



Report of testing of the Flip-Flat

Date: 2/9/09

Location: Camden, Maine

Temperature: 7 F

Telescope: NP-101

Filter: Custom Scientific Clear

The Flip-Flat was carefully aligned so that the closed cover was well mated to the end of the OTA dew shield.

With the light off, and the telescope housed in the closed observatory, 30 dark frames of 2.2-second duration were exposed using Maxim D/L. These were normalized and sigma-reject mean combined (2 sigma, 10 iterations) into a master dark frame using CCDStack.

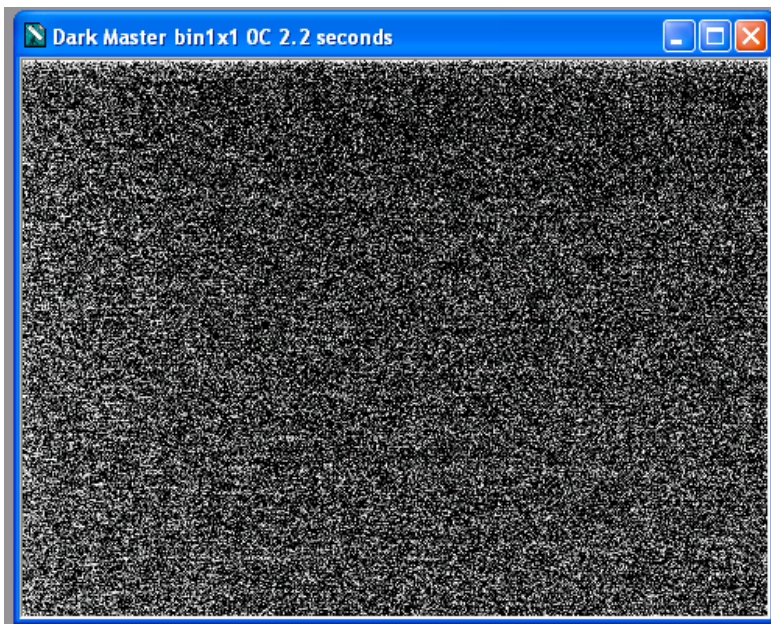


Figure 1: The master dark frame

Two sets of 30 images with the light intensity adjusted to level 21 so that 2 second exposures yielded ADU counts around 30,000 were exposed using Maxim D/L. Between the sets, the Flip-Flat was rotated 90 degrees on the OTA.

A master flat frame was made in CCDStack by subtracting the master dark from each frame and median combining each frame in the first set of light frames.

