

The Imaging Source's DMK 41AU02.AS

Planetary Imaging Made Simple

- USB CCD Monochrome Camera
- 1/2 " Sony CCD, progressive scan
- 1280x960 pixels
- Up to 15 images/s



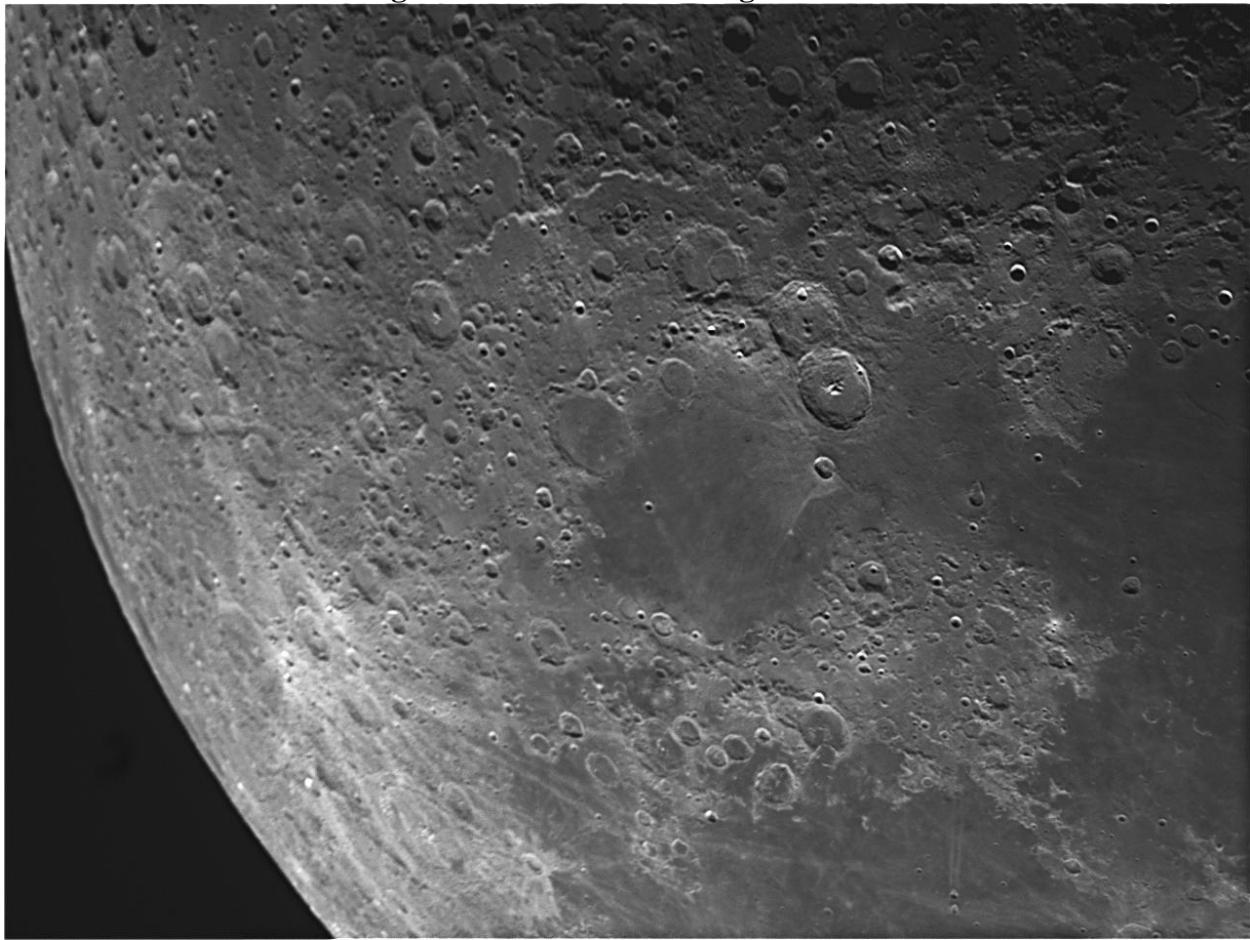
I recently had the good fortune to meet John Berryman, one of the sales engineers for The Imaging Source, at "*The Vision Show*" in Boston. This show is not one you find many astro photographers attending as the target audience for vendors at this show is usually using imaging tools to enhance their manufacturing processes. As such, they don't usually advertise in astro photography circles. However, The Imaging Source has chosen to market some of their cameras to those of us that prefer low light conditions to the bright lights of labs and manufacturing floors.

While I was talking with John over lunch I learned that he has been interested in astronomy and imaging the heavens for a very long time. That interest prompted him to offer their instruments to us and incorporate some of the features beneficial to photographing the night sky. I came away from that meeting with a DMK 41AU02.AS camera that I have been using for a few months (New England weather patterns prohibit quick trial periods!) and have had a great deal of success making images of some of the typical Solar System targets.

