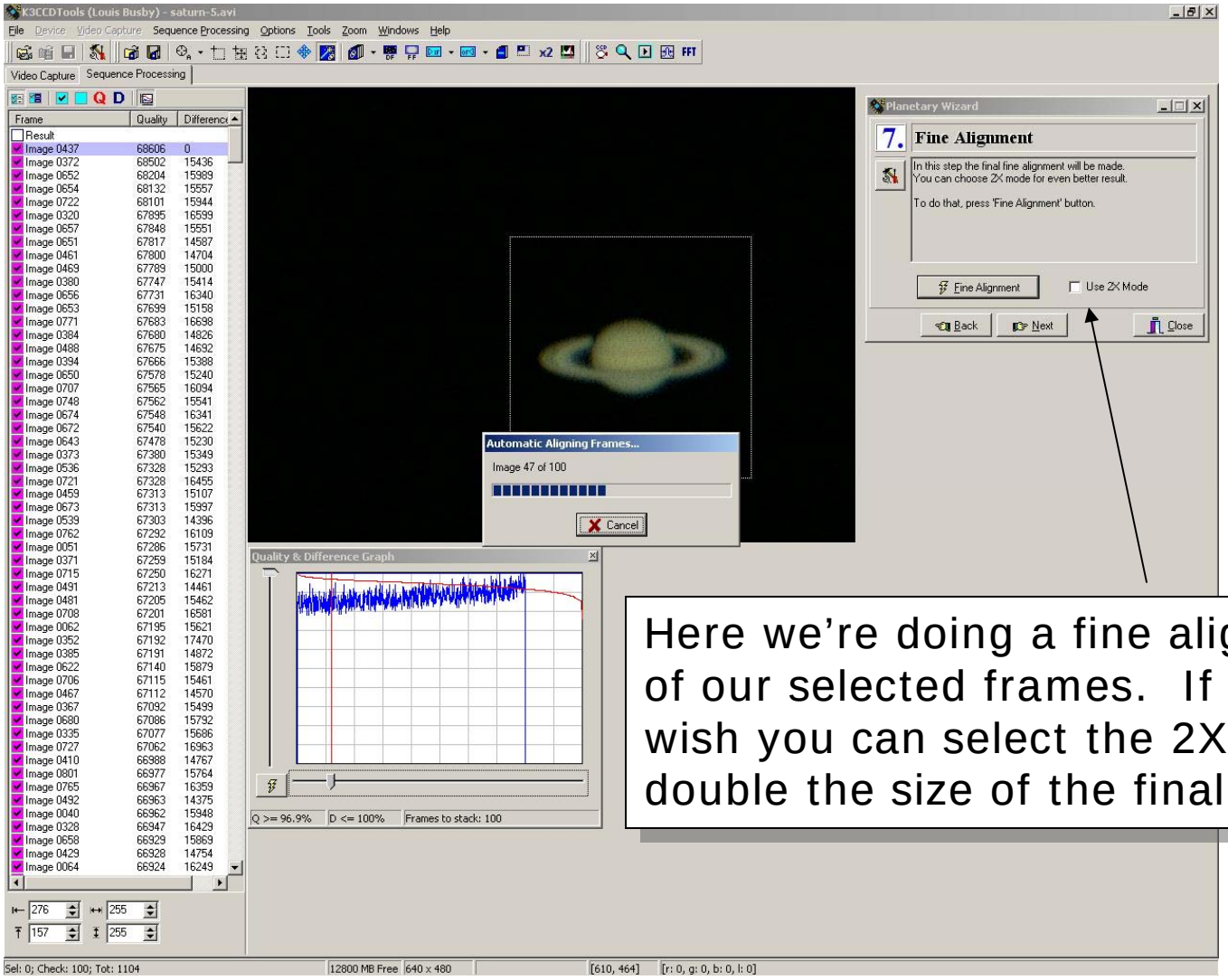
Imaging Technique – Pick Best Frames



Best 100 selected.

