A super sensitive CCD

Astronomy Now presents the world's first review of a new planetary imaging camera sporting Sony's ICX618 CCD chip from The Imaging Source. By **Nick Howes.**

▶ **The familiar blue livery of The Imaging Source cameras with solid construction of industrial strength. The C mount nose piece is included, as is a USB 2.0 cable. Image: The Imaging Source.**

The mention of planetary imaging cameras brings back memories of the heady days of the Phillips ToUcam and its various offspring, or inspires dreams of the wonders that a Lumenera camera can bring. But a few years ago new cameras from The Imaging Source gave planetary imagers something else to think about. Their DMK/DBK series cameras brought high frame rates and their low noise offered quality approaching that of the Lumenera cameras but at a better price. In particular their DMK 21AU04.AS mono camera, which had the Sony ICX098BL mono chip favoured by ToUcam modifiers, offered a fantastic 60 frame per second capture rate, ideal for beating the seeing (known as lucky imaging in professional circles) and reducing the potential for cloud interruptions when acquiring hundreds or thousands of frames.

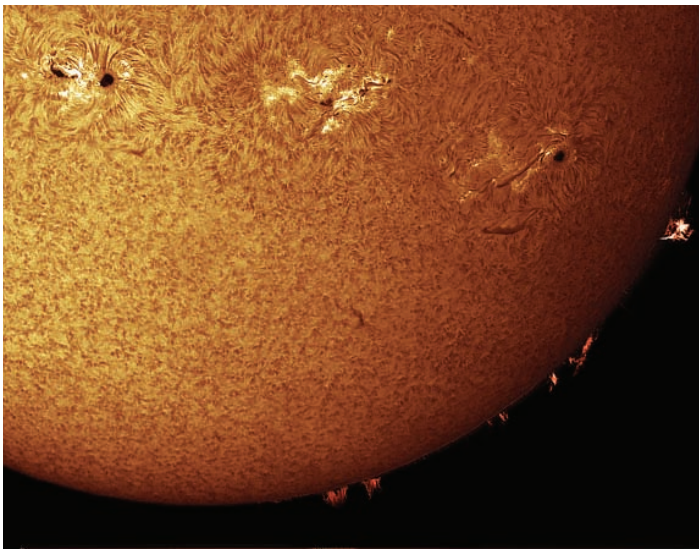
However, imaging technology is constantly evolving and a new chip, the Sony ICX618, is now making its way into a variety of new CCDs, showing improved sensitivity, noise, spectral response and quantum efficiency. Not wishing to stand still, The Imaging Source have also released a new series of cameras with the ICX618 chip.

Improved spectral response

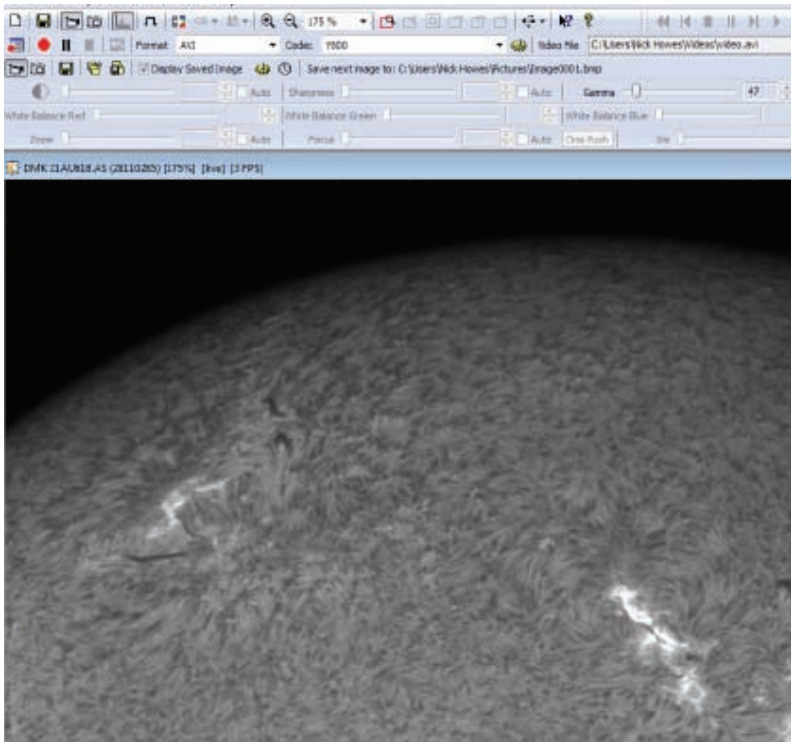
The version under test is a monochrome DMK 21AU618.AS CCD with no infrared blocking filter (there are also two colour versions, the DBK 21AU618.AS without the blocking filter, and the DFK 21AU618.AS with the filter). As my primary high frame rate imaging is narrowband hydrogen-alpha, this was the best option for me and it's relatively easy via the standard quarter-inch thread to insert a blocking filter when needed. The CCD's spectral response shows a distinct improvement over its predecessors in the near infrared regions, peaking further into the red end than the 098BL chip. Another factor that can sway people, especially for the longer focal lengths used for high resolution planetary imaging, is pixel size. The 5.6-micron pixel size on the Sony ICX618 chip is the same as its predecessor the 098BL, so what is causing planetary imagers to move over to this chip? It must be the increased sensitivity, better spectral response and lower noise – or that's the theory, anyway. How does it hold up in reality?