This is a CCD based monochrome camera. At first I was skeptical about the likelihood for success in imaging the planets with a camera that required filter changes. I was afraid I'd see too much rotation in the planet to allow proper alignment for stacking. However, I quickly realized that the planets don't rotate nearly fast enough for there to be an issue. After all, at 3 – 15 frames per second, you capture an awful lot of data in very short order. I found my greatest success with less than 5 minutes of data for each channel, usually closer to 3 minutes was sufficient. Anything above that and my poor PC got very tired trying to process all those frames. I still end up with over 2000 frames to choose from, so there are more than enough moments of good seeing captured to create a great image. Hopefully you'll agree as I share my results with you.

First up is a close up of the moon taken through my 8 inch SCT, shown in **Figure 1**. This is an RGB image based on 3 minutes of video taken using default settings in the capture software provided with the camera (more on the software later). After collecting all three data sets I imported them to Registax 5, the last version made available, and processed according to the introductory tutorial provided by the authors of Registax. I haven't used Registax in a very long time and the interfaces are completely different, so I took the default values for everything I could until I got to the wavelets section, where I applied a very mild value of 5 for each wavelet. After that it was off to Photoshop CS3 to RGB merge the data sets and then balance the colors. That's pretty much all I did for all of the images you'll see in this article. I kept the processing to a minimum to show the quality of the data provided by the camera.

Figure 1 - The Moon Through 8" SCT



The next image is also of the moon, shown in **Figure 2**. However it is a full moon image taken through my Stellarvue SV90TF refractor. I had to use a two panel mosaic to capture it all, but I think it was well worth the extra effort. When I printed this image at my local color lab (I work there part time) I clearly heard one of the customers exclaim "That's the best picture of the Moon I have ever seen!" That was music to my ears and I'm sure the folks at The Imaging Source are even more pleased to hear that. Again, I processed the data very lightly and I'm sure the image would turn out even better with more time in Photoshop, but I'm very happy with the

results and I am thrilled with how little effort it required. Stitching the panels together was almost as much work as the rest of it and I've gotten a lot of practice doing that at the color lab so I've gotten pretty fast.

Figure 2 - The Full Moon Through 90mm Refractor



I only had one chance to photograph Saturn before it drifted beyond my line of sight and it was on one of my first nights out with the camera. I hadn't had any time to experiment with the capture software or the camera before that night and I was still able to capture enough data to create the image shown in **Figure 3**. For this one I used my 8 inch'er and roughly 4 minutes of data for each channel. It is a little soft, but I believe that's because I was shooting through a lot of atmosphere. The mirrors in my SCT might not be quite perfectly aligned either and we all know that SCT's are notoriously finicky about proper collimation.

