

Application note: Achieving High Resolution Performance

Selecting the right optics for your digital imaging system, as well as paying particular attention to factors such as focus and aperture settings, is essential to achieve high resolution performance.

Here are a few simple rules to follow to get the best image quality results out of your Allied Vision Technologies camera.

Resolving Power

The resolving power of a lens is usually quoted in line pairs per millimeter (lp/mm). Inexpensive machine vision lenses usually offer an optical resolution of around 50 lp/mm, which corresponds to a horizontal pixel resolution of about 700 pixels. These lenses are adequate for use with a VGA resolution camera but will not achieve megapixel resolution.

Some good machine vision lenses have a resolving power of 100 lp/mm which corresponds to a horizontal pixel resolution of 1280 pixels (for 1/2" format). These lenses will achieve up to megapixel resolution.

Higher resolution optics are also available for high resolution cameras.

If resolution is important to you, you will need to ensure that your lens resolution is capable of achieving at least the resolution of the camera that you are using.

Focus Setting

A slight mis-adjustment of the focus setting will greatly reduce the effective resolution of your imaging system. It is generally recommended to use lenses with screw-lock mechanism on the focus adjustment and take special care in setting the focus of the camera.

Aperture

A number of issues surrounding the aperture setting of your lens may affect system resolution. Generally speaking, the wider the aperture, the greater the resolving power but the smaller the depth of field. Conversely, the smaller the aperture setting, the larger the depth of field, but the lower the resolving power of the lens. However, when the lens aperture is opened fully, there are usually lens aberrations that negatively affect resolution. Generally the best resolution performance of a lens is near the full-open setting, but not fully open.

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We invite comments or suggestions on this application note at any time.

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