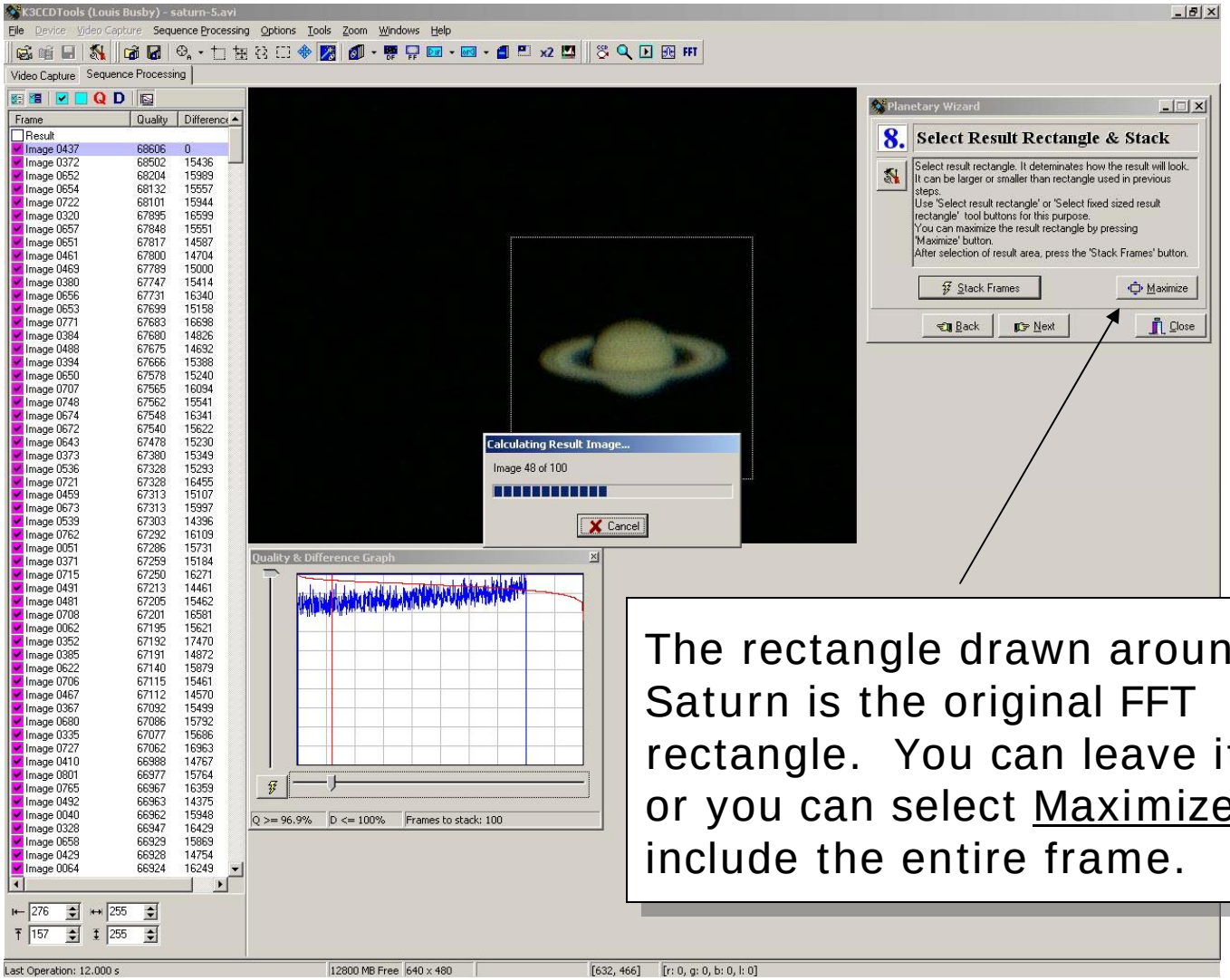
The program can select the best frames for you if you don't want to select them manually.

