The Moravian G2-8300 CCD camera

Nik Szymanek tests out a new CCD camera from Eastern Europe that proves more than a match for its American counterparts.

CCD cameras featuring the Kodak KAF-8300 sensor are very popular in the imaging community. The medium-sized sensor features good quantum efficiency and small pixels making it ideal for use with modern apochromatic refractors. Most of the main CCD camera manufacturers feature models with this sensor, including my own, the Quantum Scientific Imaging 583wsg model, so I was quite keen to see how this new offering from Czech-Republic based Moravian Instruments would compare.

The KAF-8300 sensor measures 18.1mm × 13.7mm, has 5.4-micron square pixels in a 3358 × 2536 array and features an anti-blooming gate to stop bright stars producing unsightly streaks. The camera arrived in a well-packed, sturdy aluminium case. Inside were the camera itself, 12-volt power supply, documentation and a USB stick that contained all the relevant camera drivers and software. The documentation was well written and very clear and contained some useful information to assist with imaging procedures once the camera was running. Installation was extremely easy. I only had to plug the camera's USB cable into my Windows 7 PC, navigate to 'Device Manager' and then load the drivers from the USB stick. From that point onwards the camera performed flawlessly.

Also included is proprietary camera control software called 'SIPS' (Scientific Image Processing System), which is a surprisingly powerful and comprehensive package that allows all of the modern requirements such as calibration, focusing, autoguiding, stacking etc. I tested the camera indoors initially and didn't even have to install the software as it ran quite happily from the USB stick. The camera itself is rugged and of good quality construction and with a weight of just over one kilogram shouldn't cause a problem with modern short focal length refractors.

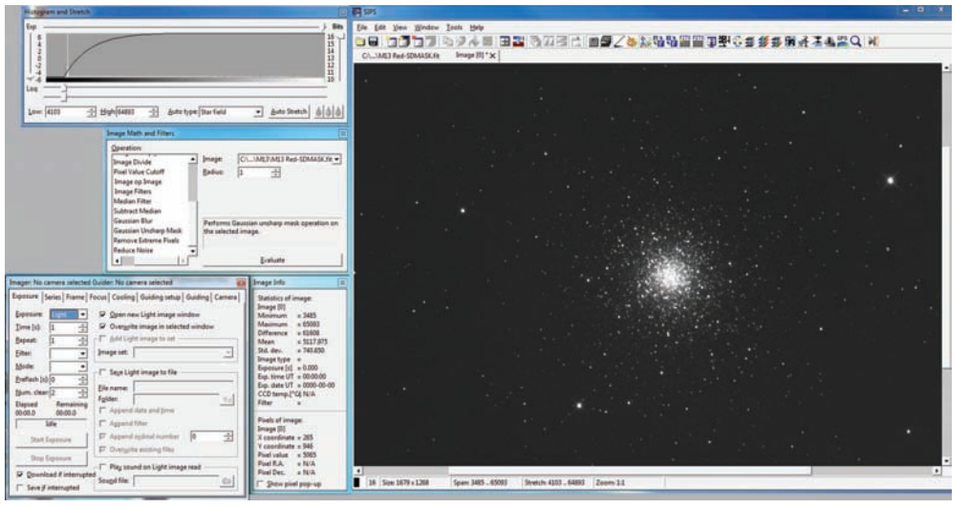
The G2-8300 camera was supplied with an internal five-position filterwheel and the filters supplied by Moravian were Astronomik 31mm red, green and blue and Astronomik hydrogen-alpha and oxygen III. Once powered up a series of LED lights blinks on the casing to confirm that all is well and that the internal filterwheel is initialised. I ran the SIPS software and switched to the cooling section, which is controlled by a twin-stage Peltier thermoelectric module and an external fan. This is extremely comprehensive and allows a lot of input from the user. The software shows real-time graphing of the camera's cooling parameters and, whilst not necessary for general imaging, it certainly shows the quality and functionality of the software. The cooling procedure can be finely controlled to prevent thermal shock to the sensor and then automatically regulated to 0.1 degrees Celsius. Cooling of the sensor is critical for the reduction of dark current and the G2-8300 boasts cooling to 50 degrees below ambient temperatures, which is impressive. The stated download time is 14.4 seconds with the camera set in its low-noise readout and I found this to be the case with my observatory PC, also running Windows 7. With the sensor binned in a 2 × 2 configuration the download time reduced to a speedy five seconds.

