



By Mark Robins

CCTV SAFEGUARDS TRANSPORTATION WITH 20/20 VISION

HELPING TO MAKE PUBLIC TRANSPORTATION SAFER, SMARTER AND MORE SECURE

The welfare, safety and security of products, places and, most importantly, people active in transportation must be an absolute non-negotiable priority. To ensure this, comprehensive and modern video surveillance systems and CCTV are requisite. As an intelligence-gathering tool, they provide real-time video data, help police respond to events, send assistance quickly in the event of problems or emergency situations, deter possible terrorist attacks and criminal activity, and control traffic and transportation flow.

CCTV and other video surveillance systems installed in shipping yards, warehouses and freight vehicles can do all this and even provide a visual record of the cargo's journey. Also, recent activist incidents have exposed the issue of airport perimeter vulnerability. Conventional solutions like fences and patrols are no longer sufficient to prevent the significant damage caused by vandalism. CCTV can offer optimum perimeter protection.

"CCTV and video surveillance play a critical role in the transportation sector, not only for ensuring the security of people, materials and equipment, but also for helping to limit liability and verify that operational processes and policies are being properly followed," says Steve Payne, owner of Pac-West Integrated Solutions, Fresno, California.



Karlheinz Biersack, Dallmeier

Karlheinz Biersack, director of business development at Dallmeier, Germany, explains, "CCTV and video surveillance play a vital role in ensuring both security and operational efficiency across transportation



AI-based camera technology can automatically classify objects at the perimeter and is used by airport managers for visual verification. Dallmeier image.

infrastructure. At airports, for example, video technology contributes to perimeter protection, apron monitoring, terminal security and even remote tower operations. With increasing safety and security challenges, including threats of intrusion or vandalism, high-performance video systems are indispensable tools not only for threat detection and visual verification but also for optimizing ground-handling processes and enhancing the overall passenger experience."

SEEING TRANSPORTATION

The transportation sector — particularly airports — poses unique challenges: vast open areas, dynamic movements, strict safety and security regulations, and complex operational processes. "Video systems must address multiple requirements simultaneously, such as detecting security breaches at the perimeter while also supporting turnaround analytics or crowd flow analysis in terminals," Biersack says. "Moreover, transport operators need surveillance solutions that can be integrated with other systems, such as radar or flight data, and provide reliable performance even in challenging weather or lighting conditions."

Payne explains that CCTV and surveillance in the transportation sector differ in one key aspect: the level of activity. "In traditional security applications, 99.9% of the time, nothing

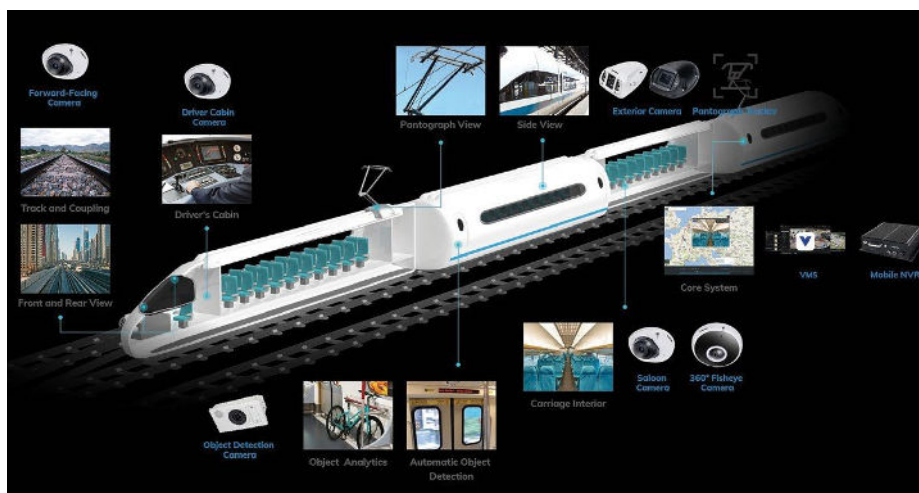
happens. In contrast, the transportation sector often operates 24/7, with constant movement of people and goods."

VIBRATIONS, SHOCKS, ENVIRONMENTAL ELEMENTS

Resilient video surveillance systems and CCTV cameras for vehicles traversing long distances and withstanding harsh environmental conditions like vibrations, shocks and extreme temperature fluctuations are indispensable. They must be specifically designed to capture clear and detailed footage even in bad conditions. Ruggedized CCTV cameras have sealed enclosures that protect the internal components from dust, dirt and debris that could harm the internal components and the image quality.

Many are "outdoor" rated, but that generally means that they meet standards for vandalism resistance (such as IK10), and moisture or dust incursion resistance (such as IP66 and 67). IK10 is the highest rating within the IK Code, an international standard that classifies the degree of protection provided by enclosures against mechanical impact. IP stands for Ingress Protection and it is a system of rating to show the levels of sealing against foreign bodies.

Payne explains that shock and vibration are typically addressed in two ways. "Physical shock and vibration resistance is achieved through the use of springs or rubber bushings to isolate the camera's



Views from different cameras in different locations on a train. Vivotek image.

image sensor. Additionally, digital image stabilization uses processing algorithms to reduce the effects of movement and shake in the captured video."

