



A battery-powered, ruggedized, combination camera and motion sensor with a wireless connection to a network operating center alerts security personnel when unauthorized intruders come near the copper cables and grounding plates.

Copper Theft: Problem, Testing, Solution

AT&T partnered with security company SNC in an effort to halt the theft of copper from the wireless carrier's cell sites in its North Texas operating area.

by Keith Jentoft

In 2006, AT&T's network engineer for the company's North Texas market reported fewer than 50 incidents involving the theft of copper bus bars, grounding wires or cable from cell sites. Within a year, copper theft incidents rose to more than 150, a nearly 200 percent increase.

Although the cost of the copper stolen in a typical incident was valued only in terms of hundreds of dollars, the repair cost was increasing dramatically along with the threat involving loss of service. Replacing or repairing damage from copper theft at AT&T's North Texas area cell sites grew from less than \$70,000 in 2006 to more than \$210,000 in 2007, an increase of more than 200 percent.

Because many of the affected sites are remote, no suspects were identified

in any of the thefts, so no related arrests were made by law enforcement agencies. Because remote sites receive relatively infrequent visits by technicians, key grounding connections could be missing for some time, exposing the sites to possible extensive damage should lightning strike in the interim. That would raise the stakes for base transmitter station repair and replacement to the level of catastrophe.

Taking the initiative to find ways to detect intruders and notify authorities as quickly as possible, AT&T Central Region corporate security looked for partners to help the company stop the growing epidemic of thefts. As a systems integrator, security specialist and monitoring service operator, SNC Security offered AT&T a wireless video security system, Videofied, made by

RSI Video Technologies and originally intended for residential indoor use.

In meetings with AT&T's North Texas market network leadership team, SNC demonstrated the wireless video security system's wireless, battery-operated capability to deliver to the security company's monitoring station a 10-second video of a site intrusion immediately when a break-in occurs. The specially developed equipment uses a battery-powered sensor and camera that operate for four years on three AA batteries.

Thanks to the battery power and wireless interconnection, the wireless system may be easily installed anywhere at the site to provide detection and immediate response to criminal activity, increasing the probability that theft suspects might be apprehended. Operationally, the system provided

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This view of a shelter shows the camera above the door and a proximity card reader on the door above the doorknob. The camera also views any approach to the air conditioner. Some thieves have removed air conditioners to gain entry to the building and have stolen all or part of the air conditioners for the metal they contain.

Development and testing

The wireless video security system had not initially been designed for outdoor applications, so additional development work was required to create an outdoor sensor and camera combination and an outdoor arming and disarming station and to finish a GRPS cell-based reporting capability to send alerts to the monitoring station. SNC also had to refine its internal monitoring processes to optimize interaction with AT&T's corporate security and with law enforcement agencies for a seamless solution.

The team decided to field five systems immediately to obtain real-life data on the solution's basic operation and viability. SNC installed the five systems at Dallas-area sites selected by the customer. These five sites had a

history of multiple copper theft incidents. The initial deployment lasted five months, and the results helped to define the final solution.

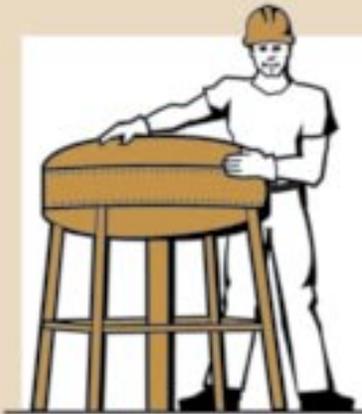
To begin, SNC mounted the standard indoor Videofied camera and sensor combination in an irrigation valve box and put the entire assembly on a movable arm to create a "bucket cam" — the first outdoor Videofied camera. These early camera and sensor combinations became the forerunners of a new line of ruggedized outdoor devices.

To save time, SNC used a wired third-party proximity card reader to arm and disarm the initial five systems. By the second phase of testing, Videofied developed its own wireless proximity card arming station to simplify installation and operation.

Communication connectivity from the towers to the central station initially was provided by standard landlines installed by SNC while the wireless video security system was being tested

network engineers real-time knowledge of grounding conditions for faster repairs to protect against outages.

