

Security Cameras / Security Systems Fact Sheet: Transit Overview December 2007

Technology Overview

Security systems incorporate technologies that enhance the security, and possibly the safety, of transit customers, personnel, equipment, and facilities. Technologies include **radio communications**, **silent alarms**, **covert microphones**, **closed circuit television (CCTV) cameras** (also known as video surveillance), **automatic vehicle location (AVL)** and other equipment that assist transit agencies in monitoring and responding to situations on board vehicles, along the routes, and at transit facilities.

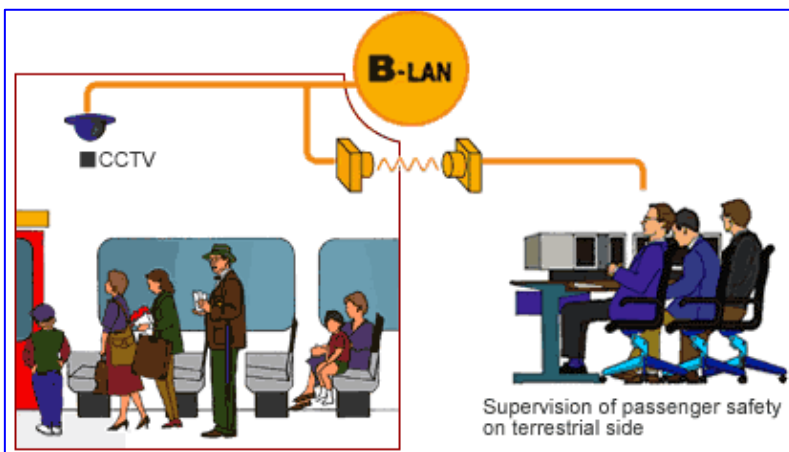
All modes of public transportation systems, whether urban or rural, bus, rail, or ferry, can benefit from the implementation of a security system.

CCTV cameras, the most basic **Intelligent Transportation Systems (ITS)** technologies used for security systems, can be used on both large and small transit systems to monitor the safety and security of passengers, employees, equipment, and materials. These security systems can be used to track the operating status of the transit and transportation networks, alerting officials to possible delays or closures. They can also warn officials of possible intentional acts of crime or violence.

Use Security Cameras to:

- Monitor safety and security on transit vehicles and at facilities
- In conjunction with other technologies, provide incident response
- Combat fare evasion
- Contest fraudulent claims

Common Technology Combinations



Security systems are the combination and integration of a number of components. The most basic and widely used equipment is the **CCTV camera**. Security cameras can assist transit agencies in monitoring and knowing how to respond to situations onboard vehicles and at transit facilities; they can also be used in incident response. Agencies can choose between *analog* and *digital* video technology. Analog technology can be less expensive, recording at 5 to 20

frames per second. Digital technology records at over 30 frames per second.

The CCTV cameras are usually paired with many other technologies to create an effective security system. These technologies include **radio communications**, **silent alarms**, **covert microphones**, and **AVL**. The use of digital video technology enables greater combination and integration opportunities with other technologies to create an expanded security system.

On-Board Surveillance

On-vehicle video surveillance can be used to observe suspicious or criminal activity, increasing the chances of arrest and conviction if a crime has taken place on a transit vehicle. Complex remote monitoring on transit vehicles can include the use of **silent alarms** that can be turned on by either the vehicle operator or by remote monitoring personnel, **GPS** or other **AVL** systems to pinpoint exactly where an incident has occurred, and **Mobile Data Terminals (MDTs)** that provide the driver non-verbal communication options.



Security cameras can be installed on buses where drivers cannot monitor occurrences.

Station and Facility Surveillance

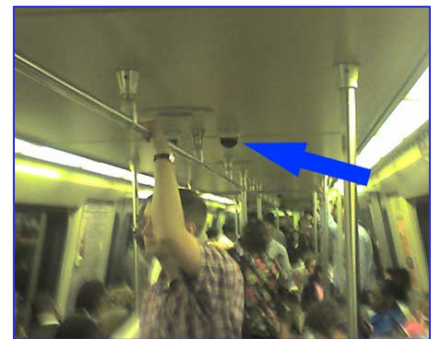
CCTV can be used as a safety and security precaution to monitor transit stations and facilities. Combined with other passive (perimeter fencing) and active (**motion detectors**) security devices, CCTV cameras can be used to determine the level of any real-time threat (e.g., was an alert from a facility fence an actual security breach or simply an animal setting off the alarm?). Use of digital security cameras transmitting over fiber-optic cable allows images from multiple locations to be transmitted to a central location for monitoring and video storage.

