TRACKTALK
RAILWAYS COMMUNICATIONS E-ZINE

SAFE JOURNEY – OPTIMIZING RAIL SECURITY WITH VIDEO SURVEILLANCE

Safety is one of the defining principles of railway operation, which extends to providing a safe and secure experience for passengers at all points of their journey. With the ever-present and evolving threats of crime and terrorism, the latest technologies allow operators to interface effectively with other agencies in both countering threats and responding to incidents when they occur.

Recent advances in communications, notably the emergence of IP technology, have transformed the functionality of and capability of video surveillance networks, with the capability of handling more detail and more data than ever before.

This issue of TrackTalk looks at how surveillance technologies can be harnessed so passengers feel safe and comfortable in the station environment, bringing together four distinguished perspectives on the topic from industry experts.

SUBSCRIBE: www.alcatel-lucent.com/blogs/tracktalk/

CONTACT: olivier.andre@alcatel-lucent.com

VISIT: www.alcatel-lucent.com/railways

SOCIAL VIEW

WHAT PUTS WOMEN OFF USING THE TRAIN?

Providing a safe environment is imperative for public transport operators hoping to retain and attract new passengers to ...

ECONOMIC VIEW

MAKING THE CASE FOR ENHANCED RAIL SECURITY SYSTEMS

Security is essential to the modern railway, protecting passengers, staff the operator's assets from diverse range of ...

CUSTOMER VIEW

PARTNERSHIPS ARE THE KEY TO A SECURE RAILWAY

The attacks on trains in Madrid in 2004, London in 2005, and Mumbai in 2008 highlighted the vulnerability of rail transport ...

EXPERT VIEW

THE CHANGING FACE OF OPERATIONAL SECURITY

In today's world you won't go very far without being caught on camera. Video surveillance or CCTV is now so common in ...

WHAT PUTS WOMEN OFF USING THE TRAIN?

BY: DR ANASTASIA LOUKAITOU-SIDERIS, ASSOCIATE DEAN LUSKIN SCHOOL OF PUBLIC AFFAIRS AND PROFESSOR OF URBAN PLANNING, UNIVERSITY OF CALIFORNIA LOS ANGELES (UCLA)

HIGHLIGHTS

- **Women are more fearful of becoming a victim of crime than men although operators have mixed records at addressing concerns specific to their female passengers.**
- **Surveillance technology is viewed as the most suitable backup to visible human presence at stations.**
- **Concerns remain on the reactivity of rail security staff watching passengers on CCTV.**
- **Internet services, real-time information displays act also as a way to alleviate fears.**

Providing a safe environment is imperative for public transport operators hoping to retain and attract new passengers to their services. Dark and deserted stations and trains are understandably off-putting and can encourage people to seek alternative means of transport, or even not travel at all, to avoid feeling threatened, or in some instances becoming a victim of crime.

These feelings are particularly pertinent among women passengers, as research conducted by Dr Anastasia Loukaitou-Sideris, Associate Dean, Luskin School of Public Affairs and Professor in the Department of Urban Planning at UCLA, shows.

Women are more fearful of becoming a victim of crime than men, particularly when travelling alone at night when there are less people around, and the chance of crime increases. Fears are exacerbated among older passengers, those from ethnic minorities who often live in poorer neighborhoods where the threat of crime is greater, and women travelling alone with their children. While crimes such as rape and violent assault from men are often well publicized by the media, and lay in the back of women's minds, concerns also exist over sexual harassment, threats, groping and other nuisance crimes with a sexual undertone.

Loukaitou-Sideris' research involved surveying female passengers in the United States, interviewing leaders of U.S. national women's organizations, and reviewing studies from the United Kingdom and Canada, about what might put women off using public transport, identifying what strategies they consider as appropriate for improving security, and suggesting policy improvements to public transport operators.

"In the United States passengers tend to be more fearful of becoming a victim of crime when they are waiting at a station, and if they have to wait for a long time," Loukaitou-Sideris says. "If there is poor visibility at the station and a lack of staff members around who can observe what is going on, these fears can increase. On board the train they tend to be more reassured if the train is busy, but if they are the only passenger in a carriage, they tend to wonder 'who else might get on?'"

Darkness, isolation, and limited opportunities for surveillance were all identified as the major reason that anxiety might increase among passengers, particularly women.

