

UAS Photography 101

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*Empowering Colleges:
Expanding the
Geospatial Workforce*



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How do I set-up my camera to fly and get sharp images

Parameters

Shutter speed – light gathering ability

Size of aperture (f-stop) – light gathering and depth of field, larger the aperture the smaller the depth of field and the more light that can be gathered.

ISO of CCD chip – the larger the value the shorter time required to gather the light but the more grainy the image.

Speed of the aircraft - the faster the aircraft the more distance covered in a set period of time.

Note Shutter speed, Aperture size and ISO must all work together to create quality images.

Common Camera Issues



Blur due to slow shutter speed.



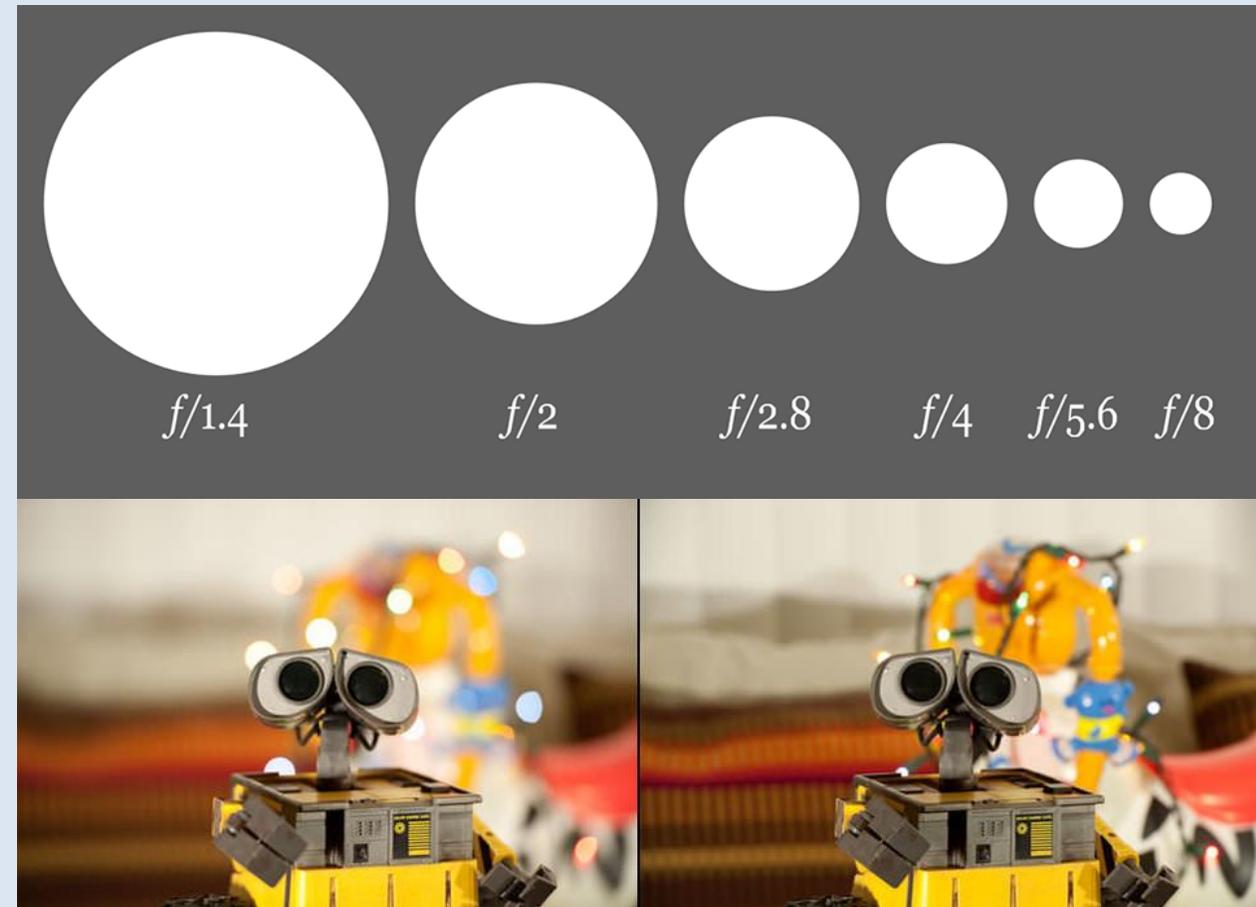
Noise due to high ISO sensitivity.



Overexposed or underexposed (wrong aperture and/or shutter speed).

Aperture

- Size of the hole that lets light through
- Bigger (e.g. $f/1.4$) = more light = overexposed = smaller depth of view [left]
- Smaller (e.g. $f/8$) = less light = underexposed = larger depth of view [right]



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For example:

$1/100^{\text{th}}$ of a second @ $f/8$ and flying at 10 mph with an ISO of 400 is 176 in/s therefore the aircraft moves 1.76 in while the shutter is open or a little less than 5 centimeter.

By knowing the height of the aircraft and resolution of the camera you can determine how much of a pixel vehicle traveled. Typically might be half a centimeter.

An f/stop of $f/8$ gives several feet in front of the focal point and behind to be in crisp focus. But an $f/16$ would be much better but that would require slowing the speed of the shutter.

Do not use auto focus because this will change the size of the pixel!

An ISO of 400 is standard the brighter the day the smaller the number but using a bigger number while it might be a little grainy can allow for a faster shutter speed.

Questions and Answers

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