

# Get smarter!



How much can turning CCTV cameras into Intelligent CCTV systems enhance ITS?

**W**orldwide, ITS tries to achieve the same goals: fighting congestion, increase road capacity without building new roads, improve safety in urban areas, in work zones and in rural areas and improve the security of road infrastructures among others. In other words: better roads! While different strategies will be applied by different agencies, one element is a constant: the CCTV camera is a key component of any ITS system and one experiencing the fastest expansion. It then makes sense to try to achieve more with CCTV cameras than just monitoring roadways: that is the concept of Intelligent CCTV.

#### ITS FOR BETTER ROADS

Worldwide, transportation agencies face the same issues. Demand for highway travel continues to grow as population increases, particularly in metropolitan areas when construction of new highway capacity has not kept pace. As congestion increases, any unexpected incident is likely to create serious problems if not cleared immediately. Increasing road capacity without building or expanding new roads is a necessity. Ever more ambitious goals to reduce fatalities and injuries have created needs to improve safety in work zones, in high-incident locations, and in rural areas. Homeland Security has raised the stakes of monitoring critical road infrastructures, such as tunnels and bridges.

Having exhausted the possibilities to address these issues by building new roads and conventional tools, all are turning to Intelligent Transportation Systems to achieve ambitious goals for transportation. While different strategies will be applied, one element is a constant: the CCTV camera is a key component of any ITS system and the number of CCTV cameras deployed is rapidly multiplying. It is now common to see one or more operators dealing with several hundred of cameras monitoring long expanses of highways and expressways in urban areas. In rural areas, there are fewer cameras which are

not monitored 24/7 if they are monitored at all. Cameras are often used to verify incidents rather than detecting them: this is a reactive approach. Within the frame of ITS, it makes sense to try to achieve more with CCTV cameras than just reactive monitoring and allow cameras to be leveraged proactively.

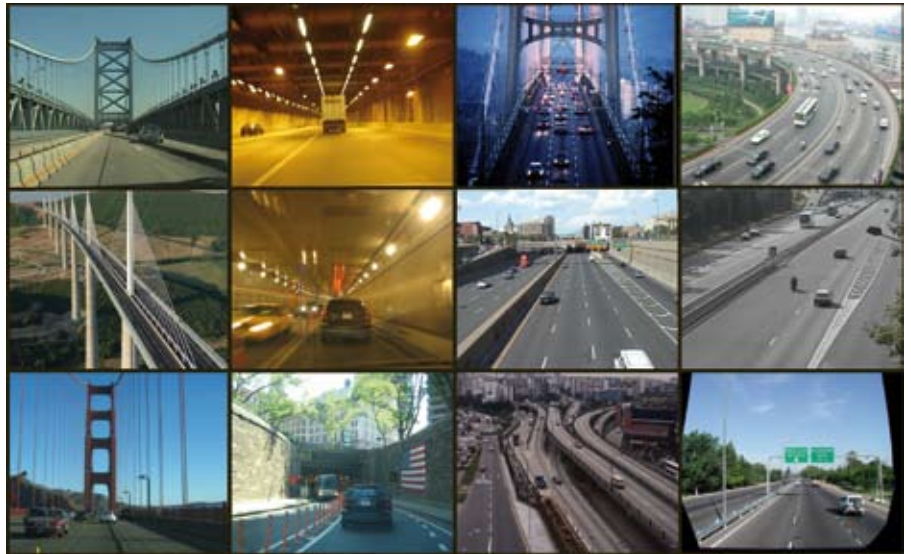
**ICCTV OR ADVANCED VIDEO**

An Advanced Video Surveillance system provides Traffic Operators with an alarm (audible and visual) immediately after an incident occurs (within seconds), even before the consequences of this incident can be noticed by traditional monitoring. Video signals from an existing CCTV system (analog or digital) are fed into a Video Detection Unit that runs a Detection Algorithm, which identifies stopped vehicles within the cameras' field of view.

Because it requires no setup or calibration, an Advanced Video Surveillance system fits perfectly into any CCTV system without the need for additional or new cameras. It also does not require the use of preset positions on PTZ cameras: cameras can be moved at will and within seconds the software automatically recalibrates and the Advanced Video Surveillance is fully functional. The system works in the background on all pictures of the network, 24/7 and Traffic Operators can concentrate on other tasks than pure surveillance of screens. The concept is simple but very efficient. Because it is easily installed and requires no setup, Advanced Video Surveillance is quickly becoming the standard for a large number of applications in the world of Intelligent Transportation Systems.