Studies from the United Kingdom found that being alone in a multi-storey car park prompted the greatest fear among women with 62% stating that they felt unsafe when alone in that environment at night, closely followed by underground stations with 61%, and railway platforms 60%. The presence of another single male passenger, a rowdy crowd, beggars and drunks, also incited increased feelings of fear, while a female passenger in New York reported feeling anxious on crowded services where groping could occur.

In each of these examples the lack of visible railway staff or law enforcement officers whose presence would provide reassurance was of deepest concern. "If people are around on the platform or when you buy a ticket this tends to put you at ease," Loukaitou-Sideris says, adding that there is a gap between what security measures women feel are most appropriate and what operators choose to provide.

"Transport authorities tend to favor security technology such as CCTV because these systems are cheaper to install than providing a uniformed police officer on every platform," she says. "A lot of women expressed reservations that they are not always assured that someone is watching them on CCTV and if they were to become a victim of crime someone would be there to help right away. Most of the incidents of crime that involve women on public transport reported in the US are not Type 1 crimes like rape and aggravated assault. They are more likely to be intimidation, groping, or verbal assaults which are difficult to prove. They feel that if there are more people around this is less likely to happen."

SURVEILLANCE

While the presence of other people is considered the optimum security solution, surveillance was the second choice in the surveys, and is considered as an effective backup or an additional reassurance.

Technological solutions that are currently available and widely used such as communication points, and emergency buttons are viewed as a positive means of drawing attention. However, concerns though remain about where exactly the operator at the other end of the line might be, and how quickly they will be able to respond.

United Kingdom have begun to implement security measures with women in mind, in the United States only three transit agencies have done this, choosing instead to take a universal security approach for all passengers.

"During safety audits in the UK women have been asked to participate in train planning and station design processes. Their concerns are heard and taken into account when drawing up solutions," Loukaitou-Sideris says. "In other countries, such as in Mexico and Japan, policies have included introducing women-only trains in order to control who gets on to a specific train. These have received mixed reviews though with some in Brazil thinking that they isolate women and actually make them more vulnerable."

While the presence of other people is considered the optimum security solution, video surveillance is considered as an effective backup.

Another significant fear found among women passengers is waiting for extended periods at stations where they might draw unwanted attention. Passengers in the UK have found that an internet service, which is easily accessible and provides real-time travel information, is effective at informing passengers about service interruptions, allowing them to delay their own journey to minimize waiting times and consequently reduce fear.

"Providing information displays which show the amount of time until the next train is scheduled to arrive can also act as a way to alleviate fears," Loukaitou-Sideris says. "Passengers know that the next train is on its way, and are not left wondering how long they are going to be on the platform."

Loukaitou-Sideris has found that transport authorities around the world have mixed records in introducing policies intended to alleviate the specific fears of female passengers. While transport authorities in the

IMPROVING SECURITY POST 9-11

The events of 9-11 and the Madrid and London terrorist bombings inevitably placed the effectiveness of transport security under intense scrutiny. Loukaitou-Sideris says she has noticed a significant change in considerations for station security since these attacks and a paper she published just before the London incident on designing and operating secure transport systems received significant attention in the aftermath of the incident.

She says that the terrorist attacks have made authorities more aware of station vulnerability and have resulted in a concerted effort to improve safety and security. Security audits is one area that has increased substantially since these incidents at all transport hubs, particularly airports, although railways continue to be vulnerable to attack because of the difficulty of screening each passenger that enters a station and boards a train. And with public transport authorities, particularly in the United States, battling to attract passengers, Loukaitou-Sideris says that careful consideration has to be made to any new screening or surveillance technologies that are introduced.

"Anything that delays the transport process makes public transport less attractive compared with automobiles," she says. "At airports now passengers are encouraged to arrive up to three hours in advance of their flight because of the increased security checks. Airline passengers are able to tolerate more delays, but it is not the same for rail passengers who would not wait for hours to go through security. In busy cities where thousands of people are flowing through stations this is impractical anyway."

Greater concern over security after the terrorist attacks highlighted the vulnerability of public transport stations and has resulted in significant investments in improving security. However, as Loukaitou-Sideris' research shows, significant fears do still exist, especially among women passengers, when using public transport at particular times of the day and in certain conditions. Improvements therefore still need to be made to alleviate these concerns which could ultimately attract more passengers to these services.

Improvements still need to be made to alleviate these security concerns which could ultimately attract more passengers to these services.

