

## Bumps in the Night!!!!

May 2014 Issue

### Tools of the Trade

#### Comparing Analog vs IP Cameras

By Bill Krempp, TnT Paranormal Investigators LLC

This article will cover video camera technology, more specifically, the Analog vs IP cameras along with their recording technologies, but with a focus on their usage as part of a paranormal investigation. Let's start off by explaining the different technologies.

**Analog Video Cameras:** Most commonly used by paranormal teams are analog cameras. They are also many times called closed circuit television (CCTV) or security/surveillance (although this term can also be applied to ANY camera used for that use) cameras. These cameras have very little technology built into them, so are fairly cheap. Broken down to the simplest terms, they are basically a lens, CCD, Image Processor, and transmitter to send the NTSC or PAL video.

**IP Video Cameras:** An Internet Protocol (IP) camera is a type of digital video camera that can send it's video over a computer network/Internet. The cameras have fairly complex technology built into them, so are more expensive than the typical analog camera, but offer many more features. They also have a lens and CCD/CMOS, but this is where the similarities end. The IP camera can be thought of having a mini computer built into it which (depending on the camera) to handle the encoding and compression of the video stream, which it can send to multiple targets, storage for the video, handling of motion detection, and autonomous pan/tilt/zoom functions, etc. Many IP cameras even contain an embedded web server so the camera can be controlled, viewed, and managed from any computer with no special software other than a web browser.

So now that we know a little about what the camera are, how can they be used on an investigation? We'll cover a few usage aspects and discuss the analog vs IP differences.

#### Recording:

Analog cameras send their video back (via a dedicated cable for EACH camera) to a recording 'device'. Years ago, this used to be VCR type of device that took a few analog camera signals and recorded them onto a tape. Modern technology made this technique obsolete with the emergence of the Digital Video Recorder (DVR), which takes those same multiple analog video signals from the cameras and digitizes them and stores them onto a command computer Hard Disk. DVRs are reasonable prices (\$100-500) but can be limited in the number of cameras they support (typically 4-16) and the resolution/frame rate they can record at.

IP cameras configurations handle this very differently. Since the camera already had the video encoded and compressed, the recording 'device' has MUCH less workload. This device here is called a Network Video Recorder (NVR) and can be a dedicated unit or simply an application running on a PC or Mac computer/laptop. The NVR just reads the incoming network traffic and writes it to disk. One advantage of the NVR having less workload is that it can handle more cameras. 25, 50, 75 camera setups on NVRs are not uncommon in the commercial security industry, but not for paranormal investigations where we typically use less than 8 cameras.

#### Resolution:

Analog cameras are limited by the NTSC/PAL standards that they support so typically range from 240-900 TV Lines (TVL). For reference, a 480 TVL camera is generally 510x492 pixel resolution. Analog resolutions are also given in CIF, 2CIF, 4CIF and D1 standard resolutions.

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IP cameras deal purely in pixels and start out at the low end with 640x480 and go up from there with 1 MegaPixel (MP), 2MP, up to 5MP commonly used with higher resolutions like 16MP possible (although VERY expensive). One drawback of the high resolutions is the amount of storage needed to store the video.

| Resolution      | Compression | Disk Storage Needed (GB)<br>(4 cameras x 6 hours each) |        |        |
|-----------------|-------------|--|--------|--------|
|                 |             | 5 fps  | 15 fps | 30 fps |
| 352x240         | MJPG        | 4  | 12     | 24     |
| 352x240         | MPEG4       | 1  | 3      | 5      |
| 352x240         | H.264       | 0.4  | 1      | 3      |
| 704x480 (4CIF)  | MJPG        | 15   | 50     | 95     |
| 704x480 (4CIF)  | MPEG4       | 4  | 10     | 18     |
| 704x480 (4CIF)  | H.264       | 2  | 4      | 8      |
| 2048x1536 (3MP) | MJPG        | 146  | 440    | 870    |
| 2048x1536 (3MP) | MPEG4       | 41   | 100    | 165    |
| 2048x1536 (3MP) | H.264       | 14   | 35     | 58     |

#### Power:

Both Analog and IP video cameras can be either local or remote powered. IP video cameras can be provided power by the Ethernet cable itself when a Power over Ethernet (PoE) switch or a power injection device is used. Some locations may not have remote power available for the video cameras, so centralized power may be used with both camera types. For comparison purposes, both meet the needs for paranormal investigation.

#### Night Vision (IR) support:

Analog and IP video cameras are both used in security and surveillance, and both can (depending on the camera models) support IR "Night Vision" to capture video in low light and no light (0 Lux) locations during an investigation. Just match the illumination distance to the location for proper lighting. For comparison purposes, both meet the needs for paranormal investigation.

#### Summary:

Both video camera types offer advantages in different areas, but for the paranormal investigation team, the main factors will generally be cost, ease of setup, and high quality video. Analog cameras definitely win in the cost category but lose in the high quality area to the IP video cameras. But does all the extra resolution of the IP cameras justify the 3x cost? Generally not. Analog cameras of middle level quality (600-700 TVL), along with a quality DVR that can record these resolutions at 15-30 FPS meets the needs of almost any investigation teams. IP Cameras, although nice, would require knowledge of networking, IP addresses, and the additional headache of switch setup, so do not really make sense for paranormal investigation usage.

#### Additional references:

[http://www.aventuracctv.com/newsletter/DOCS/Aventura\\_Newsletter\\_02\\_Analog\\_vs\\_IP\\_Cameras.pdf](http://www.aventuracctv.com/newsletter/DOCS/Aventura_Newsletter_02_Analog_vs_IP_Cameras.pdf)

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