Incident Response

Security cameras and the **communication system** can provide a critical early information source for the transit operations center and enhance the connection between the transit agency and the responding public safety personnel. A remote view of the post-incident scene by the security cameras can assist transit management's decisions on whether the structure or vehicle is usable. This decision process can be improved through the use of the **computer-aided dispatch and scheduling (CADS) system**, **AVL** technologies, and **transit communications** with dispatchers, supervisors, and drivers to determine how to best resume the transit schedule to the affected locations.

Traveler Information

Transit agency monitoring of the CCTV camera feeds can be instrumental in identifying occurrences that may impact the transit operations. When such an incident occurs, it is advantageous for a transit agency to provide modified traveler schedules as quickly as possible. The **traveler information** infrastructure is the best method to reach the widest audience of travelers and alert them to the disruption or modification of any transit service. Customer satisfaction is dependent upon timely notification.



Is This Technology Right for My Agency?

Security systems, especially CCTV cameras, are in operation by a wide range of transit agencies. Smaller agencies must determine if their security will truly be improved through the deployment of the various security and safety technologies and if they have staff trained to utilize these systems and internal staff capable of responding to incidents identified by these security technologies. Before installing CCTV cameras and other security system components, planning, implementation, and integration should be considered so the technology can be used to ensure adequate security and safety coverage from the deployments.

Planning

- Develop a well-structured procurement plan with performance-oriented requirements.
- Create thorough specifications that include opportunities for system expansion and multi-agency integration.
- Involve staff from various departments and outside stakeholders such as contractors.

		Transit Mode					
Agency Size	Fixed Route Bus	Demand Response	Rural Transit	Human Service Transit	Rail Transit	Ferry Boat	
Large	✓	Vehicle safety enhancements (rear view cameras) more important than safety enhancements	✓	If security system is deployed, low cost equipment focusing on external vehicle cameras	First priority – CCTV cameras at stations and stops	If security system is deployed, initial installation for CCTV cameras at dock and berth-side facilities	
Medium	Security System: CCTV, AVL, silent alarms, wireless communications		Utilize voice communications for incident response				✓
Small	✓ CCTV for events recording				over cameras in vehicles		

- Visit peers at other transit agencies to determine full security needs.
- Identify vehicle capacity for additional wiring and discuss impact to available passenger space.

Implementation

- The implementation process, from planning to having an operational system, can take two to three years for large agencies and less than a year for small agencies.
- Train security personnel, drivers, and dispatchers on how to utilize the security equipment.
- Hire new staff as needed to benefit from an enhanced security system.
- Test and troubleshoot to ensure that equipment is performing as desired, including checking for camera blind spots and other coverage issues.

Integration

- Achieve interoperability with existing and planned ITS technologies (avoid proprietary interfaces between vehicle and dispatch-center components; look for open standards).
- Ensure flexibility for changes in fleet size and facility modifications.
- Update other technologies, such as **Global Positioning Systems (GPS)** or **communications**, as needed. This includes providing adequate bandwidth to transmit video to a central location that oversees safety and security.
- Consider integration and multi-use of security systems with other ITS capabilities and functions, including **traveler information systems** and **scheduling systems**.

Benefits and Costs

Benefits

- Southeastern Pennsylvania Transportation Authority (SEPTA) equipped four of its buses with a surveillance and monitoring system using digital video. This resulted in a 32% *reduction in insurance claims* and a \$15 million decrease in annual payouts.
- All Washington Metropolitan Area Transit Authority (WMATA) stations have at least eight strategically placed CCTV cameras performing constant surveillance, which has led to a *decrease in crime rates*.
- Other benefits include *reductions in fare evasion and assaults* on transit-agency property. Transit users report *feeling safer* with the presence of security cameras in stations.

