Pennsylvania enters the fast lane of highway monitoring

The very first turnpike in the USA, the Pennsylvania Turnpike, was created in the Keystone State in 1940. Since then, the 532-mile roadway has been upgraded, widened and lengthened many times to manage the 188 million vehicles that travel through Pennsylvania each year.

The Pennsylvania Turnpike Commission (PTC) has worked hard to make travel faster and safer for a growing constituency of travelers while helping neighboring towns and counties during potential disasters.

The impact of digital and Internet Protocol (IP) network technology has significantly altered the way traffic is managed. In fact, over the past few years, the Pennsylvania Turnpike has extended the implementation of ITS to better serve the traveling public. The PTC maintains a 24-hour-a-day, 365-day-a-year Traffic Operations Center located in the state's capital of Harrisburg.

Serving as the hub of all Turnpike communications, the Operations Center continuously monitors turnpike activities via the Commonwealth's PA-STARNet – an extensive, statewide IP network that is the foundation of the state's public safety radio system. Roadway conditions, construction status, and weather conditions are all monitored at the center, which also serves as the focal point for all turnpike incident management. Once the Center is notified of an incident, personnel immediately respond by dispatching the appropriate first responders and by issuing traveler alerts.

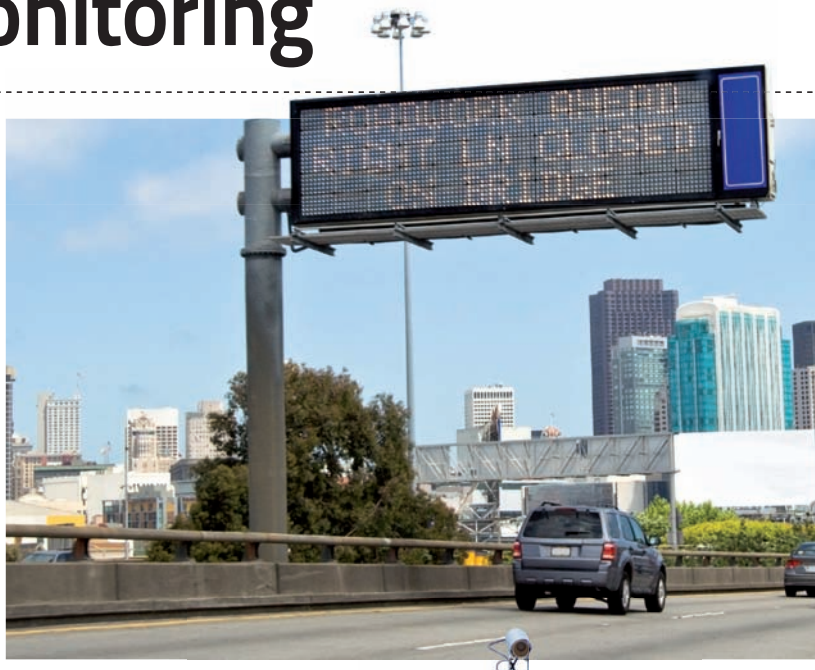
The Center relies on a variety of incident management communications tools such as fixed and mobile VMS and radio broadcasts about weather and other emergency situations that might affect the turnpike. This information is also available via touch-tone telephone, cellular phone and online.

To detect incidents, 225 dedicated state police officers are employed as well as a fleet of first-responder vehicles patroling the turnpike. Cell phone call-in numbers are also provided for motorists.

Need to know?

Providing seamless communications for improved efficiency and safety on the Pennsylvania Turnpike

- Cost-effectively extending private WAN capabilities to areas where installing fiber was deemed previously too difficult
- How VIDA Broadband will automatically reconfigure to provide optimum throughput for each ITS device on the network
- Offers scalability from a simple data backhaul implementation to a multi-application, wide-area deployment



(Above) **The PTC uses VMS to provide traveler infromation** (Right) **Cameras at intersections keep a close eye on traffic**

Finding solutions

One way to automate the real-time visual monitoring of the roadway is through remote, weather-resistant video cameras and related sensing devices that are connected to the existing LAN/WAN network to supply a continuous feed to the Operations Center. However, when setting up this technology on the turnpike, workers found that many necessary camera locations were far from accessible power lines.