Imaging Technique – Fine Alignment



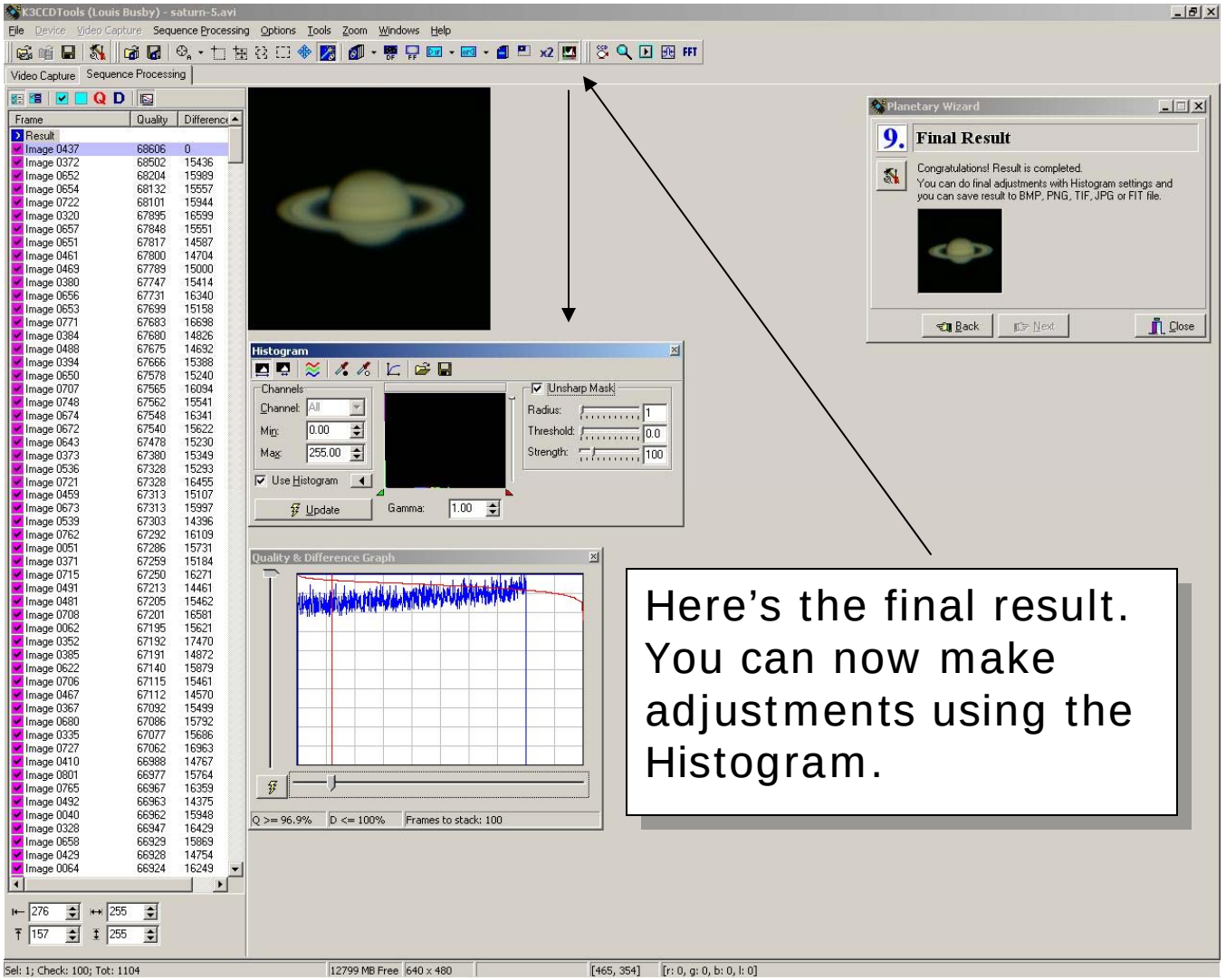
Here we're doing a fine alignment of our selected frames. If you wish you can select the 2X box to double the size of the final image.

