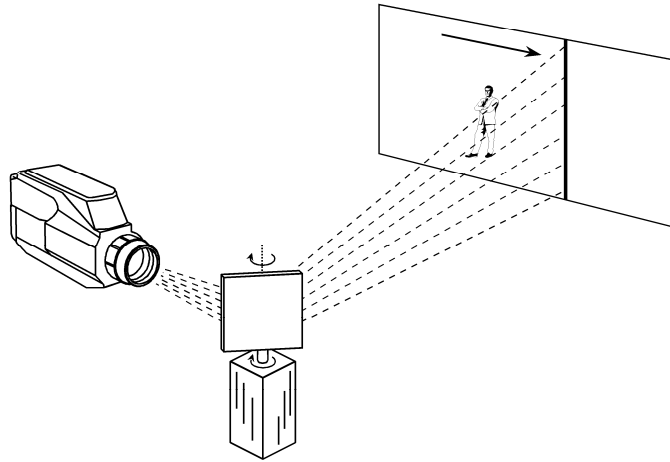


SentryScope™ Technology Primer

1) How does SentryScope work?

SentryScope is capable of capturing up to 21 million pixels per image. It uses advanced line scanning technology to achieve the highest level of resolution. 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 this line horizontally across the field of view to obtain a full image in about one second. This ultra-high resolution allows security personnel to zoom into sub-regions after the fact to identify suspicious people, items, and/or activity.



2) How does this differ from conventional CCTV?

Conventional CCTV products capture an entire image (640 x 480 pixels) in $1/30^{\text{th}}$ of a second. Alternatively, the odd scan lines are captured in $1/60^{\text{th}}$ of a second, followed by the even numbered scan lines in the next $1/60^{\text{th}}$ of a second. This mode of operation is called interlaced video.

3) How large of a field of view can SentryScope monitor?

SentryScope can identify people up to 200' feet from the camera (field of view 400' wide). License plates can be read up to 150' from the camera (field of view 300' wide). In the picture below the person and license plate are approximately 150 feet from the camera.



4) What is the aspect ratio for SentryScope?

One of the limitations with today's CCTV solutions is a fixed aspect ratio of 4:3. Many viewed areas are much wider than high and don't fit neatly into this ratio. Using one conventional CCTV camera to view a large region will result in poor resolution and non-essential areas being monitored. Multiple cameras and automatic panning features result in increased installation and maintenance expense along with sub-regions going periodically unmonitored.

With *SentryScope*, all of these design issues go away. The vertical field of view is adjustable by the focal length of the lens used. *SentryScope* has a choice of either a 50mm or 85mm lens providing 30° and 18° vertical field of views respectively. The horizontal field of view is adjustable by the user from 36° up to 90° maximum. This allows *SentryScope* to be adjusted to match the monitored field reducing the number of cameras required and eliminating duplicate images and non-essential areas from being recorded.

5) What is the image rate for SentryScope?

SentryScope captures an entire image in approximately 1 second, depending on the adjusted width of the horizontal field of view, the lens, and motion in the field of view.

6) Is motion blur a problem?

Each pixel is scanned in 0.008 seconds. This rate, and not the image rate, determines motion blur. At 0.008 seconds the motion blur with *SentryScope* is very similar to conventional CCTV products.

7) Why is SentryScope black and white?

With color, resolution is decreased by factor of three from dividing the pixels between the red, green, and blue channels. *SentryScope* is designed for unmanned operations where achieving the highest level of resolution is more important than color.

8) Can color be added to SentryScope?

Yes. *SentryChroma*TM is available. *SentryChroma* is a separate three Megapixel color IP camera mounted on top of *SentryScope* monitoring the same large field of view. Operating at a faster frame rate, *SentryChroma* fills in details missed by *SentryScope*. Details such as color of clothes or vehicle and activity such as hand movement are added to the surveillance record. Complete information is supplied to security personnel.

9) What zoom capabilities are available with SentryScope?

Because *SentryScope* has such high resolution, the monitored area can be very large and still capture enough pixels to allow zooming into sub-regions with fine detail in recorded video. Using a sophisticated PC software package, *SentryWare*TM, images are displayed in real time and stored for later review. Point and click features allow the operator to zoom in on a sub-region and pick out fine details such as vehicle license plates, identifying marks on people, or suspicious activity taking place. Advanced image enhancement techniques, such as adaptive contrast and sharpening, can be applied to further enhance the zoomed image.

10) With all those pixels, won't storage become a problem?

In order for *SentryScope* to capture up to 21 million pixels per image, transmit the data to a PC, display the images in real time, and store the images for later review, it has been designed from the ground up using advanced digital technology. *SentryScope* builds the image from the vertical scan lines, compresses and security encodes the image data, sends the image data over a dedicated Fast Ethernet connection to a PC running *SentryWare*, displays the data, and stores the data (typically on a hard disk). Using advanced compression algorithms, approximately 120

Gigabytes per day is used for image storage. Considering that 1 Terabyte hard disk drives are now available, storage is becoming less and less of an issue.

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