

## Application note: Choosing a Machine Vision Camera

Selecting a camera for your machine vision application can be a daunting task. There are a large variety of camera types and choosing the best one for your application can be difficult.

The first step to choosing the correct camera is to define the camera requirements which include resolution, sensitivity, color, camera interface, software considerations, etc.

### Resolution

Generally speaking, you should choose the lowest resolution that will meet your requirements. This is important for a couple of reasons. Firstly, the higher the resolution, the more image processing that must be done by the host computer. Better to use the computer to perform the machine vision functions than to use it processing extraneous resolution. Most camera manufacturers produce a wide range of camera resolutions. For example, Allied Vision Technologies produces cameras ranging from VGA to multi-megapixel resolution.

### Sensitivity

In almost all applications, higher sensitivity is better. Higher sensitivity means that one can use shorter exposure times, lower gain settings, and lower-cost optics. Shorter exposure times are very important in moving-scene applications where motion blur could otherwise degrade the image. Sensitivity can also be increased by using “binning” a camera function common on Allied Vision Technologies cameras that can drastically increase sensitivity.

### Color

If you can live with monochrome, buy monochrome. The use of color adds a level of complexity that should be avoided unless your application truly needs color. Color cameras produce larger amounts of data than monochrome cameras meaning greater image processing burdens. Color also negatively affects camera sensitivity and image resolution.

### Interface

Another choice to make is which camera interface to use. All the newest machine vision cameras now feature Firewire or Gigabit Ethernet interfaces so there is very little reason to

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use a framegrabber-based camera. Both Firewire and Gigabit Ethernet cameras have associated interface standards, IIDC and GigE Vision respectively, which define both the hardware and the software interface. Choosing a camera based on these standards means lower integration and maintenance costs.

## Software

There are really two categories of software. You can either use a third party machine vision software package to accomplish your vision task, or you can use a software development kit (SDK) to interface a camera to your own application software. If you are using a third party software package, then interface standards such as Firewire's DCAM (IIDC) and Gigabit Ethernet's GigE Vision are even more important. If you are developing your own software, then a good camera SDK is essential. System integration is the largest part of a vision system cost, so it pays to get the best SDK possible – one that reduces integration time and that reduces integration headaches. Allied Vision Technologies provide a wide range of SDKs to suit your application.

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

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