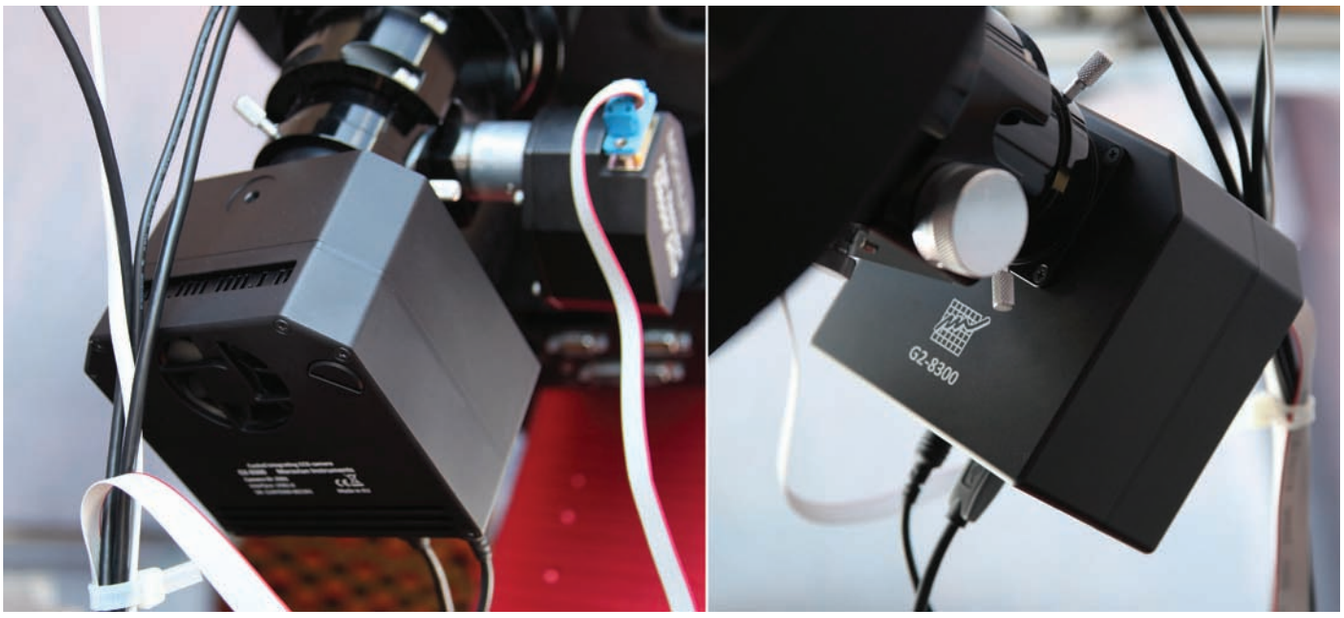
Installation

The next clear night I installed the camera in my observatory. It was supplied with a standard two-inch nosepiece although other options are available at the purchasing stage. The camera should work well with an off-axis guider as this can be placed at the front end so that guide stars are located without any attenuation from the internal filters. However, for my testing I used a Starlight Xpress Lodestar autoguiding camera attached to a Pentax 75mm refractor. I also employed an Astro Physics 0.67 focal reducer so when used with my GSO 250mm (ten-inch) Ritchey-Chrétien telescope the field-of-view was 46.5 × 35.1 arcminutes with a sampling scale of 1.6 arcseconds per pixel.

During testing in early April there was a shortage of narrowband targets so I choose to produce an RGB image of M3, a globular cluster in Canes Venatici. For the observatory session I opted to install the supplied plug-in for *Maxim DL 5*. It was a simple case of unzipping four files into the *Maxim DL* directory in 'program files' and the G2-8300 camera could then be chosen from the camera set-up dialogue box. Once these files were installed it was a simple matter to use *Maxim DL* in the normal way. I also had to configure the filter settings for *Maxim* but this was simple as Moravian Instruments had helpfully supplied the relevant positions when they installed the filters prior to

▼ The 'SIPS' (Scientific Image Processing System) provided with the Moravian G2-8300 CCD camera is a surprisingly powerful and fully-featured program that can be used to control the CCD camera during imaging as well as containing a whole host of image processing utilities. All images: Nik Szymanek.





▲ **Front and back views of the G2-8300's casing. Cable inputs at bottom are USB and power, and the start-up LED status lights are adjacent to the cables. A large cooling fan on the back of the camera dissipates heat from the Peltier cooler.**

shipment. The supplied USB stick also contains plug-ins for *Astro Art*, *ImagePro* and *ASCOM* drivers. Once successfully connected I cooled the camera to –25 degrees Celsius and noted that, as with the SIPS software, the cooling was carefully controlled automatically to reduce thermal shock to the sensor. This entailed a wait of several minutes for the camera to reach the selected operating temperature and, in passing, when the session was finished the sensor warm-up procedure was also quite lengthy.

Whilst waiting for the sky to fully darken I shot a series of flat-field frames by imaging the interior of my observatory dome. This saved time later but also allowed me to assess the level of vignetting, if any, imparted by the use of the focal reducer on the supplied two-inch nosepiece. Happily, there was no vignetting at all. With the camera stabilised at the correct temperature I shot multiple frames of M3 using the Astronomik red, green and blue filters. At the end of the run I set up a sequence in *Maxim* to record a series of dark frames and left the system running overnight, before calibrating the filtered images the next day.

Overall, the Moravian G2-8300 camera performed extremely well, delivering clean images. Its rugged build and extremely capable software are to be admired and it is a camera that will work with short focal length refractors or even camera lenses right through to long focal length catadioptric telescopes. The internal filterwheel performed flawlessly. For imagers based in Europe it is a good alternative choice of camera compared to USA-based models and is competitively priced. Highly recommended.

Nik Szymanek is a keen astro-imager based in Essex and is the author of Infinity Rising.

At a glance:

Moravian Instruments G2-8300 CCD camera with internal five-position filterwheel

CCD detector:	Kodak KAF-8300
Resolution:	3,358 × 2,536
Pixel size:	5.4 × 5.4 microns
Imaging area:	18.1mm × 13.7mm
Download time:	12.2 seconds
Price:	£1,993
Details:	http://ccd.mii.cz
UK Supplier:	365 Astronomy (www.365astronomy.com)

▼ **Messier 3, a globular cluster in Canes Venatici. This image was acquired using the supplied Astronomik red, green and blue 31mm filters. The image consists of 6 × 5-minute exposures taken through the three filters that were calibrated and stacked using *FITS Liberator*. The colour image was compiled in *Adobe Photoshop CS5*.**