Letterboxing cameras

This guide will cover how to reduce the image size of a camera to reduce data and/or increase frame rate.

Benefits of letterboxing images

1. Data reduction – Letterboxing reduces the amount of data for each image. This results in a smaller video archive.

2. Increased frame rate – A reduction in data for each image can result in a higher frame rate

Letterboxing example

Camera sensors are made up of pixels. By default, most cameras will use all of the sensor pixels for each image. However, many cameras allow a region of interest to be defined whereby only a portion of the sensor pixels are used in the image. This is known as 'letterboxing' (or 'cropping'). Figure 1 shows a letter-boxed image that is only using a portion of the sensor pixels.
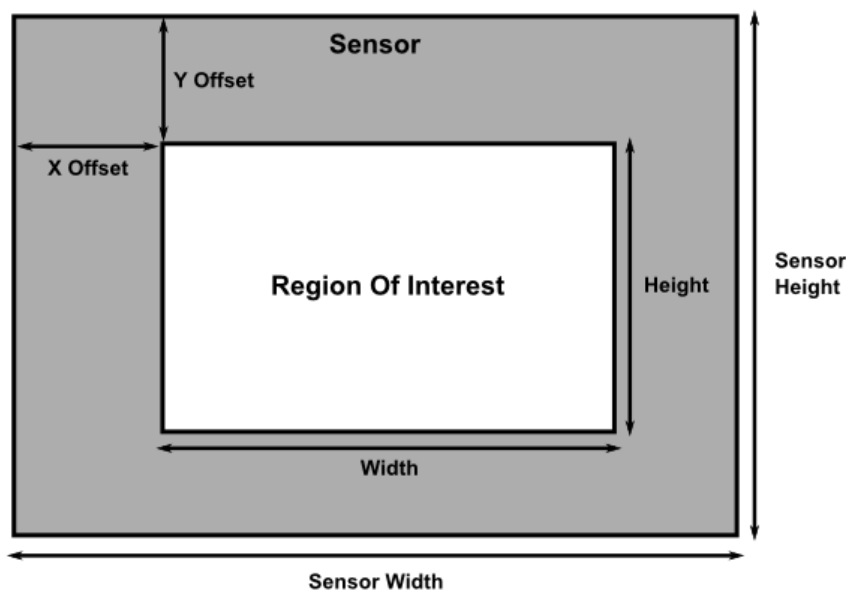

Figure 1: A letterboxed image

Common term used in camera settings

Region of interest (ROI)
The section of the image left after cropping
Sensor width
The complete sensor width

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Sensor height
The complete sensor height

Width
The width of the ROI

Height
The height of the ROI

Y offset (vertical offset)
How far the ROI is offset in the Y direction from the origin of the sensor

x offset (horizontal offset)
How far the ROI is offset in the x direction from the origin of the sensor

Please note how the exact wording used in the camera settings can differ from those used here. It is possible that firmware updates were applied to cameras, resulting in subtle differences in firmware setting locations.

Types of camera

Type of camera[1]	Location of letterboxing settings[2]
CAM-11, CAM-12, CAM-13, CAM-18, CAM-19, CAM-20, CAM-21, CAM-26, CAM-27, CAM-28, CAM-29	"ImageFormat"
CAM-10, CAM-33, CAM-34, CAM-35, CAM-36, CAM-37, CAM-38, CAM-39, CAM-40, CAM-42	"Image Format Controls"

Table 1: Camera families

1. In this table, the camera prefix (i.e. IMT/IM) is not relevant as the remainder of the name is ubiquitous across product range

2. In each camera family, the letterboxing settings are a top-level group

Notes

If you are aiming to increase frame rate then it is often simplest to just experiment with different image width and height values until you achieve the desired frame rate. For some cameras there is a greater increase in frame rate if the image height is reduced than if the image width is reduced.

It is best practice if the letterboxed image is in the centre of the camera sensor. This is achieved by setting appropriate values for the X & Y offsets. Subtract the ROI image size from the sensor size and divide by two to get offset values that will keep the image in the centre of the sensor.

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