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# Progressive Railroading

THE INFORMATION LEADER FOR THE RAILROAD INDUSTRY

## Recording progress

*More railroads are tuning in to video inspection to improve security, boost productivity*

BY ROBERT J. DEROCHE

Security-conscious transit agencies and freight railroads continue to explore their technology options on the surveillance front. Many turn to video inspection systems to monitor activity in stations, onboard trains, along track and in tunnels — and, increasingly, for productivity purposes — to detect damaged rail, and track and inspect rail cars.

But for most roads with a video bent, security's been the primary post-9/11 push. And prodded by the U.S. Department of Homeland Security's (DHS) Transportation Security Administration (TSA), freight and passenger roads likely will keep on pushing.

After TSA inspectors conducted more than 2,600 interviews with freight-rail

managers and other personnel to assess rail security and develop a database of potential high-risk areas, the agency last year issued 28 "security action items" for railroads, TSA Assistant Secretary Kip Hawley said during a Feb. 6 U.S. House Subcommittee on Transportation Security and Infrastructure Protection hearing.

Forty-one of the largest U.S. transit-rail systems already have conducted security self-assessments that TSA will use in tandem with its own assessments to develop tighter security measures, Hawley says. DHS also has published a closed-circuit television (CCTV) technology handbook to help railroads assess the technology's capabilities and limitations.

In short: Rails figure to be recording more video in the near term.

"We're talking to a lot of potential

customers who are being asked by TSA to implement video in security," says Joe Denny, president of communications and control systems provider RailComm Inc.

### PRESS TO PLAY

There's already plenty of railroad recorders out there — and plenty more ready to hit the "record" button. Just ask the folks at Duos Technologies Inc. When the provider of turnkey intelligent video and sensor-based intrusion detection systems in 2002 connected with its first rail client — CSX Transportation — it had seven employees. Now, Duos employs 53.

"We'll probably be up over 100 at year end," says Scott Carns, director of business development for Duos, which develops systems for a range of rail applications: in tunnels, along bridges, through sensitive rail corridors, for unauthorized rider detection along the southwestern border, and in rail and intermodal yards, and diesel tank farms.

During the past five years, Duos has completed three dozen projects for CSXT. In 2005, the company teamed with Epsilon Systems Solutions Inc. to design, manufacture and install a security system along a 5.5-mile CSXT line between the Class I's Benning Yard and Reagan National Airport in Washington, D.C.

Since 2002, Duos Technologies Inc. has developed and installed three dozen tunnel, bridge and other rail corridor security projects for CSX Transportation.



The system integrates “intelligent video” — comprising video, intuitive software, data storage and information technology featuring Duos’ rvspro™ digital video recorder and transmission server — radio frequency identification and other surveillance technologies.

## CAN’T AFFORD ‘FALSE POSITIVES’

Also in 2005, Duos entered into a master agreement with Union Pacific Railroad to design, build and install real-time surveillance and monitoring systems along rail lines and tunnels. UP plans to use the systems to simultaneously monitor line segments and assets remotely and from central command and control stations.

The rail tunnel security surveillance and video analytics system is based on Duos’ PRAESIDIUM™ sensor technology suite, which incorporates video analytics and data from a variety of other types of sensors into a single, multi-source platform.

The system uses live video streams to detect intruders, and can distinguish between foliage, animals, train movement and people.

“With UP and CSX, which operate 24/7 dispatching centers, even one false positive is unacceptable — they simply can’t be responding to false alarms,” Carns says. “So, we built in artificial intelligence where it actually learns what each camera sees, and adapts accordingly.”

Other rail security clients include Conrail (Duos is supplying a turnkey system featuring state-of-the-art surveillance cameras and the PRAESIDIUM platform

for the railroad’s New Jersey yard) and Amtrak (Duos is integrating several surveillance systems, video analytics and radio frequency identification devices under the Amtrak Security Pilot Project in and around D.C.)

“We’re really just scratching the surface,” Carns says.

Particularly, perhaps, in passenger-rail country, which is “where the federal funding comes from,” says Joe Donnan, president of Railhead Corp., whose subsidiary Railhead Vision Systems provides system integration and distribution services for Apollo Video and other rail industry audio-visual manufacturers.

In January, Railhead and Apollo Video Technology won a \$3.2 million contract to install 502 onboard video surveillance systems on trains operated by the Northeast Illinois Regional Commuter Railroad Corp. (Metra).

The digital color, audio-visual systems will enable Metra to record activities in the front and rear of commuter trains, including crossings and signal lights, along its 495-mile, 243-station rail system. Metra will use the systems to investigate accidents, and deter trespassers and vandals.

“The cameras can clearly capture the signal colors — that was one of the big issues for Metra,” Donnan says.

“It’s difficult to get the colors, especially at dusk, at dawn and at night.”

Stationary trains and cars also can be video recorded, and saved in a temporary computer cache. When the train or car moves, a sensor activates a video recording that downloads the activity to a com-

puter hard drive.

