Spectrum San Diego, Inc.

Technical Note: Sentry*Scope*™ Focal Length of Lens and Resolution

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Introduction

The goal of this technical note is to explain how Sentry*Scope* utilizes differing focal length lenses to achieve ultra-high resolution and contrast that with conventional CCTV.

Conventional CCTV

In a conventional CCTV camera, the focal length of the lens determines the horizontal angle of the field of view. As the focal length of the lens increases, the width of the field of view decreases. Regardless of the focal length, resolution remains constant and is generally 640 x 480 pixels per frame (307,200 pixels per frame).

Sentry*Scope*

Sentry*Scope* operates in a different manner. The width of the field of view is independent of the focal length of the lens and is software adjustable up to a full 90°. Figure 1 below shows how Sentry*Scope* captures images:

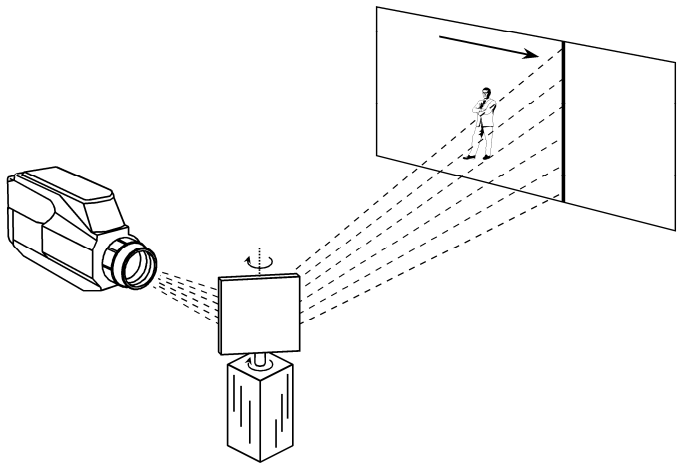

Figure 1

At any one point in time, only a narrow vertical line in the monitored region is being viewed. This vertical line is comprised of 2,048 pixels. A precision optical scanner sweeps the line horizontally across the field of view up to a full 90°, capturing many vertical scan lines to build up an image.

Sentry*Scope* provides two lens options (50mm and 85mm), both of which provide a 90° horizontal field of view. The lens choice determines resolution.

The 50mm lens provides a 30° vertical angle. The 85mm lens provides an 18° vertical angle. Regardless of lens choice, each vertical scan line contains 2,048 pixels. Because the vertical angle is smaller with the 85mm lens, each pixel must be smaller in the vertical direction. Because pixels must be square for sharp image quality, each pixel must then be smaller in the horizontal direction for the 85mm lens. Therefore the 85mm lens yields an image with more pixels than the 50mm lens.

The 50mm lens captures 6,144 vertical scan lines per image. Multiplying this by the number of pixels in each scan line (2,048) yields 12.5 million pixels per image.

The number of vertical scan lines for the 85mm lens can be determined by taking the ratio of the vertical angles of the lens (18/30) and dividing the result into the number of pixels in the horizontal direction for the 50mm lens (6,144). This yields 10,240 vertical scan lines or pixels in the horizontal direction for the 85mm lens. Multiplying this by the number of pixels in each scan line (2,048) yields 21.0 million pixels per image.

Summary

Figure 2 summarizes lens choice and resulting resolution for Sentry*Scope*:

	Vertical Angle	# of pixels in each vertical scan line	# of vertical scan lines	Total pixels per image
50mm lens	30°	2,048	6,144	12.5M
85mm lens	18°	2,048	10,240	21.0M

Figure 2