SEEING BEYOND SECURITY

The applications of CCTV and video surveillance in transportation extend well beyond security. One of the most valuable secondary uses is liability mitigation, particularly in fast-paced, dynamic environments where constant movement can lead to accidents or misunderstandings. "With so much activity, it's easy for individuals to lose situational awareness. Surveillance systems can provide critical documentation of events, helping to protect organizations from false claims," Payne says. "Additionally, video solutions play a key role in operational oversight. They can be used to verify that procedures are being followed and to monitor equipment and machinery (such as viewing meters or gauges) to ensure everything is operating within established parameters. Alerts can be triggered instantly if thresholds are exceeded, allowing for prompt intervention."

Biersack agrees that modern video technology can support operational processes in addition to its primary security function. In transportation environments, whether in aviation, rail, ports or logistics, "Reliable video surveillance systems increasingly provide data and visual information that help optimize workflows, improve coordination

and ensure better decision-making."

For example, Dallmeier systems allow the integration of external data — such as vehicle IDs, container codes, or in the case of airports, flight data like tail numbers or call signs — directly into the video stream. This creates a consolidated information layer that supports faster response times and better situational awareness for multiple departments, from security and operations to traffic or logistics management.

ENHANCED VISION

CCTV and video systems with intelligent analytics can provide real-time insights into people and vehicle flows, occupancy levels or dwell times. This not only enhances the ability to detect anomalies early but also supports more efficient deployment of personnel and resources — contributing to both security and operational resilience. "In this sense, video technology is evolving from a pure security tool into a multi-purpose data source that helps transportation operators meet the growing demands of security, efficiency and digitalization across their facilities," Biersack says.

As crime rates rise across society, transportation-related security challenges are also increasing. Incidents such as cargo theft and vandalism along rail lines, as well as SIDA violations and unauthorized incursions, are becoming more common. In response, CCTV technologies continue to evolve, offering

more advanced, intelligent solutions to help meet these growing security demands.

One of the most significant advancements in recent years has been the integration of thermal imaging into standard CCTV and security applications. Thermal cameras can detect people at much greater distances than traditional optical cameras and can often reveal individuals who are hidden from view in visible light. Their use has expanded rapidly, particularly in transportation corridors such as airports, where SIDA incursions and violations are a common, and dangerous, problem.

Because not all operations have the budget for full-time security personnel, third-party video monitoring and threat deterrence have become increasingly popular in recent years. Payne explains these systems offer a cost-effective solution by providing access to trained remote operators who can respond to real-time alerts with pre-determined actions, such as notifying law enforcement. "Many modern cameras are now equipped with flashing lights and two-way audio that enable operators to listen in and communicate directly with individuals on site. This allows them to issue verbal warnings and advise that authorities may be dispatched if trespassing continues, significantly enhancing site security without the need for on-site staff."

PTZ (pan-tilt-zoom) cameras can be highly effective in certain transportation scenarios. But Payne advises their cost doesn't always justify their use, explaining a typical PTZ camera can cost two to three times more than a fixed camera. "This makes it more economical in many cases to deploy multiple fixed cameras for full, continuous coverage of an area. PTZ cameras are most beneficial for on-site security personnel who need the ability to zoom in or adjust views in real time. However, if video footage is primarily used for forensic review, PTZ cameras may not offer sufficient value and could represent an unnecessary expense."

In contrast to PTZ cameras, which only ever record a section of the scene and often miss relevant events outside the field

of view, Dallmeier's Panomera systems record the entire area continuously and in high detail. This "overview plus detail" capability is particularly valuable for incident investigation, situational awareness, and evidence retrieval. Since each Panomera unit can cover a far larger area than traditional solutions, the required number of cameras, network components, installation points and infrastructure is significantly reduced. Biersack stresses that this simplifies ongoing maintenance — a major factor for transport environments where access is limited or operational disruptions must be avoided.

Also, the use of artificial intelligence (AI) in CCTV systems is rapidly expanding. While AI is not new to the surveillance industry, recent advancements have significantly increased its relevance and effectiveness. "Today's systems can automatically detect specific behaviors



The special perimeter optics in combination with specially trained AI and AI-based tamper detection promise optimum results with Dallmeier's Panomera Perimeter. Dallmeier image.

and trigger appropriate responses in real time, capabilities that are quickly becoming standard," Payne says.

"Furthermore, AI can analyze video metadata, identifying details such as clothing colors, vehicle makes and models, and particular actions or movements. This enhances the speed and efficiency of video review, making it easier than ever to locate and investigate specific events."

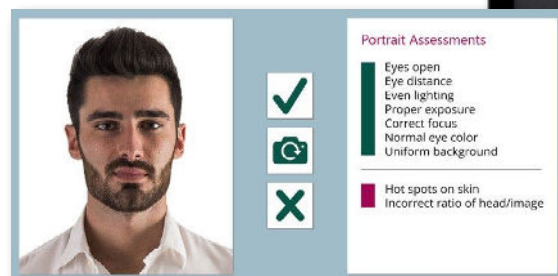
Integrated video analytics, such as AI-supported object classification or people and vehicle counting, further enhance the system's capabilities. In this way, Panomera multifocal sensor technology not only strengthens security, but also provides valuable data to improve operational processes and resource planning. With its versatility and high scalability, the technology is widely used across the transport sector — from perimeter protection and terminal surveillance to supporting traffic management and logistics optimization. 

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