▼ **The lightweight and dual-purpose capability of The Imaging Sources' DMK 21AU618.AS as both a superb planetary and solar camera but also as a half decent deep sky CCD make it perfect for compact travel set-ups. Image: Nick Howes.**

The DMK cameras all come in a solid metal housing, with only the USB2.0 port on the back for connectivity, as they derive their power requirements directly from the computer. In the box comes a rather short 1.5m USB lead,



■ **The 640 × 480 CCD makes the DMK 21AU618.AS good for high magnification work on things like planets, the Moon or, in this case, a multi-pane composite of several active regions on the Sun. Image: Nick Howes.**



▲ Familiar territory for anyone who has used cameras from The Imaging Source before is the excellent *IC Capture software*. Image: Nick Howes.

▲ The DMK 21AU618.AS' ICX618 chip is small in comparison to many DSLRs or CCDs for deep sky imaging, but is perfect for planetary imaging at 640 × 480, and can operate at up to 60 frames per second. Image: Nick Howes.

which in my case was immediately put to one side in favour of a better quality and longer Belkin version, and the CD containing the *IC Capture* software and drivers. The Imaging Source's website also claimed support for Linux and Mac OSX, but this was absent on the CD, although it is easy enough to find and download from the Internet.

Installation as ever with the DMK cameras was a breeze: simply run the driver installer, plug in the camera, then run the capture installer and away you go. It's beautifully presented as ever, and the fact that The Imaging Source provide such a capable piece of software straight out of the box is a real plus point. A hunt around the Internet also allowed me to download and test a third party ASCOM driver, which allowed the DMK to work with pretty much every piece of astro software I had. It also supports long exposure modes of up to 60 minutes (but with no cooling of any description; you're reliant on good dark frames and the noise of the camera if you want to counter the hot pixels). *IC Capture's* latest incarnation still has the occasional annoying bug that will cause the software to lock up when changing frame rates, but as that's not a common operation once you get going and the software restarts very quickly anyway, it's not a major issue.

Peak response

Set up with my various solar telescopes all worked flawlessly, only having to remember to set the AVI mode and Y800 codec on start-up of the capture software, which has cross hairs and zoom controls that help with focus. The camera has a C-mount noise-piece that slots into any quarter-inch eyepiece at the front. It's longer than most you'll find, which makes it tricky if you're using something like a Coronado PST to get focus (this is a common problem with imaging on that telescope), but worked fine with the Solarscope SV50, my Vixen modified PST80 and a William Optics ZS66 fitted with a Coronado SM60II.

That the peak response was over the 656nm I was imaging at in hydrogen-alpha leant itself very well to keeping the frame rate at the full 60fps, which all of my laptops handled easily and meant that the gain control could pretty much be left at a minimum, just tweaking the gamma and exposure settings to go from prominences to surface detail. It also had a marginally better peak response on the calcium-K (393nm) end of the spectrum, making imaging in this light a bit more friendly. What I did find was that the noise levels seemed higher with the gain control ramped up than for equivalent settings on my Lumenera cameras. Offset this with the improved spectral response though, and for brighter objects such as the Sun or the Moon it's not really noticeable.

Using this CCD with the infrared pass filters on larger telescopes will allow the increased spectral response to pay huge dividends. As these filters are useful in helping with seeing conditions, this alone may sway many to upgrade from the DMK 21AU04.AS to this model, but will it sway people away from the Lumeneras?

The DMK 21AU618.AS (I do wish they would come up with snappier names!) is not going to magically turn you overnight into the world's best planetary imager. Years of skill, hard work and incredible seeing combined with careful post-processing skills is 90 percent of what goes into a really great image. The specifications do take some beating although I wish I'd had the other 618 cameras to test side-by-side to cross verify the gain noise, because the killer feature of this package isn't the chipset, despite its brilliance, but the fact that it is a package aimed squarely at the astro imager. Sure the sensitivity boost will help, especially when imaging planets (and by that I now include Uranus and Neptune), but it's the all-round performance that will convince people to dip into their pockets. With their outstanding quality at good prices, this may be the hour when The Imaging Source finally become the new kings of 'lucky imaging'.

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At a glance: DMK 21AU618.AS

Resolution:	640 x 480 pixels
CCD size:	0.25 inch
Frame rate:	up to 60fps
Accessories:	IC Capture software, 1.5-metre USB2.0 cable, C-mount nose piece
Price:	430 euros
Details:	www.astronomycameras.com/en/products/