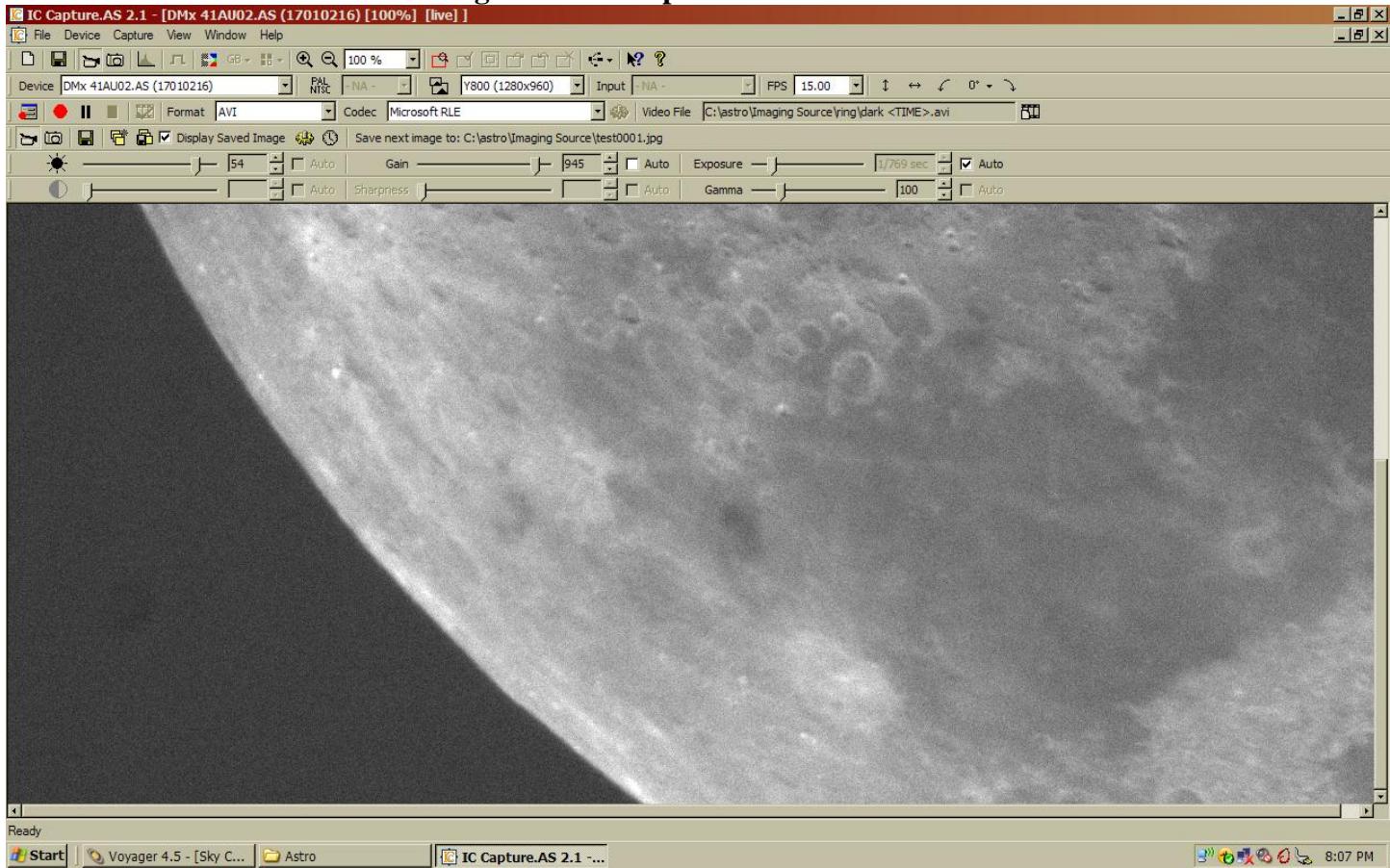
Figure 3 - Saturn Through 8" SCT



Image Capture Software

Included with the package is The Imaging Source's proprietary capture software IC Capture.AS. This is one sophisticated program. One look at the screen shot shown in **Figure 4** reveals the type of interface I prefer. There are no long menu searches to find any control you might want. Everything is right there or is in a pop-up menu that is activated by one of the icons on that screen. Bear in mind that these cameras are not intended solely for astronomical use, so there are some functions and options that don't apply well for astro photography. However, they have no impact on the usefulness of IC Capture.AS's functionality.

Figure 4 - IC Capture.AS Screen Shot



So how well does the program work? Refer back to **Figure 4**. That is a screen shot of a single exposure that I was able to make within the first half hour of operation on the first night. Being a typical guy, I started everything up without first reading a single line of the documentation other than how to properly connect and power the unit. I had to poke around a little bit to find the “Live” function and then a little more to figure out how to get it to save a video file. See that little red dot located center left in the tool bars? Look like the record button on a video camera? Hit that and you get a pop-up window that allows you to specify all sorts of parameters regarding image capture.

You can change the duration of each exposure by simply un checking the “Auto” check box next to the “Exposure” slider on the lower right and then moving the slider left or right. Slide it left and you get shorter exposures. Slide it right for longer ones. If you extend the exposures, you will override the frames per second value shown in the pull down menu displayed directly above the “Exposure” slider. Shorten the exposure and you’ll use the shorter exposure at the specified frame rate, with appropriate delay between exposures.

You can choose from several file formats for the video capture. Since I used Registax for my processing program, I used avi file format with a Microsoft RLE codec. You may require something different for your workflow. It took me a few tries to find the right one, but it was a simple matter of cycling through each option until I found a combination recognized by

Registax. I did this during the day with no concern for the actual image captured – it was actually just the inside of the nose piece cover – since all I really cared about was finding a file format that worked for Registax.

Conclusions

When I started this project, I was hesitant about the prospect of using a monochrome camera and the required filter changes to generate color images of Solar System objects. I was afraid I would see too much rotational movement in the objects to be able to generate clear images. It turns out that fear was unwarranted. While it is true that long exposures of planets can result in unclear images, each frame within the video capture can be successfully aligned with the next to ensure clean crisp details.

The DMK 41AU02.AS consistently generated good quality data and is simple to use. Like all other cameras I have used for planetary and lunar imaging, this one performs best when used with relatively short exposures. It is not cooled and its sensitivity renders it subject to thermal noise generation quite easily with long exposures. Therefore the DMK 41AU02.AS would not be my choice for deep space imaging. However, if you are interested in making high quality images of the planets, the moon or comets then you owe it to yourself to put this camera – or any of The Imaging Source products – on your short list.

The Imaging Source cameras support a variety of sensor sizes. The DMK41 utilizes a $\frac{1}{2}$ " sensor, which yields a pretty wide field of view with my telescopes. If you want higher magnification, it might be wise to consider one of the other options which come with a smaller sensor. They are all made with very high quality sensors, so they should all perform equally well.

The Imaging source cameras come with C-mount nose and a $1\frac{1}{4}$ " nose. Unfortunately for me, my filter wheel requires a T-thread mount, so I had to adapt. I found a C-mount to T-thread adapter easily enough and used that to attach the camera to my filter wheel. However, if you choose one of their color cameras you can just use the $1\frac{1}{4}$ " nose piece, which would then allow you to include a barlow in your imaging train. If you have a 2" barlow, then you'll just need an eye piece adapter which probably came with your big barlow.

The DMK 41AU02.AS is currently available through several vendors with a list price of \$630. This camera is definitely one of the highest quality camera's I have ever used for Solar System imaging. If you own one of these beauties, you'll definitely be swimming in the deep end of the astro-photography pool.