MAKING THE CASE FOR ENHANCED RAIL SECURITY SYSTEMS

BY: DAVE GORSHKOV, CEO, DIGITAL GRAPE BUSINESS SERVICES

HIGHLIGHTS

- **It is essential to consider the functional requirements of a video surveillance system from the outset of the project**
- **The capability of supporting ICT infrastructure needs to be scaled to the data volume**
- **The ability to upgrade in future is an important consideration if the system is to have a long service life**

Security is essential to the modern railway, protecting passengers, staff the operator's assets from diverse range of risks including terrorism, crime, trespass, and vandalism.

Few security systems are installed without the support of a robust business case, and it is recommended that operators create a systems requirements specification (SRS) that outlines the safety, operational, and security features of the proposed installation. This will help to ensure that camera compression and memory systems are designed to meet the operators' specific operational needs.

Environmental considerations will also be key to the business case – for example, additional protection may be required for cameras sited on platforms. The retrofitting of onboard CCTV to existing rolling stock poses a number of environmental challenges, no least static protection of memory systems and electromagnetic compatibility.

It is also important to consider the functional requirements of the systems. The chances are that CCTV imagery from both static and mobile transit applications will need to be both recorded and available to view in real-time. The operator will need to consider the quality of footage required to allow people and objects to be easily identified by security staff and law enforcement officers.

SURVEILLANCE NETWORK DICTATES POWER AND EQUIPMENT REQUIREMENTS

Modern CCTV systems can capture immense detail, but that information inevitably comes with a data penalty. "Camera frame rate, resolution, and the length of time you need to store recordings are all key factors in scaling your ICT capability," explains Dave Gorshkov. "Your surveillance network should dictate your power and equipment requirements, not the other way around. Often operators tell me they want 50 cameras. I ask them what they think every one of those cameras should be doing. It's very easy to over-engineer systems and overwhelm your ICT network with unnecessary data."

A study of the facility or vehicle that will accommodate the system is a key part of the total system design process and risk assessment. A layout plan, documenting the location and field-of-view of each camera should be included in the survey and if possible digital photographs should be taken from a pole-mounted camera.

Camera design and system architecture need to be considered carefully as part of the overall design process. "Ask yourself a few basic questions," says Gorshkov. "Why are we installing the system? What is its main use? Where do we need to install cameras and why? What are the images supposed to achieve? What recording system and back up facility do we need?"

The recording regime is a key component of the overall system and needs to be configured carefully to deliver the required image quality. The length of time images are stored will determine the specification for the supporting ICT infrastructure, including primary and secondary back up recording drives. The transmission network is also an important consideration. Many new CCTV systems use IP-based cameras, which contain a compression algorithm within the camera that modifies the output to a digital MPEG transport stream. IP-based systems require an appropriate supporting network such as Ethernet to support this data transmission. "You can easily scale your transmission network all the way back to the control centre if you have already established key criteria such as frame rate, resolution, and data storage capacity," says Gorshkov.

BE PREPARED FOR FUTURE EXPANSION AND UPGRADES

Additional data storage and transmission capacity may be required if the system is to be expanded. "It's worth talking to experts in this area to understand what existing technology you should deploy and the architecture needed to accommodate growth and scaling in operations," says Gorshkov. "Ten years ago networks operated with 5-10mbps transmission based on a handful of cameras. Today you have installations with hundreds, sometimes

Ten years ago networks operated with 5-10mbps transmission based on a handful of cameras. Today you have installations with hundreds, sometimes even thousands, of IP-based cameras that require hundreds of megabytes or gigabytes of capacity.

even thousands, of IP-based cameras that require hundreds of megabytes or gigabytes of capacity. Who knows where the technology will be in another ten years. Be aware that there are vulnerabilities in proprietary systems, which might be cheap to install but could be rendered useless when the technology moves on. You are more likely to succeed with a purpose-built system from a larger company, which will be less vulnerable to fluctuating business conditions."

The ability to upgrade in future is therefore an important consideration if the system is expected to have a long service life. "While you can't future-proof everything, you can take adequate steps to ensure that the installation can be upgraded at a later date if required," says Gorshkov. "You may find under certain circumstances that it will be cheaper to completely renew a system or sub-system than it is to upgrade, and there should be some assessment of this in the business case."

Another element to consider is the human one – how many staff will be required to operate the system? How many screens can one operator watch? Will video analytics be necessary to help security staff identify and respond to incidents?

While the primary objective of most rail CCTV projects will be passenger safety and asset protection, there are likely to be supplementary soft benefits that are not core to the business case. "There are often multi-level benefits that will strengthen the return on investment, which is why operators are often reticent to invest in security systems that don't interface to their operational needs in some other way," explains Gorshkov. "For example, cameras can offer advantages in terms of protecting operators against bogus insurance claims."