Furthermore, LAN/WAN connectivity via landlines (either T1 or fiber-optic) was either non-existent or too expensive to consider. Additionally, although batteries would suffice for operating the cameras and wireless components, keeping them charged was a problem and solar panels alone were deemed insufficient for reliable power in the northeast climate.

As a result, the PTC worked with IdaTech, a manufacturer of backup fuel-cell systems, to develop a hybrid solar/fuel-cell solution that provides reliable remote power to charge the batteries in any weather. With this solution, the PTC has a reliable source of power that can run for about two or three months, depending on cloud cover and the need to augment the solar panels, on a single tank of fuel.

The PTC found a solution to the wireless transmission of the video and data in the Harris VIDA network system. Although a number of systems rely on WiFi or proprietary protocols, VIDA uses broadband for mission-critical use, which reduces the problems of interference and provides the guaranteed QoS (Quality of Service) that the PTC needs.

When assembled as a unit, the standalone remote wireless video system – known as a POP (Point Of Placement) stand – is compact and easily deployed. This technology automatically alerts those in the Operations

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Center when traffic slows to about 20mph. The real-time images allow workers to see what the problem is and ultimately will help the center in assessing the kind of response that may be needed. In addition, a short fiber-optic cable monitors an adjacent traffic alert sign that notifies travelers to tune in to the 1640 AM band on their radio for more information.

The capabilities of information sharing between an expanded ITS 4.9GHz network and future public safety broadband networks across municipalities, states and even regions is an intriguing possibility. As digital and IP technologies improve, the PTC will continue to a dapt them to ensure critical information is shared among the state and local first responders to ensure the safety of travelers and the public at large.

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As casualty rates fall in many European countries – in the UK, for example, the latest figures show a further 11% fall in car passengers killed or seriously injured – the impact of technology is becoming clear.

The new Euro NCAP protocols reflect this welcome trend and now reward innovation in addition to scoring against the familiar crash test ratings. The overall safety rating system introduced two years ago is composed of scores in four areas – adult protection, child protection, pedestrian protection and safety assist. The underlying tests are identical to those before 2009, apart from the addition of a test for whiplash neck injury protection in rear impacts. Scores also reflect the fitment of seatbelt reminders, speed limiters, and the standard fitment of electronic stability control.

As a way of encouraging manufacturers to showcase new innovative technologies, the Advanced Rewards are made for safety technologies that demonstrate a scientifically proven safety benefit for consumers and society. Euro NCAP aims to provide an incentive to OEMs to accelerate the standard fitment of important safety equipment across their model ranges and help the car buyer to make the right purchase decision.

We can expect further casualty reductions as increasingly more cars enter the market with these crash-avoidance technologies. Euro NCAP recognizes that the availability of these advanced safety systems can further improve a car's safety beyond the level rated crash tests.

The independent safety testing organization says that many of these technologies focus on avoiding the crash by informing, advising and alerting drivers about dangerous situations and by assisting them to avoid a crash. Some technologies optimally prepare the vehicle's safety systems just milliseconds before a crash in order to provide the best possible protection, while others save crucial minutes for emergency services to arrive at the accident scene, helping medical personnel to deliver the best support given the circumstances.

Advanced technologies define today's frontier in the development of safer cars. Unfortunately, most car buyers are unaware of the potential of these technologies or are confused about how exactly these might work. A recent survey conducted as part of the eSafety Challenge showed a surprising ignorance among consumers, with marked differences in awareness levels between systems and between countries. For instance, 68% of Spanish respondents are aware of the advanced emergency braking, while in France awareness was only 38%. In the case of the most significant life-saving technology, ESC, 89% of those interviewed in Germany were aware of the technology but in the UK it was only 41%.

The encouragement being offered by EuroNCAP for innovations such as the Mazda Rear Vehicle Monitoring System, which has won the latest Advanced Reward, is welcome. The system detects and warns the driver of an approaching vehicle and helps to avoid common lane change-related crashes involving two or more vehicles. But it is certain that such innovations will be with us soon in such numbers that we will thank the designers of these eSafety technologies for saving countless lives.

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>
> **Adrian Walsh, director, Roadsafe, UK**