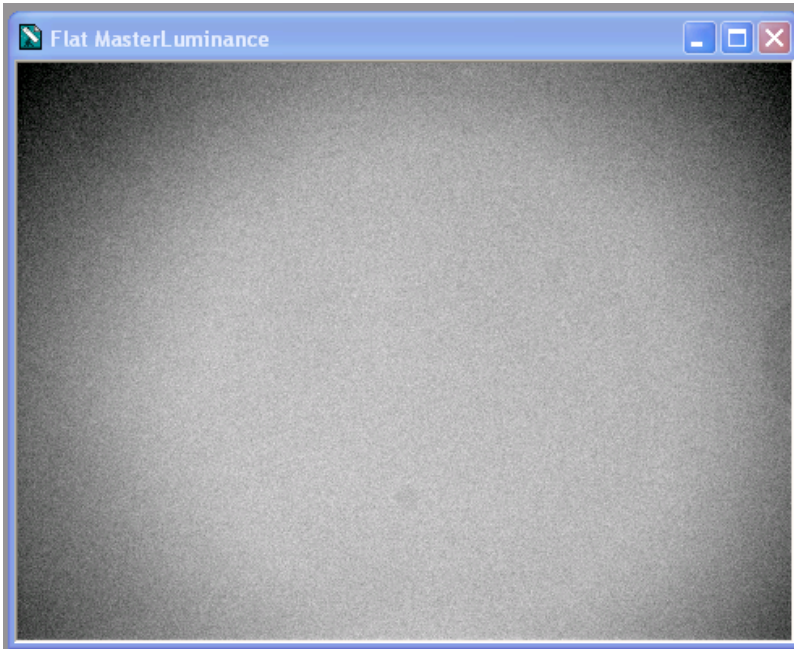


Figure 2: Master Flat Frame

Each frame in the second set was then dark subtracted using the master dark and divided by the normalized master flat field. The 30 frames were normalized and STD reject mean combined in CCDAP (2 sigma, 10 iterations) and named “mean rotated”. This image can be seen in Figure 3. It is essentially a “flatted flat” and in a perfect world should be completely uniform.



Figure 3: The “mean rotated” flatted flat

Using the line profile tool in Maxim D/L, the pixel values under a diagonal line from bottom left to top right were exported to an excel file. Regression analysis was performed and the best-fit line was plotted in Figure 4.

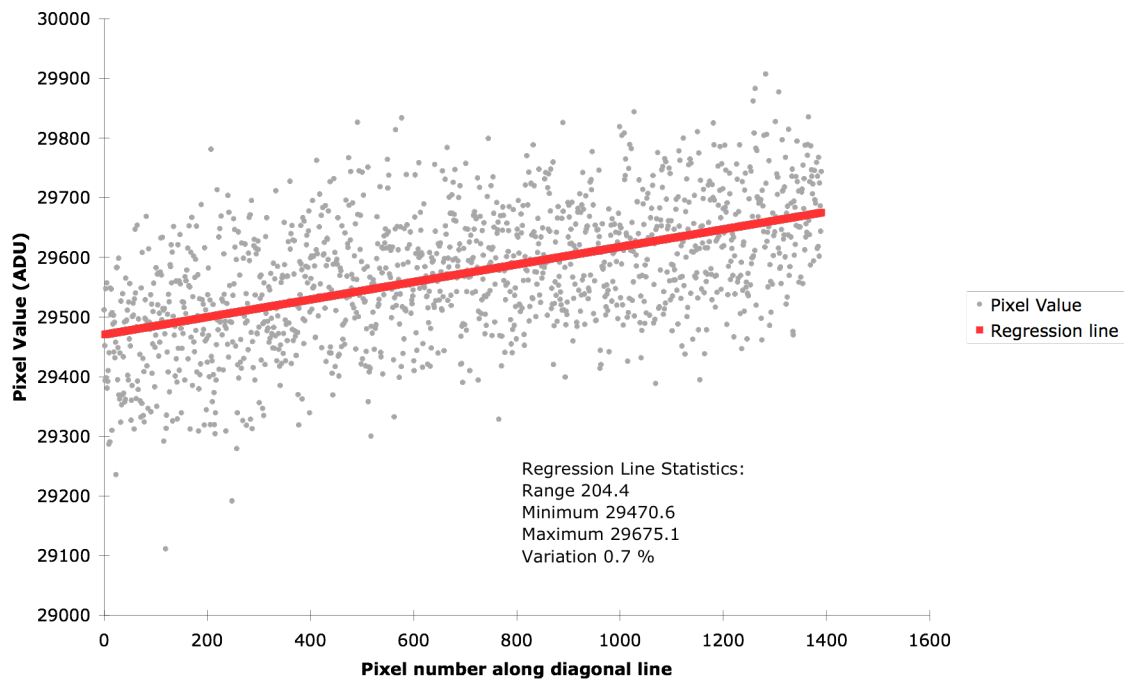


Figure 4: The pixel values along a diagonal line on “mean rotated”

The data show that the “mean rotated” flattened flat image is uniform to 0.7%.

We believe that this test shows that the Flip-Flat has less than 1% variation in illumination across its surface.

Properly used, the Flip-Flat will provide on-demand, high-quality flat fields for image calibration. Imagers and photometers take notice!