Totally Wireless Video Security

Traditional Video Surveillance ($50,000+)
vs.
Event-Based Videofied Solution ($2,500)

Executive Summary:

Totally Wireless Video Security has been effective but cost and complexity has limited deployment to protecting high value assets. Separating the "surveillance" component from the "security" component has reduced the cost by orders of magnitude and made portable Video Security affordable for mass deployment to small groups and individual personnel. The Videofied (video+verified) solution eliminates continuous recording and provides "event-based video" of only the events triggered by motion sensors. When the sensors detect an intruder, a 10 second video clip is captured and sent to the command post or monitoring station along with the alert. This video enables appropriate response for specific events.

The Videofied system has no A/C connection and is entirely self-powered – no wires anywhere. Videofied cameras are equipped with infrared illuminators for night vision and integrated with a motion sensor and encrypted transceiver in a package the size of a fist. The cameras use 920 MHz spread spectrum RF to communicate to a book-size

Fig 1: Integrated Camera, Motion Sensor, Self-Powered Encrypted Transceiver, and Infrared Illuminators

communicator which transmits alarm events and video to the command post over the cell network. The RF range between the cameras and communicator is 300mtrs line of sight. A single communicator can manage up to 24 cameras spread out over a square kilometere or an entire building.

Videofied enhances existing surveillance systems by providing early warning for more sophisticated pan/tilt/zoom cameras. Wireless camera placement makes it possible to see around corners, inside buildings and cover areas normally hidden from traditional mast-mounted cameras. The system is available in a fly-away kit the size of a briefcase. This low cost, totally wireless video security can be deployed with small mobile teams that were impossible to protect using more expensive video surveillance systems. Event-based video enhances force protection because it is affordable enough to provide even individual personnel with video protection. It is portable, self-powered, and fits in a briefcase; powerful video security in a small deployable package.

Infrastructure Protection

Outdoor/Harsh Environments

VIDEO SURVEILLANCE SYSTEMS

Totally Wireless Video Surveillance/Security
Real-Time Video, Sophisticated, Effective
Cost: $25,000 - $100,000

These systems rely on commercial 802.11 WiFi transmission which can become very crowded in urban areas.

Encrypted	Yes
Self-Powered	Yes
Remote Cameras	**No -** Mast mounted Cameras wired to platform

VIDEOFIED EVENT-BASED VIDEO

Integrated Totally Wireless Video Security
Portable, Self-Powered, up to 24 Cameras
Cost: under $2,500 for basic system

This system uses true 25 channel spread spectrum 915 MHz which is not used in typical urban WiFi systems.

Yes

Yes

Yes –
Up to 24 portable self-powered cameras
2,000 ft. RF signal between cameras and Cell communicator

TOTALLY WIRELESS SURVEILLANCE: Sophisticated and Powerful

Totally wireless video systems have been available for decades but, because they cost hundreds of thousands of dollars, they were used in only in extreme situations or military applications. This is changing with the growth in wireless communications technology and the cost of such systems has been reduced in recent years. Digital networks and wireless communications allow wireless cameras where wired cameras had been too difficult or expensive to install. Integrators create a self contained totally wireless video system by adding power using a generator or solar panel, on a platform or a trailer mounted portable "kit" more like television news vans than intrusion alarms. In fact, these totally wireless systems are powerful security tools that can be very effective and are certainly growing in popularity as their cost comes down.

The entire wireless system is designed around a platform or trailer with a vertical "mast" for mounting cameras, radio antennas and communications electronics. The integrator builds each system for specific project requirements based upon:

- Radio Frequency
  Radio communications for these systems usually are based on one of 4 bands from 900 MHz to 5.8 GHz. The ideal frequency is a compromise based on a number of factors including the amount of data to be transmitted, site conditions, obstructions in line-of-sight, available power and compatibility with other equipment.
- Power Consumption
  The totally wireless kit must include a generator, fuel cell or solar panels and batteries. Power consumption of the entire system, length of desired operation, environmental conditions are some of the main considerations.
- Cameras
  Often multiple cameras are needed to meet requirements incorporating features such as night vision, field of view, zoom and resistance to environmental extremes.
- Video Analytics
  Analytics are becoming increasingly important in sophisticated systems. Analytics are a way of programming computers or the cameras themselves to be able to intelligently "alert" someone to an event or intelligently target the camera itself on an object. Analytics eliminate a person staring for hours at a video display(s) waiting for something to happen.
- Other Sensors
  Additional sensors are often used to monitor a site such as infrared beams, pressure switches, infrared motion detectors, etc.
- A receiving station with staff specially trained in video surveillance must monitor the site.

Depending on the options chosen, systems are available with infrared cameras that can spot an intruder hidden in the bushes at 200 yards or read a license plate at half a mile. While these systems used to cost hundreds of thousands of dollars, now a typical solution of this type starts at around $50,000. Still the cost and complexity of such systems makes mass marketing difficult or impossible and many price sensitive applications requiring

totally wireless video are unserved. In addition, cameras still do not look around corners or through buildings which makes "total coverage" of some sites difficult.