Imaging Technique – Stacking Frames



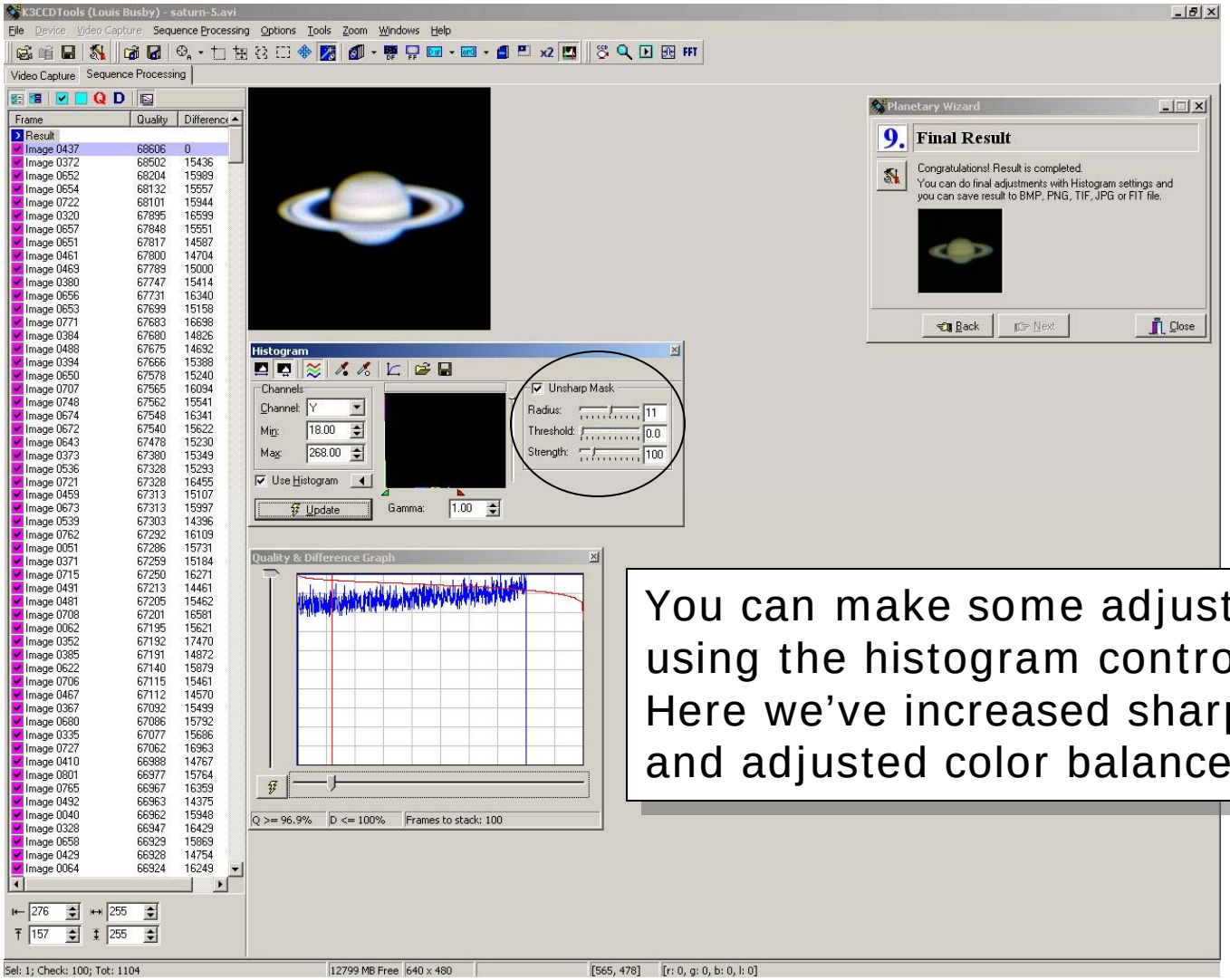
The rectangle drawn around Saturn is the original FFT rectangle. You can leave it as is or you can select