IP Cameras Glossary

Analog Video Output. In a Sony IP camera, analog video output enables installers to monitor the camera output on a conventional video monitor. It's ideal for pointing the camera, setting the focal length and adjusting for lighting conditions.

Bi-Directional Audio (G.711/726). This feature conveys real-time audio between an IP camera and the central office. This enables an attendant in the central office to have a conversation with a person at the camera location. The system requires microphones in both locations and an amplified speaker at the camera position. The G.711 and G.726 compression standards preserve network bandwidth, enabling telephone-quality audio at very modest bitrates.

Compression. Compression is a mathematical process that reduces the required bit rates in digital audio and video transmission and storage. Uncompressed digital video bitrates can be so high as to overwhelm a digital pipeline and quickly bring a digital storage system to its knees. Intelligently applied, compression can deliver pictures of high quality while reducing the bitrate by 95% or more.

For example, monochrome (black-and-white) signals at standard definition resolution can require 720 pixels horizontal x 480 pixels vertical x 8 bits per pixel x 30 frames per second. This equals 82.9 Megabits per second. Color signals typically double the burden to 166 Mbps. Higher resolutions such as XGA or high definition can raise this burden further still.

Compression works by taking out image redundancy. For example, JPEG intra-frame compression takes advantage of the similarity between one pixel of blue sky and the pixel next to it. There is usually no need for both to be fully described. The MPEG-4 and H.264 systems combine this intra-frame with inter-frame compression, which takes advantage of the similarity between one frame of moving pictures and the frame after it. Except for motion, both frames are often nearly identical.

Compression standards enable images to be used across multiple platforms and devices, for example, encoded by an IP camera, transmitted across a network in compressed form and then decoded successfully by a computer in the central office. See also JPEG, JPEG 2000, MPEG4, and H.264.

DEPA. Short for Distributed & Enhanced Processing Architecture, a Sony system that provides Intelligent Object Detection/Intelligent Motion Detection in both the IP cameras and the associated digital recorders/servers. The DEPA platform can be programmed to trigger a wide variety of alerts:

- **PASSING** triggers an alarm when an object crosses an on-screen virtual border.
- **APPEARANCE/DISAPPEARANCE** triggers when an object enters or leaves a virtual area.
- **CAPACITY** alarms when objects in a virtual area exceed a preset number.
- **LOITERING** triggers when an object stays in a virtual area longer than a preset time

- **UNATTENDED/REMOVED** alarms when an object is left unattended for longer than a preset time or is removed from the scene.

Dual Streaming. The ability of an IP camera to generate two simultaneous streams of images. For example, a camera can generate a stream of high-resolution JPEG still images for monitoring over the Local Area Network (LAN), while providing a more compressed MPEG-4 stream where bandwidth is limited, such as a Wide Area Network (WAN) or Virtual Private Network (VPN).

Dynamic Frame Integration (DFI). This Sony feature provides superb detail while taking advantage of the superior sensitivity of interlaced scanning. For images that don't have motion, DFI uses frame integration -- maximizing sensitivity. For images that do include motion, DFI uses field integration -- minimizing motion blur. You get clear images, even in low light.

H.264. An extension of the MPEG-4 family of compression standards that takes advantage of more recent technology to achieve higher compression "efficiency." In Sony IP cameras, this efficiency delivers comparable quality at lower bitrates compared to previous forms of MPEG-4 compression. However, H.264 is relatively computation-intensive. H.264 is also called MPEG-4 Part 10 or sometimes MPEG-4 AVC (for Advanced Video Coding) or even JVT (for the Joint Video Team that helped develop the standard). See also Compression, MPEG-4.

Intelligence. Because the IP camera includes computing power, it may also include intelligent motion detection software that interprets the camera image data and provides alerts for such events as Presence, Absence or Crossing a Line. See also IP Camera, Analog Camera, Webcam, Bi-Directional Audio, Web Access, Remote Client, Voice Alert, DEPA and Motion Detection In Camera.

Image Cropping. Cutting out unnecessary parts of the image to conserve network bandwidth and storage capacity. Using Megapixel cameras, you can crop the image and still enjoy high resolution. See also Solid PTZ.

IP Camera. A camera and web server integrated on a single chassis. Compared to a webcam, the IP camera is typically a full-function security camera with a robust lens (or a mount for interchangeable lenses), a high-resolution image sensor, and advanced exposure options. The integrated web server is in essence an on-board computer that manages incoming and outgoing data traffic. Compared to analog cameras, IP cameras can offer additional features such as bi-directional audio, local storage on flash media, intelligent motion detection in the camera and more. IP cameras also offer a long list of advantages as part of IP surveillance systems. See also IP Surveillance, Analog Camera, Webcam, Bi-Directional Audio, Web Access, Remote Client, Voice Alert, DEPA and Motion Detection In Camera.

