General Concepts

Tricks for High-Speed Scanning

High-speed scanning, which is roughly anything over 300 scans per second, can get tricky. These are the factors that must go into your system.

Calculating the MaxLaserOn Parameter

MaxLaserOn is related to the inverse of the number of the scans per second that you want and the 300 microsecond overhead for reading image data from the camera. Here's the formula for calculating the **MaxLaserOn** value:

$$^{1000}/_{\text{Scan Rate}} - 0.3 = \textbf{MaxLaserOn}$$

A system that requires 500 scans per second would have a **MaxLaserOn** calculated like this:

$$^{1000}/_{500} - 0.3 = 2 - 0.3 = 1.7 \text{ (milliseconds)}$$

The downside to low exposure times is that the laser may not be bright enough to fully illuminate the object. In that case, you should move your scanner closer to the object or lower the LaserThreshold parameter.

Reducing Analyzed Image Area

- **Scan Window** JSDiag visually displays the current Scan Window as a yellow bounding box in the Image View and Laser Image View. The Scan Window should be reduced to the smallest possible area to improve speed and ambient light immunity. The scanner will only analyze the absolute minimum portion of the image that could produce valid data points, increasing the maximum Scan Rate. Also, automatic exposure is calculated using data points only from within the Scan Window, which improves ambient light immunity. Due to the camera type, the scanner analyzes the data from the near end until it reaches the end of the valid area. The Scan Window parameters are **WindowTop**, **WindowLeft**, **WindowRight** and **WindowBottom**.
- **Far Away Scan Window** A common situation for scan windows is that they are far away from the scanner. Valid data cannot appear near the scanner, so in this example the Scan Window is defined to include only the area of interest. In this case, the image will be analyzed from the near part of the image to the far extent of the valid Scan Window. The remainder of the image will not be analyzed, which will reduce the amount of time it takes to process it.
- **Near Scan Window** If the Scan Window includes the area closer to the scanner than it can see, then only the Scan Window is analyzed.
- **ImagePercentage Parameter (Deprecated)** ImagePercentage is a brute force way of accomplishing the same thing, but it is more quantifiable. If you set the ImagePercentage to 33, then a maximum of one third of the image will be analyzed. We recommend that you do not use this parameter; the Scan Window accomplishes the same thing as perfectly as possible and has more reliable ambient light immunity.

Background Subtraction (don't use it for high speed)

Setting **BackgroundSubtraction** parameter to true will cut the effective Scan Rate in half for a given exposure time. This is because one exposure and read-out period is used for the background image without the laser and one for the data image with the laser. Generally, high-speed systems should avoid using the **BackgroundSubtraction** parameter.

What Happens When The Scanner Overdrives

While in the process of tuning a system, these are the indicators of trying to run a scanner too fast:

- The flags field of the jsProfile (C/C++) or the Flags field of Profile (.NET) will have bit 0 set to 1.
- Your scan data will stop at the point where the image was analyzed to when the next scan was triggered. For example, if the image was around 65% analyzed when the next scan was triggered, you would only get data points from the top 65% of the image.