According to Gorshkov, another hidden benefit not included in the core business case is passenger comfort. The presence of cameras in stations or on trains is reassuring to passengers, and it can therefore be argued that they enhance the attractiveness of rail travel, particularly to those who might otherwise feel vulnerable. There are also soft benefits to law enforcement agencies in terms of lower crime levels and the use of CCTV footage as evidence.

REGULATORY REQUIREMENTS WILL SHAPE YOUR SYSTEM

In some countries, government agencies issue guidelines for minimum security provision on public transport, and the solutions employed can range from roaming foot patrols to advanced electronic solutions such as video analytic technology. "Often these regulations are open to interpretation in terms of the solution that is deployed," says Gorshkov. "One operator may consider a single camera to be adequate where another would use ten cameras in the same situation, but both installations could still satisfy all the relevant regulations."

In the United States, CCTV systems are now regulated to ensure common standards. "The formalisation of CCTV and video analytics in the United States with written standards has set a benchmark for operators to follow.

The cost of implementing surveillance systems in passenger environments such as stations can often be offset by government grants, and many countries have instigated funding programmes that aim to improve public transport security. In some cases, the availability of public funds might determine the planning and procurement sequence of the project. For example in the United States, grant funding programmes look at the capital cost of a particular security project before considering the type of risk it mitigates.

Since 2006, the US federal government has awarded more than $1.6 billion in Transportation Security Grants (TSAs). Most of this funding is directed to large metropolitan areas where the risks are judged to be greatest, with high-impact projects that guard against terrorism given priority. The TSA process is based on empirically-grounded risk analysis, and the operator carries out its own risk assessment. This assessment is the business case that forms the basis of the subsequent funding submission.

PARTNERSHIPS ARE THE KEY TO A SECURE RAILWAY

BY: JACQUES COLLIARD, MANAGER OF SECURITY DIVISION, INTERNATIONAL UNION OF RAILWAYS (UIC)

HIGHLIGHTS

- **Security strategies need to be continually reviewed to adequately address dynamic threats**
- **Surveillance measures are often determined by specific local and national requirements**
- **The rail industry is working on collaborative solutions to security issues**

The attacks on trains in Madrid in 2004, London in 2005, and Mumbai in 2008 highlighted the vulnerability of rail transport to acts of terrorism. Rail operators and government agencies all over the world have been forced to adapt quickly and respond to the massive challenge of securing open transit networks.

Passenger rail networks are by definition open systems, accessible through many entry and exit points, with the volume of users often reaching hundreds of thousands, even millions, each day. Security measures therefore need to reflect these unique operational considerations without compromising the functionality of this vital infrastructure.

This means that no single measure has the capability to secure the network and ensure effective response in the event of an incident. "The solution adopted depends on the political and administrative organisation of each country," says Jacques Colliard, head of the Security Division of the International Union of Railways (UIC). "Strategies need to be continuously updated, because they are linked to cultures and organisations, which mean they cannot be transferred from one place to another. But while there is no single solution, there are some common principles that apply everywhere: an efficient security policy is a mix between technologies, human factors such as staff training, and regulations."

A CHANGING SECURITY LANDSCAPE

Reform of the railway industry, particularly in Europe, has also impacted the organisation of railway security and the breakup of former incumbent railways with the separation of infrastructure from train operations is posing new challenges, particularly in terms of communications. "Security problems are becoming more and more complex, partly because there are so many stakeholders on today's railways," says Colliard. "For example in stations you have various train operators, infrastructure managers, retailers, emergency services. Security has to meet the perceived needs of all these parties. In the past we dealt with only one operator and one rail authority, whereas today we need to be able to distribute significant quantities of information simultaneously between different parties." Modern security networks need to distribute information quickly and efficiently between a broad range of users. "Security is a shared responsibility between many public and private partners," says Colliard. "Each has to be informed quickly about possible incidents and staff needs to receive the right information at the right time in order to be able to take the appropriate action. IP-based networks are invaluable in the context of a multi-user network because they allow information to be disseminated easily between stakeholders. An IP MPLS backbone is also the best way to ensure permanent evolution of the information systems as new security applications emerge."

