Reverse Austin

Laser Scanner Resolution vs Feature Size

The size of a feature that can be reliably detected by a laser scanner is significantly larger than the scanner's resolution.

A scanner's resolution or point density is a measure of how closely points are spaced on the surfaces being scanned. A scanner with a resolution of 50µ (.050mm) will record a point every 50µ if the scanner is perpendicular to the surface being scanned. As it is not generally possible to always scan perpendicular to all surfaces, the scan angle should be taken into account. For instance, at an angle of 45 degrees, the distance between points increases to approximately 71µ. Once the point spacing is known, detectible feature size can be calculated.

The laser never captures 100% of any feature and the closer the point density is to the size of the feature, the lower the percentage of capture. This can be expressed using the following formula:

$$Q = 1 - (m / s)$$

Where:

Q = quality as a percent of capture

m = distance between points

s = feature size

Using this formula, a 1mm feature scanned with 70µ point spacing can be detected to 93% and a 0.5mm feature to 86%. By moving the terms around, the size of the feature can be calculated as:

$$s = m / (1 - Q)$$

Using this formula, for an 80% capture with 70µ point spacing, the feature must be at least 0.35mm.