Maximize to include the entire frame.

Imaging Technique – Final Result



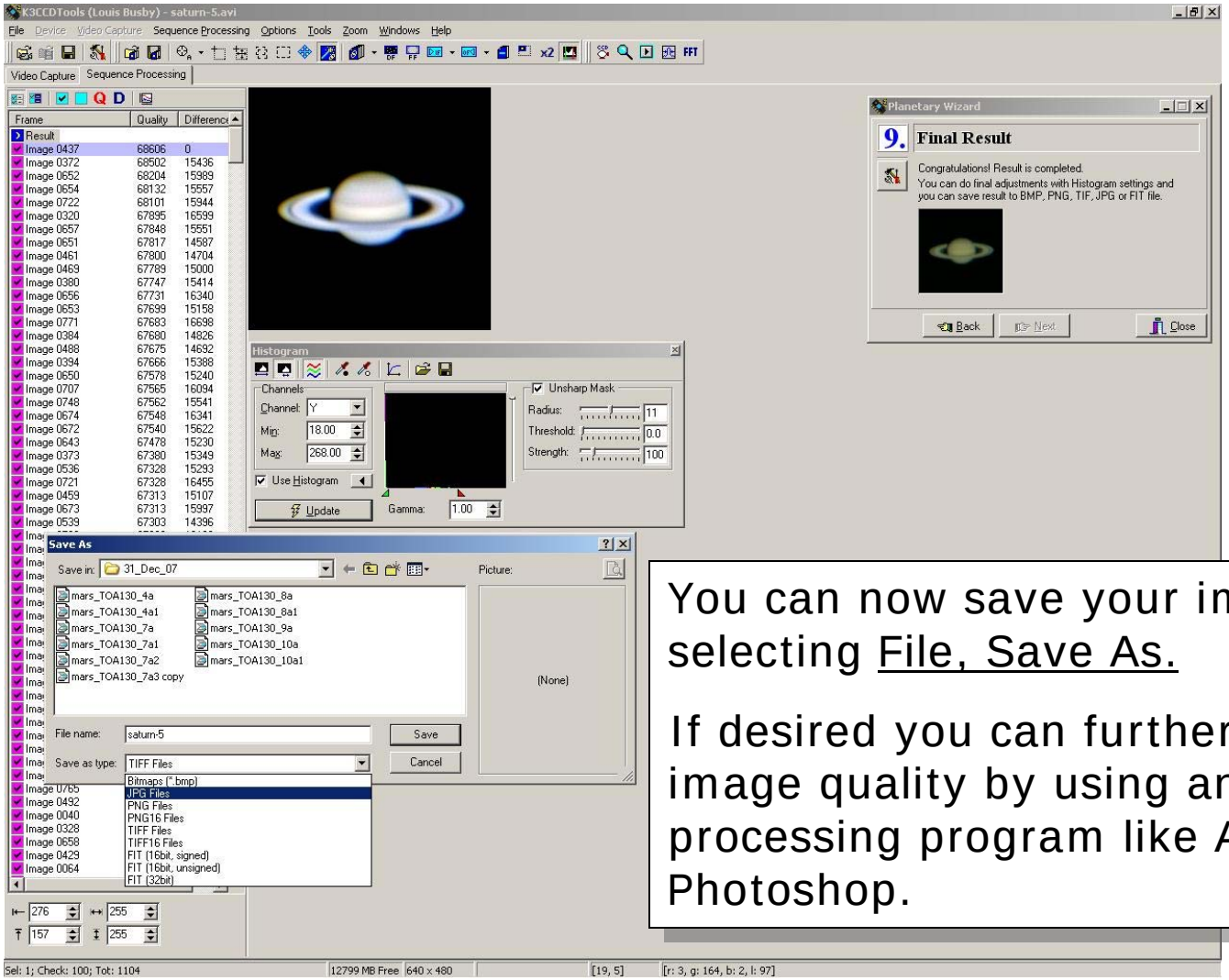
Here's the final result. You can now make adjustments using the Histogram.