IP is increasingly common on new trains, such as Alstom's Coradia Polyvalent for French National Railways (SNCF), and this development supports significantly-enhanced onboard video surveillance capabilities. "It's not expensive to install cables and devices on new trains, but it is more of a challenge on older rolling stock," explains Colliard. "Within the security aspect of a tender for new trains, organisation of data is a very important consideration if you want to support onboard video surveillance." Colliard warns however

IP-based networks are invaluable in the context of a multi-user network because they allow information to be disseminated easily between stakeholders. An IP MPLS backbone is also the best way to ensure permanent evolution of the information systems as new security applications emerge.

that operators must scale data transmission appropriately to the location, or risk being overwhelmed. “When you have too much information and too many pictures you become incapable of making a quick decision,” he says. “In large networks the challenge is more about integrating image analysis capabilities than about simply increasing the number of cameras. You need to consider what the purpose of the system will be. I think there’s a tendency to consider CCTV as a generic system, when in reality you need to be precise about what capabilities you need.”

“Are you installing a CCTV system primarily for operational purposes, or to identify specific people? Is the main purpose to prevent an act or to respond and provide evidence? Do you really need high-resolution images?”

NATIONAL VARIATIONS, INTERNATIONAL SYNERGIES

While Colliard recommends operators share best practice, the variance in local conditions and requirements means the application of security technology varies widely around the globe and standardisation of systems therefore an impossible goal. “Rail security systems cannot be entirely standardised because they need to meet specific regulatory and operational needs at a national and local level,” he explains.

Nonetheless, there is a consensus in the rail industry that a collaborative approach to security issues will promote the development of integrated solutions and a modular architecture for rail security that can be applied internationally. The UIC is supporting Protectrail, a four-year, EU-supported €21 million programme that aims to improve the protection of railway infrastructure against attack and reduce disparities in security provision between European rail networks. Protectrail will study a range of measures, including immunity of signalling and power distribution against electromagnetic terrorism, the detection of abnormal objects under ballast, the clearance of trains before daily use, control of access to the driver’s cab, and tools to isolate and secure suspect luggage. The project is supported by various industry associations, suppliers, academic institutions, and five national railway companies.

Within Protectrail, the UIC’s Security Division is leading the dissemination subproject, which aims to develop a viable set of railway security solutions by looking at the extent of the assets involved, the nature of possible threats, and the technical requirements and operational constraints.

“These projects will give us a complete view of the rail industry’s security requirements,” says Colliard. “The aim is to define our needs, then adapt existing solutions to meet them.”

Such initiatives demonstrate the rail industry is looking to capitalise on the potential of the technology that is now available and harness it to make their networks more secure in the future.

THE CHANGING FACE OF OPERATIONAL SECURITY

BY: JEREMY HASKEY, TRANSPORTATION SYSTEM INTEGRATION DIVISION, ALCATEL-LUCENT

HIGHLIGHTS

- **Security is just one facet of the use of CCTV, operational efficiency can also benefit from the technology through intelligent monitoring of assets.**
- **LTE will drive the next generation of operational security technology including video surveillance providing more accurate information and overcoming the problem of excessive local data storage**
- **Support from a trusted and expert partner is requested when selecting the best possible security systems from a range of technologies that are adaptable to specific needs**

In today's world you won't go very far without being caught on camera. Video surveillance or CCTV is now so common in our town centres, public buildings and transport networks that it is largely ignored by the public who accept it as a symbol of today's security conscious society.

The prevalence of CCTV means that the common perception when we are using public transport is that cameras monitor our every move and someone is always looking over us. However, this is actually far from the reality.

There are in fact two types of CCTV monitoring: real-time analysis, and post event analysis, with CCTV more commonly used to review events after they have happened, and used in conjunction with other technologies to alert security personnel.

This includes an effective radio system for staff to speak directly with passengers from station communication points as well as with each other.

While the concept remains largely unchanged since the emergence of CCTV, security technology is advancing rapidly, meaning that what an operator thinks it needs today might not be appropriate in two years time.

IDENTIFYING THE RIGHT TECHNOLOGY

Rail operators therefore have to make sure they select and apply relevant technology at the right time and in the right areas to keep their passengers and assets safe in the long-term. They are often supported in these decisions by trusted experts like Alcatel-Lucent, with an excellent example in the UK Highway Agency's CCTV network, which was rolled out by Alcatel-Lucent, and is the largest second-generation network in the world.

Here images from thousands of cameras are relayed to five centralised locations where they can be monitored in real time, or reviewed post event by operators. Similarly, an onboard surveillance system is now operational on Paris Transport Authority (RATP) metro Line 1, where an effective use of wireless transmission of video images to the control centre is helping to keep passengers safe.