EVENT-BASED VIDEOFIED: Affordable, Portable, Anywhere

Commercial intrusion alarm technology evolved from wired systems to wireless in the 1980s with the appearance of a new generation of cost-effective wireless sensors from several suppliers. Next, transmitting alarms from the security panel to the monitoring station went wireless using proprietary narrow band radio, analog cell phone and finally the inexpensive digital GPRS cell network. Yet the typical wireless intrusion alarm is still connected to A/C power and doesn't work in many totally wireless applications.

Video has been "surveillance-centric" by providing remote real time viewing from continuously recording cameras. Commercial manufactures created video security systems by integrating video with intrusion alarm panels and other sensors. These systems are not wireless and run on A/C power. Videofied separated "surveillance" from a video intrusion alarm to create a new cost-effective wireless video solution. The product won "Best in Show" award for new product innovation by the Security Industry Association at the ISC West in Las Vegas 2007. The system is optimized for video security instead of surveillance – the camera is only on during an alarm. Videofied is self-powered and transmits alarm events and the video of what caused them over the standard GPRS cell network. The innovation is not so much what the system does but the price at which it does it – a technology inflection point. Videofied made video security portable and affordable. Videofied dramatically reduced equipment costs while eliminating most of the complexity/cost of integration/installation. The cost-effective concept is designed around the wireless P-Cam, a digital camera integrated with passive infrared (PIR) motion sensor complete with an internal battery-pack. The motion sensor acts as a reliable analytic (with much greater accuracy than camera-based pixel change systems) for the digital camera – the camera only sends videos of what caused the alarm. The P-Cam also includes infrared illuminators for true night vision.

In ideal conditions the batteries on the panel and P-Cams will last 4 years and eliminate the need for generators or solar panels. The P-Cam conserves power by keeping the camera off until an intruder trips the motion sensor. When an intruder is detected, the camera takes a 10 second video and compresses the video to a small 200K MPEG file. This file is encrypted and sent by radio transceiver to the security panel which is powered by 2 sets of batteries (one used as a backup). The range between the camera and panel is up to 2,000 feet line of sight. The control panel sends the alarm and video to the monitoring station over the GPRS cell network – the operator sees the alarm and the video of what caused it. During the alarm, the monitoring operator can request real-time images from the P-Cams – but this is much different from surveillance where cameras are always filming/recording and accessible for remote viewing. Videofied can manage up to 24 P-Cams. The current camera is not intended to get wet and operates down to 32 F. The new IP 65 weatherproof rated P-Cam will operate down to -20 F, ideal for securing site perimeters and outdoor assets.

The basic "kit" in this case includes two cameras, the control panel, and keypad has a retail price of less than $2,500 while a system with 10+ cameras and the optional add-ons is well under $10,000. Monitoring Videofied is substantially less expensive than video surveillance because it is so simple it doesn't require special operators or workstations. Monitoring personnel don't need to manage surveillance controls for pan, tilt, and zoom and remote DVR operation.

Applications:
This affordable new concept solves historically difficult security applications where power and communications don't exist or are cost prohibitive. Many situations often required portable or temporary security installations where wires were impractical or impossible.

- Force Protection applications requiring intrusion detection to secure a perimeter or building now have an affordable solution, even if the location changes daily. Videofied is affordable enough to protect small groups or even individual personnel.
- Storage Trailers and shipping containers are vulnerable with no power or communications. Totally wireless video using the GPRS cell network can provide video security even in transit. It is perfect for high-value shipments. Additionally, it is possible for a single panel to secure a number of trailers/containers in a storage site by placing a single camera in each one.
- Unattended vehicles and equipment are targets of tampering, sabotage and theft. Cameras placed inside the cab or engine compartment resolves this and gives an early warning of a potential incident.
- Hazardous material areas need immediate security at an accident site, exactly what this system provides.
- Temporary installations for command centers, convoys, and special open air events can now be installed in minutes, even in multiple buildings, by a single person.
- Remote infrastructure is subject to both theft and sabotage. Totally wireless video provides security while enabling the appropriate form and level of response depending upon whether the video shows an animal, children or something worse.

Conclusion:
Sophisticated totally wireless video surveillance systems are becoming less expensive and moving from military to commercial applications. They are becoming more common in large construction projects, mines, large public gatherings and festivals. However, cost-effective video security opens new markets where totally wireless surveillance systems are still too expensive. It creates a new "mass market" for video security where most construction sites, commercial buildings and even residential applications are viable prospects. In addition, because it is so extremely cost-effective, Videofied enhances more sophisticated video surveillance systems by enabling a user to place "more eyes in the field" giving redundancy and better video coverage than can be accomplished by a single system. Surveillance cameras mounted on a single mast simply cannot cover all the areas at risk within a job site. They cannot see inside of buildings or look around corners. Multiple portable P-Cams can be placed and moved anywhere to deliver short videos of intrusions so that surveillance operators know where to look and what to look for with their sophisticated high definition cameras. The other traditional method to secure these

sites has been with security guards. Guards are expensive and can only be in one place at a time. Video security acts as a force multiplier to maximize the efficiency of a single guard by alerting them of an intrusion and providing video of what or who they are to pursue.