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for compatibility with AT&T's static IP SIM cards. Once the equipment was approved for use on the AT&T network, the landlines were disconnected, and the five original beta test sites were converted to 100 percent wireless applications during the second quarter of 2007.

During the initial testing phase, SNC worked closely with the network team to optimize monitoring processes. As part of this system, they implemented dynamic alerting that incorporated the weekly personnel schedules of the network field technicians. They also implemented daily updates of the systems in the field as to whom was authorized to arm and disarm the system, both employees and contractors. Even today,

the service template SNC created is continually reviewed for possible improvements and faster law enforcement response. For instance, SNC has implemented pushing the videos of the intrusions to multiple people within the company as well as directly to law enforcement agencies for certain sites. The objective is to apprehend as many suspected thieves as possible.

The second phase of testing began in the third quarter of 2007. In October 2007, SNC equipped 18 additional sites with



This camera gives a straight view from the cable tray looking outward, revealing any possible intruders to viewers at the security monitoring center. Metal thieves might be attracted by the copper in the wires shown here covered with green insulation.

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the latest generation of the new wireless video security systems and upgraded the initial five sites. The goal was to broaden the test sample and saturate an area to see what would actually happen with the copper theft. The tests continued throughout the Dallas area through the first quarter of 2008.

Results?

The short answer is, "It works." The systems have been in place for over a year and have proven they deliver real protection against copper theft at AT&T cell towers. The production version of the new wireless video security outdoor system is performing beyond expectations. The new generation of camera and sensor combination operates at temperatures from -20 degrees F to +140 degrees F and is entirely waterproof. It also has enhanced night vision with twice the illumination of the initial unit.

In addition, SNC's monitoring and installation processes deliver results that can be measured and thus help to support a purchase decision based on the return on investment. Affordable hardware, simple and consistent installations and proven processes are all part of the solution. SNC is being noticed beyond AT&T as other carriers and tower owners begin to follow AT&T's lead and deal with copper theft in a serious way. The following data compiled in the test speaks for itself.

Compelling statistics

The financial effect of the 25 wireless video security system test sites has been compelling:

- The cell tower sites installed represented reported losses of more than \$100,000 during for 2006 and 2007.
- No thefts have been reported at 18 of the cell site locations since installation of the alarm system. Criminal activity at those sites stopped.

- Criminal activity was detected at five cell sites following installation of the video alarm system
- The activity was quickly noted and police were dispatched in all five incidents.
- Five individuals were arrested in connection with four of the incidents.
- One suspect was sentenced to 3 years in prison.
- Less than \$5,000 was spent for replacement or repair at all the sites combined where the wireless video security system was installed.

This is only half of the story. Even more dramatic is the continued copper theft plaguing other tenants at sites used jointly by AT&T and other carriers. While AT&T solved their problems the other carriers continued to be hit by copper thieves, *even at the same sites*. After installation of SNC's wireless video security system, AT&T sustained no losses as copper thieves avoided the

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AT&T area of the sites and targeted the other carriers. According to police reports filed for five collocated sites in the test group, other carriers sharing the sites with AT&T were hit multiple times by copper thieves. Although the cost to repair for the other carriers is unavailable, police reports confirm the following incidents in which the other carriers' copper was stolen and no arrests were made:

- Site 1: three incidents on 2/15/08, 3/11/08 and 4/4/08
- Site 2: two incidents on 7/18/07 and 2/19/08
- Site 3: one incident on 4/24/08
- Site 4: four incidents on 12/27/07, 1/19/08, 2/27/08 and 4/11/08

SNC is now promoting this concept to tower owners and carriers across the country. The company has an established national installation and service organization capable of implementing national

rollouts as they have done with many retail chains. Mike Korbuly, vice president of SNC, said, "We believe that this affordable solution is a viable answer to copper theft for tower owners. Our efforts over the past 14 months to prove the system works have delivered what we promised. This is the message that I

spoke about at a recent state wireless association meeting in New Orleans." **agl**

Jentoft is president of RSI Video Technologies in White Bear Lake, MN. His email address is kjentoft@videofied.com. Videos of actual apprehensions can be viewed at www.coppertheft.info.

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