Why Your VMS Matters

Interest in hemispheric cameras is a result of saving money

By Bret McGowan

As a security professional, how many times have you had to explain why a PTZ camera should always be paired with at least one fixed camera to provide constant "back-up" coverage of everywhere the PTZ is not looking?

Today, that conversation is happening far less often, thanks to the current generation of hemispheric cameras—super high-resolution 360-degree cameras with fisheye lenses. For many PTZ applications, as well as situations requiring the use of several fixed cameras, a single hemispheric camera is now often the preferred solution. However, in order to take full advantage of the benefits offered by hemispheric cameras, you must carefully consider the VMS being used with them. Understanding the relationship between VMS and camera is vital to ensuring that your investment in this technology delivers on expectations.

Hemispheric Cameras: Why and Where?

The main reason customers are so interested in hemispheric cameras is that they can save money. Investing in a VMS system can add up quickly, and an easy way to keep costs contained is reducing camera count. Using a single camera to cover large areas reduces costs in many ways: the price of cameras themselves, cabling to support them, and the associated time required for installation. There are also cost savings related to VMS licensing (only one camera license is needed, instead of several) and on-going maintenance and support.

Hemispheric cameras are popular in a wide range of settings, both indoor and outdoor. Schools use them in intersecting hallways where multiple cameras were historically installed. They also make sense in large spaces that have a defined perimeter, like cafeterias and gymnasiums. Commercial customers find them useful in areas such as lobbies or parking lots. To cover these spaces, the cameras can deliver a wide, 360-degree or 180-degree view, and allow for zooming into specific areas as needed.

Usually, they are ceiling or wall mounted, with the main difference being that a wall mounted camera can only provide a 180-degree view. When wall mounted, a "wedge mounting plate" is typically used, that tilts the camera downward, so that its field of view covers the length of the wall. A less common mounting option is facing upward, either on the floor or on a table or counter top. In all situations, the compression and data rates are the same.

When choosing how many megapixels you need, keep in mind that the megapixel count refers to the entire field of view—all 360-degree or 180-degree. Bandwidth and storage will need to accommodate that number. However, when you zoom in on sections of the total image, your megapixel count for that video frame is approximately equal to its percentage of the entire field of view. And, the more you zoom in, the lower the visual megapixel count becomes. So, if you're thinking about using one hemispheric camera in place of four 2MP cameras, you will need at least an 8MP hemispheric to deliver images of each quadrant with a similar level of detail.

Does Your VMS Dewarp?

When hemispheric cameras first entered the market, several years back, the VMS systems on the market hadn't been designed to deal with them any differently than "regular" cameras. Therefore, the hemispheric cameras were responsible for dewarping the distorted image captured by their fisheye lens before sending it on to the VMS. This meant that the VMS recorded the video exactly as it was displayed. Full information available from the original spherical image was not captured.

Today, many VMS manufactures are building dewarping filters into their own software. This allows the VMS to receive a high-resolution image of the camera's entire field of view, and then display it in any number of ways. Better yet, it can provide these multiple views simultaneously. For example, a VMS might be set up to display video from a single hemispheric cameras in several different ways.

- Panoramic frames can display the entire perimeter of a property using just two 180-degree views.
- Zoomed in frames displaying certain areas of interest, set up as presets, as if each were an individual camera. Such areas might include doorways, cash registers, service counters, kiosks, etc.
- A virtual PTZ experience, very much like using a real PTZ, that allows for panning and zooming around the original 360° spherical image. Although the zooming is digital, today's 6 and 12MP cameras have come a long way to diminish the pixelization that can occur.

That a single camera can do all of these things, simultaneously, is pretty remarkable, but the fact that it can do so both in live view and playback mode, completely independent of each other, is what really sets the power of these cameras apart. For example, let's say that a hemispheric camera is being used to cover a parking lot. A car on the lot was vandalized. When the damage occurred, system operators did not have a close up of that particular car set up in their live viewing streams. No problem. With a hemispheric camera covering the entire lot, and a VMS dewarping the video, the system operator can set up a video frame that focuses just on that car and the surrounding area, after the fact, and then view it in playback over the time in question. All the visual detail was captured by the VMS as part of the original, high-resolution video stream sent from the camera.

In other words, having a hemispheric camera with VMS dewarping is like having the ability to instantaneously install a new camera whenever you need it, without any labor or the hassle of configuring or focusing it, and then view video from before it was "installed." Now that is cool.

No Solution is Perfect

While hemispheric cameras break new ground in many ways, there are still situations where traditional cameras work better. The most obvious are situations that require super high magnification. The clarity of optical zoom offered by traditional PTZ cameras across long distances far surpasses anything that can be delivered by the digital zoom of today's highest resolution hemispheric camera.

Angle and perspective should also be considered. A hemispheric would not work well as part of an LPR system, which needs to read plates from a camera mounted down at car level.

Lighting can also be an issue. Hemispheric cameras with fisheye lenses do not perform well in low light or uneven light, so for those conditions, it's better to seek out a different camera option, or to invest in additional lighting to brighten the area.

Finally, hemispheric cameras with very high megapixel resolutions are growing in popularity, and with these high resolutions (6MP or 12MP) come the need for greater bandwidth and storage. Also, decoding and viewing such high resolution video streams requires a lot of a PC's CPU power, so there is a limit as to how many of these cameras can be simultaneously viewed within a VMS. Hardware and network requirements, and associated costs, to support high-resolution hemispheric cameras need to be evaluated against the cost savings and benefits of using fewer cameras overall.

Hemispheric cameras are growing in popularity for good reason. When paired with the right VMS, they can save customers money and provide excellent coverage, while delivering capabilities and flexibility not possible any other way. Just make sure that you choose a camera that offers high enough resolution to support your zooming requirements, and a VMS that can process the image at the required resolution and frame rate, dewarp it, and allow for setting and calling up presets of your desired views. If all those boxes are checked, you can feel confident that your hemispheric cameras will provide added value and enhanced performance to your surveillance system.

Bret McGowan is the senior vice president of sales and marketing at Vicon Industries Inc.