Imaging Technique - Adjustments



You can make some adjustments using the histogram controls. Here we've increased sharpness and adjusted color balance.

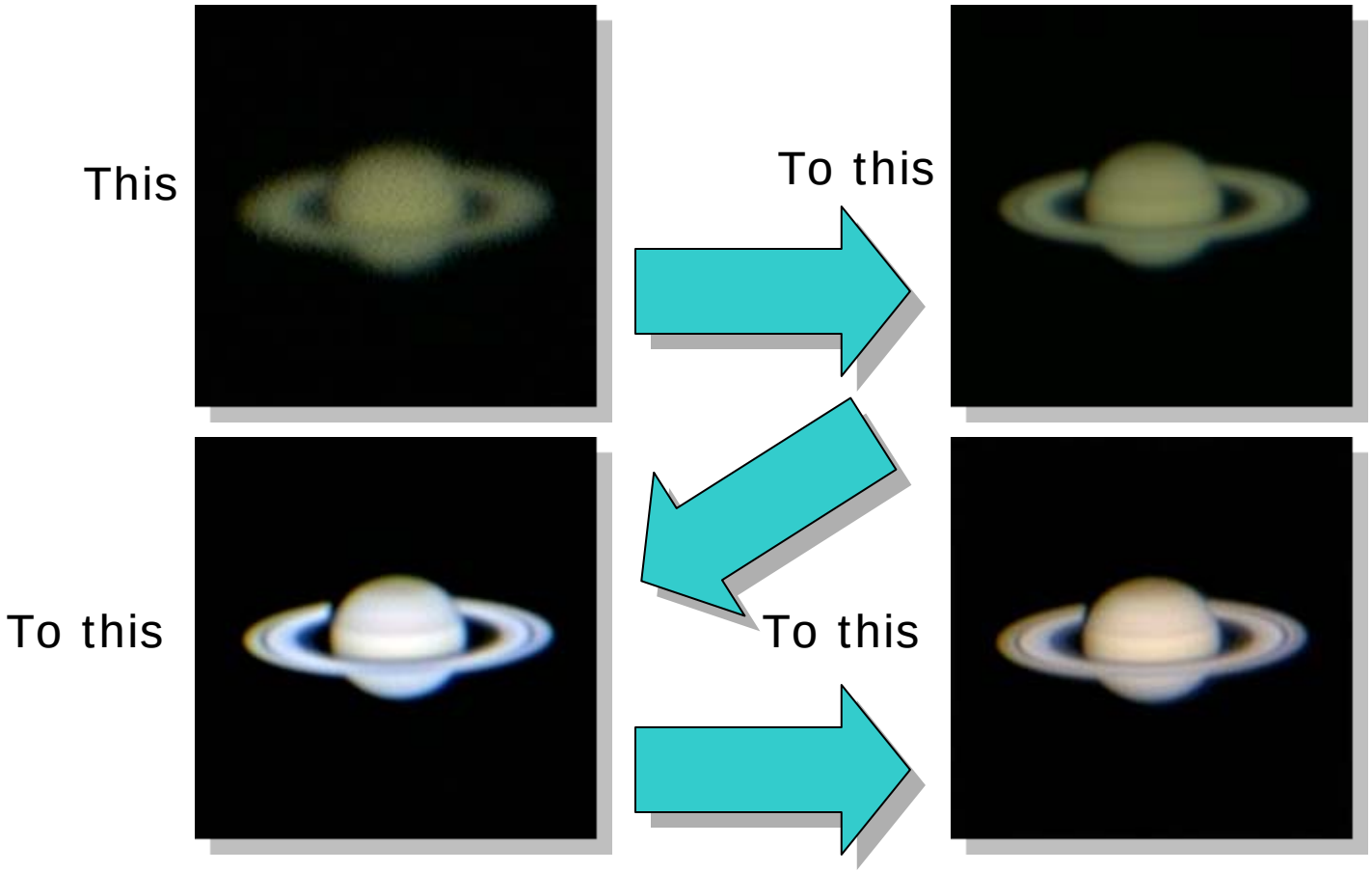
Imaging Technique – Saving the File



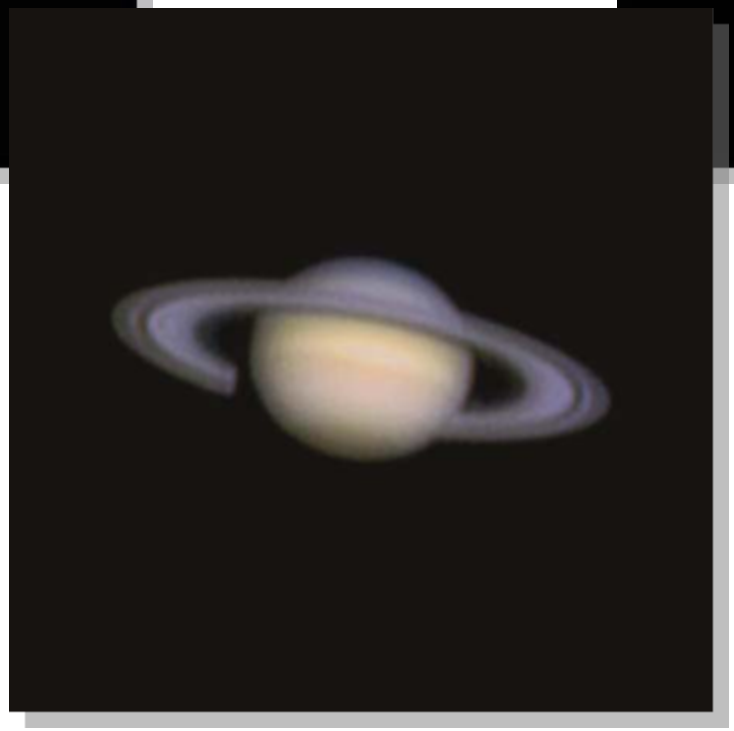
You can now save your image by selecting File, Save As.

If desired you can further improve image quality by using an image processing program like Adobe Photoshop.

Imaging Technique – Image Refining



Imaging Technique – Image Refining



To This!!!