And the technology is only going to get better, Donnan says. Higher-resolution cameras and high-definition systems “are on the way ... [with] complete and full integration with event recorders and all on-board systems, with simultaneous video playback,” he says.

## VIDEO AS DETERRENT

But video’s current intrinsic value was enough to convince Comdesco Group Inc. Vice President John Plese that security-minded railroads, rail agencies and the communities they serve were ready to embrace the technology in a big way.

About two years ago, Plese and Teleweld Inc. President Mike Supergan were talking about a commuter railroad that had just experienced a crossing accident and “the light bulb went off,” as Plese puts it: He thought of the “PODs” or Police Observation Deterrence video cameras the Chicago Police Department claims have helped shut down drug trafficking and other Windy City crimes.

“You put up a POD — it’s a big, white box up on a pole, there’s a flashing light, maybe it has a police logo on it — in a neighborhood area, parking lot or wherever there’s an issue,” Plese says. “Why not at railroad crossings?”

Enter the Advanced Real-Time Video Information System (ARVIS), which Plese refers to as a “Homeland Security offering” that Comdesco and partner Teleweld are marketing to the rail industry, as well as cities and municipalities.

“Our belief is that with these systems, people will think twice about going around a gate, or trespassing,” says Plese, adding that ARVIS technology has been installed in the city of Wooddale, Ill. “When people see a flashing light, they know it’s being seen by village or police depart-



Comdesco Group Inc.

Wooddale, Ill., is using Comdesco Group’s Advanced Real-Time Video Information System.

ment officials. It's a deterrent."

Video technology's also changing the way rail officials think about how to improve their operating practices. And suppliers are stepping in to help.

For example, ENSCO Inc. has developed a fully automated joint bar inspection system that utilizes high-speed cameras to find joint bar damage on continuous-welded rail. The system was developed in conjunction with the Federal Railroad Administration, which implemented more stringent joint inspection standards last fall.

"You can find everything from a hair-line crack to a major break," says Jeff Stevens, manager of business development for ENSCO's Rail Technology Division.

Canadian Pacific Railway installed one of the systems last fall, while Canadian National Railway Co. will install one this summer. BNSF Railway Co. and UP also have tested the systems.

ENSCO's joint bar inspection system utilizes two cameras trained on each rail, mounted either on a rail car or a hi-rail truck, Stevens says.

The cameras download information to two computers: an image acquisition and analysis computer, and a laptop mounted in the hi-rail truck. The computer captures and analyzes images of joint bars, and determines the location of suspected cracks. When a crack is detected, the computer sends a message and a corresponding image to the laptop, which sounds a buzzer and presents the visual image of the suspected crack to the inspector in the hi-rail vehicle. The laptop also provides image storage and inspection reports.

A Global Positioning System is included to apply a latitude and longitude position stamp to every image, which can be captured at speeds up to 55 mph. Maintenance personnel then can locate the joint bars with suspected cracks and to produce a complete inventory of all joint bars by location.

"If you've got 200 joints a mile and 100 miles of track, it's a time-consuming job," Stevens says. "This saves you a lot of time and money."

ENSCO officials also are looking at modifying the system to detect missing bolts, rail gaps and crushed railheads, Stevens adds.

## MITIGATING HUMAN FALLIBILITY

Video inspection is creeping into the rail-car and rail-yard realms, too, and not just for security reasons. Last year, Metra selected Duos to develop an Automated Pantograph Inspection System or APiS™ featuring video analytics to automatically and continuously detect car anomalies.

The system flags defects, enabling Metra technicians to zoom in for closer inspection. Records are digitally recorded, time-stamped and archived; real-time and streaming video also is accessible from remote operator stations through a Web browser-based interface.

Duos also offers the Gondola Car Remote Digital Video Inspection System, or GCiS™. The system, which uses an IP-based architecture with real-time, intelligent video capability, provides archived video images of gondola car condition. A "major U.S. railroad" in the Northeast is using GCiS, Carns says, adding that Du-

os offers the rvspro SMART Yard Digital Management System.

"What we're trying to do is mitigate the human fallibility," he says.

Other technology providers also offer products and systems designed to help railroads improve yard productivity.

To help railroads track and locate "lost" tank cars in rail yards, RailComm is improving its Domain Operations Controller (DOC®) tracking systems to include a video component that can enhance real-time tracking in yards as tank cars move in and out of yards — which also means DOC tracking systems double as security tools. Car movement in yards is a prime concern for DHS officials, who remain worried that hazardous material tankers could be used for terrorist attacks.

"We can generate a trip report and our software time-stamps it. Video is a module that's added to the system," RailComm's Denny says. "Multiple industrial railroads are looking at it."

Meanwhile, Railhead is working with the Elgin, Joliet & Eastern Railway Co. to install a wireless camera system in the short line's switching yard that will provide real-time yard views accessible via a laptop computer.

Expect rail-related video applications and installations to increase.

"I have a laundry list of sites from CSX, UP and Conrail that we haven't even touched yet," Duos' Carns says. **PR**

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