


White Paper

Pixels per Dollar (Pp\$): Rethinking the ROI of Surveillance Cameras

Abstract

Whether for home or business, most buyers make purchase decisions by comparing product costs. When considering surveillance cameras, the detail of the image, as measured in pixels, dictates whether one can read a license plate or recognize a face. Therefore, one of the most important criteria when evaluating the ROI of a camera is the number of pixels delivered per dollar spent (Pp\$).



Understanding the Superior Value of Megapixel Cameras

Megapixel cameras provide superior performance and imaging capabilities versus legacy analog technology and standard-definition IP cameras. Megapixel cameras are also field-proven to deliver the most cost-effective video surveillance solutions. To understand the real value of megapixel cameras, it's important to evaluate the total system cost, not simply the price of a single camera.

Analog and standard definition IP cameras may

be priced less than megapixel cameras on a per-camera basis, but they deliver significantly less value when total system costs are evaluated. Compared to the efficiencies of megapixel cameras, analog and standard IP cameras do not provide a comparable return on investment (ROI). This white paper will analyze the additional value of megapixel cameras through a quantifiable measure of that value: pixels per dollar (Pp\$).

Purchasing Results, Not Cameras

When end-user customers buy cameras, what they want is the ability to view video that cost-effectively achieves the goals of an application. They need video that can deliver facial recognition and license plate identification, captures numbers from shipping crates and shows activity in retail stores, bank branches, company or government facilities or at borders, airports or ports and more. They are purchasing the capabilities and functionality the cameras can provide to solve a specific problem.

Megapixel cameras do a far better job of capturing more information than standard-resolution cameras, and that superior performance translates into ROI in several ways. Based on the measurement of "pixels per meter," a standard for the number of pixels required to depict one meter of a scene for a specific application, more pixels translate into a larger viewing

area. For example, while it could require ten standard-resolution cameras to cover a single parking lot, the same coverage can be delivered using three or four three megapixel cameras or even a single megapixel panoramic camera, depending on the application requirements.

This reduction in the number of cameras translates into a decrease in installation costs and maintenance costs. Furthermore, the ability to digitally zoom into live scenes and recorded video while maintaining high resolution and wide area coverage, virtually eliminates the need for mechanical pan-tilt-zoom (PTZ) devices. By capturing a detailed, wide-angle view without the PTZ camera requirement of having a live operator following events in real-time, multi-megapixel cameras can also deliver a reduced operating costs by eliminating operations staff.

Understanding Resolution

A true advantage of megapixel cameras is the ability to provide more resolution than analog or IP VGA cameras. Using estimated pricing and the number of pixels as a quantitative measure of resolution, it's easy to distinguish that megapixel cameras provide more resolution for the money.

The following table illustrates the cost-effectiveness at various camera resolutions. VGA or standard definition cameras provide about 300,000 pixels per camera. Megapixel cameras provide 1,300,000 to 10,000,000 pixels per camera, or more.

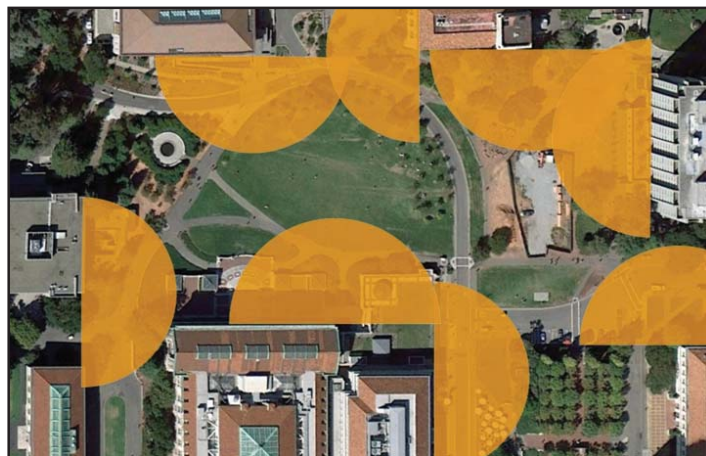
Class	Resolution	Pixels	Pixels per \$1
VGA	640x480	307,200	1,536
HDTV 720p	1280x720	921,600	2,836
1.3 MP	1280x1024	1,310,000	4,039
HDTV 1080p	1920x1080	2,073,000	5,891
3MP	2048x1536	3,145,728	7,149
5MP	2592x1944	5,038,848	10,179
10MP	3648x2752	10,039,296	18,438