Image Showcase - Moon

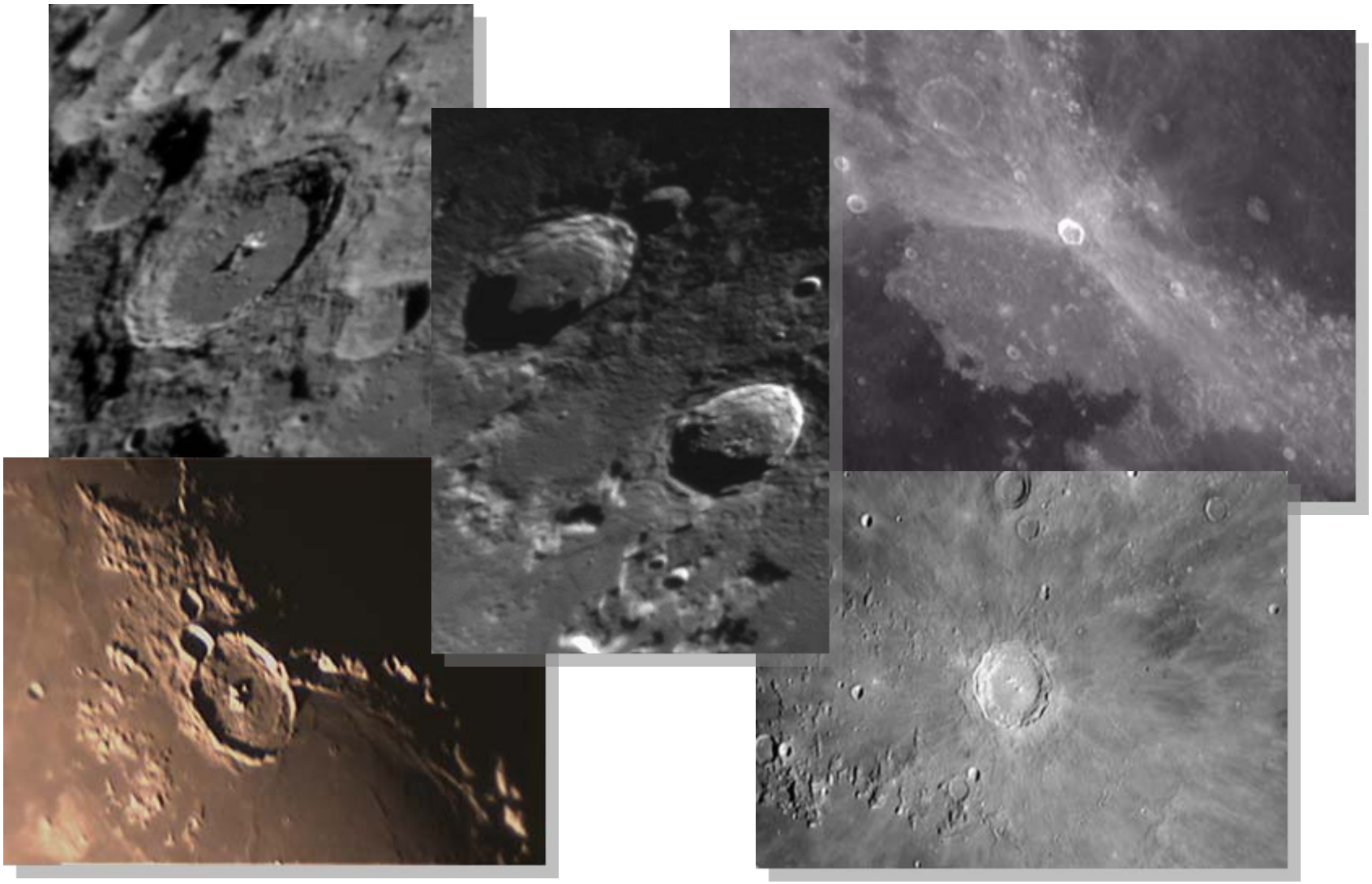
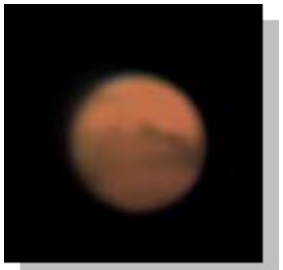
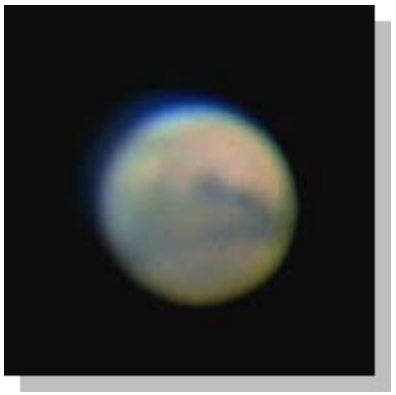