**FIGHTING CONGESTION**

It is widely recognized that unpredictable events such as stalled vehicles account for half of the congestion on highways. Non-recurring events dramatically reduce available capacity and reliability of the entire transportation system. While a number of those incidents cannot be avoided, quickly report-



ing and addressing an incident will decrease the duration of incidents, thereby reducing their impact on driver delay.

A study by the Oregon Department of Transportation shows that quick response can reduce incident duration by 15 to 30 percent and the average delay by 36 to 66 percent. An Advanced Video Surveillance system identifies a stopped vehicle within 20 seconds and is an extremely valuable tool to fight non-recurring congestion.

An Advanced Video Surveillance system enables users to be warned in time to reduce the risk of multiple accidents by responding quickly to those incidents. Digital video clips automatically recorded by the system for each incident are valuable tools to investigate the nature and the cause of incident. Responding adequately to an incident can save lives when time is of the essence.

This is the reason why Advanced Video Surveillance systems have been widely deployed: over 300 bridges, tunnels and highways worldwide now rely on them to provide a high level of safety.

**HOMELAND SECURITY**

In the past, cameras were only on the roadways to monitor accidents, stalls and traffic congestion. They are also now used to identify 'who is doing what and where' or 'anyone being where they should not be'.

"Before 9/11, a breakdown was just a breakdown, but now we always wonder 'Is it?'" says a Traffic Control Center manager in the US. It is no wonder then that bridges and tunnels are an important focus for Homeland Security.

Deployment of Active Video Surveillance systems has allowed for the raising of the security level on sensitive infrastructures worldwide including the four Manhattan tunnels in the US, the Millau Bridge in France, the Vasco de Gama Bridge in Portugal, the Fuxing tunnel in China, over 50 tunnels in Spain and over 250 worldwide.

**RURAL ITS**

ITS technology is generally lightly deployed in non-urban areas. However wherever it is deployed it tends to be more targeted at critical safety needs. Video surveillance systems are placed at spot locations such as bridges or areas with high incident occurrence with their focus on alerting travelers to road hazards: accident, disabled vehicles and so on.

For rural applications, stand-alone capability is key. Systems may be deployed in the

**"Before 9/11, a breakdown was just a breakdown, but now we always wonder 'Is it?'"**



field at great distances from a Traffic Operation Center and often with limited bandwidth for communications. In that case an Active Video Surveillance is able to establish connection with the TMC only in case of incident and transmit data ranging from a simple audible alarm, to a snapshot of the incident and even live video streaming.

**INTELLIGENT WORK ZONE**

The City of Calgary is deploying an Intelligent Work Zone system on the construction of the Glennmore Trail Corridor: two new interchanges and widening of the existing roadway. A study by the FHWA in the US shows that work zones create 24 percent of non recurring congestion, 1,182 fatalities and 40,000 injuries (2002). This is the reason why monitoring work zones is paramount both for Traffic Safety and for congestion

relief. The Intelligent Work Zone system provides real-time traffic monitoring. The system detects incidents and congestion and sends the alarms to the Calgary Traffic Management Center. The information is provided to road users through VMS along the work zone.

This system is integrated in the actual Advanced Video Surveillance system using Calgary's existing PTZ cameras to report stopped vehicles.

**INTELLIGENT HARD SHOULDER**

The junction between A3 and A86 highways around Paris, France, merges a two-lane and a four-lane highway onto a four-lane wide and 700m-long viaduct. The junction is a heavily congested area. The road capacity of the viaduct was increased by turning the hard shoulders into traffic lanes. In order to keep a

high level of safety for road users on a section deprived of a hard shoulder, an Advanced Video Surveillance system was deployed to identify any stopped vehicle.

A traffic operator can deploy retractable-barriers dynamically and physically recreating a hard shoulder. After two years of operation, the increase in road capacity on the A3/A86 junction has made the case for a much larger deployment of the concept on the A4/A86 junction, east of Paris. The project is an archetype of the benefits of ITS solutions for upgrading safety and providing congestion relief at a cost/benefit ratio better than a conventional solution.

**PROACTIVE VIDEO SURVEILLANCE**

Advanced Video Surveillance can turn a CCTV system from a passive monitoring system to a proactive incident detection system. All the above applications show that Advanced Video Surveillance can greatly contribute to improve Safety, Security and Mobility on our roads.

Intelligent CCTV is meeting these objectives and proving itself to be a significant component in helping the ITS industry and Transportation Agencies worldwide. ■

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ACCIDENTS REPORTED BY ACTIVE VIDEO SURVEILLANCE