Inevitably design is a major consideration for the effective application of large CCTV networks. The Highways Agency's system has cameras positioned at different angles at known accident hotspots and congested areas helping operators better understand the root cause of any accident that might occur, and to plan future responses. The same philosophy can be applied to the railway environment. In Paris, Alcatel-Lucent has helped RATP to decide whether multiple cameras viewed at multiple locations are required, or if a simple point-to-point solution is appropriate.

Selecting the right technology from the range of CCTV equipment available is another important consideration that could optimise the return on investment. For instance, high definition cameras which use face identification technology to produce a clear image of a suspicious individual amongst a crowd are proving to be effective in busy urban stations, but are not necessary for monitoring a road outside of a station where a cheaper low resolution camera might be just as effective.

Other types of intelligent CCTV software are capable of detecting atypical situations like left luggage on a platform, or abnormal behaviour, such as someone in a station car park going to multiple cars, rather than heading to their own vehicle. Simple systems designed solely to count passengers are similarly in widespread use, particularly in China, in order to improve passenger safety and solve operational issues.

In rural areas, or at stations that do not always have a physical human presence and might be susceptible to vandalism, cameras that use a flashcard are proving to be effective. Even if intruders cut the wires to the power supply, the 16 gigabyte or 32 gigabyte card continues to record images and provide police with valuable evidence following a security breach.

CCTV is also useful for protecting assets. At train stabling yards, for example, which might be vulnerable to vandals and opportunistic thieves, it is possible to set up a trip wire defense mechanism which when triggered can alert an operator's attention to a specific area through CCTV cameras positioned at strategic locations. Any intruders are immediately identified, or operators can quickly recognise a false alarm if the intruder turns out to be an animal.

INTELLIGENT RAIL INFRASTRUCTURE

Away from passenger safety, video monitoring is a key component in intelligent infrastructure. Cameras are monitoring the condition of the pantograph and cable of electrification systems to help schedule maintenance works and contribute to preventative maintenance procedures. Cameras might also be positioned at the front of the train to observe activities on the track with footage used to assist police to identify the causes of any collision that might occur, or to monitor platforms to make sure that the train is clear of passengers before it departs the station.

A future application being trialled by a major European Infrastructure Manager on its level crossings is similar to the trip wire CCTV application used at stabling yards. In this instance, if a person or a vehicle breaches the barriers and crosses the tracks an alarm notifies the operator at the nearest signal box. Drivers of nearby trains are informed to immediately stop to avoid a collision, or if a collision is unavoidable, the operator can alert the emergency services. If debris has to be cleared from the track, CCTV footage can determine when services might be resumed and accurate and up to date information provided to other trains on the line so they might advance when possible, minimising delays and disruption.

Inevitably all of this information has to go somewhere to be managed and responded to in an effective manner. Alcatel-Lucent's Intelligent Communication Management System (ICMS) acts as the facilitator of this information, also providing operators with the tools to respond to a specific incident.

With no single standard available for all emergency services' and transport operators' communication equipment, these systems are often not compatible with each other. The ICMS is able to decode the information from the various communication and security surveillance systems that are in place, providing integrated communication paths between the different organisations.

THE FUTURE

As Dave Gorshkov points out, utilising high-end security cameras can use a significant amount of bandwidth and could overwhelm ICT networks by storing large quantities of unnecessary data. Networks that rely on Tetra communications that store five frame per-second images on DVR systems could soon be replaced with the impending introduction of Long Term Evolution (LTE) into the railway market.

The hype surrounding the development of LTE is justified. With greater capacity, it has the potential to revolutionize video surveillance by carrying live high-definition video to individual handheld devices carried by security personnel, staff in control centres or directly to the emergency services. The HD images will improve zoom quality making grainy images associated with current CCTV applications a thing of the past.

It also offers some significant cost benefits. With operators investing significant sums in improving and maintaining fixed infrastructure, improved security could help reduce this by deterring vandals and thieves, and also contributing information that will improve preventative maintenance scheduling.

Potential customers have expressed their excitement about LTE's potential. And this is this just the beginning. The technology is still in its initial stages of development and realising its potential. But as it evolves LTE will soon become the platform from which the next generation of security can be built and developed by the technological community. It will open the door to the new innovations that will further enhance security of assets and the safety of rail passengers to the benefit of all.

SUBSCRIBE: www.alcatel-lucent.com/blogs/tracktalk/

CONTACT: olivier.andre@alcatel-lucent.com

VISIT: www.alcatel-lucent.com/railways

Alcatel·Lucent