Image Showcase - Mars









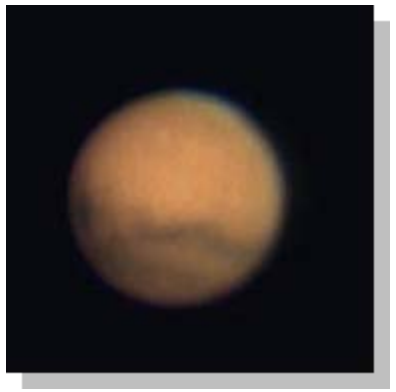
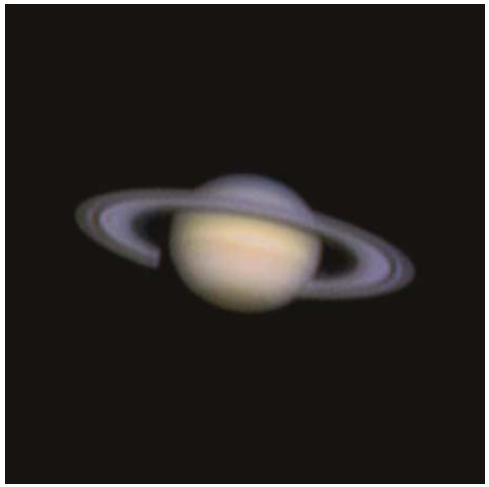
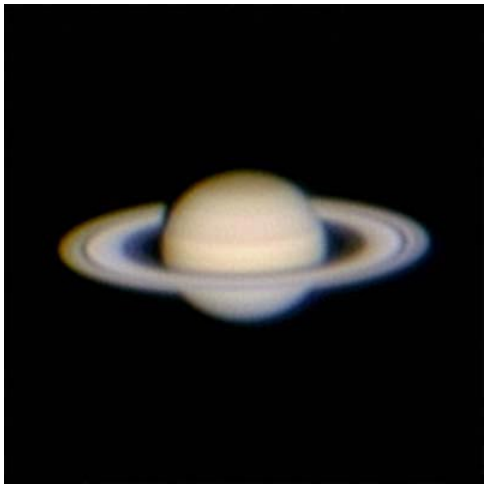


Image Showcase - Saturn





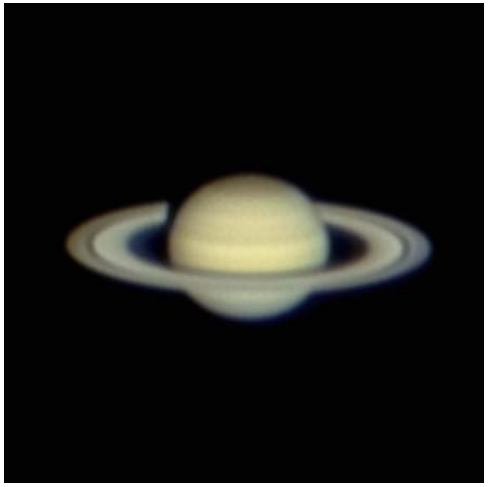


Image Showcase - Jupiter

Image Showcase – Other Images

Conclusion



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  - Easy
  - Inexpensive (kinda)
  - Fun
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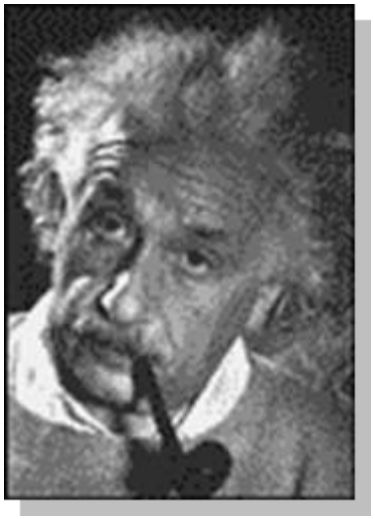
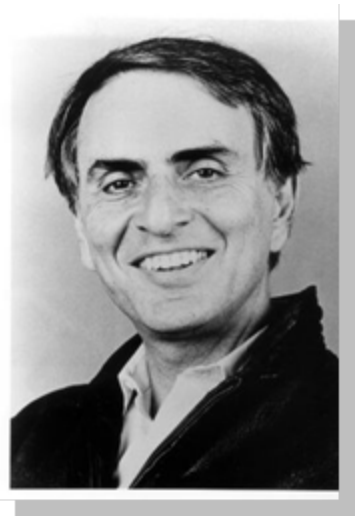
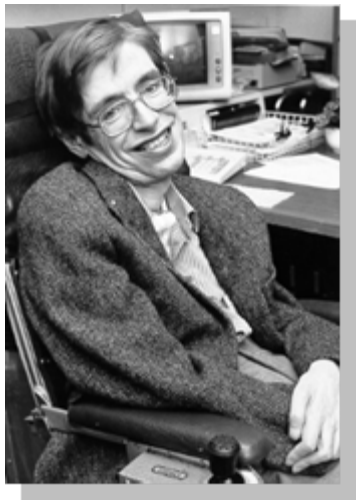
Questions???



“Do you feel lucky punk? Go ahead, make my day.”