IP Surveillance. A video security system that uses IP cameras instead of analog, data networking instead of coaxial cable and networked servers instead of video monitors and recorders. Just as IP surveillance can "piggyback" a customer's prior investment in data networking, IP surveillance also takes advantage the massive economies of scale in data networking to deliver impressive advantages at modest cost.

- **Simplicity.** In analog surveillance, each camera can require separate connections for power, video output and pan/tilt/zoom remote control. In IP surveillance, a single Ethernet cable can accommodate all this, plus multiple video streams and bi-directional audio.
- **Bi-directional audio.** Audio streams are just another data type, easily handled by the IP network.
- **Powerful centralized control.** One server with one software application can oversee dozens of cameras.
- **Scalability.** Adding additional cameras is easy. There's no need for "home run" wiring of each individual camera back to the central office. Simply plug each new camera into the nearest network switch in an IDF closet. The central server is also open to future upgrades with faster processors, larger disk drives and more.
- **Full remote monitoring & storage.** In analog surveillance, the camera location is closely tied to the monitoring location because coaxial cable run lengths are relatively limited. In IP surveillance, the camera and monitoring locations can be on different continents. Given authorization, any PC on the Internet can have direct access to any camera. So you're not limited to the command station, or even to wired connections. This enables powerful applications. For example, security officers responding to an alarm can check camera images on a handheld PC to ascertain the situation before moving in.
- **Multiple, simultaneous access.** A single Sony IP camera can serve up to 10 or more simultaneous clients.
- **Robust, redundant storage.** IP cameras can store images on optional flash memory cards or in a central location on scalable data storage systems. This central storage can easily be protected against hard disk drive crashes by RAID redundancy and the option of tape backup storage via SCSI connectivity.

JPEG. A file format for still image output from an IP camera. JPEG stands for Joint Photographic Experts Group. Nearly every PC application that accepts images will accept JPEG files. JPEG is also the file format of consumer pocket digital cameras. JPEG compression uses Discrete Cosine Transform (DCT) macro-block technology. At excessively high compression levels, this can result in the visible degradation of "blocky" pictures. See also Compression, MPEG-4, H.264, JPEG 2000.

JPEG 2000. A file format for still image output from an IP camera. JPEG stands for Joint Photographic Experts Group. Compared to the Discrete Cosine Transform (DCT) technology of conventional JPEG images, the wavelet technology of JPEG 2000 can result a smoother image at high compression ratios, without macro-blocking artifacts. See also Compression, JPEG.

Light Funnel. Also called "binning," this Sony feature maximizes image quality in low light. In the normal operation of Sony's 1.3 Megapixel cameras, each photosite on the image sensor corresponds to one pixel in the image output. Light Funnel mode combines the output from four adjacent photosites on the image sensor to form a single pixel in the image output. This quadruples the signal strength. Light Funnel mode reduces the image size from 1280 x 960 down to 640 x 480. But this can be a valuable tradeoff in night surveillance. An alternate technique called "slow shutter" can also increase sensitivity in low-light image capture. However, slow shutter renders motion as a blur, making it difficult to tell who is doing what.

Motion Detection In Camera. Selected IP cameras provide the ability not only to capture pictures but also to analyze those images for motion and trigger appropriate alarms. See also Motion Detection In Recorder, DEPA.

Motion Detection In Recorder. The ability of a digital recorder or server to analyze surveillance images for motion and trigger appropriate alarms. See also Motion Detection In Camera and DEPA.

MPEG-4. A family of video compression standards that support a very broad range of bitrates and image sizes. MPEG stands for Motion Picture Experts Group. In IP surveillance, MPEG-4 is associated with low bitrate video. But MPEG-4 is also a key enabling technology behind Sony's high-end HDCAM SR™ recording system at up to 880 Mbits per second. See also Compression, H.264, JPEG 2000.

Solid PTZ. A technique whereby an attendant in a central station can enlarge a small, moderate-resolution window that is just part of the camera's total field of view. In this way, the operator can "zoom" into an area of interest, "pan" left and right, or "tilt" up and down while the total field of view remains unchanged. Zooming in also conserves network bandwidth and storage capacity. See also Image Cropping.

Transparency. This IP camera function enables a distant PC to control a local RS-232C peripheral via the camera. The PC speaks via Ethernet to the camera, which controls the peripheral via RS-232C. From the PC's point of view, the RS-232C peripheral appears to be under direct control, making the camera "transparent."

Voice Alert. A feature of Sony IP cameras that stores pre-recorded audio clips in the camera. These stored audio files can be played back through active speakers connected to the camera. Voice Alert can be activated by a sensor input or intelligent motion detection. Up to three pre-recorded audio messages can be stored in the camera.

Webcam. A computer peripheral that can only connect to the Internet via the host computer. Webcams are often confused with IP cameras because both connect to the Internet. However true IP cameras have built-in web servers, and many have sophisticated software features in addition. When in doubt, check the interface. Webcams typically offer only a USB (Universal Serial Bus) interface. IP cameras offer an RJ-45 Ethernet port and/or 802.11a/b/g/n WiFi wireless Ethernet interface.