This analysis demonstrates how the most cost-effective imaging solutions are multi-megapixel cameras. The VGA-resolution cameras provide 1,536 pixels per US dollar (\$), compared to 1080p cameras at 5,891 pixels/dollar and 10MP cameras at 18,438 pixels/dollar. At 10MP resolutions, multi-megapixel cameras are 10X

more cost-effective compared to VGA cameras.

Understanding resolution makes it simple to evaluate which camera (or what number of cameras) will provide the most value for a given application. Pixels per meter specifies how many pixels are needed to effectively view a certain area.

Analog/VGA vs. Megapixel Cost Comparison — Public Area



Analog

24 cameras cover this public area with about 10,000,000 pixels.

Multi-Megapixel

8 panoramic cameras give better coverage with 64,000,000 pixels.

Analog			
	Qty	Cost	Extended
Dome 768 x 494	24	\$253	\$6072
16 Channel DVR	2	\$2785	\$5570
DVR Lics	Incl.	Incl.	Incl.
Cables	24	\$150	\$3,600
Power Supplies	24	\$20	\$480
Labor (2/cam)	48	\$95	\$4,560
30 Days Storage (2TB drives)	Incl.	Incl.	Incl.
Total System	10 MP		\$20,282

IP VGA			
	Qty	Cost	Extended
Dome 640 x 480	24	\$438	\$10,512
Server	1	\$2,400	\$2,400
MS Prof. Lics & Server	24	\$120	\$2,880
Cables	24	\$100	\$2,400
Switch	1	\$500	\$500
Labor (3/cam)	72	\$95	\$6,840
30 Days Storage (2TB drives)	1	\$300	\$300
Total System	8 MP		\$25,832

Megapixel			
	Qty	MSRP	Extended
Panoramic 6400 x 1200	8	\$1618	\$12,944
Server	1	\$3,000	\$3,000
MS Prof. Lics & Server	8	\$160	\$1,280
Cables	8	\$100	\$800
Switch	1	\$500	\$500
Labor (3/cam)	24	\$95	\$2,280
30 Days Storage (2TB drives)	10	\$300	\$2,100
Total System	64 MP		\$23,804

The difference in resolution (total system pixels) is considerable. The megapixel solution is delivering 64 million pixels vs. 10 for the analog system and 8 for the standard definition IP system. The overall storage is 20TB for the megapixel solution vs. 2TB for analog or standard definition IP systems. Ten times the available information. That is exactly what the security team needs—much more data (images) to review in case a problem does occur. The information is stored on the system if it is needed.

System Cost vs. Camera Cost

When crunching the numbers on a surveillance system installation, it is helpful to take a full view of total system costs. The total cost of the system is a more meaningful measure than the price of a single component. In the case of megapixel cameras, beyond the relative lower resolution-per-dollar cost analysis, other savings include a decrease in absolute

costs such as installation by using fewer cameras, the elimination of mechanical pan-tilt-zoom devices, a reduction in operations staff and support costs.

Using fewer cameras to effectively cover the same area also translates into infrastructure cost savings (cables, mounts, housings, etc.), which makes it easy to realize an improved ROI.

The Conclusion

Multi-megapixel cameras deliver the highest image quality and ROI. Low-resolution analog and VGA IP cameras provide significantly less value than multi-megapixel IP cameras.

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Arecont Vision is the leading manufacturer of high-performance megapixel IP cameras. Arecont Vision products are made in the USA and feature low-cost massively parallel image processing architectures MegaVideo® and SurroundVideo® that represent a drastic departure from traditional analog and network camera designs. All-in-one products such as the MegaDome®, MegaView®, MegaBall™ and D4F/D4S/D4SO series provide installer friendly solutions. True Wide Dynamic Range (WDR) and remote focus/remote zoom enhance camera utility. Compact JPEG and H.264 series of cameras address cost sensitive applications. These innovative technologies enable Arecont Vision to deliver multi-megapixel digital video at IP VGA camera price points.