Security Systems are deployed to:

- Reduce vulnerabilities
- Detect and deter potential attacks or criminal acts
- Respond to an incident or emergency
- Mitigate the consequences of an incident or emergency

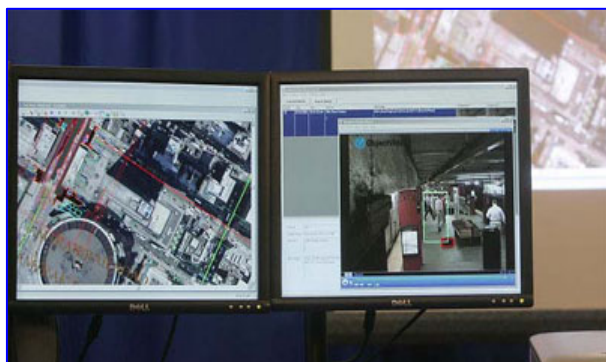
Costs

Price

Onboard security packages that include multiple CCTV cameras, digital video recorders, silent alarms, and covert microphones, now range from \$5000 to \$10,000 per vehicle. External CCTV cameras cost more to install due to pole installation costs and the need to reinforce the equipment from the elements. Security systems reported full deployment costs ranging from \$10,000 for a single black and white CCTV camera installation to over \$5 million for an advanced bus surveillance system utilizing wireless technology for live video transmission to an operations/security center. The median security system deployment cost falls between \$300,000 and \$400,000 per agency.

- Stand-alone cameras may not be as cost-effective as cameras integrated into a larger security system.

- Integrating a security system with other technology could prove expensive.



Security images often are transmitted back to security command centers.

Operations and Maintenance (O&M)

O&M costs for the various security components are generally running up to 5% of the original capital cost.

- Staffing needs for monitoring the CCTV camera feeds may increase
- On-site security personnel needs may be reduced.
- Additional storage equipment must be purchased to archive data.

Training

Incorporate security technologies into ongoing security training for select transit agency personnel.

Transit Agency Deployments of Security Systems

Agency	Contact Information	Number of Vehicles	Context / Success of Deployment
Southeastern Pennsylvania Regional Transit Authority (SEPTA)	1234 Market St. Philadelphia, PA 19107 215-580-7800	1,388 buses 1,190 rail cars	Cameras installed on 4 buses: Accident and injury claims reduced by 32%.
New Jersey Transit (NJT)	NJ Transit Headquarters Building One Penn Plaza East Newark, NJ 1-800-772-2222	2,035 buses 200 commuter rail (CR) cars	Integrated Security System: Provides live and archived feeds that count customers, detects dropped bags, tracks intruders in secure areas such as tunnels and bridges.
Washington Metropolitan Area Transit Authority (WMATA)	600 Fifth St., NW Washington, DC 20001 202-962-1234	640 buses (1,443 buses in fleet)	Cameras installed on 640 buses.
Dallas Area Rapid Transit (DART)	1401 Pacific Ave. Dallas, TX 75202 214-749-3278	68 (of 673) buses 115 light rail cars 17 CR cars	Cameras installed on 68 buses: Insurance claims (from accidents and injuries) reduced by 35%.
Pinellas Suncoast Transit Authority (PSTA)	3201 Scherer Drive St. Petersburg, FL 33716 727-540-1800	16 buses (208 buses in fleet)	In-vehicle Surveillance System: Per bus, installed 5 CCTV cameras, video recorder, covert microphone

Additional Resources on Security Systems

- Transit Agency Security and Emergency Management Protection Measures (November 2006); <http://transit-safety.volpe.dot.gov/publications/security/ProtectiveMeasures/PDF/ProtectiveMeasures.pdf>
- Advanced Public Transportation Systems: State-Of-The-Art Update 2006 (March 2006), http://www.fta.dot.gov/documents/APTS_State_of_the_Art.pdf
- Service Public Transportation Security (Volume 11) - Security Measures for Ferry Systems – TCRP Report 86 / Project J-10H (2006); http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_rpt_86v11.pdf
- Transit Security Design Considerations (November 2004); Report No.: FTA-TRI-MA-26-7085-05 / DOT-VNTSC-FTA-05-02; <http://transit-safety.volpe.dot.gov/security/SecurityInitiatives/DesignConsiderations/CD/ftasesc.pdf>
- Public Transportation Security (Volume 4) - Intrusion Detection for Public Transportation Facilities Handbook – TCRP Report 86 / Project J-10A(3), (2003); http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_rpt_86v4.pdf
- Electronic Surveillance Technology on Transit Vehicles, A Synthesis of Transit Practice - TCRP Synthesis 38 / Project J-7 (2001); <http://onlinepubs.trb.org/onlinepubs/tcrp/tsyn38.pdf>



Federal Transit Administration – Office of Research, Demonstration, and Innovation – Office of Mobility Innovation (TRI-11)
Research and Innovative Technology Administration – John A. Volpe National Transportation Systems Center

