

## Reply to the Color Shading Issue of the Mavic Pro

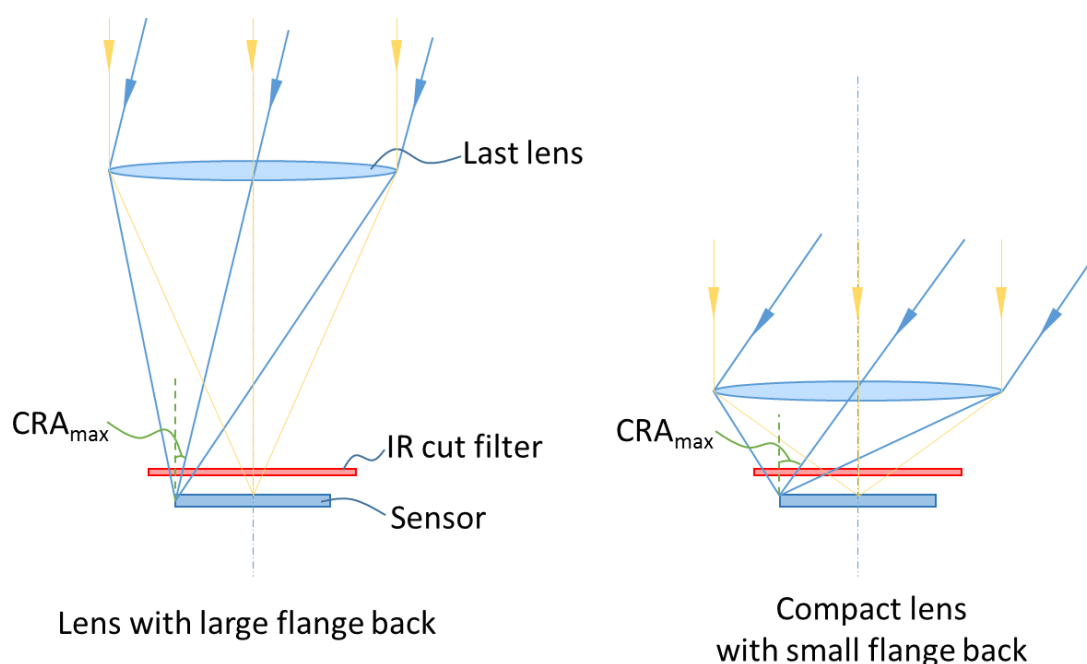
Hi everyone,

Some of you have noticed red spots in the middle of your Mavic Pro images. This is a common issue for micro-DLSRs, and it's caused by color shading. The Mavic Pro's camera compensates for color shading but cannot totally remove it. It can still be seen when shooting in snowfields, at night fall, or under artificial light. Color shading's strength is closely related to the incident light's place on the light spectrum.

For DLSRs or micro-DLSRs with long flange focal distances, including the Zenmuse X5/X5R, color shading is weak and isn't generally a problem. Color shading also does not occur with Phantom 3 and Phantom 4 series aircraft cameras, as they have relatively long flange focal distances.

One of the causes of color shading is the relationship between the cutoff frequency of the IR filter (usually located between the last lens and sensor) and the incident angle of the light. The chief ray angle (CRA) varies in different positions on an image, and the largest CRA occurs at the edge of an image. Hence, when shooting an object in the same light spectrum, rays of different lengths will be intercepted by the IR filter, and the colors in different parts of an image will not be the same. That's a brief explanation of color shading. For more information about color shading, [click here](http://www.dxo.com/us/more-information-about-color-shading). (hyperlink = <http://www.dxo.com/us/more-information-about-color-shading>)

In the figure below, the lens on the left has a longer flange focal distance, while the compact lens on the right has a shorter flange focal distance.  $CRA_{max}$  indicates the CRA on the edge of an image. We can see that the CRA of the compact lens is larger than that of the lens with the longer flange focal distance, in which color shading is obvious. As you can see, it's hard to avoid these issues with compact lenses.

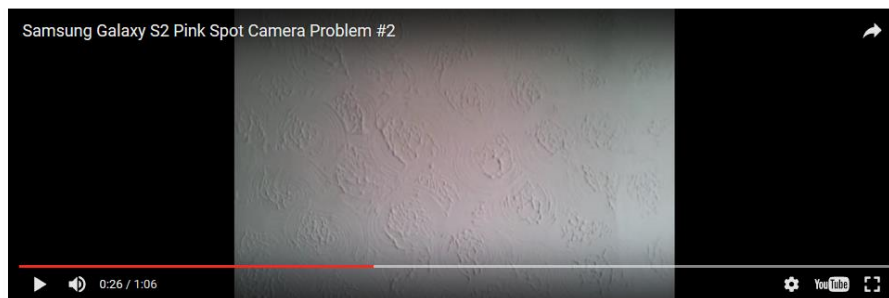


There are complaints about color shading from mobile phone users on [www.dxo.com](http://www.dxo.com). For more details, visit <http://www.dxo.com/us/embedded-imaging/image-signal-processor-isp/dxo-autocls/user-comments-dxo-autocls>. One is shown below.

### Color shading - User comments

Here are some links to web pages where mobile camera users complain about the color shading issue. Most people describe the effect as a pink/blue/green spot. These are only a small selection of typical examples, as the complaint is very widespread. Listing all the phones and complaints would require several pages. Note that all these phones use per-unit calibration (with or without a hybrid filter).

#### Samsung Galaxy SII



See also these videos

<http://www.youtube.com/watch?v=EJ-14AeaHqo>

and this forum thread

<http://forum.xda-developers.com/archive/index.php/t-1106454.html>

Some obvious color shading also occurs with the Mavic Pro's compact lens in certain conditions. The Mavic Pro's camera has been optimized for shooting in daylight. A solution to color shading in snowfields and LED lights, etc. is still under testing and color shading has not been totally removed just yet.

Customers also reported that color shading is more obvious in DNG images than in JPEG images. We are working on fixing this. Thank you for your feedback and support, everyone!